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THE 9th EXPLORATORY WORKHOP "DEFENSE RESOURCES MANAGEMENT - TRENDS AND OPORTUNITIES"

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A MODERNIZATION APPROACH FOR THE ROMANIAN ARMED FORCES COMMUNICATION AND INFORMATION SYSTEM NETWORKING AND INFORMATION INFRASTRUCTURE

LTC Eng. Mihai Cătălin ALEXANDRESCU

INTRODUCTION

Nowadays, the communication and information systems (CIS) are becoming very complex and the businesses are dependent in a higher degree of their offered services. The old approach for developing such systems is no longer appropriate and needs to become more structured and agile.

Concepts like network enabled environment, architectural approach, service oriented architectures, and programme and information management are becoming more and more relevant. These concepts must be taken into account when building this kind of systems on their entire lifecycle and should be reflected through regulating policies and processes developed in building blocks, in a coherent manner. Governance and organizational structures should be in place to manage such systems and the offered services.

In order to create an up-to-date approach for the modernization of the Romanian Armed Forces Communication and Information System (SCIAR), we should learn from NATO's experience and adapt it to our needs. Also commercial best practices should be taken into account to develop SCIAR in an efficient and effective manner.

In the first part of the document, there are defined some NATO terms used in this paper.

The second part is a short description of the main NATO policies in support of the NATO Consultation, Command and Control (C3) system development presented in a structured manner.

The third part makes a short analysis of the existing policies and proposes a way ahead for an approach which should further guide the elaboration of the necessary policies, strategies, roadmaps and implementation plans for the designing and implementation of the

SCIAR Networking and Information Infrastructure Architecture to support a networked enabled environment.

In the last part there are drawn some conclusions and observations.

I. Definitions

The definitions described below are captured from the NATO ACT Tidepedia website.

Architecture:

- A formal description of a system, or a detailed plan of the system at component level, to guide its implementation.
- The structure of components, their inter-relationships, and the principles and guidelines governing their design and evolution over time.

Reference: TOGAF 9.1 Specification.

Architecture Framework:

- A conceptual structure used to develop, implement, and sustain an architecture.

Reference: TOGAF 9.1 Specification.

Enterprise:

- The highest level (typically) of description of an organization and typically covers all missions and functions. An enterprise will often span multiple organizations.

Reference: TOGAF 9.1 Specification.

Enterprise Architecture:

- the integrating element of all architectural products [1]

Capability:

- the ability to perform action(s) to achieve objective(s)/effect(s). It will most likely consist of a complex combination of Doctrine, Organisation, Training, Material, Leadership, Personnel, Facilities and Interoperability (DOTMLPFI).

Reference: An Introduction to the NATO Defence Planning Process, CAG Read-ahead by STRE, dated 20 September 2010, and TOGAF 9.

C3 capabilities:

- C3 capabilities are functionalities required to provide CIS services. They enable service provision, but are not a service in themselves (AAP 31). C3 capabilities also underpin and facilitate the required integration of Intelligence, Surveillance, Reconnaissance and Target Acquisition functions and their associated information exchange. Ultimately, the capabilities that enable C3

are important to allow for the right "Information Sharing" between NATO and the Nations (AC/281-D(2012)0002-REV 10, dated 08, June 2012).

Reference: The Consultation, Command and Control Board (C3B) Mandate, AC/322-D(2012)0016, 13 Jul 2012.

Metamodel:

- A model that describes how and with what the architecture will be described in a structured way.

Reference: TOGAF 9.1 Specification Taxonomy.

Taxonomy:

- A classification of things into an ordered system that indicate hierarchical relationships.

Reference: NATO ACT Tidepedia website.

II. NATO Policies

For a better understanding of the concept, I would like to present what are the main NATO Policies and documents related to development of NATO CIS in support of capabilities, as well as the intended way ahead in developing a NATO Enterprise Architecture.

Some of these documents should be updated by NATO in order to take into consideration the latest NATO Reforms which took place in the last 3-4 years (NATO Command Structure Reform, NATO Agencies Reform and NATO HQ Committees Reform).

II.1. NNEC Concept

Beginning with 2004, NATO started to improve its operational effectiveness by using networking of capabilities which uses new technologies and concepts. This effort is called NATO Network Enabled Capability (NNEC). The NNEC vision foresees that national capabilities will be linked in a federated information network which is operationally focused. The NATO and national efforts would be developed progressively by means of different sets of objectives.

In 2005, NATO C3 Agency developed NNEC Feasibility Study which establishes a Networking and Information Infrastructure (NII) as the technical support for NNEC.

Consequently, ACT developed the NNEC Strategic Framework in order to prepare the sequential development of the NNEC.

The NNEC concept is basing its principles on a federation of networks, services and processes. [2]

In figure 1 are shown the 6 capabilities areas of the NNEC of which the Communications, Information and Integration, Information Assurance and the Service Management Control capability areas constitute the NII.

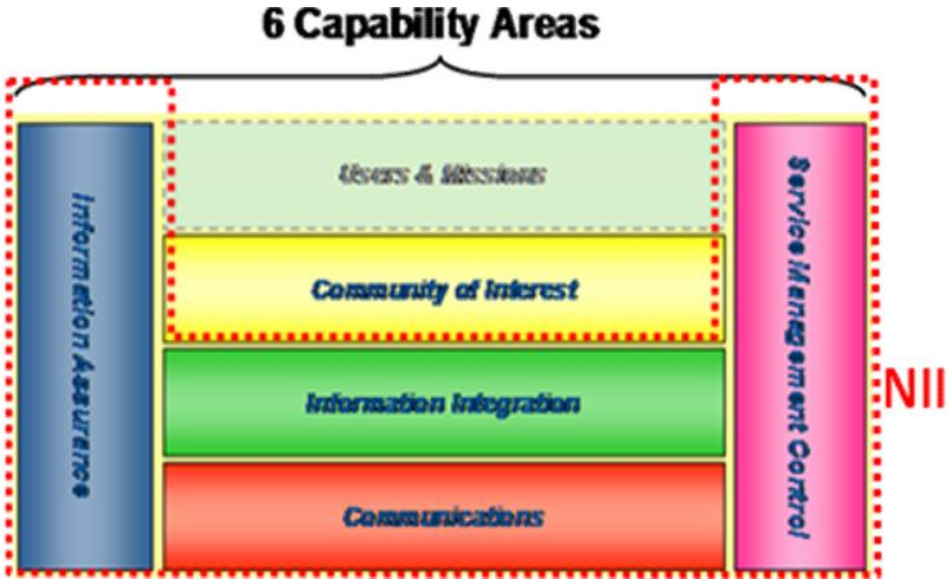

Figure 1 NNEC capability areas [2]

II.2. NATO Networked C3 Interoperability Policy (NIP)

The realisation of NNEC will enable the sharing of information and provide services in order to reach information superiority, increased situational awareness, improved operational planning and decision-making processes, as well as better connections between the commanders, sensors and effectors. [3]

The NIP defines the NATO Networked C3 (NNC3) interoperability as the capacity of information sharing among all civilian and military organisational levels supported by the NATO and **national** federation of NII elements to provide the necessary capability. "*This includes the political and the strategic, operational, and tactical levels of military commands; across all military components (e.g. land, maritime, air), functional areas (e.g. operations, intelligence, C3 and logistics), and between **national force elements**, including where appropriate, Partner Nations and coalition partners.*" [4] The NIP also defines roles and responsibilities, as well as the necessary measures to be taken in order to harmonize the transition to a networked-enabled environment by NATO and **nations**.

What is important in this policy is that in order to be able to operate in an NATO environment, also nations must apply this policy, not only NATO structures.

Three principles are defined in the NIP. These are:

- the necessity to use an **architectural approach** in accordance with the NATO Architecture Framework (NAF);
- the use of **interoperability solutions** defined in the NATO Interoperability Standards and Profiles (NISP);
- **experimentation, test and validation** of NNC3 solutions [4] (N.B. the interoperability testing part is defined in the NATO C3 Interoperability Testing Policy which was developed in 2012).

II.3. NATO C3 System Interoperability Directive (NID)

To support the NIP and help in implementing interoperable NATO common-funded C3 systems and capable to **interoperate with national systems** in a federated environment, it was elaborated the NID which defines the directives for the process application of NATO C3 systems interoperability and the mandatory use of, among others, the NAF and the NISP (which replaced NATO C3 Technical Architecture). [5]

I would like to insist here on the matters related to the NAF. The NID defines the mandatory types of architectures for the systems in NATO as well as the roles and responsibilities for the NATO structures. The architectures are defined for a specific timeframe and should be updated regularly.

There are 4 types of architectures defined as follows [5]:

- the Overarching Architecture (OA), which focuses on capability, is a top-down NATO C3 system desired configuration high level description that meets NATO's capability requirements for medium to long term (up to 15 years); it identifies, within the user, network and sensors domains, the systems and their associated components, their internal and external interconnections with other C3 systems;
- the Reference ("to be") Architectures (RA), which focus on services, processes and component functionalities, are system-specific and describe the overall structure or concept of a required system for a period equal with the planning cycle of the foreseen system capability (minimum 6 years);

- the Target Architectures (TA), which focus on the specification of systems and the systems components, products and services, are providing the design to obtain and integrate the future capability within the limits of the RA;
- the Baseline ("as is") Architecture (BA) describe the fielded systems and is aiding in the process of assessment of newer solutions for the future operational requirements; the TA will update the BA and could provide feedback to RA after implementation.

The NID should be updated (the document was elaborated in 2004) to reflect the modifications of the NIP (updated in 2009) in support of NNEC development.

In the figure 2 are presented the relationships between architecture types. The OA identifies a number of RAs that are further broke down is individual TAs that are easily managed and used for the acquisition of specific parts of the entire system.

The BA is dynamic in nature and is being modified each time a new TA is implemented.

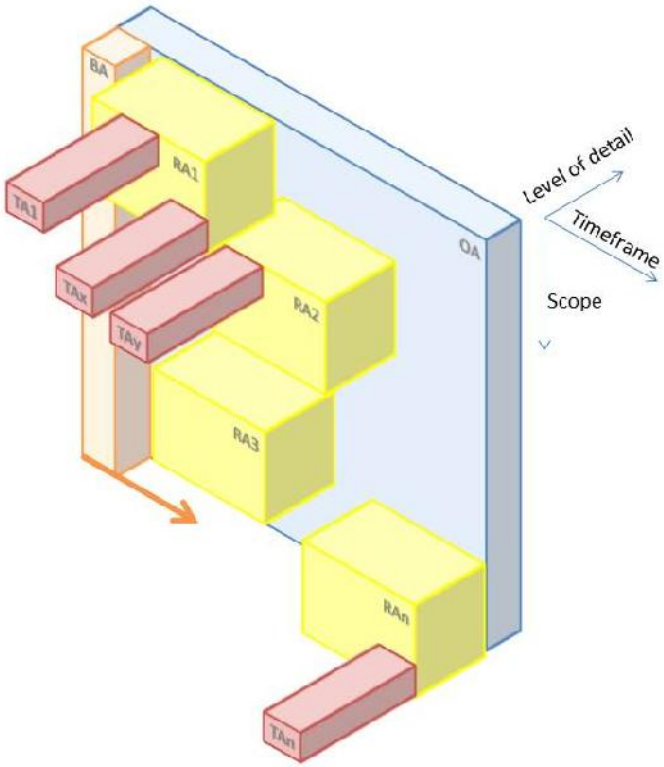

Figure 2 Relationships between architecture types [5]

II.4. NATO Architecture Framework (NAF)

NAF is providing regulations and directions for describing CIS [6] in order to ensure a common understanding for presenting, comparing and integrating CIS

architectures. NAF is derived from US Department of Defense Architecture Framework (DoDAF) and the UK Ministry of Defence Architecture Framework (MODAF). The latest version, NAF v.3, was developed in order to deal with aspects of NNEC and service oriented architectures (SOA). It also defines a NATO Architecture Metamodel (NMM) that describes how the views and sub-views are modelled and to facilitate the interoperability between the architecture development and analysis tools. In order to be used, compared and reused, the architectures will be stored in a centralized database called NATO Architecture Repository (NAR).

NAF is looking from different perspectives (called "views") to a CIS in order to determine all aspects of the CIS architecture (scope, tasks and activities, system functionality, provided services, technical rules, programme and capability management). Each (point of) view has a specific template and complexity, and serves for a particular purpose and audience. Depending on the audience level, purpose and/or the level of detail, the architectures can contain a certain number of sub-views.

The NID is defining the minimum number of sub-views to be developed for each type of architectures (OA, RA, TA and BA).

In the chapter 4 of the NAF there are presented the mappings of sub-views to Communities of Interests (CoI) and NNEC elements.

In figure 3 is presented an example of using architecture modelling for defining the views for an Enterprise Architecture.

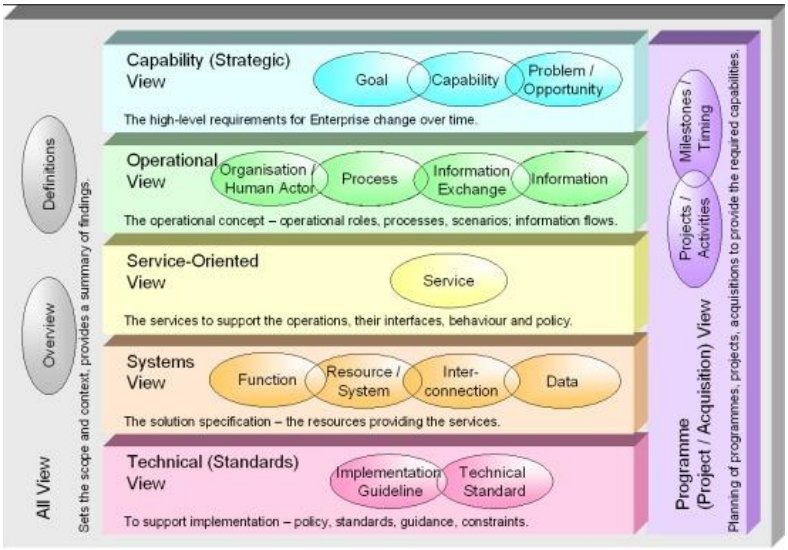

Figure 3 Example: European ATM Enterprise Architecture (EAEA) framework derived from NAF and MODAF -

http://www.eurocontrol.int/eec/public/standard_page/ETN_2009_1_ARCH2.html

In the last couple of years, the experts in the area of architecture framework development and management are working to upgrade and merge the UK's MODAF and the NATO's NAF v.3 in a NAF v.4 [7] and then to harmonise and unify NAF v.4 with the US's DoDAF and the Department of National Defence / Canadian Armed Forces Architecture Framework (DNDAF) in a such called Unified Architecture Framework (UAF) which is envisaged to be delivered in 2016. The purpose of this unification is to standardise the interpretation of the architecture views, the tools and training. [8]

II.5. NATO Interoperability Standards and Profiles (NISP)

The NISP was developed by taking into account the shortfalls in interoperability experienced by NATO and nations. "NISP provides the necessary standards and profiles to support C3 interoperability by assisting in the transition to the NNEC." [9]

NISP is supporting an architecture-based CIS programme development and evolution.

NISP is balances the COTS-based approach, Open System approach and Service Oriented approach.

In NISP there are listed the agreed interoperability standards which should support the NATO and national systems implemented, under procurement or specification, as well as the near-term standards and technologies to support NII. "Interoperability Profiles identify essential profile elements including Capability Requirements and other NAF architectural views, characteristic protocols, implementation options, technical standards, Service Interoperability Points, and the relationship with other profiles such as the system profile to which an application belongs." [9]

NISP is updated annually, the present version being number 7.

II.6. NATO C3 Classification Taxonomy

The document is capturing various communities' concepts and maps them for classification purpose in an integrated and harmonized manner. It presents the top level description of the C3 Classification Taxonomy (see figure 4) and the definitions for each component and sub-component. [10]

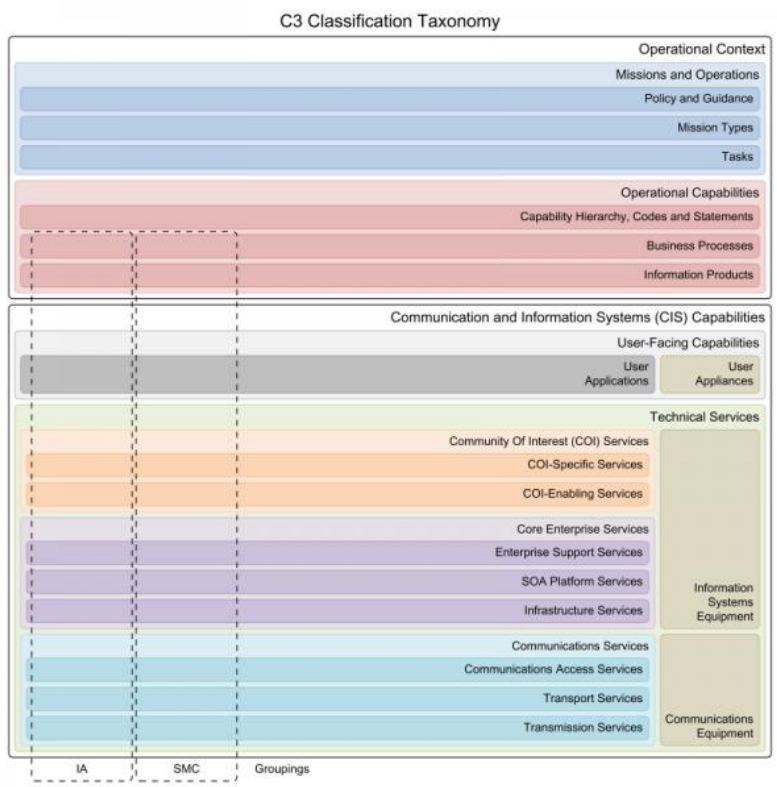

Figure 4 Top level C3 Classification Taxonomy [10]

In 2010, NATO developed the NATO OA v3.1. The Allies could not reach agreement on the OA and the document was replaced in 2012 with the C3 Classification Taxonomy level 1. [11]

II.7. NATO CIS Policy and Directive to Support Capability Management

Elaborated in 2009, these two documents provide the principles for the CIS components provision and use that supports NATO capabilities throughout their lifecycle. [12]

The Policy is mandatory for NATO organizations and recommended to national authorities which provide components that will be integrated into a NATO capability.

The Directive provides the roles of the management authorities for the provision of CIS in support of NATO capabilities. The management authorities are:

- the Operational Authority (OA);
- the Transformation Authority (TA);
- the Implementation Authority (IA);
- the Service Provision Authority (SPA).

II.8. NATO Enterprise Architecture Policy (NEA)

The architectures are used in the commercial world as primary tool for a successful governance of an enterprise. "*The C3 Taxonomy, which builds upon the work done under the NATO Defence Planning Process, is a first step towards the definition of a comprehensive EA for NATO*." [1]

Presently, in NATO there is in the development phase a NEA Policy which, in the draft form, states that will "*describe the roles and responsibilities* ***across the capability lifecycle*** *concerning the development and use of architectural products*". [13]

The policy defines the NATO Enterprise Architecture as a combination of 4 architectures, as follows: [13]

- a Business architecture that is defining the business strategy, governance, organisation and the main business process;
- an Information Architecture that is describing the logical and physical information assets of the organisation, as well as the information management resources;
- an Application Architecture which provides a design for the deployed services, their interactions, and their relationship with the main organization business processes;
- a Technology Architecture which describes the software and hardware infrastructure capabilities required to support the deployment of services.

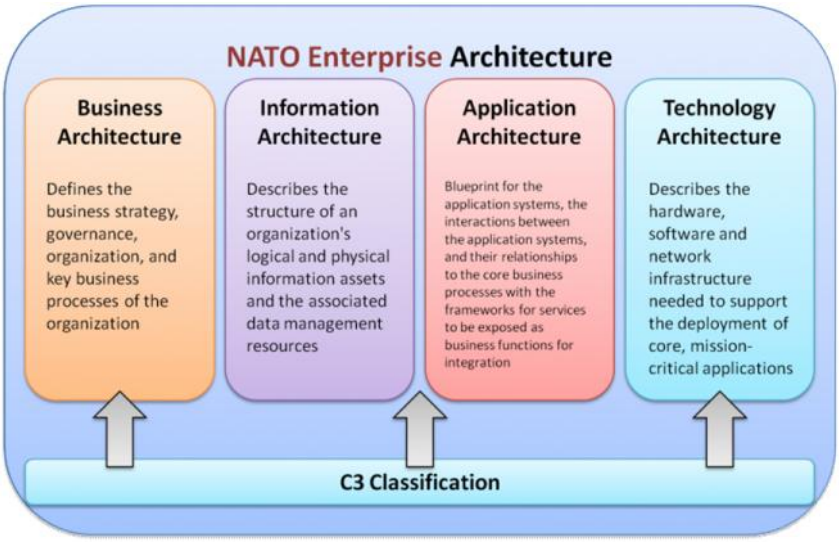

Figure 5 NATO Enterprise Architecture [13]

In figure 5 is described the NEA and the mapping with the C3 Classification Taxonomy.

Each aspect of these 4 architectures will be seen from 3 different perspectives: overarching (for the capability governance), logical (for the capability definition) and physical (for the capability delivery and sustainment). These perspectives, more or less, reflect the architecture types defined in the NID.

The Policy will define also the management entities that will be responsible for the NEA (some of them described in [12]: OA, TA, IA, SPA and other new defined entities).

III. SCIAR NII Development

III.1. Current status

My personal experience with architecture framework started in 2005 and I was involved in 4 cases where the NAF was used.

- The definition of an architecture for the modernization of the Permanent Telecommunication Network management system, part of the Romanian National Defence Network (RTP/RMNC). Due to the RTP/RMNC complexity, limited knowledge of the information exchange requirements for the business processes at the entire Romanian Armed Forces level and lack of training, we couldn't expand the development of the architecture for the entire RTP/RMNC.
- The second case was about the definition of a C4ISR system architecture for a Mechanized Brigade. The results of the second case were supposed to conduct to a gap analyses, the development of the technical specifications and the acquisition of the C4ISR system. Unfortunately, due to the lack of funds, the results were not fruitfully used.
- At the CIS technical exercise "CETATEA" we managed to define some of the operational, system and service-oriented sub-views necessary to conduct the exercise. The purpose was to familiarize the CIS experts with the methodology of constructing CIS architectures according to the NAF, but without a proper training.
- A training course on NAF took place in 2011 and was conducted by the European Defence Agency in Bucharest. This only whetted the appetite for using the architectural approach.

In support of a network enabled environment development, the CIS Directorate from the Romanian General Staff already accepted the C3 capability targets set in support of the NATO Defence Planning Process and also elaborated some policies, such as the

doctrine, concept and implementation plan for the SCIAR modernization, but still didn't regulate the architectural approach. The use of architectural approach in the CIS development process is not just a trend, but a need that demonstrated its benefits in other countries and organizations for almost 15 years. Concepts like Information Management and Chief Information Officer are still in embryonic development and implementation.

III.2. Way ahead

In order to develop an Enterprise Architecture at the Romanian Armed Forces level (from now on, I will refer to it as the "Enterprise") for the NII of SCIAR, I consider that the following top-down approach should be considered by the decision making authorities:

- Implement the Chief Information Office concept and enforce its authority (at DRESMARA already exist an annual course for training the future CIOs and the CIS Directorate prepared the doctrine to implement the Information Management and CIO principles).
- Create a vision on medium to longer term stating how the technology can improve the efficiency at Enterprise level (learn from other initiatives like NNEC, TACOMS, Future Mission Network etc.), taking into account also the information management, architectural approach and needed doctrinal changes.
- Conduct an awareness campaign to promote the vision, inform about the expectations and benefits in order to gain support from all levels of the Enterprise.
- Elaborate a policy that defines the measures to be taken and responsibilities for transitioning to a networked-enabled environment (having as model the NATO Networked C3 Interoperability Policy and the future NATO Enterprise Architecture Policy), which include the adopting of NAF (and, in the future, of UAF), NISP, NATO C3 Classification Taxonomy and creates the conditions for experimenting, testing and validation of interoperability solutions (learn from NATO C3 Interoperability Policy).
- Elaborate a directive that creates a clear and appropriate governance structure of the SCIAR NII, stating also the roles and responsibilities of different structures at the Enterprise level and processes that supports it (learn from other documents like NATO Networked C3 Interoperability Directive, NATO CIS

Policy and Directive to support capability development, the NATO Future Mission Network Concept [14] and the NATO C3 Board Mandate [15]).

- Coordinate the development of an Information Exchange Requirements at the Enterprise level in order to better understand the present environment and the future expectations (by regulating the adoption of NNEC Concept and mapping with the accepted capability targets from NATO Defence Planning Process).
- Develop an Information Enterprise Architecture of the Romanian Armed Forces (see also DoD IEA [16]).
- Develop an IT Modernization Strategy in close correlation with other modernization strategies and programmes at Enterprise level (see also NATO IT modernization concept of NCIA [17] and the US DoD CIO's 10-Point Plan for IT Modernization [18]) in order to create also an implementation plan for the vision.
- Develop a strategy and an implementation plan for building a new CIS organization that supports the achievement of goals set.
- Elaborate a strategy and a roadmap for developing high performing CIS specialists through education, training and exercises.
- Elaborate a strategy and a governance structure to deal with SCIAR NII risk management which should be part and integrated in the overall Enterprise risk management.
- Develop tools for measuring the key performance indicators to measure SCIAR NII's behaviour and development, in order to be able to communicate the results or the consequences of achieving or not the nominal parameters.

CONCLUSIONS

The technological changes in the last two decades and the increasing IP networking led to an exponential evolution and usage of Information and Communications Technology (ICT) which made our lives dependent of those changes and which transformed also the way military operations are or will be conducted. To reach the information superiority, all the dimensions of the NNEC Concept should be developed in parallel, not only the technological part. We should realize that information is an asset, a resource that needs to be managed accordingly, having in mind a proper balance between the "need to know" and "duty to share" principles. The people dimension should be

developed not only through education and training, but also by adapting the organizational behaviours through policies, concepts and doctrines, as well as Tactics, Techniques and Procedures (TTP), which will lead also, in time, eventually, to a cultural change. All of these in order to be ready and able to work in a networked enabled environment.

The limited financial, research and development (R&D), and human resources, encountered in the last period, limits the capacity of developing, from scratch, new policies, strategies and frameworks. That's why, the Romanian Armed Forces should take advantage of the knowledge that NATO invested in and accumulated over the years, as well as from the experience of the commercial IT&C best practices to implement and manage CIS infrastructures and services (e.g. project and programme management, like PMBOK and PRINCE2, service management, like ITIL, etc.) in order to build a Networking and Information Infrastructure capability able to be integrated in a NATO federated C3 environment.

The thoughts shared in this paper are by far not rigid, nor exhaustive, but can be used as a backbone for building further ideas in support of a modernization approach for SCIAR NII.

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SMART DEFENCE

LTC (AF) Cristian ANDRIEŞ

INTRODUCTION

"Gentlemen, we have run out of money. It's time to start thinking."
Ernest Rutherford

During the last period of time, as the world economic climate deteriorates, and a lot of governments impose drastic austerity measures to diminish budget deficits, there are growing concerns about European and transatlantic security. Generally, the defense budget has fallen and created large disagreements in the organization. Thus, while Europe has significantly reduced defense spending, the U.S. had to make significant efforts to maintain NATO's security objectives by increasing the U.S. contribution.

The old differences of opinion amongst the allies from North America and Europe worsened during the financial crisis. Increased expenditures in operations in Afghanistan and in Kosovo, plus the appearance of retaliation actions against pirates in the Horn of Africa area have led to reevaluation of budgetary efforts since 2008.

It was obviously that once the money is depleted, and operations are propagating acted in any way.

How military actions do not expect financial solutions due to prolonged negotiations between politicians, the U.S. defense budget passed to develop its own initiative. Thus, the gap between North America and Europe has increased significantly.

It was time for a new approach. In financial and strategic terms NATO HQ launched a new concept to adjust military expenditure under the motto "Smart Defense" on the " to do more with less" .

I. GENERAL CONTEXT

From 2008 the world economy has been facing its worst period since the end of the Second World War. Governments are applying budgetary limitations to deal with recession,

which is having a considerable effect on defense spending. If you exclude Britain, European nations have reduced their defense budgets. Since the end of the Cold War, European NATO members' defense expense has fallen by 20%. Austerity policies also caused falls in military spending in most of Europe in 2012. Since the 2008 global financial crisis, 18 of the 31 countries in the European Union or European NATO have cut military spending by more than 10 per cent in real terms. According to EU Commission estimates, this austerity may last for up to 2 decades, until 2030. In 2012 the USA's share of world military spending went below 40 % for the first time since the collapse of the Soviet Union. A declining trend that began in 2011 accelerated in 2012, with a drop in US military spending of 6 per cent in real terms from $711 billion.[1]. Almost half of NATO countries have allocated 1 % of GDP or less than that for defense and continue shrinking budgets. Romanian MoND budget is in this negative trend of budget cuts which have impact on procurement programs.

Worse yet, as demonstrated by the euro crisis and the most recent debate over London's role in the EU, diplomatic coherence in Europe has yet to make the step from idea to reality.

On the other way, emergent developing countries that have realized their economies expansion in latest years, spend more on their militaries The BRICs countries (Brazil, Russia, India and China) have three things in common. Each one is large equally regarding size and population; each has a emergent economy; and each is experiencing a military upgrading effort aimed at preserving their strategic interests.

While Europe's powerful nations are cutting defense expenditure and the U.S. defense budget is set to flat-line in the next years, these four countries are looking for to declare themselves on the global stage and are willing and able to invest in improving the capabilities of their armed forces.2

In 2012, European NATO members' defense spending was, in real terms, around 11% lower than in 2006. This reduction continues to shape military capabilities, and especially in the United Kingdom, France, Germany, Italy and Spain which account for almost 70% of European spending. According to IISS data, total military personnel in European NATO states have reduced from 2.51 million in 2000 to 1.86m for the same set of states now, a decline in excess of 25%. The intention was that reduced numbers, when combined with structural reforms, would produce an increase in the usability of armed forces. But in many European countries, this has not happened. The budget crisis exacerbates the trend.

[1] http://www.sipri.org/media/pressreleases/2013/milex_launch
[2] http://www.marthaferreira.com.br

Regardless of their strategic intent to maintain forces suited to present-day needs, defense ministries are playing 'catch-up', adjusting force structures to match immediate financial priorities.

While the major cuts have been in Central Europe, where considerable budget deficits have taken heavy tolls on weaker economies, general defense expenses (excluding Denmark) fell from €209 billion in 2006 to €194 billion in 2010. Also, military spending among European countries in 2009 was 1.74% of total GDP – well below the 2% requirement set by NATO, which was the amount spent in the year 2000.

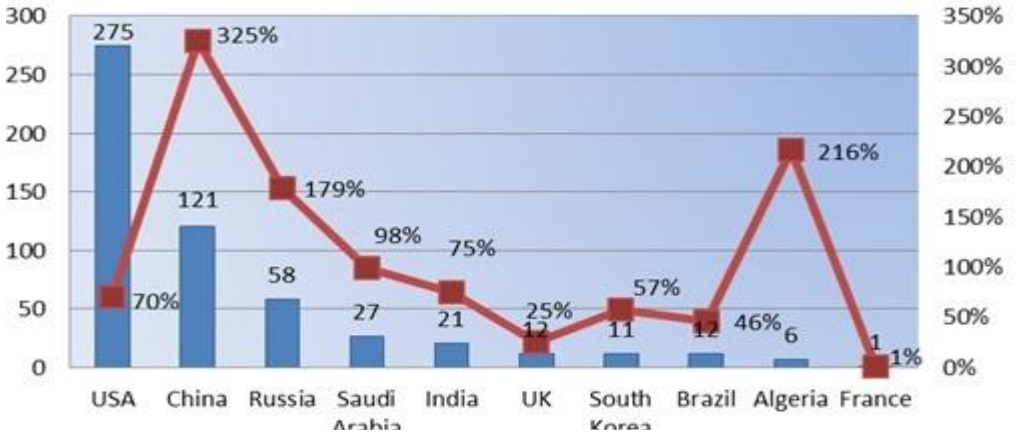
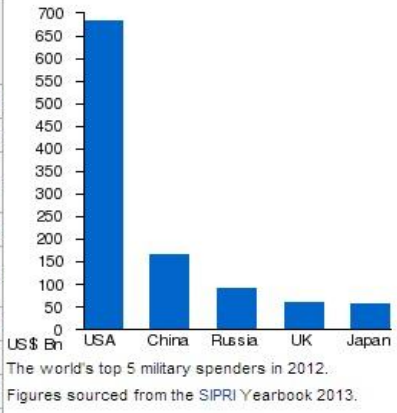


Fig 1 World military expenditure increase [3]

SIPRI Yearbook 2013 – World's top 15 military spenders

Rank	Country	Spending ($ Bn.)[3]	% of GDP	World share (%)	Spending ($ Bn. PPP)[3]
—	**World total**	**1,753**	**2.5**	**100**	1562.3
1	United States	682.0	4.4	39	682
2	People's Republic of China[x]	166.0	2.0	9.5	249
3	Russia[x]	90.7	4.4	5.2	116
4	United Kingdom	60.8	2.5	3.5	57.5
5	Japan	59.3	1.0	3.4	46.0
6	France	58.9	2.3	3.4	50.7
7	Saudi Arabia[y]	56.7	8.9	3.2	63.9
8	India	46.1	2.5	2.6	119
9	Germany[x]	45.8	1.4	2.6	42.8
10	Italy[x]	34.0	1.7	1.9	31.0
11	Brazil	33.1	1.5	1.9	34.4
12	South Korea	31.7	2.7	1.8	44.2
13	Australia	26.2	1.7	1.5	16.3
14	Canada[x]	22.5	1.3	1.3	18.3
15	Turkey[xz]	18.2	2.3	1.0	25.9



The world's top 5 military spenders in 2012.
Figures sourced from the SIPRI Yearbook 2013.

Fig 2. World's top 15 spenders[1]

Additionally, in the course of this crisis the Alliance's security condition has been changing, and has become more varied and random.

A major challenge in the sense of international cooperation is to find the resources to meet the critical needs of the alliance. Key phrase of this concept is to spend less and achieve more through extensive international cooperation multinational increasingly many NATO countries cannot afford high -level financial responsibilities allied with direct impact in maintaining and develop necessary capability.

2001: USA spend around 50% of NATO defense expenditure, in 2011, USA spend approximately 75%.Three fifths of the Alliance's defense spending is, as a result, now accounted for by the United States. While this plan has benefited Europe, how much longer will it be able to exploit the "free rider" pass it has played thus far? More significantly, will the U.S. be ready and capable to sustain this arrangement?

The Libyan Operation. NATO's Libya operation highlighted several of NATO's limitations in relation to allies equipment and military capabilities. In particular, both the controversial US decision to "lead from behind" and the European claims of having taken the military and political initiative need to be assessed in the light of the capabilities employed during the operations. It was the first European (mainly British and French)- led NATO campaign, but european allies were hardly independent of US military support throughout the Libyan campaign. US delivered 75% of ISR data, in addition to 75% of the refueling planes. It is vital for Europeans to obtain the capability to carry out future operations autonomously; however, with the defense cuts being implemented, this does not seem likely.

II. SMART DEFENSE

II.1 ORIGINS OF THE CONCEPT

The origin of the 'Smart Defense' concept is related with the preparation of the NATO Strategic Concept of Lisbon, November 2010. Secretary Rasmussen, sustained the idea for an important change in the Alliance vision. He further elaborated his view in his discourse at the European Policy Centre in Brussels, in 30 September 2011.

"I know that in an age of austerity, we cannot spend more. But neither should we spend less. So the answer is to spend better. And to get better value for money. To help nations to preserve capabilities and to deliver new ones. This means we must prioritize, we must specialize, and we must seek multinational solutions. Taken together, this is what I call Smart Defense."[3]

[3] Anders Fogh Rasmussen, speech at the European Policy Centre in Brussels, 30 September 2011.

The concepts of "Smart Defense" and "Less Defense" can be understood as follows: *"The concept of Smart Defense refers not simply to increasing expenditures for defense but to their prioritization. Smart Defense can work if it is implemented together. Smart Defense should not be an excuse to lower defense budgets. Our choice is between Smart Defense and Less Defense. We must search for multinational solutions to common problems. A common defense means Smart Defense. If you think that security is money, remember that it is cheaper than insecurity." As for the concept of Less Defense, its name is self-explanatory and, in this respect, the Pentagon warned against the possible consequences of reckless budgetary cuts. "Smart defense is not to spend more but to spend better"*[4]

Smart Defense is clearly nothing new. Concerns about shortfalls in NATO military capabilities have been spoken regularly over time by many political and military actors, frequently suggesting the development of "pooling and sharing" to remove the persistent gap within the Alliance between requirements and capabilities.

Presented at the 2011 Munich Security Conference by NATO Secretary General Rasmussen, Smart Defense wanted to be core of a new vision aimed at improving the development and sharing of military capabilities between NATO nations.

In translation, Smart Defense could be defined by three features:

- pooling and sharing military goods and accepted practices;
- identify a common set of security rules and priorities with overall acceptance and coherence;
- establish strategic concerted effort between NATO and EU.

At the May 2012 NATO summit in Chicago, heads of state and government made a political declaration in support of the Smart Defense Initiative, making clear that defense cooperation will be a key factor of European defense policy in the predictable future. It is clear that defense collaboration will be very important for NATO and European defense strategy in the predictable future. Having made a symbolic signal to advance with Smart Defense, leaders now face the implementation task, which requires simplicity of determination, a strong understanding of the new added value, models as to how Smart Defense can be organized and understanding of the political implications that will arise for decision NATO and EU-member capital cities. So, the choice was clear: to choose between Smart Defense and Less Defense, and decision was Smart Defense.

[4] NATO Deputy Secretary General for Defense Investment, Patrique Auroy

II.2 THE CONSTITUENTS OF SMART DEFENSE

Smart defense is based on capability critical for NATO, in special as established at the Lisbon summit in 2010. On the list were ballistic missile defense, ISR, maintenance and readiness, training and force training, effective engagement and force protection.
Smart Defense by the Chicago Summit has formulated this claim to give this challenge a pragmatic and multiple project-related response. This is based on the elements of collaboration, prioritization and specialization and thus trying to make defense policy in Europe to a new organizational basis.

Smart Defense represents for NATO an effort to hold together its transatlantic rationale, today seriously threatened by European defense budget cuts which could push the US to look elsewhere for reliable defense partners

Prioritization- aligning national capability priorities with those are requested by NATO. Smart Defense is the chance for a clear, cooperative and cost-effective method to meet essential capability requirements.

Specialization- with defense budgets decreasing, nations make individual choices to abandon some capabilities. When that occurs, the other nations fall under an increased requirement to keep those capabilities. Such specialization "by default" is the inevitable result of uncoordinated budget cuts. NATO should encourage specialization "by design" so that members concentrate on their national strengths and agree to coordinate planned defense budget cuts with the Allies, while maintaining national sovereignty for their final decision.

But, while economically seems to be attractive, specialization is at the same time the most complicated of the Smart Defence initiatives, seen both from a practical and a political perspective. Some would call it idealistically briliant, others practically unrealistic.By specialization the Allies could risk next consequences:

- *Significant reduction of their long-term strategic flexibility;*
- *Even greater transfer of their political freedom to act into the hands of other states;*
- *Inability to continue providing higly visible capabilies to NATO´s international missions;*
- *Suffering of their defence industries;*
- *Loss of their ability to join non-NATO operations, led for instance by the UN or the EU;*

- *Loss of their ability to prepare officers with proper qualifications to function in an operational environment in NATO´s various headquarters – thus leaving it to only the big member states to man the posts concerned in a qualified way* [5].

Cooperation- together, the nations should have access to capabilities which they could not have the funds for individually, and do economies. Cooperation could be in different forms, such as a small group of nations, or strategic sharing by partners.

Cooperation is like a silver bullet to secure military capabilities with stationary funds. At final, the value of cooperation from financial savings, increased military capabilities and also developed reciprocal understanding between partner nations. Benefits of cooperation must be established difficult. Anyone expecting to short-term and especially financial effects may be disappointed. Only the wide and long-term view shows the potential of surplus value.

Cooperation is not always easy, as with NATO's experience in Libya. Last year, it was not easy to build even a tentative consensus about the alliance's role in intervening there -- and if it weren't for U.S. equipment and logistics support, the intervention could have taken a dramatically different shape. [6]

Before national specialization, a relatively cheap, quick campaign like the Libya intervention was already straining NATO, which is also still fighting in Afghanistan. Within the alliance, not all member countries were enthusiastic about the bombing campaign. This poses a critical question for future NATO operations: once countries specialize so much that they depend on one another to carry out a military campaign, what happens to NATO's military effectiveness if its political leaders start disagreeing? [7]

On the other hand, serious conflicts could arise even between NATO members, for instance, the conflict between Turkey and Greece in Cyprus in 1974. Disagreements of Lithuania and Poland could also be referred to such conflicts: there is no mutual trust anymore between the countries, i.e. the trust of 2004 when Baltic States joined NATO. Ambitions of separate countries might also prevent from realizing a smart defense concept.[8]

[5] http://www.iiss.org/en/about-s-us/press-s-room, accessed on November 14, 2013
[6] McDonald/ Henius- Smart Defense-A critical appraisal, Rome, 2012 pp 46-47
[7] http://www.theguardian.com/world/2011/mar/22/us-nato-libya-operation-infighting, accessed on November 13, 2013
[8] http//derspiegel.de, accessed on November 11, 2013

II.3. PRINCIPLES OF SMART DEFENSE

Taken as a whole, Smart Defense stands out as nothing new: a nice-looking brand name for an old idea, which places importance on some principles:

- Openness by facilitating a dialogue among NATO members about the role of defense as part of a broad security framework and capabilities development.
- Access by creating opportunities, so that every nation can participate in the multinational projects;
- Efficiency - doing more with less by using the best ideas from different sources to create cheaper and faster solutions concerning security problems.
- Sustainability by optimizing the defense economy to protect and preserve liberty, without overwhelming citizens with unnecessary costs.
- Invest in Science and Technology and create greater coherence within multinational projects and closer links regarding the private sector;
- Ensuring greater security for less military spending by working together with more flexibility;
- Nations to pool and share capabilities, to set the right priorities, to achieve improved coordinated efforts;
- Reduce bureaucracy and slim down structures;
- NATO and EU intensification of practical cooperation.

II.3. THE MECHANISMS OF SMART DEFENCE

US changing international security architecture, in which the relationship between Europe and the US is somehow shifting in its balance, support the idea of Smart Defense. Indeed, as the global center of gravity has left the Atlantic and moved to the Pacific and Indian Oceans, the focal point of US attention has shifted further east, meaning that Europe must take increasing responsibility for potential security issues emerging in its own neighborhood. The Libyan campaign was probably the first time within NATO that the US had carried out its threat to leave the Europeans to take the lead for maintaining the security of their own region. This US approach - 'leading from behind' has left many Europeans nervous: how far will the US go in devaluating military responsibility"? [9]

[9] Thomas Valasek, "What Libya says about the future of the transatlantic Alliance", Centre for European
Reform, July 201, p112

The global centre of gravity has moved to the Pacific and Indian Oceans, the US attention has shifted further east, meaning that Europe must take increasing responsibility for potential security issues emerging in its own neighbourhood. US Secretary of State Hilary Clinton wrote in a recent Foreign Policy piece entitled "America's Pacific Century", the United States need to engage in a "strategic turn" to the Asia-Pacific region.[10]

How big is the risk of Europe losing its capacity to act in situations where the US might decide to play only a limited role in european area?

National support is essential, as regards the concept of smart defense and on the concrete multinational projects developed by ACT. NATO and the EU have the same challenge, that of improvement to a modern defense.

Being supple and pragmatic, away from being conventional and outdated, are the key elements of a smart defense. A new vision, a new mentality should be developed in a new area of cooperation. Some capabilities, non-affordable at national level, should be settled together. Smart defense may require short, mid and long term solutions. Three possible strategic approaches are presented below:

Short-term approach. According to this option, Smart Defence will amount to a small handful of measures, principally in the coming two or three years. Affordable and feasible, this approach will minimise political resistance, focusing on specific and limited targets.

Mid-term approach. A broader and larger set of Smart Defence measures will be developed in the coming five to eight years. This will manage the shortfalls in critical capabilities more effectively while not creating too much political stress among allies.

Long-term approach. Requires the pursuit of multinational cooperation and a deep political commitment. The risk in this approach is that it will prove too much for NATO's capacity to create political agreement among its members, overloading the political circuits in ways that will cause Smart Defence initiatives to fail.

The decisions needed to achieve successful implementation of Smart Defence are also political. What are the reasons for the national governments' reluctance to cooperate and their desire to preserve their sovereignty? It is hoped that this will facilitate discussion of their causes and of potential solutions,in order to inform a renewed approach to pooling and sharing and shape a pragmatic Smart Defence policy. Four main obstacles are identified:

[10] Hillary Clinton, "America's Pacific Century", *Foreign Policy*, November 2011, http://www.foreignpolicy.com/articles/2011/10/11/americas_pacific_century

• **Trust deficit.**

. Governments desire to maintain complete autonomy when it comes to military and security issues is a constant feature throughout history.

Smart Defence initiatives will raise *fears of entrapment*, *fears of abandonment* related to their pooling partners' possible refusal to take part in a given military mission. When the capabilities that partners decide to pool and share are responsible for national security and homeland defence, such fears are predictable.

The Libyan war clearly illustrated the unstable nature of military trust, with some NATO allies not only voting against the intervention but also withdrawing their military capabilities and personnel from common opperations. Germany's decision not to participate in the Libya operation should induce NATO to assess the issue of trust closely, tackling the questions concerned in a political perspective.

• **Level of Ambition (LoA).**

What really determines defence and security policies is the national Level of Ambition (LoA).

Three LoAs can be identified among NATO allies: the ambition to maintain *full-spectrum forces* and be a global, independent military actor; the ambition to enhance sustainable deployability of armed forces in distant theatres for a limited period of time and within multilateral stability operations; and the ambition to develop *niche capabilities* and work towards role specialisation.

• **NATO/EU partnership.**

NATO should take into consideration the importance on its dialogue with the European Union. Since 21 out of 28 NATO allies are also EU members, and declining defence budgets are concentrated in Europe, Smart Defence can not ignore the political role assumed by the The EU is intensely promoting its "pooling and sharing" policy and has recently welcomed its member states' commitments to specific concrete projects facilitated by the work of the European Defence Agency (EDA). There is thus a considerable risk of duplication of effort between the two organisations. ACT and
the EDA are managing important work together with the aim of ensuring that their respective inputs are complementary and avoid any wasteful overlap;

• **Role specialisation.**

Role specialisation remains different in its dynamics from other initiatives of this kind like burden sharing, pooling of assets, standardisation, or closer cooperation. While these forms of military cooperation requires a certain degree of change to national military

structure, role specialisation goes further. It means that NATO member states decide to specialise permanently in one or more military capabilities and that they will thus be the main, or in some cases the only, providers of such capabilities – a situation with implications for all members of the Alliance. Although Smart Defence programmes need not imply such a radical departure, with the political resistance this would engender, a certain degree of role specialisation seems intrinsic to them. The primary question is thus what degree of specialisation Smart Defence is likely to promote: a "flexible" approach or a more "rigid" one? Naturally, a specialised Alliance capabilities structure would require a high degree of cohesion to guarantee that a full spectrum of capabilities is always available regardless of the participation of willing nations in any future combined task force. Creating such cohesion therefore appears to be a major political challenge which NATO needs to address, and must ultimately be a crucial element in achieving an effective Smart Defense.[11]

III. MULTINATIONAL INNOVATIVE APPROACH – THE CORE OF THE SMART DEFENCE

There are different perceptions about Smart Defense. Some are very ambitious, some others are skeptical. Some say it might be important for NATO as a whole, some say it is relevant only to big NATO countries, and some say it might be effective for all allied countries, either they are big or small. Baltic countries, which based on their good will, developed practical aspects of a regional smart defense approach.

European countries, especially South East countries have and will have pressure to national budgets, where pressures to defense budget cannot be excluded. The main question for them is how to develop more capabilities with less financial resources? This question needs indeed smart answers.

The Alliance's role remains to set the strategic direction, to identify possible areas of cooperation, and to share best practices. The below examples describe how Smart Defense goals can be achieved:

• Strategic Airlift Capability (SAC)/ SALIS

Ten NATO nations Bulgaria, Estonia, Hungary, Lithuania, the Netherlands, Norway, Poland, Romania, Slovenia, and the United States of America, and Partnership for Peace countries Finland and Sweden. The SAC's initial participants also included the Czech

[11] McDonald/ Henius- Smart Defense-A critical appraisal, Rome, 2012

Republic, Denmark, Italy, and Latvia, which withdrew after Hungary, Finland, Norway and Sweden signed the Letter of Intent. On 23 September 2008 the Memorandum of Understanding came into effect. Confirming their participation in a Strategic Airlift Capability (SAC) initiative to acquire, manage, support and operate three Boeing C-17 strategic transport aircraft. A fleet of three Boeing-manufactured C-17 Globemaster III aircraft is thus jointly managed and operated. The operational organization of SAC is the Heavy Airlift Wing, a multi-national force based at Pápa Air Force Base in Hungary and commanded by a colonel of a member nation. The C-17 Strategic Airlift Capability can be allocated to NATO, UN or EU missions, or used for other international needs. Missions have been conducted in support of ISAF and KFOR operations, for humanitarian relief activities in Haiti and Pakistan, and for peacekeeping in Africa.[12]

The guaranteed availability of the aircraft was provided despite reservations sovereignty reached by four blocks:

- The EATC has operational control of the aircraft at all times and can arrange orders.
- The nations are free to decide how many and which aircraft they are subject to the EATC.
- Each partner country has a veto officer, who may reject applications for national reasons.
- Each nation can perform purely national operations when needed.

The Strategic Airlift Interim Solution (SALIS) is a similar agreement between 15 NATO participants (Canada, the Czech Republic, Denmark, France, Germany, Hungary, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and Turkey). The program leases a number of Antonov An-124 aircraft permanently for NATO missions which might occur.[13]

• **NATO Airborne Warning and Control System (NAEW&C).** The NATO Airborne Early Warning and Control Force is one of the few military assets that is actually owned and operated by NATO. It is the Alliance's largest collaborative project and is an example of what NATO member countries can achieve by pooling resources and working together in a truly multinational environment; Multi-nationality is the key characteristic of the NAEW&C Programme Management Organization (NAPMO). Currently, the 16 full member nations are: Belgium, the Czech Republic, Denmark, Germany, Greece, Hungary, Italy, Luxembourg, The Netherlands, Norway, Poland, Portugal, Romania, Spain, Turkey and the United States.

The United Kingdom exercises limited participation as a NAPMO member; but her fleet of E-3D aircraft is an integral part of the NAEW&C Force. France has an observer role and

[12] www.wikipedia.org, accessed on November 16, 2013
[13] Idem 11

maintains continual coordination to ensure her E-3F aircraft remain interoperable with the other E-3 fleets. France also often assists in coordinated operations with the NAEW&C Force.

• **Multinational Logistics Coordination Center (MLCC).** During a 2008 NATO summit in Riga, Latvia, senior military representatives endorsed development of multinational logistics initiatives. One of the major challenges facing logisticians is that multinational logistics are often uncoordinated and to address this, the Czech Republic socialized the idea of creating a multinational logistics coordination center.

On Oct.28, 2009, senior logisticians from Greece, Hungary, Slovakia, United States and the Czech Republic formalized their support to cooperate with the establishment of MLCC to enhance multinational logistics cooperation through the signing of a Letter of Intent.[14]

Officially opened in February 2010 in Prague to enhance multinational logistic cooperation, the Multinational Logistics Coordination Center MLCC provides real-time visibility of logistics events to other countries; reduces cost of coordination of events between countries through virtual environment capabilities; and provides a central repository of logistics events data readily available to all countries.

With the virtual tool and the physical facility both in place, nations can submit logistics requirements for education, training events and exercises in one central location

• **Allied Ground Surveillance (AGS).** The Allied Ground Surveillance project on drone technology is often presented as another example of Smart Defense. AGS will enable the Alliance to perform persistent surveillance over wide areas from high-altitude, long-endurance, unmanned air platforms operating at a considerable distance and using advanced radar sensor. Although its development has been indicated as a priority for the past two decades, reaffirmed in the 2010 NATO Strategic Concept as one of the Alliance's most pressing capability needs, AGS is still currently at an impasse due to disagreements over funding. Bulgaria, the Czech Republic, Estonia, Germany, Italy, Latvia, Lithuania, Luxembourg, Norway, Romania, Slovakia, Slovenia and the United States will participate in the procurement of unmanned drones and other equipment only if all other allies are ready to meet the operating costs once it is running. France, which is developing its own drone technology, is opposed to it; even so, the AGS system is expected to become fully operational in 2017.

[14] http://www.eucom.mil/article/20038/multinational-logistics-coordination-center-opens, accesed on November 16, 2013

• **The Franco-British Defense Agreement (The Lancaster House Treaties)** On November 2, 2010 in London, the French and British governments signed two cooperation treaties in security and defense for a 50-year period, advancing bilateral strategic rapprochement and serving, albeit with some doubts about the long-term sustainability of the agreements as a source of inspiration for other joint defense initiatives in Europe. The elements of this declaration are as follows:

- Defense and Security Cooperation Treaty.
- Nuclear Stockpile Stewardship
- Operational Matters
- Industry and Armaments
- Combined Joint Expeditionary Force
- Aircraft carriers

France and the United Kingdom have many motives to join forces more closely, indirectly benefitting both NATO and the EU. This agreement represents an supplementary opportunity through which to implement Smart Defense, encouraging countries to work on a bilateral basis on more practical and tangible developments.

Other clusters of countries can be identified: the Nordic-Baltic cluster, the Balkan cluster, or the *Visegrad Four* (Poland,Czech Republic, Slovakia, and Hungary), to name just a few. Of course, affinity in LoA will be more relevant when the pooled and shared capabilities are supposed to be deployed in the field, and less relevant when countries decide to pool training facilities or other kinds of administrative support.

The Connected Forces initiative presents an opportunity to build on the lessons learned from recent operations to ensure that Allies retain the ability to work effectively together into the future.

Cyber defense - In June 2011, NATO adopted a new cyber defense policy and the associated Action Plan, which sets out a clear vision of how the Alliance plans to bolster its cyber defense efforts. This policy reiterates that the priority is the protection of the NATO network but that any collective defense response is subject to a decision by the North Atlantic Council, NATO's principal political decision-making body.

CONCLUSIONS

At present, all Allies have to cope with the serious effects of the economic crisis. The potential long-term negative effects if defense cuts are too large and disproportionate.

The new NATO Strategic concept is an action plan: more effective, more engaged and more efficient. NATO should promote awareness of the benefits of Smart Defence by distributing examples of best practices to its members; it should remove technical obstacles by working closely with other international partners, in particular the EU; and it should remain realistic about the political resistance Smart Defence will be likely to encounter.

The history of European integration shows that every major project was always the sum of smaller initiatives. It would not be the first time that Europe , driven from an economic and functional necessity overcomes national reservations and ultimately grow closer together politically. But this concept is behind a question: How long U.S. will pay for the security of hitchhikers? Europe, the giant with feet of clay will have to take care of his own safety.

Smart Defense must be flexible and adaptable in order to be successful. It is not a one-size-fits-all initiative and must offer a variety of projects that promote efficiency and cost-savings. They could be implemented either partially, or together for greater cumulative effect, but all aim to generate a positive dynamic for Smart Defense.

Smart Defence it is essentially a political matter with fundamental sovereignty implications for all NATO members. Application of 'smart defense' concept requires first of all a strong political will at national and regional level. It will require new legal arrangements from all regional countries, either members or aspiring NATO and EU membership. Governments do not feel ready to give up their sovereignty on security and defence issues, many governments would rather have autonomous and useless militaries than integrated and capable ones. Actually there are not many alternatives regarding this issue. This perspective was best summarized in those words :"pool it or lose it"[15].

With these measures, Smart Defense would take a greater step towards turning NATO into a more efficient alliance.

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CRITICAL INFRASTRUCTURE

CDR. (N) Costea BELA

INTRODUCTION

The word infrastructure has been used since 1927 to make reference to total number of the roads, harbors, bridges, rail lines, and other similar public system works that are required for an economy, or a part of it, to function. The term was also used to describe the military installations necessary for defense the country. Later, people use the term infrastructure, to define any substructure or basic system. In corporations terminology emerged words like "financial infrastructure", and political organizations use "infrastructure of groups." The latter sense was used by the military intelligence officers during the Vietnam War, to describe the shadowy organizations of the enemy. We may hear today that terrorist organizations are composed of infrastructure of people.

OVERVIEW ON CRITICAL INFRASTRUCTURES

In the first meaning of the word, infrastructures represent the backbones of a system. They are functional and relational, making the system unique and in the same time representing the support for the system to recognize itself, to interact with other systems, to get stabilized and thus to function properly.

According to their position, role and importance in the well-functioning of the system, as well as to security and safety conferred to the system and processes, the infrastructures can be divided in three main categories:

- Ordinary infrastructure;
- Special infrastructure
- Critical infrastructure.

The ordinary infrastructures are represented by the structure that ensures a frame for functioning of the system. These infrastructures don't have special qualities and the system could maintain its ability to function properly in the absence on them. A country, for instance, always have roads, railways, power plants, cities, etc. A simple road between two villages can be an ordinary infrastructure, but, if along of this road, for example,

nuclear plant is constructed, the road can became part of a special or even critical infrastructure.

The special infrastructure has a distinct role in the system functioning, providing performance, productivity, security, comfort etc. to the system. Regularly, performance infrastructure is part of special infrastructures. In absence of them the system is continuing to function but not at full capacity. Those special infrastructures, which through upgrading or extension can achieve an important role in security and stability of the system, can also develop in critical infrastructure.

The core infrastructures responsible for safety, security and stability of system or processes, in absence of which the system became vulnerable, is not operable or is functioning at low state, are the critical infrastructure.

Taking in consider that ordinary and special infrastructures can develop in critical infrastructure, flexibility and unpredictability criterion must be used to identify and define such structures.

The main characteristic of the critical infrastructures, are:

- their conditions is unique in the system or process;
- their importance is vital in the support (material or virtual) of operation and performance of the system, or process;
- their role in stability, safety, functionality, security, reliability of the system is irreplaceable;
- they have an increased vulnerability to direct threats;
- they have an increased sensitivity to changes, especially to sudden change of the environment

Critical infrastructure encompass many economy sectors (including energy, utilities, food supply, health, banking and finance, transport and distribution, communications) as well as crucial government services. They are not established arbitrarily; they are identified and evaluated as being critical. Some essential parts in these sectors cannot be strictly named “infrastructure”; in fact, they are networks or supply chains used to transport goods or services. For example, the supply chain of food or water in urban area depends on some facilities, but also a network of producers, manufacturer, transporters, retailers, etc.

The critical infrastructures are important because, in fact, they are those capabilities, facilities and services which can affect, or even harm or destroy, human life

if they stop functioning, or function in a low state. The protection of these services and facilities is the key to keep life and lifestyle of peoples protected.

The continuous increase of the complexity of systems has led to an increased number of interdependencies among the different critical infrastructure. Without a security policy against to the new types of threats and without having a central management control, the global infrastructures are more dependent on technology systems used for distribute information, such as internet.

In the same time, in order to function properly, these infrastructures are interconnected, and more, they depend on each other. That's why, malfunction appeared at one element can conduct to malfunction of other critical elements causing widespread cascade effect. An example might be a failure in electrical utilities, when distribution of electricity is disrupted; sewage treatment plants, water network will also fail because of pumps, turbines or other electric devices used in these facilities will shut down.

The blackouts occurred during the last decade in North-America (in 2003, a manageable blackout occurred in Canada, cascaded into widespread distress on the electric grid that affected part of Canada and eight U.S. states), Europe (where, in 2006, a planned routine disconnection of a power line that crossing the Northwest Germany, cause a changes in load flows that extended in cascade causing two hours of energy blackout in Poland, Benelux, France, Portugal, Spain Morocco, Greece, Romania, Serbia) and South America (in 2009, a failure in transporting energy network of a dam from Brazil, affected 60 million inhabitants from Brazil and Paraguay) proved the vulnerability of energy infrastructure and subsequently, the need of the set of measures to prevent or to diminish the consequences derived from a cascade effect in critical infrastructure.

For these reasons, identifying, improving and securing critical infrastructure remain a concern for the managers of systems but also became interesting for those who plan to attack or destroy the system or processes. The terrorist attack of the 11th September 2001 on World Trade Center and Pentagon is considered the point from which infrastructures are considered or can became critical due to their expose to terrorist attack or other threats, mainly asymmetrical ones. Noticeable is also the hijack of Intelsat 12 satellite in March-April 2005 by the Liberation Tigers of Tamil Eelam (LTTE), a rebel group from Sri Lanka. They succeeded to operate a satellite broadcast channel with their National Television of Tamileelam (NTT), two hours per day, for more than 45 days.

Critical infrastructures are not critical only because they can be attacked. Their functioning can be affected or interrupted by a natural hazard or a human technical error.

As an example, hurricane Katrina caused loss of electricity, and three major pipelines (Colonial, Plantation and Capline) didn't receive crude oil, and couldn't distribute petroleum because the pump stations lose the electricity. 1.4 million barrels of oil was lost and southern and eastern states were not getting any refined oil. The pipelines got back to normal operation after seventeen days.

CRITICAL INFRASTRUCTURE – EUROPEAN APPROACH

To improve the critical infrastructure protection, in December 2006, the European Commission launched a series of measures, comprising proposal for a Directive regarding identification and description of European Critical Infrastructure and the necessity to improve their protection, communication of a European Programme for Critical Infrastructures Protection (EPCIP) and a communication on Protecting Europe's Energy and Transport Infrastructures.

Thus, the EU defines a critical infrastructure as "an asset, system or part thereof located in Member States which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact in a Member State as a result of the failure to maintain those functions".[16]

In this context, Franco Frattini state that: "*The security and economy of the European Union, as well as the welfare of our citizens depend on certain infrastructures and services which these offer. Discontinuity in their functioning can generate losses of lives, losses of goods and the loss of public confidence in EU organisms. The package of norms we are presenting today aims to assure the Community that any eventual dysfunction or unwanted intervention over the critical infrastructures will remain in an incipient form, situations with reduced frequency, controllable, geographically isolated and with minimal effect, locally as much as possible*."[17]

Taking in consider that amplitude and frequency of natural disaster are increasing and the terrorist actions developed rapidly, critical infrastructures requires an improved protection from threat and risks.

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[16] *Directive on the identification and designation of European Critical Infrastructure and the assessment of the need to improve their protection (2008/114/EC)*

[17] *Franco Frattini, Vice President of The European Commission, the Commissioner for Justice, Freedom and Security*

Consequently, the governments show their special concern for security regarding population and state authority, and made the first step: the vulnerabilities were evaluated and also the impact on society in case of an infrastructure dysfunction. In the analysis two axioms were accepted:

- It is impossible to protect 100% a critical infrastructure;
- Unique or universal solutions are not available for solving the problem.

At EU level, the EPCIP identified the following critical infrastructures sectors:

- installations which produce energy and their networks (e.g. oil and gas production, refineries, storage facilities, electrical power, transmission and distribution system);
- communications and information (e.g. broadcasting system, software, hardware, telecommunications);
- finance (e.g. banking, investment funds);
- health care (e.g. search and rescue, emergencies services, hospitals, health supply facilities, laboratories);
- food (e.g. food industry, distribution, retail);
- water (e.g. plants, treatment, storage, network);
- transport (e.g. ports, air ports, railway stations and corresponding networks, traffic control systems);
- administration (e.g. facilities, critical services, information networks, national sites and monuments);
- production, transport and storage of dangerous goods (nuclear, radiological, chemical, biological materials);
- space (e.g. communication, satellites);
- research facilities (e.g. laboratories, research and test centers)

The infrastructure above mentioned can be owned or operated by the public and/or private sector, and due the fact that in the most cases they are interconnected, a failure of one critical infrastructure can have a "*domino effect*" to other critical infrastructures, increasing the severity of consequences. This interdependence raises the vulnerability of the entire system that comprises all critical infrastructures. Hence, it is highly possible, that in parallel with the European process of integration, the number of critical infrastructures to rise. This is a very important conclusion for the analysis of the vulnerabilities and the threats of the critical infrastructure, and their continuous proliferation.

For the identification of critical infrastructure, the European Commission proposed three criteria:

- Size or magnitude. Critical infrastructure is evaluated depending on the area which would be affected: international, national, regional, local;
- Severity or seriousness. The effect can be high, moderate, minimal or null. To evaluate the severity some important criteria should be used:
    - Public incidence: number of population affected, evacuation, medical illness, serious injury, loss of life;
    - economic incidence: GDP effect, economic loss, degradation of goods or services;
    - incidence on the environment: impact on surrounding locations of urban areas;
    - interdependency: with other critical infrastructures
    - political incidence: loss confidence in govern and administration
- Time necessary for effects to occur: immediately, hours, days, weeks or longer period of time.

Anyway, psychological effect may escalate minor events.

Critical infrastructures must be identified by the government structures of every state. But the European states are not isolated, they are in extremely tight and complex relationship, the independence concept disappeared long time ago. Member State becomes more and more interdependent; this is the reason for which is not possible to identify, analyze, evaluate and protect critical infrastructures in an isolated or fragmented manner.

If a single Member State doesn't take the necessary measures to identify and analyze the vulnerabilities of critical infrastructure, doesn't ensure the necessary standards regarding protection and security the effect will affect, in one way or another, all the other states.

Therefore, in the increased interdependencies environment and in current proliferation of threats, the responsibilities for assessing, evaluating, protecting critical infrastructures becomes a vital aspect for a functional society. This is another important conclusion for critical infrastructure security.

In communication 574/10.Oct.2001, the Commission has declared: "*The reinforcement of certain security measures by the public authorities in the wake of attacks directed against society as a whole and not at the industry players must be borne by the*

State". Thus, the public sector has a fundamental role to play. Meantime, critical infrastructures were defined both at Member State level and European level.

The framework provided by EPCIP, enclosed some binding and non-binding measures: financial support to CIP projects (CIPS Programme), a sharing network for CIP information (Critical Infrastructure Warning Information Network – CIWIN), and, as key element, the Directive 2008/114/EC on the identification and description of European CI and introducing requirements regarding information exchange and elementary security measures. The Directive is focused on Energy and Transport sectors, and through periodically updates will include other vital sectors, like technology of information and communication.

The Directive defined different the Critical Infrastructures (CI) for each member state and the European Critical Infrastructures (ECI), as follows:

CI (for Member state): "an asset, system or part thereof located in Member States which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact in a Member State as a result of the failure to maintain those functions"[18];

ECI: "critical infrastructure located in Member States the disruption or destruction of which would have a significant impact on at least two Member States. The significance of the impact shall be assessed in terms of cross-cutting criteria. This includes effects resulting from cross-sector dependencies on other types of infrastructure"[19].

Thus, the Directive above mentioned, specify that the Member States and the operators or the owner of critical infrastructures are responsible for protecting ECI. The Directive also emphasizes the necessity to have "Operator Security Plans ('OSPs') or equivalent measures comprising an identification of important assets, a risk assessment and the identification, selection and prioritization of countermeasures and procedures"[20]. The Member States has the liberty to choose the most adequate way to implement OSPs.

Nevertheless, a number of problems remain:

- National policies of Member States are fragmented and shown varying degrees of maturity. The Directive was legally implemented by the Member States, but

[18] *Council Directive 2008/114/EC, article 2, par. (a)*
[19] *Council Directive 2008/114/EC, article 2, par. (b)*
[20] *Council Directive 2008/114/EC, Annex II*

instead of sector-approach issued by the Directive, the Member States analysis criticalities with "system" or "service" approach;

- The Directive encourage the bilateral agreements of Member States, and didn't create a European forum for decision-making, despite the fact that the Directive raised Critical Infrastructure Protection (CIP) awareness, and asked for European Cooperation;
- Risk evaluation and risk reporting are not assessed using a common methodology and that represent a serious gap. The implementation of a common methodology would require common databases for interdependencies, vulnerabilities, threats and impact of critical infrastructure crash and those databases doesn't exist even though Member State asked for EU support.

The European Program for Critical Infrastructure Protection has in its attention 33 vital sectors and services connected to them (presented an ANNEX A)

Because that a great part of a critical infrastructure (that represent national interest) are under private property, a public-private partnership is required to implement the security and control measures.

The European Commission document "The Prevention and Response to terrorist threats" (2004), establish the framework for "Public-Private Security Dialogue". This document also propose that both private and public sector must has a role in establishing and achieving measures regarding risk reduction, protection and security of critical infrastructures vital to each country.

The competences for coordinating planned measures belong to the national authorities. Also, measures for trans-border interdependence protection has to be taking it in consider. A coordinating role of EU in certain situations will be necessary.

CRITICAL INFRASTRUCTURES IN ROMANIA

In "National Development Plan 2007-2013" and in "National Strategy for Sustainable Development 2013-2020-2030" refers to *infrastructure* and its requirements for development on short and medium term as well as the necessity of protection of critical elements that compose *infrastructure*.

Romanian Critical Infrastructure can be approached from few essential perspectives:

- Romanian infrastructures are the descendent of a gigantic industrial infrastructure, inflexible and unable to adapt to market economy;

- economy and society are in different phases of transition;
- environmental safety policy, lack of ecological culture, massive forest exploitation, actions on the environment represent threats for critical infrastructure;
- participation of the Romanian Armed Forced to antiterrorist or peacekeeping operations, in crisis situations or conflict management missions generate a threats for all the Romanian citizens, for their living condition and also for Romanian critical infrastructures (from economic, social and informational point of view).

In Romania, notable steps have been made in promoting the concept at institutional level by Presidency, Parliament and Romanian Intelligence Service in the framework provided by the Ministry of Economy through the General Directorate for Energy Policy.

In the private sector a series of companies, like EURISC[21] foundation, Translelectrica SA[22], UTI Group[23], ARTS[24], ROSA[25], RASIROM[26] etc., had a key role in promoting critical infrastructure concept, organizing national and international conferences, workshops, round tables or participating in research projects. To notice only the last event, in Aug 29-30, 2013 ROSA with the IAA[27] organized in Mamaia, Romania, the "2nd IAA Conference on Space Systems as Critical Infrastructure".

The aim of all these meeting is to promote the implementation of European Program of Critical Infrastructure Protection in Romania.

Also Romanian experts from different public or private sectors (Ministry of Economy, EURISC, Transelectrica SA etc.) are part of European and Euro-Atlantic committees that promote critical infrastructure concept.

But all these steps weren't enough and Romanian actions and responsibilities concerning Critical Infrastructures, were summarized as being "mainly absent or inconsistent" in a study made for the European Commission regarding this matter (Booz & Co 2009). This study analyzes the status of Critical Infrastructure in each Member State following seven indicators:

- Organizational Model;
- Strategy & Policy;
- Public-Private Partnership & International Collaboration;

[21] *The European Institution for Risk, Security, and Communication Management*
[22] *Romanian Power Grid Company*
[23] *Company that provide security solution, http://uti.eu.com/*
[24] *The Romanian Association for Security Technique*
[25] *Romanian Space Agency*
[26] *Company that provide security solution under Romanian Intelligence Service authority*
[27] *International Academy of Astronautics*

- Methodology & Standards;
- Funding & Human Resources;
- Training & Exercises;
- Sector-Specific Key Players & Initiatives.

For the first two indicators the study states that "there is no specific organization dealing with CI protection", or "deal in an unstructured way" without any "specific strategy" for protection of Critical Infrastructures.

For the third indicator, was remarked the collaboration in the "development of the Mutual Support Integrated Operational System" to minimize the effects of natural or technological disaster and the effects of terrorist activities within Balkans area.

For the last four indicators Romania was scored with "not applicable" because information or data weren't available using Web based survey, Open Source Research and individual interviews.

After 2009 (when this study was released) due to the obligation imposed by the Directive 2008/114/EC, Romania have made improvements in implementing legislation and in identification and assessment of Critical Infrastructures. As such, the 18/11.03.2011 (EO 98 2010) approved Emergency Ordinance no 98 regarding critical infrastructure and its identification, designation and protection. Thus the legal framework was settled for identification of National and European Critical Infrastructures and the assessment of the requirements regarding their protection.

The EO 98/2010 specifies The National Critical Infrastructures (NCI) sectors and subsectors and the public authorities in charge with their management (ANNEX B). The same EO 98/2010 specifies ECI sectors and subsectors and the respective authorities at Romanian level (ANNEX C).

In EO 98/2010, Annex 2 is described the process for identification of NCI/ECI. The procedures consist in the application of the followed criteria (sectorial and inter-sectorial criteria):

- Victims criterion: depend on the expected number of deaths or injured;
- Economic criterion: depend on the economic loss or degradation of goods and services;
- Population criterion: depend on the impact on public trust, disturbance of daily life, loss of essential services

These criteria do not apply cumulative for the identification of NCI/ECI; either one criteria is met the infrastructure in cause could be selected as critical. So far, for 5 of the

10 sectors of NCI have been established sectorial criteria and critical thresholds as follows: Energy, Information and Communication Technology, Space and Research, Chemical and Nuclear Industry, Food.

Article 11 of EO 98/2010 state that the owner/operator of the NCI/ECI in 9 month from a designating an infrastructure as NCI/ECI has the obligation to develop the Operator Security Plan (OSP) with the approval of responsible authorities. Annex 3 of EO 98/2010 state the minimum requirements for the OSP:

- Identification of important elements;
- Elaboration of major scenarios which must include risk and threats on the vulnerable points and the potential impact;
- Establish priorities in countermeasures and procedures to be used, establish the difference between permanent measures, identify safety investments.

There are different types of risk and threats to CI in Romania:

- Intrinsic: as a result of the complexity of systems (known as accidental threats);
- Result of certain interest: issued on purpose, maliciously;
- Natural: affected by the environment;

Thus risks ad threats to CIs can be (Macuc & Predoiu 2008):

- *Cosmic, Climatic and Geophysical risks and threats*, consequences of meteorological and cosmic phenomena.
    - Climatic: hurricanes, snowfall, extreme cold or heat, floods, acid rain;
    - cosmic: meteorite falls, cosmic storms, cosmic radiation etc.;
    - Geophysical: earthquake, landslide, volcanic eruptions.
- *Risks and threats due to human activity* are the most numerous. Can be classified in:
    - Intrinsic to human activity (i.e. human error). These can be divided in:
        - System – generated by the system malfunctions (physical or moral degradation, collapse etc);
        - Physical and social processes – generated by actions to destroy (in areas like: economic, financial, IT, terrorism).
        - Dynamics – sudden change in functioning systems, actions of unpredictable factors
    - Unconventional confrontation means (malicious)
- *Risks and threats to Critical Infrastructure in cyberspace* usually affect network lines, vital centers, physical systems or equipment (computers, servers

etc.), databases and data storage facilities. As cyber elements support them, their interdependencies increase. Also they are vulnerable to all types of threats: natural, accidental, malicious

SPECIFIC LEGAL FRAMEWORK IN ROMANIA

Institutionalization of the concepts is underway, and the notion of critical infrastructure is present in different legal documents, as:

- The National Security Strategy – document adopted by the Supreme Council for National Defense;
- Government Decision nr. 2.288/9 December 2004 for the approval of the assessment of the main support functions offered by the ministries, other central governmental bodies and nongovernmental organizations on the prevention and management of emergency situations;
- Decision of the Minister of Economy and Commerce nr. 660/2004, on the approval of the Guidebook on identification of elements of critical infrastructure in economy;
- Decision of the Minister of Economy and Commerce nr. 791/2006 : on establishment of the « Working Group for the Protection of Electricity Critical Infrastructure»;
- Romania Strategy on Energy between 2007-2020, adopted in Mai 2007;
- The Law of National Security (Government Proposal), 2007;
- Government Decision No. 1489/09 September 2004 on establishing the National Committee for Emergency Situations;
- Government Ordinance No. 21/ 2004 on establishing The National System for Emergency Situations Management;
- Government Decision No. 1490/09 September 2004 on establishing the role and responsibilities for Emergency Situation General Inspectorate;
- Civil Protection Law No. 481 / 08November 2004;
- Government Ordinance no. 98 of 03/11/2010 on the identification, designation and protection of critical infrastructure – transposes Directive of the Council 2008/114 EC ;
- Government Decision no. 1110 of 03/11/2010 on tasks and the organization of the Interinstitutional Working Group for Critical Infrastructure Protection;

- Law No. 18 of 11/03/2011, on the identification, designation and protection of critical infrastructure;
- Government Decision no. 53 of 02/05/2011, regarding approval of the Interinstitutional Working Group team for Critical Infrastructure Protection, the Regulation of organization and functioning;
- Government Decision no. 718 of 13/07/2011 on the National Strategy for Critical Infrastructure Protection.
- Other Government and Ministerial Decisions, harmonized with EU legislation, designed to protect their subordinated Critical Infrastructures and key assets.

Management of different emergencies situations appeared at critical infrastructure level is made at ministries or departments level through different structures (permanent and temporary structures) and is regulated through special laws. Also strategies, special structures, allocations of financial resources and dedicated logistics for functioning, training, exercises, public information are supported with special laws.

Most of the actions in supporting critical infrastructures protection are carries out by IGSU[28] under MAI[29] authority. In this regard, Inter-ministerial Group – Protection of the Critical Infrastructure was formed, group that is coordinated by the IGSU. Now, this group is working to harmonize Romanian legislation with European Directives.

A Working Group was also created at Ministry of Economy level and that represent the basis for creating a general framework for discussions and decisions on the coherent Energy Security Strategy.

At the initiative of the Prime Minister was establish "The Consultative Experts Group on Energy Security", that developed valuable concepts regarding critical infrastructures protection sector which were included in "Romanian Energy Strategy 2007 – 2020".

At level of Ministry of Education, benefitting ROSA support, national competitions are organized in order to financing research project where a special part is dedicated to critical infrastructures protection.

The National decision flow diagram regarding critical infrastructures protection is presented in ANNEX D

CONCLUSIONS

[28] *General Inspectorate for Emergency Situations*
[29] *Ministry of Interior and Administration*

The protection of Critical Infrastructure has become vital in Member States of the European Union in last years. This is due to the increasing number of CI vulnerabilities, making them attractive to different threats. Romania makes no exception. The first step to be made in protecting National Critical Infrastructures is to identify them. Even though a couple of years ago in Romania does not exist a legally framework regulating this aspects, matters are changing and became necessary to adopt clear criteria for designation of ECI and NCI within the borders.

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ANNEX A

EPCIP vital sectors and services

Sector	Service or product
I. Energy	1. Production of oil and gas, refinery, treatment and deposit, including pipelines; 2. Production of electric energy; 3. Energy, gas and oil transport; 4. Energy, gas and oil distribution;
II. Information and communication, technology	5. Information and network systems; 6. Command, automation and instrumentation systems; 7. Mobile and land telecommunication services; 8. Navigation and radio communication services; 9. Satellite communication services; 10. Broadcasting services;
III. Water supply	11. Drinking water supply; 12. Water quality control; 13. Dam building and water quantity control;
IV. Food supply	14. Food supply, food safety, security and protection;
V. Health	15. Medical support and hospital services; 16. Drugs, serums, vaccines , and pharmaceutical products; 17. Bio laboratories and bio agents;
VI. Finance	18. Payment services / related structures; 19. Governmental financial systems;
VII. Defense, Public Order, National Security	20. Country defence, public order and national security; 21. Integrated management of borders;
VIII. Administration	22. Government; 23. Armed forces; 24. Administration and services; 25. Emergency services;
IX. Transport	26. Road Transport; 27. Railways; 28. Sea, river and ocean transport; 29. Air transport;
X. Chemical and nuclear energy	30. Production, processing and storing of chemical and nuclear substances; 31. Dangerous chemical substances pipes;
XI. Space	32. Air traffic 33. Outer Space[30]

[30] *Proposal made at ESRIF Workshop – September 2007 by Prof.Dr.Eng. Adrian Gheorghe, Dr. Liviu Muresan and Dr.Eng.astronaut Dumitru Prunariu*

ANNEX B

Sectors and subsectors of Romanian NCI and responsible authorities

No	Sector and Subsector of NCI	Responsible public authority
1	**Energy** Electrical energy, including nuclear Oil and derived products Natural gas and derived products Mineral resources	Ministry of Economy, Commerce and Business Environment
2	**Information and Communication Technology** Communication systems, networks and services Data processing and storage systems, including those of electronic public services Information security infrastructures Communication systems and networks for the state cipher Radio and TV emission infrastructures National postal services	Ministry of communications and Information Society; Ministry of National Defense; Ministry of Education, Research, Youth and Sport; Service for Special Telecommunications; Service of External Information; Romanian Information Service
3	**Water supply** Drinking water supply Water quality control Damming and quality control of water	Health Ministry; Ministry of the Environment and Forestry
4	**Food** Production and supply of food, ensuring food safety and security	Ministry of Agriculture and Rural Development; National Sanitary Veterinary and Food Safety Authority; Ministry of Economy, Commerce and Business Environment; Ministry of Education, Research, Youth and Sport
5	**Health** Medical and hospital assistance Medicine, serums, vaccines, pharmaceuticals Bio-laboratories and bio-agents Emergency medical services and sanitary transport.	Health Ministry Ministry of Education, Research, Youth and Sport
6	**National security** State defence, public order and national security Integrated system for state border security Defence industry	Ministry of National Defence; Ministry of Administration and Interior; Romanian Information Service; External Information Service Ministry of Economy, Commerce and Business Environment;

No	Sector and Subsector of NCI	Responsible public authority
		Special Telecommunication Service
7	**Administration** Services and administration Emergency services	Ministry of the Administration and Interior
8	**Transport** Road transport Railway transport Airways Shipping	Ministry of Transport and Infrastructure
9	**Chemical and nuclear industry** Production, processing, storage and use of chemical substances and nuclear and radioactive materials Pipelines for hazardous chemical substances/products	Ministry of Economy, Commerce and Business Environment; Ministry of Education, Research, Youth and Sport
10	Space and research cosmic space research	Ministry of Education, Research, Youth and Sport; Romanian Space Agency

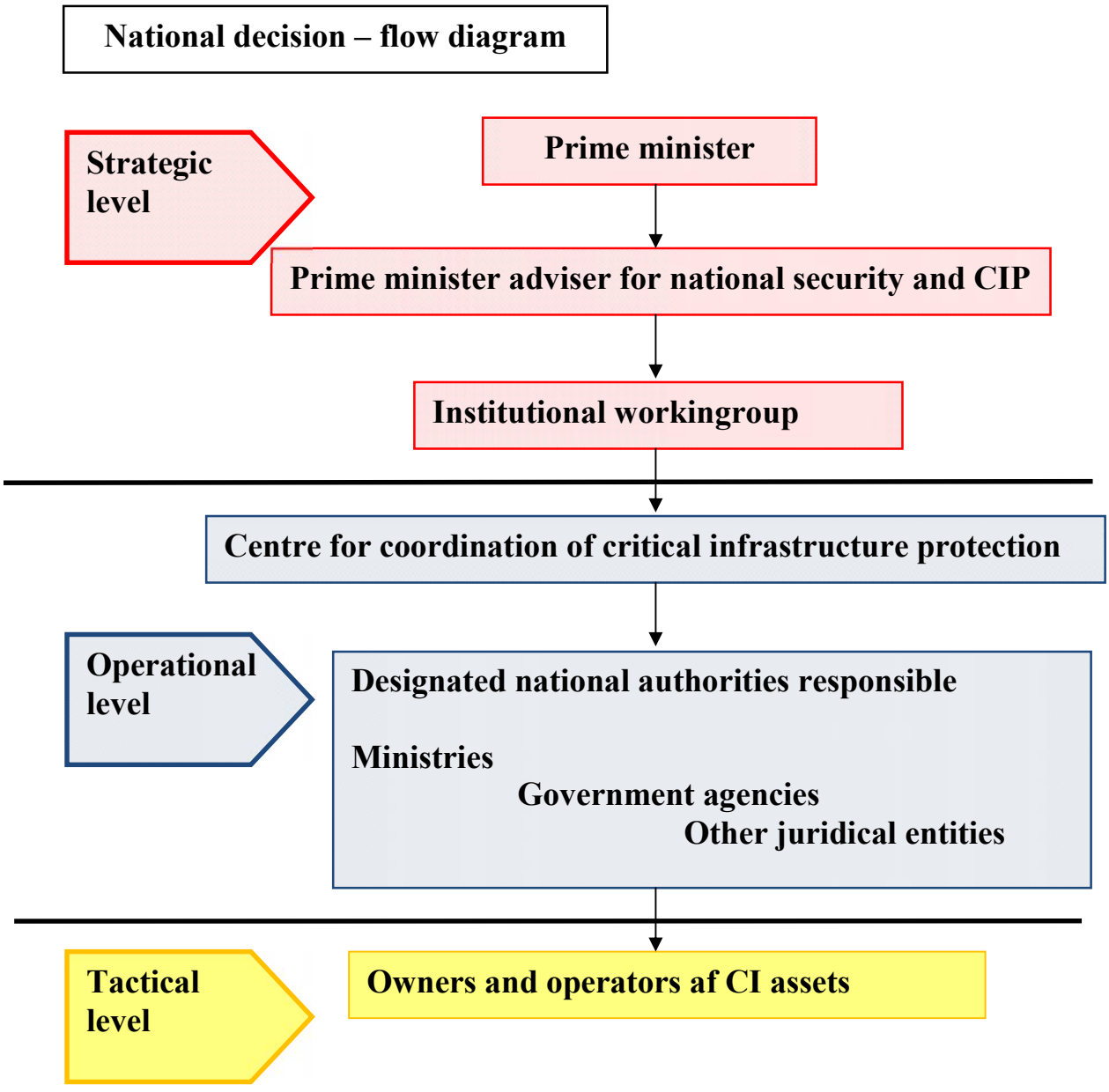
ANNEX C

Sectors and subsectors of ECI in Romanian and responsible authorities

No	Sector and Subsector of ECI	Responsible public authority
1	**Energy** Electrical Energy Oil Gas	Ministry of Economy, Commerce and Business Environment
2	**Transport** Road transport Rail transport Airways Transport on internal shipping routes Marine shipping on short distances and harbours	Ministry of Transport and Infrastructure

ANNEX D

CIP – Romanian perspective



DEFENSE RESOURCES ANALYSIS OF A HISTORICAL BATTLE. OMAHA BEACH

LTC. Constantin CIMPOIAŞU

INTRODUCTION

The battle for Omaha beach was part of a great operation between the Allies and Germans, named "Overlord". On the Omaha beach the US forces confronted the German forces in a desperate fight, in order to cut a route through France to Germany. The opposing forces fought this battle on 6 June 1944. The operation to conquer Omaha beach began around 0300, with preliminary actions by American forces and ended at nightfall on 6 June around 1800.

The battle took place on one of Normandy's beaches in France, named Omaha.

Figure 1. Normandy

Figure 2. Landing areas

In fact, in terms of Operational Doctrine, the battle was a confrontation between a bold offensive doctrine and a flexible defensive doctrine. Beyond the new technologies, techniques, and the chaotic moments of the battle, the American **TEMPO** of the offensive operations contributed to victory. The battle was a lesson learned for the later US Army Manuals for Operations: "Attacks succeed only if they achieve their objective before the enemy recovers his balance, identifies the threat, and masses combat power against it.

Attackers must keep the enemy off balance as long as possible and maintain the momentum of the attack. Successful attacks maintain a TEMPO and degree of lethality that the enemy cannot match."[31]

This paper tries to make an analysis of the condition which conducted to the outcome of the battle in terms of resources. I choose Omaha Beach battle as case study due to its peculiar to the Normandy invasion. My thesis outlines that a superior management of the defence resources allowed US forces to keep the TEMPO of the battle and consolidated the aftermath. In this respect, the defence resources analysis will start with a strategic settings overview that will highlight the suggestible factors of the battle.

I. STRATEGIC SETTING OVERVIEW. A PERST ANALYSIS

The Omaha beach was one of the five main objectives that Allies tried to seize on D-Day (6 June 1944). The entire scenario called "The Invasion" or "Overlord Operation" started to take shape in 1942 when the Allies planned to assault Europe. At the beginning, the main Allies parts, American and British, had different strategic viewpoints. In spite of significant controversies, US and their allies focused on defeating Germany. After debates they shared the same way to do this. It was the best way to conduct a direct attack on Germany by the shortest route, through northern France. The great dilemma was the target, Pas de Calais opposite Dover or Normandy? The Allies objective regarding Omaha beach was to breach the defensive elements, to seize the critical German key terain behind them and then to establish an area defense for follow-on operations. The Omaha beach was a good option due to its deep-water anchorage. Also, the terrain behind the beach was more suitable for motor transport than other areas. Allies had the plan to create an artificial harbor in order to support the follow on operations.

The PERST factors (political, economic, religious, social, and technological) represent the indicators of the strategic environment prior the Omaha Beach battle.

I.1. Political

The resolution to invade Nazi-held Europe was taken at high political level of the Alliance. After U.S. had entered the war Hitler wanted to build an "impregnable fortress"[32]. In December 1941 he had the idea to build a wall running from Kirkenes to the Pyrenees, against

[31] US Field Manual 3-0, Operations, chapter 7, paragraph 7-99
[32] The Longest Day, pg 24, Cornelius Ryan, Simon & Schuster, 1959

every potential attack. Hitler was obsessed about the fortress concept, and after the heroic Canadians landed at Dieppe in 1942, he ordered at his generals that "The Atlantic Wall" would have the first priority and should be completed immediately. Field Marshal Erwin Rommel, popularly known as the Desert Fox, was in charge to build this wall. In 1942 the Allies planned to attack the Hitler's wall in order to free Europe. There was a disagreement between Winston Churchill and Americans concerning the place where they could attack. Finally, in July 1943 "the American strategic viewpoint prevailed against the more experienced British staff"[33]. Omaha beach was chosen as one of the invasion's target.

I.2. Economic

The economic factor was decisive during 1944. This factor had a great influence over the running operations. The conversion of American economy from peace type to war type was in the Allies favour. American factories began to produce more guns, ammo, ships, tanks, plans, dress-uniforms and MEALs in more numbers than ever before. The United States even shipped abroad many factories in order to cover logistic strategic points of supply. For instance states such as Iran started producing assets for Air Forces. The US mass-production economy turned out into the main enemy for Germany. The German war machine started waning at the beginning of 1944. The weakness of the German war economy influenced in a bad way the measures which Germans had to take to reinforce the defence of Normandy beaches. For example the artillery battalions that had Omaha in range were provided with only one unit of fire. No resupply was available for a few days. There was also a lack of concrete in Europe and the Germans couldn't finish all the fortifications. Hitler ignored the fact that his economy was unable to face the multiple tasks of the war and "Who defends everything, defends nothing".[34]

I.3. Religious

The religious factor did not have a really strategic meaning but a tactical one. Providing religious assistance by the Allies, during preparation and during the invasion on Normandy's beaches had a psychological impact. Each battalion, even airborne battalions, had his own chaplain that contributed to the soldier's moral. In *The Longest Day*, Cornelius Ryan described the actions of some of the chaplains such as Captain John Gwinmett from the 9th Battalion and Captain Francis Sampson the 101st chaplain. In one of picture of the Ryan's

[33] D-Day 1944(1) pg.9, Steven J. Zaloga, Osprey Publishing
[34] D-Day 1944(1) pg.10, Steven J. Zaloga, Osprey Publishing

book we can see Father Edward Wathers conducting dockside service for 1st Division assault troops, before landing on Omaha beach.

I.4. Social

In Normandy, in June of 1944, most of the men in the German forces were from two types: one compound of untrained young soldiers which had just reached their units, many of them conscripts and another type of older conscript soldiers and officers assigned to Normandy, trained but unmotivated. The second category was unfit for other duties in the east due to various reasons.

I.5. Technological

Field Marshal Rommel was fascinated by mines as a defensive weapon. Beside of the other obstacle such as jagged triangle of steel, saw-toothed, gate-like structure of iron, metal tripped wooden stakes and concrete cons, he ordered mines laid-all varieties, about 5 millions on the cost. Rommel used every new technique.

He even had a miniature robot tank called "Goliaths." These devices, capable of carrying more than half a ton of explosives, could be guided by remote control to detonate among enemy troops or landing crafts.

Figure 3. The miniature robot "Goliath"

The Germans also had automatic flamethrowers. Webs of piping carrying Kerosene ran out from Kerosene tanks to the beach. As a result the enemy's troops would be burned by flame. Luftwaffe support for the beach defences was nonexistent. Germans also had a radar system but its position made it useless.

From the Allies side some unique technical solutions had impact over the events of the battle. Because the German artillery battery on Point-du-Hoc was located on a cliff top, the Ranger battalions that were assigned to eliminate it developed a solution for scaling the cliffs under fire, in a short time. The ladders were fitted inside the cargo hold of DUKW amphibious trucks and they developed a rocket-fired grapnel hook. Another new technique

was the amphibious tank. The Allies modified Sherman tanks to be able to swim ashore about 5000 yards from LCTs (Land Craft Transporter). But the water was too rough and most of Duplex Drive (DD) tanks sank immediately when their canvas screens collapsed. As a result 58 of its 96 tanks reached shore on Omaha beach and influenced the number of casualties of the first attack wave[35].

Most of these PERST factors are inputs for the defence resources analysis. The management of the defense resources can be analysed within the strategic envelope:

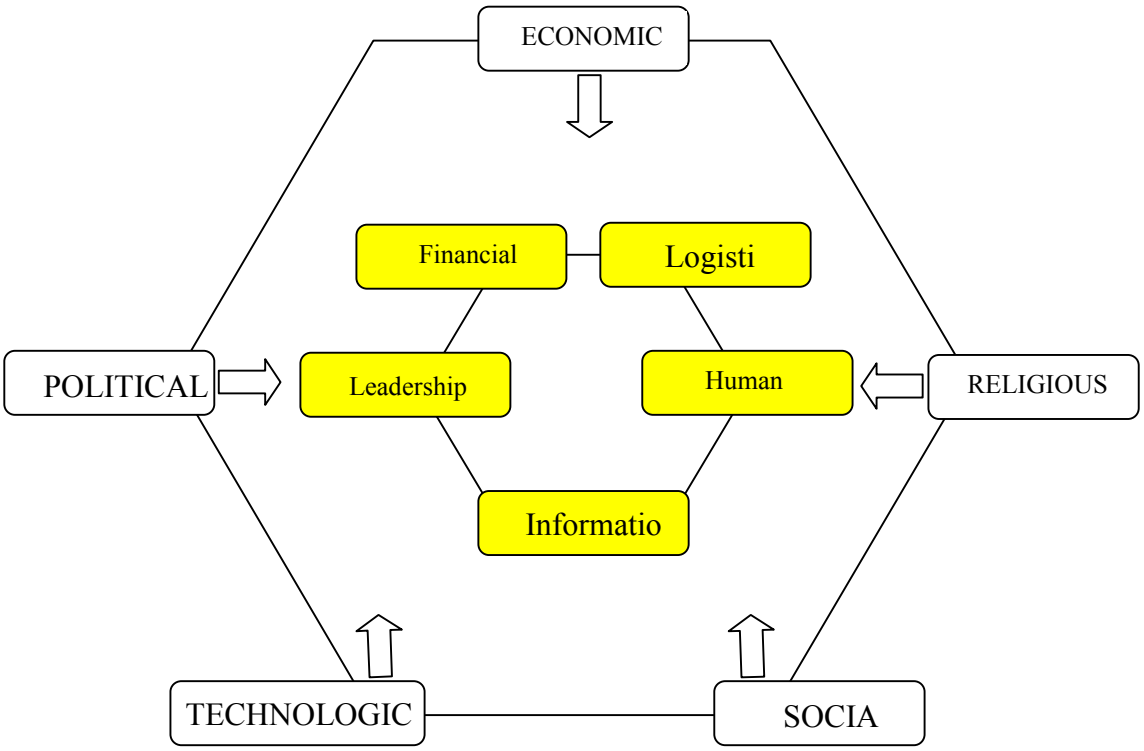


Figure 4. Strategic envelope

II. DEFENSE RESOURCES ANALISYS

Besides the operational analysis of this battle and of the entire operation „Overlord", the outcome is partially justified by the imbalance of the defence resourses between combatant forces. In this chapter I will try to bring into the light the battle behind the operational curtain. The leadeship and the differences brought about by organizational change are described as influence factors. The management of the main resourses, which the opposite forces counted on, can be a lesson learned for any military leader.

[35] The Longest Day, pg 29-30, Cornelius Ryan, Simon & Schuster, 1959

II.1. Military organizational change

When Hitler invaded Europe in 1939 the United States had only 190.000 soldiers including all services. There were only few divisions with limited deployable capabilities. By May 1944 the United States had almost 8 million men under the arms.[36] There was a tremendous organizational change of the US Army which affected the traditional military culture. At the beginning of the war "an assault against the German-occupied coast of France was inconceivable for US forces. Could the millions of civilians who had been hastily converted to soldiers stand against the elite SS, the Panzertruppen, the Fallschirmjager- who had overrun France in one month?"[37] The American high command had to deal with this issue and they succeed creating a new force. All three services Army, Navy and Air should be under a unique command, for planning, training and operation. For this purpose should be established one joint headquarters.

In the spring of 1944 when the US economy was at its maximum power the military organizational change was over and the eighty-nine divisions were ready to accomplish any desired mission. The US military culture changed in support of big offensive operations. The commitment of the soldiers to defeat the enemy was stronger than it was three years previously. This was a key element for success. So the casualties on the big scale during an invasion over Normandy were to be tolerated by the United States.

II.2. The Leaders of the battle

Generalleutnant Dietrich Kraiss (1889 – 1944) was an exceptional leader. He took command of the 352nd Infantry Division, located in Normandy in front of the Allied invasion. He was awarded during World War II with Gold German Cross and the Knight's Cross of the Iron Cross with Oak Leaves. All these medals were the result of his bravery on the east front and the military successful. In the Omaha Beach battle he did his best in accordance with the defence doctrine but the lack of resources to initiate an efficient counter-attack didn't change the outcome of the battle. He eventually died on August 6, 1944 of injuries sustained 2 days earlier.

General Norman Daniel "Dutch" Cota, Sr. (1893 – 1971) was the first general which landed on the Omaha Beach. He was involved in planning of this battle, and he was appointed as Assistant Division Commander of the 29th Infantry Division assigned to land at Omaha Beach. Even if in the planning phase he opposed daylight landing and had no success, during D-Day he did a great job. His outstanding leadership features and the commitment to

[36] Omaha Beach:D-Day, June 6, 1944, pg. 1, Joseph Balkoski, Stackpole Books,2004
[37] Omaha Beach:D-Day, June 6, 1944, pg. 2, Joseph Balkoski, Stackpole Books,2004

breach the German defensive positions made his command of the assault forces one of the key event of the Omaha Beach battle.

II.3. Human resources

In accordance with some historical researchers as Steven J. Zaloga, by the D-Day the opposite forces were as follows:

German forces:

- The 716th Infantry Division had garrisoned Omaha beach since 1942. It was spread out over all Normandy beaches and **was under-strength**.
- Two **under-strength** battalions from the 726th Grenadier Regiment were reinforced by two regiments of the 352 Infantry Division and a reinforced regiment as corps reserve, along the Omaha coastline. The fourth battalion of GR 726 was 439th Ost Battalion **under-strength**.
- 914th Grenadier Regiment was responsible for the Isiguy/Pointe-du-Hoc sector west of Omaha beach.
- 915th Grenadier Regiment and the division's 352 Fusilier Battalion were formed into Kampfgruppe Meyer **as corps reserve**.
- 916th Grenadier Regiment was also responsible for the Omaha beach.
- 1st and 2nd Battalions of 352 Artillery Regiment had Omaha beach in range. The artillery battalions were provided with **only one unit of fire**, meaning 225 rounds per 105 mm howitzer and 105 rounds for each 105 mm gun. **No re-supply** was available for a few days.
- A battery of heavy artillery rockets (Nebelwerfer) of the 84 Werfer-Regiment.
- Behind the 352nd Infantry Division was the 1st Flak-Sturm Regiment of the Luftwaffe 11th Flak Division, adding 36 of 88 mm guns to the defense in this sector.
- On the Pointe-du-Hoc, between Omaha and Utah beaches was the 2nd Battery of Army Costal Artillery Regiment 1260 equipped with six French 155 mm guns and five light machine-guns.

Many soldiers of these German forces were young about 18-19 years old. They had just been conscripted and attended their primary training in the Hitler Youth. For them was a sense of unreality the confrontation with the Allies in a decisive battle. This had a major impact over de battle amplifying the surprise of offense.

German Forces were not ready to accomplish the mission to defend the Omaha Beach. The shortfall in human resources at the Normandy coast can be explained with the increased requirements from the east operational front. At the end of the battle the German casualties were 1,000 men.

American Forces:

- 16th Regimental Combat Team (RCT) from the 1st Infantry Division.
- 116th Regimental Combat Team subordinated for the initial phase of the operation to the 1st Infantry Division. The 1st Infantry Division named "Big Red One," was the **Army's most experienced division**. Each regimental team was allotted a tank battalion for fire support, the 741st Tank Battalion for 16th RCT and 743rd Tank Battalion for 116th RCT.
- 29th Division nicknamed the "Blue and Gray".
- In order to eliminate the German artillery battery on Pointe-du-Hoc was assigned 2nd and 5th Ranger Battalions.
- 16 Gap Assault Teams of the Special Engineer Task Force.
- 5th and 6th Provisional Engineer Brigades.
- 115th Regimental Combat Team
- 18th Regimental Combat Team

For this battle United States use the most trained and motivated soldiers to reach the military objectives. The units were at full strength and the personnel were eager to fight after an exhausted and long training period in England. By the end of D-Day, the U.S. Army had a strong beachhead, one mile wide behind the shore. Although it was a clear victory, the end of 6 June 1944 found the American assault forces concerned with a possible German counter-attack. About 34,200 troops landed at Omaha beach on D-Day. The U.S. casualties will never be precisely determined. In accordance with V Corps history there were 2,374. Of these 694 were killed, 331 missing, and 1,349 wounded.

One important element which sustained Allies human resources welfare was the use of penicillin drug. Some research sources confirm that thousands of allied lives were saved during operation Overlord and the Normandy Campaign due to the use of penicillin. This new drug discovered by Fleming, Florey and Chain was used for military patients who had amputation or dangerous wounds. The medical officers estimated that 15% of lives have been saved with the use of penicillin.

II.4. Information Resources

Equipment. One major element of the preparation phase prior D-Day battle was the Allies Deception Plan. They used a variety of misinformation techniques to convince Germany that the place of landing is one of the northern regions. They even created a false army, British 4th Army, code-named Skye[38] which was trained for a false landing operation. By the spring of 1944, the radio and airwaves over Scotland were overload with communications about the movements of different big units in order to prepare an overseas assault. The Allies knew the Germans monitored these communications. The German aerial reconnaissance missions confirmed this false Army. What the Germans didn't know was the fact that the hundreds of tanks and airplanes from the pictures were empty shells made of plywood or rubber "blow-up" models.

Personnel. The Allies also use double agents (German spies) for acting in the Deception Plan. This subterfuge worked. In the end many German divisions missed the battle with the real Invasion Force while they waited in the north regions for the non-existent Army. Through these strategies the Allies won the battle of minds. In The Art of War, Sun Tzu wrote "All war is based on deception". To him the greatest battle was the one not fought.

Information technology. The Allies cryptographers deciphered German coded messages. Hitler erroneous considered that their coded messages were unbreakable. The first break of the "Enigma Cipher" was accomplished by Poland. The techniques used were passed to the French and British Allies before the start of the War in 1939. The decipher technique was improved by the Allies and used in an effective way. Eisenhower could quite often receive the most important German messages within two and half hours of the time the German had sent it[39]. Other milestone technology was the capability to take infrared pictures of Omaha Beach while avoiding German patrols. In correlation with a performant radar systems (resonant-cavity magnetron), developed by United Kingdom, this technology was a useful tool during D-Day regarding monitoring the operations.

Critical infrastructure protection (CIP). This concept is new but some elements were settled in World War II times. The US defending of its critical infrastructures had more a global application than a local one. One method to protect vital information (as critical infrastructure) prior D-Day was a Deception Plan called "Operation Bodyguard"[40].

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[38] http://strategybydesign.org/d-day-and-the-normandy-invasio

[39] D-Day, The Battle for Normandy, http://www.u-s-history.com/pages/h1749.html

[40] Critical Infrastructure Protection V, Jonathan Butts, Sujeet Shenoi, pg.7 , Springer shop, http://books.google.ro

They conducted air raids, sent false messages and even create a false army to convince Hitler that the landing point of the invasion would be Pas-de-Calais. To gain advantage opposite forces extensively used intelligence and counter-intelligence in large scale spy operations.

A more aggressive CIP was when United States issued "Casablanca Directive" which led to strategic bombing operations designed to destroy German economy. For instance, after D-Day Operations Allies started bombing German railway system and as a result almost two third of the rolling stock was destroyed. In this way they slowed the overall delivery of good to the point that the Germany economy was pushed to collapse[41].

II.5. Logistic Resources

Army Services Forces (1942), Commanding General Brehon B. Somervell said "Good logistics alone can't win a war. Bad logistics alone can lose it."

American Logistic Resources. Logistics was the key to every important conflict since the oldest times. Overlord Operation was one of the biggest logistic operations ever attempted. In 1940 US Army and Navy had only few resources to practice a landing on an island in United States. After the change of US economy into a war economy, the logistic resources exponentially grew-up. As a result US were able to sustain not only its own military operations but even the allied countries as United Kingdom or Soviet Union.

The D-Day landing and force build-up alone involved millions of tons of supplies, thousands of ships, and hundreds of thousands of personnel. To carry out this massive logistics operation, planners used supply point and throughput resupply operations, which involve stockpiling supplies at depots in the rear, transporting them to forward depots, and moving them to the units[42]. All the logistic build-up and sustainment operations during modern conflicts reflect the logistic technique used by First US Army in World War II.

At Omaha and Utah beaches have been planned to be discharged 24,850 tons of cargo in the first 3 days. Due to the operational facts and the bad weather conditions, only 6,614 tons arrived which implied difficulties in beach resupply operations. The twelve logistic units that arrived with the assault forces provided all typed of supplies from general things to funeral services. As soon as the Omaha beach was secured the logistic units had to organize to receive the supplies, assets, equips, ammo, spare parts, in order to sustain the invasion forces.

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[41] Critical Infrastructure Protection in healthcare system, pg.12 , col. Steiner Nicolae & col. Corneel Bellanger, Bucharest, 2011, http://books.google.ro

[42] D-Day Remembered: The Logistics of an Invasion, Major Frederick V. Godfrey, http://supplychainalmanac.com/3284/d-day-remembered-the-logistics-of-an-invasion/

The shipment of supplies for Overlord Operation was restricted by the amount of supplies British port could handle. Even if the shipment of supplies started flowing into United Kingdom by December 1943, in July 1944 more than two million tons was shipped to sustain the Invasion. The same problem Allies encountered to deploy the supplies in France. The used the Mulberries (deployable ports) to receive the logistic things. As the logistic process was clear established, 20,000 tons of supplies, 10,000 vehicles, and 90,000 troops were discharged each day. Even if the logistic support reached no more than 60% of what was planned it had a major impact over the operations. If the American troops are reinforced in ammo, equipment and general supplies on Omaha Beach, the Germans confronted with a serious lack of ammo and reinforcement forces that made it impossible to stop the US operations.[43]

German Logistic Resources. As I mentioned in Economical Strategic Review the declining of the Germans war economy influenced the defensive measures in Normandy. Facts as German lack of ammunition, no units in reserve, no unit's full-strength or no air support from Luftwaffe over Omaha Beach were the results of an imbalanced logistic resources support in east front and for "Atlantic Defensive Wall". If the German logistic system had supported a successful counter-attack during D-Day it would have given a good chance to win the confrontation. The root of the logistic system decline was the lack of attention to address logistics. From the beginning of the war German officers didn't want to work in logistic service due to the poor prestige and no career perspective. As a result this branch attracted low quality officers. Germany had a limited industrial base that created a weak logistic system. Even if during the European campaign Germany seized industrial assets from occupied countries the east front operational requirements exceeded the logistic support. The German logistic system was designed to support an army that was supposed to win a war in a brief period. This system could not cope with a protracted war.[44]

II.6. Financial Resources

Germany. At the beginning of the war Hitler had strong financial resources based by donations, external loans and a strong partnership with some bankers and industrialists as Alfried Krupp - then Europe's leading industrialist. During the military campaign the German

[43] http://www.dday-overlord.com/eng/omaha_beach_2.htm

[44] Citino, Robert M., The German Way of War: From the Thirsty Year's War to the Third Reich, pg.XIV, University Press of Kansas: Laurence, 2005

Army confiscated the gold reserves of every country they occupied. . *They used imprisoned Belgian Jewish engravers to help create counterfeit British Pounds and American currency. So much counterfeit currency was created that the Allies decided to keep it a secret for fear of destabilizing the world's currency at the end of the war.*[45] In the June 1944 The German Financial Resources were at a low level. Even if Germany was mostly fed by occupied countries the needs of the war machine exceeded the financial sources. The financial resources had a negative impact in implementation of the Omaha beach defensive measures prior D-Day.

United States. In accordance with the economist Tyler Cowen the impact of World War II required a massive effort. US funded the war effort by raising taxes and tapping into American's personal savings. As they called it in 1942, the "Victory Tax" raised returns tax charges. This law allowed taxes to be withheld directly from paychecks. With a good advertisement the US Government sold war bond during the war at a total value of 186 billion dollars. That meant three quarters of the US federal spending from 1941 to 1945.[46] Also, the US war effort had a good impact over the financial system in term of end of the Great Depression. The United States overall financial status allowed supporting D-Day and follow on operations.

CONCLUSIONS

The Omaha Beach battle is considered decisive for the war in Western Europe during World War II. The outcome was a result of the superiority and tempo of the American assault. Beyond tactical considerations my brief analysis tried to bring into light the manner in which opposite forces managed the defence resources as an important factor that contributed to the victory.

The American superiority of the economic system, the outstanding defense resources management, and the leadership commitment to efficient change the military organization decided the outcome of the Omaha beach battle and the follow on operations against Germany.

[45] WW II: How did Hitler finance his war, http://www.quora.com/World-War-II/How-did-Hitler-finance-his-war-Where-did-he-find-so-much-oil-to-run-his-vehicles

[46] How did America pay for World War II, Tyler Cohen, 2010, http://marginalrevolution.com/marginalrevolution/2010/09/how-did-american-pay-for-world-war-ii.html

This analysis reveals a good management of the resources and can be a lesson learned and a model for NATO logistics in major joint operations. The leader's commitment during World War II can also be a model for the nation leaders of NATO to support the joint political effort for operations which prevent conflicts all over the world.

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DECISIONS UNDER UNCERTAINTY

LTC Inocentiu DRUGAU

INTRODUCTION

"Uncertainty is a personal matter; it is not the uncertainty but your uncertainty.
Uncertainty is everywhere and you cannot escape from it."

Dennis Lindley, Understanding Uncertainty (2006)

Uncertainty is a term used in subtly different ways in a number of fields, including philosophy, physics, statistics, economics, finance, insurance, psychology, sociology, engineering, and information science. It applies to predictions of future events, to physical measurements that are already made, or to the unknown. Uncertainty arises in partially observable and/or probabilistic environments, as well as due to ignorance and/or indolence.

Although the terms are used in various ways among the general public, many specialists in decision theory, statistics and other quantitative fields have defined uncertainty, risk, and their measurement as:

Uncertainty: The lack of certainty, a state of having limited knowledge where it is impossible to exactly describe the existing state, a future outcome, possibly to be more than one.

Measurement of Uncertainty: A set of possible states or outcomes where probabilities are assigned to each possible state or outcome requiring the application of a probability density function to continuous variable.

Risk: A state of uncertainty where some possible outcomes have an undesired effect or significant loss.

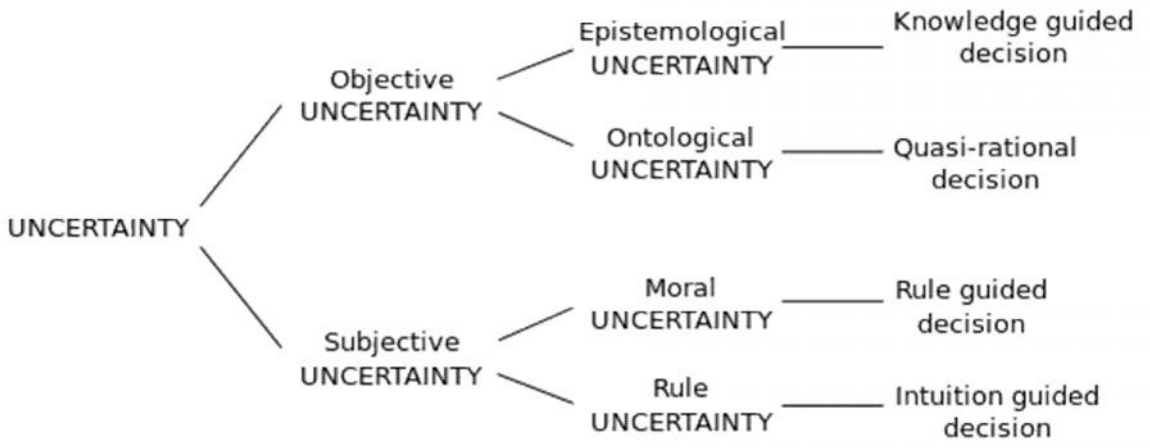
Measurement of Risk: A set of measured uncertainties where some possible outcomes are losses, and the magnitudes of those losses – this also includes loss functions over continuous variables. [1]

In his seminal work Risk, Uncertainty, and Profit (1921), University of Chicago economist Frank Knight established the important distinction between risk and uncertainty:

“Uncertainty must be taken in a sense radically distinct from the familiar notion of risk, from which it has never been properly separated.... The essential fact is that 'risk' means in some cases a quantity susceptible of measurement, while at other times it is something distinctly not of this character; and there are far-reaching and crucial differences in the bearings of the phenomena depending on which of the two is really present and operating.... It will appear that a measurable uncertainty, or 'risk' proper, as we shall use the term, is so far different from an unmeasurable one that it is not in effect an uncertainty at all.” [1]

So, uncertainty and risk are not the same thing, but both play an important role in the decision-making process. Uncertainty is a probabilistic state where multiple outcomes are possible yet unknown. Risk is a state of uncertainty whereby possible outcomes involve losses of varying degrees depending on the actual outcome.

There are other taxonomies (classification) of uncertainties and, relatively, decisions that include a broader sense of uncertainty and how it should be approached from an ethics perspective:[1]



Trough the lens of environments we can state three types of decisions as follows:

Decision Making under Certainty when there is known for sure (that is, with certainty) outcome or consequence of every decision alternative.

Decision Making under Uncertainty when there is no information at all about various outcomes or states of nature.

Decision Making under Risk is the state when decision maker has some knowledge regarding probability of occurrence of each outcome or state of nature.

In any large dynamic organization, complexity brings uncertainty and this impacts decision making imposing, subsequently, clearly thinking, decisively action and confidence.

Statistician George Chacko (1991) defines decision-making as "the commitment of resources today for results tomorrow". Because decisions involve expectations about the future, they always involve uncertainty

Decision making under uncertainty is a disciplined, methodical / structured approach to decision making, with probabilistic analysis at the heart of its logical reasoning.

Decision making under uncertainty is routinely used in two cyclic ways of making strategic decisions "choosing the right path" and proactively managing risks and opportunities "running the path".

To understand the frame of developing the skills of decision makers is good to take in account in comparison the dimension Uncertainty Avoidance (UA) of Hofstede's model witch express the way that a society deals with the fact that the future can never be known. This ambiguity brings with it anxiety and different cultures have learnt to deal with this anxiety in different ways. Countries exhibiting strong UA maintain rigid codes of belief and behavior and are intolerant of unorthodox behavior and ideas. Weak UA societies maintain a more relaxed attitude in which practice counts more than principles.

I. TYPES OF DECISIONS MAKING

1. Instinctive vs. Reasoned Decisions

In order to become effective decision makers, an understanding of how the mind works (the processes of thinking) and how it does not work (in contrast with our expectations), when natural (unconscious) forces development act against human brain, starts with a comparison between intuitive and logical thinking.

People are not naturally good decisions makers. The natural tendency is to analyze whatever facts are convenient, to make assumptions about areas of uncertainty, and to state a conclusion that you hope will solve the problem. Everything we think is colored by biases and problem solving tends to be by trial and error. Humans are inclined to solve problems by instinct or intuition and most of the times seem that higher education tends to reinforce poor decision-making practices. Preferring the most convenient solution the predisposition is to avoid structured thinking. These are the opponent features as they can be seen in the following table.

Instinctive	vs.	Reasoned
Intuitive		Structured
"Good enough"		Systematic comparisons
Fast		Slow
Subjective		Defensible

In the intuitive process, the mind does not actively seek alternatives that would conflict with the preferred and convenient solution. Doing so would slow things down and, is no reason to believe that a decision taken later would be any better.

Reasoned decision making involves the analysis of the route taken to arrive at a decision. It requires time and involves focusing on the process as much as the product.

The first step in becoming a rational decision maker is to develop a comprehensive understanding of how your mind operates versus how you assume it operates. The second step is to learn how to dismantle problems or questions into manageable bits that can be more easily and systematically analyzed.

2. Barriers to Sound Reasoning

- Crude emotions
- Mental short cuts
- Patterning
- Bias and assumptions
- Mind set
- Need for explanations
- Narrow focus
- Stubbornness

II. CRITICAL THINKING AND REASONING

1. Definition and role of critical thinking

Critical thinking is that mode of thinking – about any subject, content, or problem – in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them.

Critical thinking skills are not a natural consequence of education, quite the contrary. Education tends to make us advocates of a particular point of view, which is completely contrary to the goals of critical thinking.

Critical thinking is influenced by the native intelligence and this requires an awareness of forms of intelligence[47] of individuals can be born and educated.

Critical thinking is the discipline of making sure that you use the best thinking that you are capable of in every situation. In order to be a skilled critical thinker it is necessary to understand thought processes and to use that understanding to structure your analysis of anything and everything, in a balanced way.

Critical thinkers continually question their own and other people's assumptions, reasons, motivations, and outlook.

In addition, this questioning must not be focused on generating mere contradiction, but rather on the discovery of context, reasoning, and point of view. Critical thinking asks questions to answer questions, and to seek reason and logic as the foundation for understanding.

In effect, what critical thinking does for you is it puts the extent of your real understanding (knowledge) into perspective. Critical thinking illustrates what you do and do not know by revealing the nature and significance of assumptions and gaps in information.

However, critical thinking should not be thought of as an effort to disprove any particular choice or decision, but rather to balance evidence, reason, and options. Critical thinking may very well make it harder to choose between various options, but the ultimate choice will be made with a fuller understanding of the implications and consequences.

To become a critical thinker is to become an effective critic of your own thinking. This involves an analysis of the inputs (information, assumptions, and biases) that form part of your reasoning, as well as the outputs (decisions, assumptions, and biases) that result from your reasoning.

As part of your development as a critical thinker you learn to gauge and measure the outputs of other people's thinking. As a result of gauging other people's thinking you develop greater empathy for others.[2]

[47] Intelligence is spread in many fields: verbal – linguistic, visual – spatial, musical - rhythmic & harmonic, logical – mathematical, bodily – kinesthetic, interpersonal, intrapersonal, naturalistic, and existential [spiritual].

2. History of Critical Thinking

The intellectual roots of critical thinking date back to ancient Greece. Socrates set the schedule for the tradition of critical thinking; namely, to reflectively question common beliefs and explanations. Followed by the critical thinking of Plato (who recorded Socrates' thought), Aristotle, and the Greek skeptics; all of whom emphasized that things are often very different from what they appear to be and that only the trained mind is prepared to see through to their essence.

In the Middle Ages, during the Renaissance (15th and 16th Centuries), a flood of scholars in Europe began to think critically about religion, art, society, human nature, law, and freedom.

The critical thinking of these Renaissance and post-Renaissance scholars opened the way for the emergence of science and for the development of democracy, human rights, and freedom of thought. [2]

3. Components of Critical Thinking

Development as a critical thinker involves the transition from being a first order thinker to becoming a second order thinker; from spontaneous unreflective thinking to self analyzed and restructured thought processes.

There are three components to critical thinking. The first is the structure of thought. You are better able to find errors in your thinking if you are able to take your thinking apart.

The second component of critical thinking is the standard for thinking. It is impossible to judge the quality of your thinking if there are no standards with which to compare.

The third component is ethics. As developing thinkers you can learn to recognize mistakes in your own thinking as well as in that of others, or you can focus your criticism on the thinking of others.

Structures	Standards	Ethics
Purpose	Clarity	Humility
Questions	Breadth	Fair-mindedness
Point of view	Relevance	Autonomy
Data, facts, and experience	Depth	Perseverance
Concepts	Precision	Empathy
Assumptions	Logic	Integrity

Structures	Standards	Ethics
Inferences	Significance	Confidence
Implications and consequences	Accuracy	Courage
	Fairness	

Reasoning is the process of drawing conclusions based on reasons. The elements of thought are all interrelated. They can never be completely isolated in your analysis, but must always be considered in combination as follows:

Whenever we think, we think for a purpose,
Within a point of view,
Based on assumptions,
Leading to implications and consequences,
We use data, facts, and experiences,
To make inferences and judgments,
Based on concepts and theories,
To answer a question or solve a problem.

4. Interplay of Elements of Reasoning

- Having a point of view influences your purpose.
- The nature of your purpose affects the kind of questions that are asked.
- The kind of questions asked affects the answers and information gathered.
- The information gathered influences the way it is interpreted.
- The interpretation influences your assumptions.
- Assumptions lead to implications.
- Implications affect your point of view.

III USING BEST PRACTICES, CREATIVITY AND STRUCTURING TECHNIQUES

1. Decision Analysis Techniques

The key to improving the quality of decision making therefore is to do anything and everything that opens the mind. Fundamental techniques that help liberate the thinking are

referred to as “best practice”, because they should be routinely included in all important decision analysis.

Necessity compels to make quick decisions rather than comprehensive decisions and the result is partial solutions that provide short-term relief.

Quality decisions come from breaking out of restrictive mind sets and giving serious consideration to alternative solutions.

2. Best Practice Guidelines

- Slow down and think critically
    - Question assumptions (yours and theirs)
    - Reason with structure and standards
- Restate the problem
- Focus on major factors
- Collaborate
- Impose creativity
- Focus in and out
- Structure the analysis
- Determine what information, if available, would change the decision
- End with a birds eye’s view

3. Objective of the Creative Process

Active creativity steps are necessary because many adults lack vivid imaginations, and because the creative process helps dislodge the barriers to reason that naturally undermine the quality of decision making

4. Fostering Creative Solutions

- Slow down, being imaginative takes time
- Suspend judgment, the more judgmental one is, the less free their imagination is and actively and vigorously try to think without creating mental boundaries of reasonableness
- Imagine courageously and Think beyond conventional wisdom
- Question everything and everyone
- Imagine backwards from the ideal

- Dismantle the problem
- Devil's advocacy

5. Structuring techniques and their value

Structuring is important to the decision-making process. It reduces complexity allowing comparing of individual elements rather than clusters, to Focus on individual elements, but not any one element and, finally, it will represent a visual basis for assessment and reasoning.

Structure does not replace analysis. Structure is the drawing of a blueprint, whereas analysis is the set of choices made that ultimately result in a floor plan. Analysis leads to the selection of choices and the paths that result. Structuring is performed trough instrument of analytical techniques showed below.

6. Analytical Techniques

i. **Sorting** means to organize the component parts of a problem into patterns of association that permit the analysis of all problems and allows questions to be asked of the data. This provides a visual display of data.

ii. **Sequencing** is to sort significant events according to timing. This creates a visual image of time as it relates to the problem at hand. This requires three steps: To list all events, minor and major, to trim and sequence events, and to include future events.

iii. **Matrixes** are Simplest and clearest methods for sorting information. This Visual display of related data, Isolates elements of a problem, Categorizes information, Allows comparison between types of information, Allows comparison of information within a category Illustrates patterns

iv. **Decision trees** are graphical representation of choices and their outcomes and they respects the rules that say branches must be mutually exclusive and branches must be collectively exhaustive

v. **Probability Branches** must be mutually exclusive, branches must be collectively exhaustive, and the probabilities at each node (branch) must total 100%

vi. **Ranking** is the assignment of position to one thing (choice, action, or alternative) relative to another.

IV. DECISIONS UNDER UNCERTAINTY

If the decision maker does not know with certainty which state of nature will occur, then they are said to be making decision under uncertainty. The five commonly used criteria for decision making under uncertainty using a frame of events with their outcomes (pay offs, results) are:

1. The optimistic approach (Maximax)

The optimistic approach would be used by an optimistic decision maker.

The decision with the largest possible payoff is chosen.

If the payoff table was in terms of costs, the decision with the lowest cost would be chosen.

The decision makers examine the maximum payoffs of alternatives and they choose the alternative whose outcome is the best.

This criterion appeals to the adventurous decision maker who is attracted by high payoffs.

2. The conservative approach (Maximin)

The conservative approach would be used by a conservative decision maker.

For each decision the minimum payoff is listed and then the decision corresponding to the maximum of these minimum payoffs is selected. (Hence, the minimum possible payoff is maximized).

If the payoff was in terms of costs, the maximum costs would be determined for each decision and then the decision corresponding to the minimum of these maximum costs is selected. (Hence, the maximum possible cost is minimized.)

This is also named Wald's Maximin Criterion

3. the minimax regret approach (Minimax regret)

The minimax regret approach requires the construction of a regret table or an opportunity loss table.

This is done by calculating for each state of nature the difference between each payoff and the largest payoff for that state of nature.

Then, using this regret table, the maximum regret for each possible decision is listed.

The decision chosen is the one corresponding to the minimum of the maximum regrets. This is also named Savage's minimax regret criterion

4. Equally likely (Laplace criterion)

It is assumed that all states of environment are equally probable, the favorite one giving us:

The Laplace method (equally likely)

$$\max_i \left(\frac{1}{n} \sum_{j=1}^{n} a_{ij} \right), \text{ where n = the number of states}$$

This is also named Laplace's insufficient reason criterion.

5. criterion of realism with α (Hurwicz criterion)

This is often called *weighted average*, the *criterion of realism* (or *Hurwicz*) decision criterion is a compromise between optimistic and a *pessimistic* decision.

1. First, select *coefficient of realism*, a, with a value between 0 and 1. When α is close to 1, decision maker is optimistic about future, and when α is close to 0, decision maker is pessimistic about future.
2. Payoff = α x (maximum payoff) + (1-α) x (minimum payoff)

CONCLUSIONS

Uncertainty is the normal state of managerial decision-making, especially in complex organization due to centre-stage placed imperfections in information and knowledge making conclusions from limited information or conjecture.

The managerial landscape is often defined by situations of risk and uncertainty. The decision-making process is an attempt to reduce, mitigate, or even removed risks and uncertainties. As such, the decisions of managers impact the extent to which risks and uncertainties remain.

Uncertainty has a fairly linear effect on decision making in that it delays it. When confronted with uncertainty, managers will attempt to put off decisions until uncertain circumstances become more certain.

When a decision maker must choose one among a number of possible actions, the ultimate consequences of some if not all of these actions will generally depend on uncertain

events and future actions extending indefinitely far into the future. With decisions under uncertainty, the decision maker must:

- Reduce, clarify, and eliminate chaos within your control
- Identify, analyze, and determine priority of your workday
- Use a daily action plan to allocate time and energy
- Remain focused and act more decisively when priorities shift
- Become more assertive and strategic in your communication
- Manage interruptions and conflicts with greater ease
- Utilize the right tools to balance and manage tough choices

Remain focused and act decisively by setting priorities at work and managing workplace chaos so that you can handle interruptions and conflicts with ease.

Upon systematically describing the problem and recording all necessary data, judgments, and preferences, the decision maker must synthesize the information set before him/her using the most appropriate decision rules. Decision rules prescribe how an individual faced with a decision under uncertainty should go about choosing a course of action consistent with the individual's basic judgments and preferences.

Under risk, policy should respond to every raindrop; it is fine-tuned. Under uncertainty, that logic is reversed. Complex environments often instead call for simple decision rules. That is because these rules are more robust to ignorance. Under uncertainty, policy may only respond to every thunderstorm; it is coarse-tuned.

Five Commandments of Decision Making under Uncertainty are recommended by Andrew Haldane and Vasileios Madouros the paper titled "The Dog and the Frisbee" [3]:

1. "Complex environments often instead call for simple decision rules"
2. "Ignorance can be bliss"
3. "Probabilistic weights from the past may be a fragile guide to the future"
4. "Other things equal, the smaller the sample, the greater the model uncertainty and the better the performance of simple, heuristic strategies"
5. "Complex rules may cause people to manage to the rules, for fear of falling foul of them"

Haldane and Madouros apply their analysis to financial regulation, but the heuristics that they introduce have a much broader applicability. The entire paper just scratches the surface of this important topic, but it is a readable and valuable contribution.

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[1] http://en.wikipedia.org/wiki/Uncertainty

[2] Critical Thinking, Problem Solving, and Decision Making, Global Knowledge Course, Brian EGAN, David EGAN, Nancy DUNHAM, John VOORHEES, Kirsten E. HALE, 2005.

[3] http://rogerpielkejr.blogspot.ro/2012/09/five-commandments-of-decision-making.html

[4] http://kansascityfed.org/publicat/sympos/2012/ah.pdf?sm=jh083112-3

PERSONAL PERSPECTIVE ON GOVERNMENT QUALITY ASSURANCE

CDR.Eng. Costel ENACHE

INTRODUCTION

This paper aims to present a personal perspective on the place and role of quality assurance in the procurement process of materials and military equipment, a process that is part of the broader process of building the necessary capabilities of the armed forces, capabilities that should be able to handle a wide range of risks and threats in the security environment. The approach of the subject is trying to answer four questions:

1. Why is necessary Government Quality Assurance Activity?
2. What they are talking about in this domain?
3. Who is responsible to carry out this activity?
4. How they are dealing with?

I. NECESSITY FOR QUALITY ASSURANCE

I.1. GENERATING NEW CAPABILITIES

"*There is no security on this earth; there is only opportunity*."[48]

The security environment is a contemporary reality that includes all the phenomena, processes and conditions of political, economic, social, diplomatic, cultural, environmental, information and military, domestic, regional and international, which affects the protection of the individual, community, state and area or even on global scale during the promotion of their interests. In light of its configuration is extremely complex and its dependence on evolutionary of many objective and subjective factors, determining features of current security environment requires a new approach that takes into account the many changes taking place in all areas of social life. Because international strategic security environment is constantly changing, due to the complexity of the phenomena and processes of interaction and

[48] Douglas MacArthur - http://www.quotationspage.com/quote/1954.html

interdependence of all levels, states are deeply interested in their own defense and security. One such example is globalization, complex, multidimensional and pervasive, generating positive and negative effects, such as security threats. In the post-Cold War, these challenges require a redefinition of security; therefore, the future agenda should be based on new approaches to asymmetric and unconventional risk, taking into account the large scale which comprised but are not limited to: amplification trend of power centers reorganization; redistribution of spheres of influence; terrorism; disintegration of some federal states; ethnic tensions; political instability in certain areas; failure states; differentiated access to resources; transnational organized crime; trafficking in drugs, radioactive, biological substances and human beings; actions against of domestic and international transportation systems; individual or collective illegal actions on accessing computer systems; financial and economic aggression; deliberately inflicting environmental catastrophes and so on.

Adapting responsiveness of countries and international organizations to the current security environment is the major priority. The military, as one of the main pillars of generating national and international security also requires transformation. With the foundation set by political decisions at the national level, military should becomes a more compact, efficient, effective and flexible organization, able to respond efficiently to current and unpredictable risks in security environment. Since the planning phase of needed capabilities must establish a balance between capability able to address a single type or a restricted palette of threats and capabilities to be able to address a wider range of threats. It also requires deep analysis and evaluation of efficiency and effectiveness leading to consistent decisions on alternatives related mainly to the rapid shift to a new generation of systems able to deal with future threats or the allocation of resources to maintenance and upgrading of existing equipment, sometimes obsolete, but still useful. Given these comprehensive changes, it is important and imperative that any changes in the endowment to be judged carefully validated and planned in order to effectively use public funds.

In general, the development of a weapon system is fully adapted to meet operational requirements formulated by the user. This process has a multidisciplinary nature, and during the performance tests are performed at the level of each element and program and integration with the final tests in its complete definition, in accordance with the specifications and reference standards. Synchronize all parties (subjects) involved in the system development process is done by managing the program, the team integrated program at each stage or pre-decision points. System development stages are followed by an approval process and freeze reached maturity and proper configuration utility for each meeting separately and ends with

configuration freeze the whole system. A system integration business success requires rigorous discipline, proper planning and support in the early stages and can not be separated from other activities such as requirements development, system design, and risk mitigation and so on. Any acquisition of a system, either existing or upgraded or new beginning must be planned and integrated into the development process of the entire system level , to ensure an optimal balance between performance characteristics of the system, the necessary initial resources, effectiveness and the life cycle cost, in order to develop the necessary capabilities.

I.2. PROCUREMENT MARKET

Crisis lead to reductions in public expenditure on defense budgets, which exacerbates the problem of creating new capabilities in which the new equipment is often technologically complex and expensive. The economic recession following the 2008 global financial crisis and the succeeding austerity measures imposed in many countries started to have an impact on sales in the area of arms industry in very near last years. Though, the shock on the industry was not identical, with diverse results for individual company. Individual companies are taking steps to protect themselves against austerity measures throughout military specialization, downscaling, diversification, and exports and other types of internationalization. In some situations company subsidiaries have not only preserved but also increased arms and military services sales out the borders of the countries in which the mother companies are located. Another trend that could be observed in the last period is the fact that governments make use of a number of tactics to support their defense industries outside of their own markets. These consist of direct government defense equipment and technology export promotion; support for reductions of the costs; promising offset agreements (which later on can be put in practice or not) and the use of defense industry employment as a propagandistic subject. But not only individual countries are concerned about defense industry. As an example, European Commission delivered a communication to European Parliament on July 24th, 2013 named "Towards a more competitive and efficient defense and security sector" (COM 542)[49] which describes some principles and a detailed roadmap with concrete actions and timelines will be developed to deal with challenges of European defense industry. On the other hand, countries that have not decreased military expenditure perceive this dilemma as a chance to either get more favorable provisions on arms imports or to develop their own defense industries.

[49] http://new.eur-lex.europa.eu/legal-content

I.3. DEFENSE EXPENDITURES

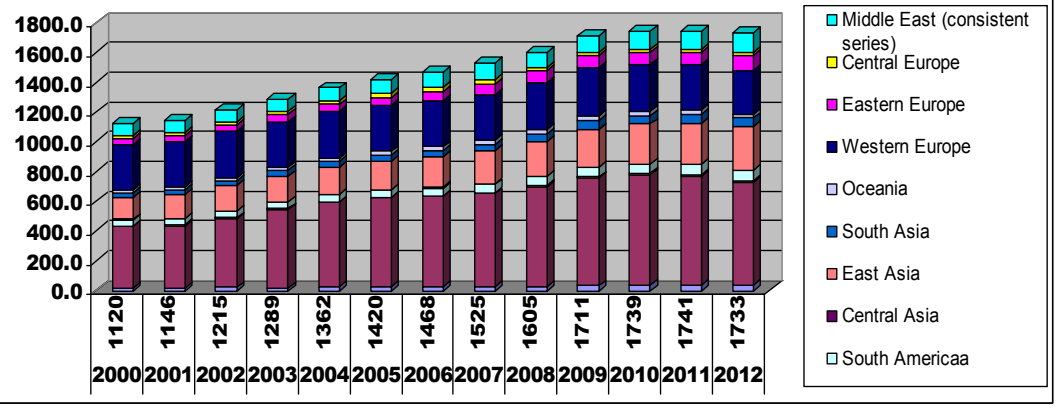
Defense spending is obviously the determinant key of the health of the defense industry. It is perceptive related to the economic cycle regarding political changes, with democratically voted governments preferring to center their resources on politically sensitive domains, such as education, healthcare and welfare spending, or on measures to increase employment, when their incomes are coming under pressure during an economic slowdown.

Military budgets have demonstrated floating over the past few years, due to the wars in Iraq, Libya and Afghanistan, and because of the higher spending by developing countries.

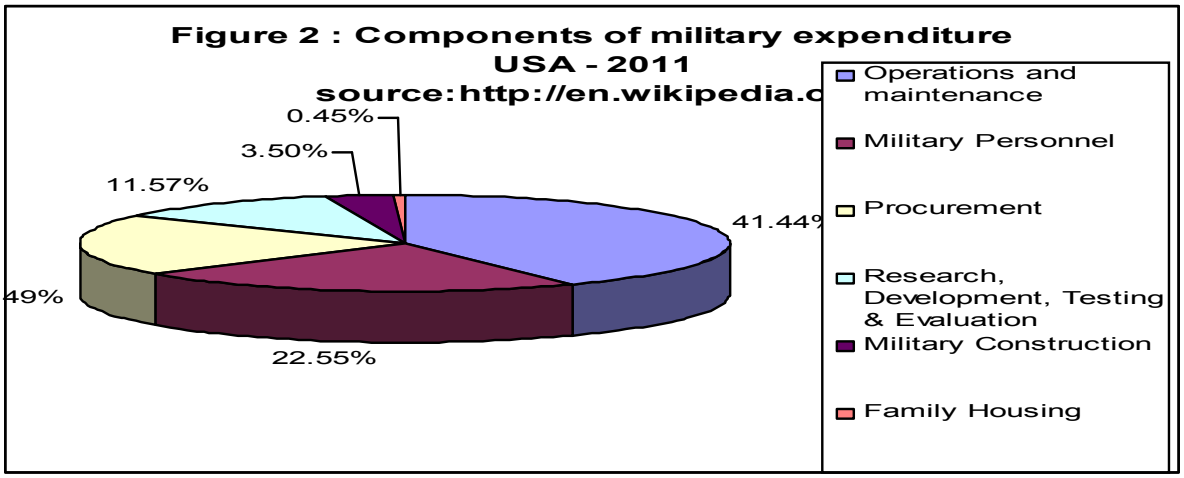
Basically, however, when a country is involved at war it has small option but to maintain defense spending, despite of the economic conditions, and for sure no any mature country is eager to sacrifice its long-term security goals only for the reason of short-term savings. But again, this expression is valid for mature countries with a well-defined and responsible political class.

But, let's take a look on the next graph to see the result of Stockholm International Peace Research Institute related to military expenditure:

Figure 1 Evolution of world military expenditures
Source : http://www.sipri.org/yearbook/2013



Undoubtedly, the total military spending is not an absolute indicator relative to budget for endowment which is spent directly in the defense industry market. Depending on the priorities of individual countries, the rate for purchases may vary in a fairly wide range. For example, in Figure 2, the author has chosen to present the distribution of military expenditures of U.S. defense budget for fiscal year 2011:



Given that an important part of defense spending is for procurement of military equipment and technology, including services related to, interaction between military and defense industry body must be made in the way that products and services meet the requirements. In this respect, military have developed an integrated procurement management system.

The Integrated Procurement Management System has to identify and prioritize the needs of the endowment, the plan allocation of resources; to coordinate and control the acquisition and to report to competent bodies. It is important to note that this procurement system includes: research, development, production, test and evaluation, installation on operational units, disposal or recovery that system. In fact, that means a life cycle approach. AQAP 2009:2010 identified some characteristics of this approach:

"Life Cycle Phases: The life cycle (ranging from conception through disposal) of the system is divided into well-defined phases that provide a framework for the project(s).

Life Cycle Processes: In each phase of the life cycle there are processes which may be organization wide or specific to a project. The organizations of the life cycle participants should establish, document, maintain and improve effective and economical processes for each life cycle phase. The quality management process includes the activities of planning, review, audit, measurement and monitoring, verification, validation, corrective and preventive action.

The Life Cycle Participants: The participants directly involved in processes and associated activities throughout the life cycle phases can be expressed in generic terms: e.-g., the user, the Acquirer, the owner, the Supplier, and the personnel with responsibility for

Government Quality Assurance (GQA). Since quality is a shared responsibility, the responsibilities should not be allocated exclusively to any one of the participants."[50]

As a conclusion, the necessity of Government Quality Assurance Activity is dictated by the interaction of several factors: the need for a secure environment, building capabilities corresponding risks and threats to the security environment, the existence of a defense industry that operates on free market principles. Given the involvement of GQA activity throughout the life cycle, it represents one of the important tools to control the interaction of factors described above.

II. QUALITY ASSURANCE LANGUAGES

II.1. INTERNATIONAL LANGUAGE OF QUALITY ASSURANCE:

ISO 9000 series standards were issued by the International Organization for Standardization in 1987 and were updated in 1994, 2000/2001, 2005/2008. Etymologically the term comes from Greek word "iso" which means "equal". ISO 9000 series comprised by: ISO-2005 - Quality management systems - Fundamentals and Vocabulary, ISO 9001-2008 - Quality management systems — Requirements, ISO 9004-2009 - Quality management systems – Guidance for performance improvement.

From this series, the most important one can be considered ISO 9001 and the author will describe briefly an historical overview regarding his development.

Military Specification MIL-Q-9858 - Quality Program Requirements and MIL-I-45208 – Inspection System Requirements was issued in 1959 by US DoD representatives as a result of requirements of government quality inspectors (revised in 1963 as MIL-Q-9858A and MIL-I-45208A). Based on those standards, in 1979, it was released British Standard BS-5750 were you can find a great degree of commonality with military standards mentioned above. In 1987, BS-5750 became first ISO 9001. In the cross matrix above, you can find a comparison of ISO 9001:1994, ISO 9001:2008 MIL-Q 9858, and MIL-I-45208.

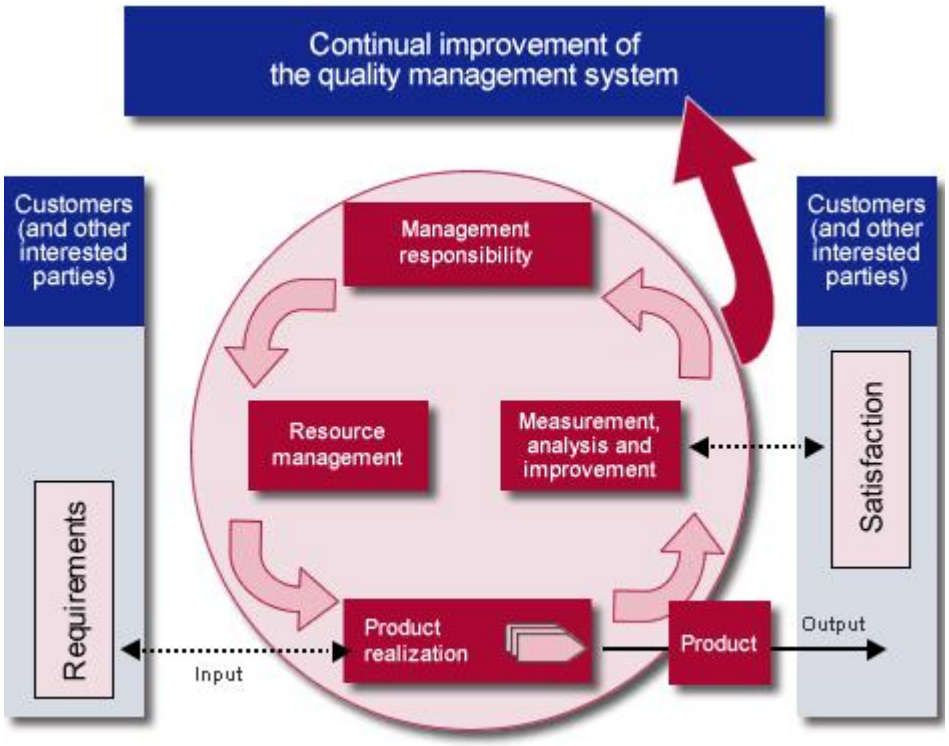
Quality system elements	ISO 9001/1994	ISO 9001/2008	MIL-I-45208A	MIL-Q-9858
Management responsibility	4.1	5.1, 5.3, 5.4.1, 5.5.1, 5.5.2, 5.6, 6.1, 6.2.1, 8.5.1	3.1	1.3, 3.1
Quality system, Initial Quality Planning	4.2	4.1, 4.2.1, 4.2.2, 5.4.2, 7.1	1.1	1.3, 3.2
Contract review	4.4	5.2, 7.2.1, 7.2.2, 7.2.3	1.2	3.2, 1.4
Design control	4.4	7.2.1, 7.3	N/A	4.1

[50] AQAP 2009 ed.3 / 2010. NATO guidance on the use of the AQAP-2000 series

Quality system elements	ISO 9001/1994	ISO 9001/2008	MIL-I-45208A	MIL-Q-9858
Document & data control	4.5	4.2.3	3.2	4.1
Purchasing	4.6	7.4.1÷7.4.3	N/A	5
Control of customer supplied product	4.7	7.5.4	3.6	7.2
Product identification and traceability	4.8	7.5.3	N/A	6.1
Process control	4.9	6.3, 6.4, 7.5.1, 7.5.2	3.4	6.2
Inspection & testing	4.10	7.1, 7.4.3, 7.5.3, 8.1, 8.2.4	3.1, 3.2.1, 3.12	6.1, 6.2, 6.3
Control of inspection, measuring and test equipment	4.11	7.6	3.3	4.2÷4.5
Inspection and test status	4.12	7.5.3	3.5	6.7
Control of nonconforming product	4.13	8.3	3.7	6.5
Corrective and preventive actions	4.14	8.5.2, 8.5.3	3.2.3	1.3, 3.5
Handling, storage, packaging, preservation and delivery	4.15	7.5.1, 7.5.5	3.6	6.4
Control of quality records	4.16	4.2.4	3.2.2	3.4
Internal quality audits	4.17	8.2.2, 8.2.3	N/A	N/A
Training	4.18	6.2.2	N/A	N/A
Servicing	4.19	7.5	N/A	1.3
Statistical techniques	4.20	8.1, 8.2.3, 8.2.4, 8.4	N/A	6.6

ISO 9001 - 2008 is a process orientated standard which specifies the requirements for a quality management system that may be used for internal application by organizations, certification, or contractual purposes. The quality management system is based on quality management principles: customer focused organization; leadership; involvement of people; process approach; system approach to management; factual approach to decision making; mutually beneficial supplier relationships and continual improvement. The "20 element" structure of ISO 9001:1994 which the author used as a basis of crossing matrix, even if all of elements can be founded in last revision it was in fact replaced by this 8 processes-based quality management system:

Figure 3: Quality management system processes cycle



ISO's Technical Committee 176 who is tasked with ISO revision is now working on a new revision of the standard which will be delivered in 2015. Some of the concepts that, as far as the author is concerned, will be probably taken into consideration are: risk management approach; time, speed and agility; process management; product and service life-cycle management; expanding the concept of customer; correction as a distinct concept from corrective action concept and so on.

II.2. NATO GOVERNMENT QUALITY ASSURANCE (GQA) LANGUAGE

NATO has created a set of standardized procedures in an attempt to sustain quality acquisition activities among NATO member nations. This approach makes certain that each NATO nation carries out reliable quality assurance activities. NATO Standardization Agreement (STANAG) that governs NATO quality assurance activity is the STANAG 4107 (rev.8 / 2007). The STANAG 4107, titled "Mutual Acceptance of Government Quality Assurance and Usage of the Allied Quality Assurance Publications", sets forth the terms and conditions under which mutual government quality assurance of defense products is to be performed by the national authority of one NATO country on request of another NATO country or NATO organization and to standardize the development, updating and application of AQAP on the basis of the concept of quality assurance in the procurement of defense

products. A small comment regarding STANAG 4107: This agreement has been ratified "as is" by majority of nations in NATO but the United States ratified with certain reservations.

The original AQAP's (issued in 1968) series which had been established for quality assurances were numbered from 1 to 15. These AQAP's were analogous to documents that were already used at that time by the U.S. DoD for quality assurance activity. AQAP-1 was similar to MIL-Q-9858A, AQAP-2 was similar to MILHDBK- 50, AQAP-4 was similar to MIL-I-45208A, etc.

In the early 1990's, when NATO recognized that quality was flattering a major factor in international market and the ISO standards provided synchronization of NATO quality concepts and terminology with the other countries world-wide, NATO had decided to revise the existing AQAP standards with the intention of hold these new international quality standards. In February 1993, NATO canceled the AQAP 1-15 documents and implemented a new series of AQAP's that fit in the ISO 9000 series quality system standards. This series of standards was referred to as the "Century Series" because of its numbering system (from 100 to 170). After 2000, a new series (let's say "Millennium Series") of AQAPs have been issued, and now the list is comprised of:

- AQAP 2000 end 3 / 2009. NATO policy on an integrated systems approach to quality through the life cycle;
- AQAP 2009 ed.3 / 2010. NATO guidance on the use of the AQAP-2000 series;
- AQAP 2070 ed.2 / 2009. NATO mutual government quality assurance (GQA) process;
- AQAP 2105 ed 2 / 2009. NATO requirements for deliverable quality plans;
- AQAP 2110 ed 3 / 2009. NATO quality assurance requirements for design, development and production;
- AQAP 2120 ed 3 / 2009. NATO quality assurance requirements for production;
- AQAP 2130 ed 3 / 2009 NATO quality assurance requirements for inspection and test;
- AQAP 2131 ed 2 / 2006 NATO quality assurance requirements for final inspection;
- AQAP 2210 ed 1 / 2006 NATO supplementary software quality assurance requirements to AQAP-2110;
- AQAP 2310 ed A version 1 / 2013 NATO quality management system requirements for aviation, space and defense suppliers.[51]

It is the moment to emphasize that there are differences between the AQAP's and ISO 9000 quality system standards. The AQAP standards enclose supplementary requirements to

[51] http://nsa.nato.int/nsa/

certain ISO elements. These supplements establish additional trend and guidance on NATO quality system needs.

Because defense materiel can be procured or developed as multinational projects, a set of NATO documents (including AQAP) should be maintained and used for the mutual benefit of NATO and member nations. According to their scope there are two types of AQAPs: (1) Contractual type and (2) Guidance type. The most essential AQAPs are the contractual type. These AQAPs require the supplier to provide objective evidence that a contract-related quality management system has been established and is maintained. The system should contain the necessary elements to give the GQAR confidence that the product meets the contract requirements.[52]

II.3. NATIONAL LANGUAGE OF QUALITY ASSURANCE:

Modern quality assurance history have begun in Romania on 1924 by Law 21/1924 for organizations, then continues in 1929 with the adoption of "Organization and Regulation norms that shall be applied in Romanian industry" the first national standards being adopted in 1937-1938 by AGIR – "General Association of Engineers in Romania". In 1948, was founded Fees Standards, the first national standards body. It acquired even greater importance in 1955, establishing "State Office for Standards and Patents". After a number of its reorganization in 1970 it was established "Romanian Institute for Standardization – IRS". In 1991 IRS join the European Committee for Standardization (CEN), and next year is designated as a specialized body of central government that operated until 1998 together with "National Centre for Training and Quality Assurance Management". Since 1998, the national standards body is the "Standards Association of Romania" - complete list with today full member of ISO, IEC (International Electro technical Commission), CENELEC (European Committee for Electro technical Standardization), CEN (European Committee for Standardization) and an observer member of the ETSI (European Telecommunications Standards Institute).

By Government Decision number 1073:1996 have been established that assessment, certification and quality assurance in procurement process for armed forces are organized and run by the Ministry of National Defense, Ministry of Interior and Intelligence Service through their bodies, according to this decision and other bodies as required by law.

[52] AQAP 2070 ed.2 / 2009. NATO GQA process

- Minister's Order no. M 31/2008 concerning the competence of procurement of goods, services and works in the Ministry of Defense, as amended and supplemented;
- I.1000.5 instruction on scientific research management for technical and military technology approved by the Minister of National Defense no. M 33/1999;
- Instruction I.1000.2 -01 on defense acquisition management, approved by the Minister of National Defense no. M 160/2001;
- Instruction I.1000.3 interaction between system planning, programming, budgeting and evaluation, system requirements and release management system for defense procurement, approved by the Minister of National Defense no. M 127/2002;
- Instruction I.1000.4 the testing processes, assessment and approval of products, approved by the Minister of National Defense no. M 15/2006;
- Code of Ethics for MoD personnel responsible for procurement, approved by the Minister of National Defense no. M 6 /2004;
- Decision of state secretaries for armaments DA-4/2006 regarding assessment, certification and quality assurance;
- Management process suppliers of defense - defense systems and equipment (similar to that applied in the NATO); preparation process "Qualified Suppliers List ".[53]

Besides ISO series, STANAGs, AQAPs, and country-specific regulations, quality assurance representative must face other manuals, standards and regulations specific to both the industry branch and the organization providing the product or service covered by quality assurance activity.

Given the multitude of rules and regulations as well as their continuous transformation due to the necessity to be connected to the realities of society, learning the language of quality assurance is not only difficult but it is also a continuously process.

III. GOVERNMENT QUALITY ASSURANCE ACTIVITY

No Risk - No Assessment – No Government Quality Assurance Activity

The government quality assurance activity is conducted by qualified personnel (Government Quality Assurance Representatives - GQARs) during the specific phases of life cycle of the products, military equipment, armament systems and related services on different places (production facilities, laboratories, test polygons, commissioning places – factory, harbor, airport, sea, air, fire ranges, military units and so on) in order to support research,

[53] http://www.dpa.ro/despre/acte-normative/acte-normative-reglementari-specifice

development, production, test and evaluation, installation on operational units, operating, upgrading, disposal or recovery of the object of quality assurance. The quality assurance activity is a process-based approach for Government determination of product acceptability based upon confidence in the supplier's quality management system or inspection system developed through a risk-based systematic verification of significant objective evidence.

III.1. MAIN GQAR RESPONSIBILITIES

- Participation in the review / finalize the provisions of the technical specifications / product sheets , tender documentation , the draft agreement / framework / contract drawn up by the contracting authorities, at their request, in order to select and mention in these documents appropriate requirements relating to quality assurance ;

- To participate as technical experts in the evaluation of tenders, checking pre-calculation estimates / post calculation of suppliers, activities testing / evaluation / reception and so on, at the request of the contractor;

- To participate as technical experts in research activities at the request of appropriate authority;

- To participate as technical experts on Quality Management System (QMS) assessment activities of supplier or sub-supplier organizations;

- To analyze the contract and associated documents and clarification of contractual requirements with the purchaser / provider;

- To identify risks and their causes related to the contract in cooperation with internal and external authority;

- To plan, develop and adapt GQA Plan based on risk

- To carry out GQA activities related to contracts received from internal / external contractors to monitor and mitigate identified risks, with release related documents.

In each country should be a Delegated Authority for GQA at the suppliers belongs to that country able to empower a specific GQAR on a specific activity. Depending on the complexity of the activity, contract, product or service, designated GQAR may have a subordinate team of several people, including staff from inside or outside of his own institution.

There are two situations:

a. The supplier has the location in the country and delivers systems and military equipment for his national MoD. For this situation, the Request for Government Quality

Assurance (RGQA) regularly is not issued and the quality assurance activity is performed according to the national practices described in their current procedure;

b. The supplier has the location in the country and delivers military equipment and systems for the foreign Ministry of Defense from a member or a non member state of NATO (delegator). For this situation, a RGQA is received from the delegator, which will be treated in conformity with the specifications in AQAP 2070 and internal procedures.

NOTES: The procedures concerning the government quality assurance (GQA) applied at the supplier or itinerate have to be in consensus with the procedures and policy of the GQA at the highest organizational and national level.

If the contracting authority of MoD has contracts which called GQA but the suppliers or sub-suppliers are located outside the country, GQARs support activity of issuing of a RGQA is as specified in the national regulations and AQAP 2070.

III.2. ANALYSIS OF CONTRACT AND ASSOCIATED DOCUMENTS AND CLARIFY REQUIREMENTS

For the beginning of the GQA to a particular activity, contract, supplier GQAR carries out a contract technical review in order to identify the nature and extent of the requirements associated with activity. Analysis includes complete review of the contract, RGQA (if is the case) , RIAC, Quality Assurance Letters for Instruction (QALI), Letter of Delegation (LOD), and any other related documents: providing relevant plans (e.g., quality plan , risk management plan , configuration management plan, and so on) programs (e.g. programs, manufacture, inspection, testing and delivery) and processes.

Contract technical review is performed upon receipt of contracts/modifications administered by contracting authority requiring GQA activity at source (e.g. Suppliers location, laboratories, fire ranges, testing polygons and so on).

Contract technical review for identical and / or similar items need to be reviewed to determine if there are differences and / or changes to technical requirements.

Contract technical review is oriented to identify and report contract deficiencies; to identify processes and characteristics; to identify and plan quality assurance actions; to identify quality assurance resource requirements; to identify special training requirements and to identify requirements contractor may not have the capability / capacity to meet.

QALI and LOD documents are supposed to identify customer requirements and needs and should provide direction to the GQAR with regard to: processes and tasks; mandatory inspections; critical characteristics; communications and reports.

Contractual requirements must be clear, complete and understood by the supplier and the GQAR. After analyzing the contract and associated documents to support its GQA activities subsequent GQAR may initiate or participate, if needed, to conduct meetings with supplier and Customer / Delegator to discuss and clarify aspects of communication lines or access rights for GQAR, quality requirements, supplier plans and graphs, specifications, standards, and the responsibilities of the parties participating in the contract.

If the review of the contract and associated documents, GQAR or purchaser identifies risks to the effect that it is necessary to conduct GQA activity on sub-suppliers, analysis of contracts with sub-suppliers will be separated by GQAR appointed to carry out GQA at each sub- supplier. GQAR check in the contract clause indicating that supplier provides a right of access and support for GQAR at its facilities during performance of the contract and the supplier has the responsibility to control the sub- suppliers. Also, GQAR verifies that the purchase orders to sub- suppliers , the supplier has notified that the goods are subject to the GQA activity and must provide access of GQAR to facilities, equipment and data from sub-provider side.

Work contract review and clarification of the requirements allows GQAR to identify potential risks that may affect the achievement of product / service from the supplier and implementation of the contract, other than those identified by the initial RIAC and to determine the level and volume of the GQA activity to be performed and nominated in GQA Plan.

III.3. RISK ASSESSMENT

It is an effective means of determining the appropriate type and amount of GQA activity. It helps sort through all of the contractual requirements and identify risk related to activity, contract, product or service which will be the object of GQA activity.

Definition of risk accepted and used in quality assurance is issued in AQAP 2070: "Risk is an uncertain event or condition that has both a likelihood of occurring and a negative effect (impact) on the fulfillment of the contractual requirements relating to quality."[54]

Risk Cause means the potential reason(s) why a risk will occur expressed in terms of a breakdown of supplier's processes or process control and linked to the contractual requirements relating to quality.

Risk Impact is the consequence of an uncertain event occurring.

[54] AQAP 2070 ed.2, § 2.2

GQAR and representatives of the Customer / Delegator communicate to identify and assess risks based on the requirements of the contract , those of RGQA (if received) , RIAC and related documents , using all available data and information sources such as :feedback from the beneficiaries; past performance of the supplier; feedback of previously risk; monitoring Quality Imputation Carried Forward; certification of QMS processes or the supplier; processes and critical fundamental features or product; lack of experience of the provider and so on.

GQAR requests to provide information on risks or other factors that may affect the planning GQA, such as: planning the implementation of products / services; archive data on manufacturing of products / services (procurement, manufacture, inspection / testing); data on internal audits; non-compliances; complaints from other beneficiaries.
Risks are identified, analyzed and evaluated for a particular supplier and contract on the "system", “process” and "product". The purpose of risk assessment is to identify factors that may have a negative impact on fulfilling quality requirements during the implementation of products / services and the contract.

Risk assessment process steps: establish risk statement (initiate risk profile, develop / update facility process list; generate risk statement); perform risk impact assessment; identify risk cause (conduct performance factors assessment); determine likelihood; complete risk profile.

Establish risk statement:

Initiate risk profile begins the process by initiating the risk profile of the supplier. A minimum documentation is required: basic supplier information; applicability (program, contract or facility); QMS requirement. It shows relationship between risk indicators and planned GQA activity. As an exception, a risk profile may be not required for some small contracts where LODs or similar documents are received to verify or witness only specific tasks (activities in the delegation serve as the GQA plan). Specific mandatory requirements in QALIs, LODs or similar documents are not required to be risk assessed**.** The resulting risk profile shall be used to plan the appropriate GQA activity. Without a Risk Profile, there is no valid GQA plan.

Develop / update facility process list means listing of all manufacturing and support processes associated with contract, program, or facility. This is not a list of GQA activity requirements.

List is based on flow of product / service /data through the supplier’s facility. As a remark, QMS may be listed as a single process or individual clauses. Risk statement generator

is used to generate risk statements and identify risk impacts based on a listing of predefined conditions and questions. “Risks” are expressed in terms of risk statements. A risk statement has to answer to one of next questions: “What might go wrong?”; “What are we afraid could happen?” and “What are we trying to prevent?” as related to contractual requirements.

Risk impact assessment:

This assessment has to answer to „What would happen if the risk statement were to occur?” question. The impact of risk is critical as is the consequence of contingency: high, medium or low. Given that the Customer / Delegator has a clearer picture of the impact of the risk, GQAR will take into account that the GQA activity may have a small impact or may not influence the risk impact at all.

Risk cause assessment:

This assessment has to answer to „What system, process or product failures would cause the risk statement to occur?” question. Performance factors assessment is used to identify potential causes of the risk statements based on the contractor’s current and past performance. Also, additional potential causes can be taken into consideration related to the new systems, processes or products will be used according to contractual requirements. In order to identify risk causes the assessment has to documents an explanation when negative performance exists, reviews explanations against each applicable risk statement to identify relationships and develops potential reasons why a risk statement will occur regarding inspection or test process, product characteristic, QMS clause, or other contractual requirement.

Risk likelihood assessment:

This assessment has to answer to „What is the likelihood that the cause or potential causes will occur?” question. It has to determine the likelihood of occurrence for each risk cause that was identified. The more likely the risk cause is to occur, the more likely the risk statement will occur. Assessing the likelihood of risk is dependent on the knowledge and experience of the evaluator and the evidence available. Where the evidence is insufficient or there is reasonable to assume that the probability of risk is high. In these cases, GQA activity can be used to gather enough evidence so that evaluation is documented.

Risk assessment is an ongoing process during GQA activity. Periodically, risk profile should be reevaluated and updated trough reevaluation of impact and likelihood ratings taking into account risk events or changes in performance documented by data analysis, correction

requests, corrective action requests or customer complaints. During GQA activity risk profile has to be kept on the current profile, as applicable and annually as a minimum.

Risk information is used to complete and document a GQA Plan.

III.4. GQA PLAN

GQA Plan should contents the answers at the question "How the occurrence of identified risks can be mitigated?"

The Risk Profile identifies the type of plan: facility-wide basis (covering all contracts); program, product / product line, or on a contract by contract basis.

GQA Plan must be clearly identified related to activity, contract, product or service. If the same supplier are several contracts GQAR may carry GQA activity through broader surveillance (facility wide approach), where level of risk allows that. This means that if at the same time more similar products corresponding to several contracts are going through a process, it is sufficient that a type of verification in that specific process runs once for all products / services / contracts. Also, in this case, GQAR has to complete a single GQA Plan. GQA Plan shall be developed by the GQAR) in a format that is easy to understand and apply. GQA Plan shall include at least the following: information relating to the contract (the contract, the full names of the purchaser, beneficiary and provider); information on the potential risks identified by the purchaser / Delegator, customer, supplier and the GQAR (risk profile); definition of GQA activities for each identified risk; methods and techniques of quality assurance that will be used; frequency (intensity) of activities.

GQA methods and techniques:

System Audit Method:

When the identified risk cause is a Quality Management System (QMS) or specific QMS clauses the plan shall: identify System Audit as the method to be used; identify the clauses or sub-clauses to be audited, if a partial audit is identified; include schedules and/or frequency for planned audits. (Note: The time period for the full QMS shall not exceed 3 years in US and not exceed 2 years in Romania).

Process Review Method:

When the risk cause is identified as a process, the plan shall identify Process Review and/or Product Examination as a part of GQA activity methodology. The process review portion of the GQA plan shall include the type of Process Review (Single Event or Incremental), frequency, schedule, and identification of the process outputs to be verified. Production rates shall be considered when establishing the frequency for recurring Process

Reviews. Process Reviews shall be scheduled at intervals of no greater than one year when the identified risk cause is a special process (a process where the resulting output cannot be verified by subsequent monitoring or measurement. This includes any processes where deficiencies become apparent only after the product is in use or the service has been delivered) or the process is associated with a high impact risk statement.

When the likelihood rating is moderate or high, or Process Review is the only selected quality assurance method the frequency shall be commensurate with the risk but as a minimum accomplished semiannually.[55]

Product Examination Method:

When Risk Cause is identified as product characteristic or feature - plan shall include Product Examination as (at least) part of GQA activity method. Product Examination should be planned and performed as early in the product realization process as practicable. The higher the performance risk (likelihood) the greater the benefit of early product examination.

GQA techniques: GQA activities techniques are: inspection, testing, witnessing and verifying.

All those techniques may be documented in the GQA plan or referenced inspection records. Multiple characteristics of the same product may be verified using product examinations with different techniques, frequencies and intensities. The GQA plan shall identify the specific characteristics to be verified or reference a supplemental document that identifies the specific characteristics.

Scope, intensity, and frequency for GQA activities shall be established in GQA plan in order to meet customer directed requirements; to assure the supplier is meeting contractual requirements and to establish and maintain a basis of confidence for product/service acceptance

All three elements are subject to change based on subsequent analyses and risk assessment. Multiple characteristics of the same product may be verified using product examinations with different frequencies and intensities.

Scope is “How large” GQA activity should be performed, intensity is “How Much” GQA activity to perform and frequency is “How Often” GQA activity is performed.

The impact of the risk statement influences the scope of GQA activity as:

[55] guidebook.dcma.mil/226/226-11/index.cfm

Higher impact: broader scope might include multiple methods: product examinations (critical and major), process reviews (incremental or full), system audits (QMS clauses), and any combination. GCQA surveillance cannot change the impact of the risk statement

Lower impact: narrower scope: may not need multiple methods - low impact generally defaults to product examination and/or process review or might include only final product examination (perhaps data verification as the technique).

Final product examination could serve as the method of GQA activity depending on likelihood risk rating, so likelihood influences frequency / intensity:

Increased Intensity and Frequency: High Likelihood will increase the frequency and intensity of the method & techniques used;

Reduced Intensity and Frequency: Lower Likelihood will decrease the frequencies and/or reduce intensity of methods and techniques used.

Note: Frequency is not always measured by time. It could be lots, shipments, occurrences, opportunity (i.e. every third vehicle).

Minimal surveillance review is necessary to be established in order to get confidence in supplier's ability to produce conforming supplies or services

If national procedures require to not keep simple this plan you can add: time planned to achieve deadlines; place of activities; regulation's name which contain requirements for quality assurance (such as for example quality plans , test plans , assessment plans, technological operations , specific work instructions); the name of product acceptance criteria / process established by contract and related documents; intensity of surveillance : percentage using statistical control theory; other quality assurance activities under the contract. More than that, you can draw a recommended model and you can ask GQAR that the form of his plan

must include at least the requirements of the recommended model. At the end you also can create a list of positions that have to approve or agree this plan (no less than 5 and do not forget to include the supplier on the list).

GQA Plan is developed, usually, before the start of the activities specified in this, timely, in orders to not affect the proper performance of the contract. If, because of objective reasons (for example exacerbated bureaucracy, institutionalized through national procedures), development / approval is delayed, GQAR will not disrupt or delay the GQA activity.

GQAR will review GQA Plan when necessary, usually when changes occur on the contract, supplier or when new risks are identified or when the risks have changed

substantially. Also, GQAR will consider reviewing GQA Plan when identifying the non - compliancy of the system, process or product.

III.5. GQA PERFORMANCE

Government quality assurance activity is performed before acceptance by or under the management of Government Quality Assurance personnel. Each country that has a defense industry or even a defense procurement department have developed and manage a systematic, cost-effective government quality assurance program to guarantee that contract performance for defense system is in accordance to specified requirements.

"Acceptance" means the act of an authorized representative of the Government by which the Government, for itself or as agent of another, assumes ownership of existing identified supplies tendered or approves specific services rendered"[56]

"Contract Quality Requirements" means the technical requirements in the contract relating to the quality of the product or service and those contract clauses prescribing inspection, and other quality controls incumbent on the contractor, to assure that the product or service conforms to the contractual requirements.[57]

GQAR carries out on the supplier's facilities, but not limited to, the following activities subject of GQA activity: analysis of the documents used to perform the contract (specifications, technical documentation, supplier's QMS, documents, standards); the monitoring of performance by the supplier of verification and / or calibration equipment used for measuring and monitoring; surveillance and monitoring parameters measurement supplier's processes and products in various stages of manufacture; analysis and / or verify the effectiveness and efficiency of the methods used by the supplier to control changes of processes and products; analysis and / or verify the effectiveness and efficiency of the methods used by the supplier for the control of non-conformities; analysis and / or verification records issued by the supplier on the processes and products; other reviews relating to performance of the contract by the supplier in compliance with the quality requirements defined in the technical military standards. GQAR verifies that the supplier's QMS ensures traceability of activities to allow both monitoring activities related to the production and timely identification of parameters that have a negative influence in order to initiate corrective / preventive actions required. If the supplier has a QMS (certified or not), GQAR review of its elements in whole or in part. GQAR may ask the supplier data resulting from a second / third

[56] FAR Part 46 – Quality Assurance - 46.101 Definitions
[57] FAR Part 46 – Quality Assurance - 46.101 Definitions

part certification of the QMS. GQAR sets with supplier a model document (letter of invitation) trough the supplier calls GQAR conduct GQA activities. Based on activities provided in GQA Plan and in conjunction with the activities included in the inspection programs / plans detailed by the supplier, GQAR verifies the products / services provided by the supplier after they have been inspected / tested by the supplier through its specialized compartments and those were declared in accordance with contractual requirements. GQAR verify the implementation by the supplier of efficient and effective methods of quality assurance by ensuring compliance of products / services provided. GQAR will not replace or reproduce supplier activities with the activities of GQA activity. Customer is not performing GQA. GQAR aims supplier to fulfill the contractual requirements related to quality and timeliness of delivery. In this respect, GQAR will conduct inspections and assessments established in the GQA Plan. GQA activities contained in the GQA Plan will be executed by GQAR independently and / or together with the supplier. When is considered that is necessary and justified, GQAR has the right to extend quality assurance activity out to the provisions of GQA Plan and if found change in risk status he review RIAC and GQA Plan. If at any time during the conduct of GQA activity, GQAR finds that the actions required beyond his experience / technical competence, he will require to complete his team with staff from other departments / offices or other structures.

During GQA performance, GQAR can use the following GQA techniques: formal audit; informal audit; interviews; document reviews, verifications; witnessing of any supplier processes and/or activity; participation/attendance of meetings.

In principle, a verification process has some basic steps: measure performance against a standard; determine the scope of the problem to be evaluated; identify the root causes of malfunction; suggests solutions (recommendations); task responsibility of persons or structures that may eliminate malfunction and enforce solutions. For GQA activity only first three steps are appropriate followed by a request for preventive actions, corrections or corrective actions. The fourth, fifth and sixth steps are in supplier's area of interest with the amendment that supplier's solution or suggestion and solution enforcement are subject to validation by GQAR.

GQAR responsibilities related to preventive actions, correction and corrective actions are: to generate a request for corrections or corrective actions whenever a potential nonconformity or a deficiency is found on an appropriate level which will depend upon the importance or criticality of the nonconformity found and, if is the case, must keep a complete

documentation trail of the supplier's failure to comply with repeated requests for corrections and corrective actions.

Nonconformity represents a non fulfillment of a requirement. In other words, means supplies or services that do not conform to contract requirements. Nonconformance can be: minor - nonconformance that is a departure from established standards having little bearing on the effective use or operation of the supplies or services; major - nonconformance, other than critical, that is likely to result in failure of the supplies or services; critical – nonconformance likely to result in hazardous or unsafe conditions.

As a remark, the distinction between the concepts defect and nonconformity is important as it has legal connotations, particularly those associated with product liability issues. Consequently the term "defect" should be used with extreme caution. Defect can be defined as a non fulfillment of a requirement related to an intended or specified use. The intended use as intended by the customer can be affected by the nature of the information, such as operating or maintenance instructions, provided by the supplier. A defective (unit or product) can have more than one defect.

Preventive action is the action to eliminate the cause of a potential nonconformity or other undesirable potential situation. GQAR should take into consideration there can be more than one cause for a potential nonconformity. Usually, preventive actions can be requested as a result of system audit or process review activities.

The distinction between preventive and corrective action consists in the fact that preventive action is taken to prevent occurrence whereas corrective action is taken to prevent recurrence.

Corrective action is the action to eliminate the cause of a detected nonconformity or other undesirable situation. Again, there can be more than one cause for nonconformity.

There is a distinction between correction and corrective action. Correction is the action to correct defects so is oriented on the effect, not on the cause...

The steps of correction or corrective actions are: identify contractual nonconformity; generate corrective action request; issue corrective action request; distribute corrective action request; document corrective action request details; supplier takes corrective action; review supplier response; verify implementation; follow-up; corrective action request closure and if is the case and such a tool is available, recoupment of re-inspection costs.

The author has to emphasize that are three overarching steps performed by the supplier and GQAR in the process: supplier takes the necessary actions to correct the contractual nonconformity; perform an initial review of the corrections, which have been implemented to

ensure they are adequate and are, in fact, doing what supplier is supposed to do; monitor or follow-up to verify that the corrections continue to be effective.

GQAR prepares reports on its activities, taking into account: the results of GQA and reporting requirements of the Costumer / Delegator; the supplier management processes; the status of critical processes designed to achieve product / service by the supplier; the supplier's processes and methods for measuring and monitoring which is kept under control achievement system of products / services; customer satisfaction (purchaser / user / beneficiary). The findings and conclusions GQA is communicated to the supplier and Costumer / Delegator (or bodies involved in program management / contract).

GQAR require the supplier to issue the compliance certificates / declarations of conformity in order to take responsibility for compliance with contractual requirements based on official records of quality. GQAR has the responsibility and authority to accept only products / services that meet contractual requirements and to reject those that do not meet contractual requirements. GQAR is required to sign / stamp documents relating to GQA, to prove that the materials / goods / services have been the work of GQA.

GQAR sign CoC when required by contract / RGQA, his signature being that the activities of GQA planned have been achieved. This does not mean accepting goods from the Costumer (Delegator) or that all individual components of the products have been inspected and any that have been granted certain certifications (e.g. airworthiness or buoyancy).

At the end of research and development phase, GQAR has to fill in a closure report, issued according with national procedures or AQAP 2070. But it does not that the activity is finished. During acceptance he / she will be fully involved, in operating phase all costumers complain is again the subject of GQA activity, he / she will be also involved in upgrading of the product / service and disposal or recovery of the product. And, case by case, the activities that should be performed are more or less the same.

CONCLUSIONS

The necessity of Government Quality Assurance Activity is dictated by the interaction of several factors: the need for a secure environment, building capabilities corresponding risks and threats to the security environment, the existence of a defense industry that operates on free market principles. Given the involvement of GQA activity throughout the life cycle, it represents one of the most important tools to control the interaction of factors described above. In fact, it made a more efficient matching between resources allocated to building a

capability (and the author refers here to the technical means and related services) and what is received as a final product / service. Taking into account the fact that is dealing with a free market, it is natural for the supplier to try to deliver the product manufacturer / services at the lowest possible price. The ongoing struggle of Government Quality Assurance is to ensure that the final product / service will meet quality requirements at the highest possible level.

Like many of today's activities, language development of quality assurance is not a process to have an end. Adapting to new aspects of reality surrounding makes the transformation to be a continuous process. Therefore, the staff involved in the Government Quality Assurance needs to prepare continuously to remain connected to their environment.

Government Quality Assurance activity is performed by government representatives who have appropriate qualification, being empowered by a national authority, during all life cycle phases of a product or a service.

GQAR activity is based on Deming cycle "Plan – Do – Check – Act", has a balanced proactive and reactive approach, is a risk based activity and is focused on system, process and product with the final goal to increase customer satisfaction regarding product or service that is the subject of Government Quality Assurance Activity.

FOLLOW UP:

Due to contemplated repercussions from the financial crisis, after long discussions in a working group on the future of Government Quality Assurance activities, one of the participants have formulated the following trends: more focus on pre-contractual activities; GQA focus on early planning and risk identification; decrease number of GQARs.

The author is not so convinced regarding the value of his conclusion. First, pre-contractual activities means, in fact, to certificate supplier's QMS. There are a lot of examples that demonstrate the fact that certification, even are a second or third party certification, not automatically lead to lack of nonconformity. As an example, "Firestone, a QS 9000 registered corporation, provided nonconforming tires for the Ford Explorer. The non-conforming tires are linked to numerous accidents of the Explorer. The link resulted in Explorer occupant injury and a lack of public trust in Ford and Firestone products."[58]

Secondly, risk identification in early phases is just an identified risk. Without sustained actions to reduce the occurrence of risk everything comes down to an elevated

[58] Tommie J. Lucius - Department of Defense Quality Management Systems and ISO 9000:2000, page. 3

discussion on the theory of risk OK, it is possible to decrease number of GQARs only up to the point where critical mass is reached. But again, you have to take into consideration that the human resources needed for this kind of activity is a long term investment. As far as the author is concerned, only the preparation of a GQAR takes quite a long time (2 to 4 years).

In this author's opinion, GQA activity should be focused on: quitting the system of periodic certification of second party in the absence of contracts with the defense system; reallocation of human resources made thus available to the risk assessment in pre-contractual phase and in early contractual phase; quitting bureaucratic and lengthy procedures that make impossible a judicious planning of activities; finding the balance between proactive and reactive approach.

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THE CONUNDRUM OF CHANGE MANAGEMENT IN THE MILITARY: SOME THEORETICAL AND PRACTICAL INSIGHTS

Cpt.Cdor Daniel FURDUI

INTRODUCTION

Nowadays reality is changing too quickly too often too radical and in too unexpected way. In the same time nowadays reality become more and more interconected more and more interdependent and for sure more pressed for time, especialy decision time. Challenges never encounter yet and the relatively new world, the virtual one, bring at fast peace virtual adversaries or virtual tools, making the response needed to chalanges eaven hard to find or if found are too often born already obsolete. Volatile, uncertain, complex and ambiguous are the words more and more often heared about nowadays environment. Our ability to predict and planning dimminished as a consequences of the complexity and dinamics of environments and often responses necesary to cope with reality for survival have different nature as it was used to be. Leaders of all kind but especially military ones start to look at the new reality in order to understand and to find solutions to it. Survival and success is the stake of this answers. As steps were taken for this stakes by increasing the amount of info structure and creating new info tools, also was well understood that new challenges that were found so daunting are direct consequences of the capabilities associated with the IT technologies and network centric warfare or network centric business fare is almost everywhere. We need to be sure that survivability is ensured and the success is achieved but not in a very harder manner and at much more costs thus remaining in these conditions is more and more unaffordable and unacceptable. In this new environment the need to find solutions as fast as posible can be enhanced by a relatively new concept called agility. This concept underline the human resource ability to fast shifting from something already in place to a new approach or new way of doing things, a new mind set thus challanging the individual change processes. The individual abilities to cope with change procceses is the carrier for the hard needed manifested

agility that can have decisive outcomes in succeding within this new environment, in the new era.

I. THE PROCESS OF CHANGE

Change is a process neither simple nor easy. Change is difficult, whether is about people or organizations. It is well known that the natural resistance that people shows in the face of change is valid also for the world of organizations.

Currently in the military system, the change has become the rule rather than the exception. Questions arise about how a committed leader can lead at the best the change process in his organization. How he can act and what are the best approaches for him as an agent of change. How well he can adapt his knowledge about the dynamics of individual transformation to the reality of his organization. All this questions have become more and more crucial in a volatile, uncertain, complex and ambiguous environment for those leaders that are keen to successfully fulfill assigned missions and objectives.

Many change agents found this "wisdom" words: it is much easier to do a people change than to change people's mind or way of acting. In other words, it is often easier to start something with a new team (and a new mentality) than to shift or change what organization already have. Within air forces, people change policy is less likely to occur because of specific positions and functions that have a high degree of technical complexity (fighter pilots, ground navigators, operators and technicians providing the means of warfare or network centric warfare) where experience plays an important role to ensure quality and continuity of the objectives and missions. Therefore leaders, as the main agent of change, will have to act mostly in order to change people that are already in his organization. Most of the time people do not preclude too much change, but rather their reluctance came from the "personal unknown zone". Many people in organizations have the willingness or want to make changes, but have not acquired the knowledge and skills that they need and must be helped to cross the stages of change. Old ideas die hard and it is important that any effort to change - personal and organizational - to take place both in the cognitive as well as affective states. In other words, the leader must win both minds and hearts of his people. At the intellectual awareness, people need to see the benefits of the change but the real challenge is to find ways to trigger in them forces to attach emotional availability (or even eagerness) to try new things. This is valid for the people changes and for the change of organization too.

In air forces organizations as well as in any other group of people, successful implementation of a change depends on people's well understanding of individual reactions to the process of change and in the end organizational changes naturally develop along with individual changes.

I.1. INDIVIDUAL CHANGE DYNAMICS

Currently, there are several schools of thought about how much change can be done at individual level, and how this changes occurs.

In the first period of childhood, individual personality develops as fast as his body. In the adult phase radical or revolutionary changes rarely occur, but at any time of life, it is possible some degree of change. Every individual have a continuous degree of changes and in any stage of life occur gradually evolutionary process. In fact, the change is inevitable. Principles underlying the development of this process appear to be relatively invariant from one individual to another and predictability of these stages allows extrapolation of individual changes at organizational changes level. Five essential components of individual changes were identified:

A. Concern,

B. Coping,

C. Clarify,

D. Crystallization,

E. Change of the self.

A. Concern

This is a state of negative emotion which requires the individual to be aware of the serious consequences that can be expected if a dysfunctional situation would perpetuate and makes his "status quo" increasingly difficult to maintain.

Given the relative stability of people's personality, triggering the process of change requires the action of a strong disturbance, like danger or pain type (frustration, anxiety, sadness, anger, etc). Must intervene an element (or elements) of high discomfort that overmatch as importance the pleasure of "secondary gains" such as sympathy, attention or other psychological benefits that individual continues to have maintaining the current status. Individuals must experience a concern regarding or to make him be carefully with the current situation or to be putted under continuous emotional discomfort caused by one or more stressful stimuli such as: tension in the family or team work, financial deprivation, health problems, negative image in society or at work, accident, behavioral problems, isolation. This stimuli leads to a general feeling of helplessness or insecurity,

thoughts of unpleasant incidents occurred to someone near or dear can occur in his life, having daily frustrations or experiencing minor troubles on a daily bases.

When individual occasional complaints are starting to turn into a constant pattern of dissatisfaction, the individual can not deny that he must do something to change the situation. From this point on, any new disturbance is recognized as part of the general pattern of dissatisfaction. Its discontents converge and supplying a coherent entity and finally manage to decisively interpret what is happening. More and more individual is able to see clearly that the situation can not be improved either by the passage of time, or even by making some minor changes. In the absence of drastic measures individuals start to have a strong belief that, the situation gets worse. At this point the individual begins to set in motion a process at mind set level which mental examines the alternatives of his current unfavorable situation, making the transition from total denial to the awareness that things are not right and begins to undergo a process of revaluation .

B. Confrontation or turning point

The concern is a necessary first step, but by itself is not a guarantee of action therefore people need a boost, a confrontation as something that can be defined as “focal event” or a “turning point”. Sometimes the event that triggers the change may be something that only in retrospect perspective can be interpreted as being the turning point or sometime a minor event all but the last thing added to others, clarify the situation. Other times, focal events of an individual, even if at first glance seem like unimportant incident, can reveal a host of symbolic incidents linked to the issue that upset it. In this case even if, objectively , is perceived as a minor incident in a subjective level it is lived as significant because it draws attention to a problem long existing that switch or trigger to a visionary moment. This is the moment when the individual begins to be ready to spring into action and its resistance to the change begins to blow. Individual begins to understand their situation very differently, sees new opportunities, though before general feeling was just helplessness and hopelessness. His emotional energy is transferred from the "care" of the past to the present and future issues. Individual is mentally ready to deal with the future in a more constructive way and make use of his creativity for this purpose.

C. Clarification

The third step in the process of changing an individual’s is the spreading to others his intentions and individual is ready for an insight personal confrontation that would clarify the intent. Declaring individual willingness has decisive importance, because it generates two simultaneous effects: it influences him and in same time influences his environment. Disclosure of "public" intention, along with, the confrontation with others which clarifies situation, the individual increases his commitment to act and also to attract the support of others, which in itself manifests as a

powerful agent of change. Individual already started a communication process that leads to clarify the self meaning and self vision and through this public declaration, the individual shall give itself a kind of ultimatum: if you do not take things to the end (no matter what the change is) draws contempt of others, triggering erosion and even the end of his credibility that he enjoys in its environment.

D. Crystallization

Personal decision taken at the stage of clarification already laid the foundation for a reassessment of the goals and judicious testing various new alternatives that have been glimpsed. Individual creativity is to clarify the ideas and the plans start to take shape. Destination toward is heading this individual insight is a better understanding of self and set the foundation of a new beginning.

E. Effective Change

The only real sign that change is done is displaying or showing of new mentality that individual already undertook. Inner transformation takes place only when the individual internalizes a whole new way of looking at surrounding reality and further having a new mind set.

In the literature shows that during each of these stages three internal forces act together either altogether or against each other, causing a series of change experiences, small and interwoven. Intentional individual change once achieved, these forces recalibrates itself, consolidates itself and deepens strengthens individual's new life orientation. These internal forces are: individual defensive structures, his emotional reactions and perceptions about themselves and others. From the point of view of these forces, individual change requires:

- Individual voluntary rejection of the defense mechanisms after the identification and recognition of these mechanisms,

- Individual openly expressing his moods, after emotions were identified and understood,

- Perception of self and of the others to be done in an objective manner, corresponding to reality, after individual image of the self and of the others was changed.

Understanding of the individual change processes and based on their predictability leaders can extrapolate from individual change to organizational change. Being attentive and considering the different stages of individual change leader can reach to a parallel set of conclusions about the stages of his organization changes. His vision made about individual change applied to the transformation awareness, induces, facilitates and even speeds up his organization change.

I.2. LEADER STRATEGIES IN CHANGE IMPLEMENTATION

The magnitude of change that is needed depends on the organization and the environment in which it operates. The organizations generally identified three approaches placed along its continuous change process. That range goes from simple operations to improve the overall operations to redesigning entire organization, to massive personnel layoffs, reorientation with new strategies identifying minimum required competencies at all levels up to revitalize the core leadership of the entire organization and change overall organizational mindsets. These approaches are translated into real life in restructuring (when the organization becomes smaller) redesign (when the organization becomes more efficient) or reinvention (when the organization becomes more "smarter"). Small changes do not present too many problems for most organizations that in what follows I will summarize strategies for radical changes at leaders' hand.

A. Re-organization

In the military system often are available two of these approaches.

Restructuring or shrinking of large organizations is often unavailable to their leaders, because imply very complex operations. At small level organizations restructuring is possible, to some extent, which involves rethinking and redesigning operational attributes of the remaining stations. "Survivors "remaining in an organization that has reduced the personnel number often complain that abolished positions led to overloading, further aggravating the situation of the personnel already in stress and with certain confusion. To avoid such unnecessary tension, leader must clarify the duties, responsibilities and workloads on each of the remaining positions. At the same time can compensate by putting in the shade or even eliminate personnel with lack of creativity and skills change and highlighting others, more energetic, more skilled, more creative, and enthusiastic, able to help the organization change process.

Redesigning of the organization involves redistribution of the allocated resources and invested in people, in the form of various forms of training and professional. This sends to all personnel a strong signal of confidence in the future that leader has for his organization and helps reduce the difficulties of adaptation. Leader must not forget that the mental welfare of subordinates depends mainly on the stability of the working environment due to facts that human being usually has low tolerance to uncertainty. Certainly people's concern is inevitable, but the commander can reduce it to a minimum and may keep people's confidence if keep them up to date with all details of systematic steps which go with organization process of change. Leaders offering encouragement to those who need it making it accessible all the time, clarifying situations arising when it seems necessary (or when requested to do) and being open and honest about the overall effects of organization change.

B. Strategic Reorientation

Strategic reorientation of the organization can be understood as giving greater attention and understanding of their main objectives, a refocusing of the activities. Leader, as a first step towards this goal is to make a comprehensive assessment of the activities in which his organization is indeed an expert, therefore this are its core competencies and what his personnel do at their best. The second step should be a good analysis of the organization environment, identifying what kind of difficulties are faced, knowing what are the requirements and expectations of the upper echelons on his organization results, which discontinuities may arise in the future and how they affect the organization overall activity. All these leader actions and measures are a good way to acquire and increase the vitality of his organization on the path of organization change process.

C. Change the organizational mindset

Obviously, in any action for organization change, the main interest is to change the organization mentality as a must for achieving the success in the change endeavor. With predilection at leader hand reach is the most successful strategy. Restructuring, layoffs and other tactical actions can lead organization change only to a point. Long-term competitive advantage comes only from strategic innovation, from the ideas that lead to sustainable progress, and from investments in the people onward to that innovation and ideas.

Therefore, the leader must use appropriate actions that stimulate and increase the use of positive creativity and inventiveness of his personnel. He must motivate subordinates to make the efforts that are needed, to inspire and mobilize them, and in the end, they themselves must show that evolved with individual process of change.

Creating a collective mentality, culture realignment is the act of the leader that must ensure that all organization members assume personal responsibility for each stage of organization change. But he can not make people to take personal responsibility by just asking them through job description or by ordering to do it. If you want to spread the responsibility across the organization leader must inspire people, to stir up enough interest and affection from all people to win their harts and making them to want the targeted future, therefore creating a collective mentality on foundation of ongoing use of the personnel positive creativity. For this, leaders need to initiate and develop a dialogue with subordinates on personal issues on how to enhance individual effectiveness (components of organization effectiveness) on the obstacles encountered due to forces within and outside the organization. The way people respond and act after such clarification depends on the entire creative process and transformation of the organization. Collective attitudes necessary for a successful change process combines concrete future objectives with those aspects of organizational culture that may contribute to the desired future.

Organizational culture is a mosaic of fundamental conceptions expressed as principles, values, and behavior patterns specific and adopted by members of the organization to cope with pressure from inside and outside and is generally beyond people's awareness. It is a kind of "invisible hand" that structures the personnel way of work and can not be changed easily.

Generally considered as a matter of course, organizational culture within organizations is one that lays down certain rules of behavior. It provides a set of common frameworks that are learned during the social and professional interactions are transmitted from person to person and are normative. In other words, organizational culture helps employees understand what they are allowed to do and what not, while they are at work.

In terms of creativity, organizational culture helps organization to determine its strategy, the attitude of others or legitimately interested echelons of its operation, the main methods for the selection of subordinates, performance evaluation criteria and promotion, the right style in interpersonal relationships and social work, the leadership style.

Organizational culture speaks about organization features, about it identity , including a lot of symbolic elements that come to be expressed through language, rituals, stories, metaphors, specific, behavioral and other manifestations linked to everyday life. Organizational culture is deeply rooted in organization identity and last long in time. Identification of positive creativity and its affirmation as a cultural value is of particular importance for the process of changing the organization and the leader must ensure that it becomes a value shared by all personnel and will be maintained. In this way certainly the creativity would enhance the other organizational core values:

- Orientation to teamwork;
- Honesty;
- Empowerment of subordinates;
- Respect for the individual;
- Competitive spirit and desire to win;
- Pleasant atmosphere;
- Taking personal responsibility;
- Lifelong learning;
- Openness to change;
- Confidence
- Positive approach to problems.

Implementation and creation of collective mentality, in terms of creativity as declared value, depend of subordinate's entrusted fall in leader's power and its willingness to recognize, use and reward positive outcomes of creativity together with identifying and punishing negative creativity

occurred. In this process, the communication, which we know involves listening and speaking, play the most important role. Individual excessive preoccupation to formulate his own answers so that he no longer listening interlocutors or lack of mutual respect (involving honesty, openness, consistency, competence, fairness and integrity) quickly removes the desire for the act of communication with negative consequences like diminishing or total loss of confidence, diminishing personnel motivational support and the reduction or elimination of personnel positive creativity.

II. POSITIVE APPROACHES IN THE PROCESS OF CHANGE

Positive approaches are a prerequisite for positive creativity which in turn is the engine of change processes. But positive approach is not just something like "how full a glass of water and not how much is empty" or "what do we have to perform a task and not what shorts we have not able to perform a task" or "if regulations say it can not be done then can not be done instead of if regulations did not say it can not be done then it can be done". Positive approach should not be seen by the leader only individual value in the collective mentality, but also as a possibility to develop and improve the capabilities of foresight and planning the activity of organization. The leader can achieve collective positive approach by turning weaknesses into strengths and maximizing opportunities and maximize the use of resources.

II.1. MAXIMIZING OPPORTUNITIES AND TURNING WEAKNESSES INTO STRENGTHS

An objective analysis of the entire organization and its basic elements can reveal to leaders that his organization almost always is in a situation less, "pink" than expected. The positive creativity results or important and viable knowledge either are not applied where it could produce maximum outcome or produce mediocre or useless outcome. In this case solving the day to day problems not prevents worsening of the situation and is needed of a systematic designed program and targeted. Of the large number of tasks, leader must identify the priority ones and resources, if limited, will be channeled to the most important occasions, ordering these tasks and meet them at the highest quality. Of course this can create a situation of imbalance, moving sideways and recording negative results elsewhere, excessive working thing and neglecting another. To avoid this imbalance leader must systematically define opportunities that can be capitalized on the basis of the positive creativity and new knowledge and skills, in other words, the opportunities for innovation. He must identify where the opportunities to undertake something new and different that will bring

the best results in their tasks and missions. It is the dynamic approach that gives rise to new ideas, techniques, methods or specific processes or action which add value to organization. Then the leader will focus on providing the knowledge, skills, methods and procedures necessary to capitalize on these opportunities which means maximizing occasion. Maximizing occasion is not just technological innovation but also innovation in plan interpersonal like combining traditions of interpersonal relationships within the discipline specific of modern military system. Successful planning is always based on maximizing opportunities. Maximizing opportunities leader shows how to move organization from past to present and preparing it for the challenges of tomorrow's missions. Thus will discover activities to be pursued and which should be abandoned and new items that can multiply the results and the knowledge of personnel.

II.2. MAXIMIZE THE USE OF RESOURCES

For each personnel leader seeks, chooses and assigns an important opportunity to match their talent and character, an opportunity for each individual "resource" able to make the greatest contribution. One of the obvious rules of evidence in resources maximization shows that he must not assign to an important opportunity an inadequate human resource, meaning a mediocre person. Such a person can not turn opportunity into an advantage. Every opportunity has a corresponding degree of risk, therefore, mediocrity of human resource allocated will cause damage if leader choose to offer that opportunity and to benefit from the material resources allocated to those occasions and moreover wasting organization occasion itself. Maximizing resources is moving from analysis to action. Therefore leader setting priorities and focusing resources on priorities ensure that energy and effort of organization will go to places where they can achieve best results for organization tasks and objectives. Adequate allocation of human resources in military systems is vital to achieve the organization missions. The essential point of a coherent program of action in the process of change is raising at rank of principle the positive approach, the resources allocation and maximization, and no less in particular the most scarce and productive resources – high skilled and trained personnel. Always people having the highest level of creative ability and performance must benefit of major opportunities. If from this point of view there are no resources available, they must be formed, developed and generalized. If is a must for great opportunities to be exploited only by personnel with largest professional value there is reverse also, these personnel resources should not be wasted with any occurred occasions. The biggest temptation is to spread resources and not to focus them. It is very easy and convenient to avoid painful decisions, priority ones, continuously asking high-valued personnel for one to one support and advise a colleague of him less competent after mentality "more competent people will could find and allocate time from his schedule to help their

less fortunate fellow". In this way, the potential will be wasted with competent personnel assigned in secondary opportunities and mediocre personnel assistance.

Leader must concentrate all the makings to be effective, and any major occasion is nothing but a challenge for him and subordinates and requires all their attention and total involvement.

CONCLUSIONS

We are clearly living in a new reality where volatility, uncertainty, complexity and ambiguity are the new coordinates of our environment and this new world is here to stay. For any leader that wants to succeed in the future endeavors need to redefine the rightful role of combined strategic foresight with a right path toward agility both on personnel level and organization level.

Those leaders who don't clearly see the direct connection between individual changes, creativity, making creativity as main pillar in organizational change and organizational culture under a participative management, needs for asking to all personnel for a high level of manifested agility and finally to achieve a necessary level of organizational agility might not survive. Or if they manage somehow to survive would be at great costs and efforts.

Main reliable resource in any organization that can successfully evolve and to cope with new era is human resources and is in a way an endless resource. Leaders, and especially for a military leaders that understand the fact that creativity represents a source of power for holder when proper recognized and put at good use into organization culture would be blessed with a team that can reach the aims of tomorrow assignments. These kinds of teams can well understand the nature of agility and by definition if agility it can be improved it will increase the chances of success in unanticipated circumstances. Leaders must be able to understand what the key determinants of agility are and how it can be improved. Must to understand how can be measured the agility and to determine how much agility is needed for every level and components of their organizations. Appropriate actions would lead to achievements of proper levels of agility to building that collective mentality required for winning, along with possibilities to develop and improve the capabilities of foresight and planning the activity of any organization in our new world.

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CAPABILITIES BASED PLANNING – ADVANTAGES AND CHALLENGES

Wing Commander Viorel GEAMANU

INTRODUCTION

Before the end of the 20th Century, traditional threats included territorial disputes, ethnic and cultural conflicts or competitions for the access to the resources. Nowadays, besides these threats that are still pertinent, new ones emerged: terrorism, proliferation of weapons of mass destruction, involvement of non-state actors, asymmetric or hybrid threats, human rights violations, resources management and dissolution states.

"In such a tense and complex environment, the security of each individual country, as well as that of the international community as a whole, depends on the ability to anticipate and to undertake proactive actions, rather than on reacting to events or adjusting to them. In a conflicting, dynamic and complex world that is undergoing an all-encompassing globalization process the proper understanding of the major trends of the world's development and of the way in which each country has the chance to become an active part of this process is a prerequisite for progress."[59]

Australia, Canada, New Zeeland, the United Kingdom and the United States are implementing a capabilities based planning (CBP) system for long-term force structure and equipping needs planning. Due to differences in organizational, planning and legislative processes, each nation is implementing a specific variant of CBP to meet their own environment. There are strong similarities between these variants, and also significant differences, but the core concept behind CBP is unique.

The current defence planning processes – at national or international organization level – are the result of an evolutionary process defined as a need for adaptation to the conditions of the new security environment.

[59] The National Security Strategy of Romania, 2007

I. DEFENCE PLANNING

As a part of defence policy, defence planning is a set of activities and measures targeted to promote national interests, to define and accomplish national security objectives in defence areas.

In NATO, defence planning means "the political and military process used by nations to provide the capabilities needed to meet their defence commitments"[60]. This definition is taking into account the factors that influence the development of capabilities: political, economic, technological and military ones. Defence planning in NATO is a crucial tool which enables member countries to benefit from the advantages of working together.

The role of defence planning process is to facilitate identification of capability needs, to make available an equipped, trained, interoperable and sustained pool of forces and develop the capabilities associated to these forces in order to accomplish the full range of missions. If part of an alliance, defence planning includes also programs, actions and measures initiated as contribution to collective defence. The ultimate aim is to harmonize the national and collective defence planning in the most effective approach in order to meet common targets.

In respect to the capabilities based planning, Paul K. Davis [1] is considered to be the one who contributed most at the conceptual work on capabilities based planning, developed at the RAND Corporation's US National Defense Research Institute. He defined the new approach as "planning under uncertainty, to provide capabilities suitable for a wide range of modern-day challenges and circumstances while working within an economic framework that necessitates choice."

Both NATO and EU are implementing capabilities based planning processes. At NATO level, the transformation started after 1990, as the tipping point that changed the defence planning focus on force planning (1993-2001), then on force planning and logistic planning (2001-2005). In 2007, the command and control and resources were included in the area of defence planning, and in 2009 the focus changed towards capability planning. Today, NATO defence planning process includes five steps: establish political guidance (step 1); determine requirements (step 2); apportion requirements and set targets (step 3); facilitate implementation (step 4); and review results (step 5). All the requirements considered necessary to meet the quantitative and qualitative ambitions set out in the political guidance

[60] AAP-42, NATO Glossary of Standardization Terms and Definitions

are included in the Minimum Capability Requirements. The process is structured, comprehensive, transparent and traceable.

Target setting initially apportions the overall set of Minimum Capability Requirements to individual countries and NATO entities in the form of target packages, respecting the principles of fair burden-sharing and reasonable challenge. NATO planners develop targets packages for existing and planned capabilities against the Minimum Capability Requirements. Targets are expressed in capability terms and are flexible enough to allow national, multinational as well as collective implementation. Packages will be forwarded to Allies with a recommendation of which targets should be retained or removed to respect the principles mentioned above (fair burden-sharing and reasonable challenge). Allies will review these packages during a series of multilateral examinations. Agreed packages will be forwarded to defence ministers for adoption, together with an assessment of the potential risk and possible impact caused by the removal of planning targets from packages on the delivery of the Alliance's Level of Ambition [5].

The issue of military capabilities in the EU is part of the Common Security and Defence Policy (CSDP). The first concrete step to enhance military capabilities was made in 1999 when member states signed Helsinki Headline Goal. The document includes the creation of a catalogue of forces. In December 2001, EU launched the European Capabilities Action Plan (ECAP) in order to overcome the defence capability deficiencies, and in February 2003 was adopted the Capability Development Mechanism which set the ground for a commonly developed processes. The Requirements Catalogue elaborated in 2005 is defining scenarios and strategic planning hypothesis that will help identify the military capabilities needed by EU actions. The forces and military capabilities offered by nations are included in the Force Catalogue (issued in 2006 and updated in 2009). The cross analysis between forces and military capabilities made available by the nations and military capabilities requirements is made through the Progress Catalogue. Based on this analysis, a decision on military capability development is to be taken. At EU level, the responsibility on military capabilities resides to European Defence Agency (EDA).

II. PLANNING METHODOLOGIES

There are different approaches to defence planning. Some are easy to be understand, some are more complex. The main methodologies, as defined by the *Handbook on Long Term Defence Planning* [2] include:

a) “Step by step planning” – developing current capabilities, envisaging only short term options;

b) “Risk avoidance planning” – is a conservative approach, using proven concepts and structures and trying to maintain the status quo;

c) “Incremental planning” – improving the existed capabilities with focus on near term options; is an alternative of risk avoidance approach;

d) “Historical extension” – the process is based on historical analysis taking advantage of the positive factors and avoiding the negative ones;

e) “Top-down planning” – it starts from top-level policy, interests and objectives; through the process are developed strategies down to lower levels tasks;

f) “Resource-constrained planning” – the focus is to provide the necessary forces and most efficient capabilities within the provided budget;

g) “Technology optimism” – main goal is to obtain operational and strategic superiority through technology;

h) “Threat-based planning” – this approach intends to identify potential enemies and evaluate their capabilities; requirements are defined to prevail over the enemy;

i) “Scenario-based planning” – the process utilizes a representative set of situations for the employment of forces; the situations include environmental and operational parameters and form the test bed for assessing capability or system requirements against formulated mission objectives;

j) “Capabilities based planning” – a functional analysis of expected future operations; the outcome is not concrete weapon systems and manning levels, but a description of the task force structure units should be able to perform, expressed in capability terms; once the capability inventory is defined, the most cost-effective and efficient physical force unit options to implement these capabilities are derived.

In reality, defence planning is implementing usually a combination of these methodologies rather than an individual one. The last three approaches are the most used and they are focusing on functions or concrete scenarios when trying to measure the performance.

The threat-based approach was the traditional military planning approach during the relatively stable strategic environment of the Cold War, when a clear distinction between friends and foes was established. Requirements for capabilities or systems are based on the responsive criterion and are explored quantitative and qualitative solutions. A basic product is the threat assessment, by which intelligence is providing the commander with an estimate on

the adversary's probable intent, objectives, strengths, weaknesses, probable course-of-action, most dangerous course-of-action, values, and critical vulnerabilities. Threat-based planning produces only guesses in the face of state-sponsored and non-state threat actors. In an asymmetric and unprecedented threat environment threat-based planning can be simply frustrating because of the absence of enough hard intelligence and can result in continued inability to determine courses of action.

Scenario-based planning methodology was developed after September 2011 and is focused on what events could happen. It is simple to execute and adjustable, derived from the scenarios selected. The contingency plans do not require detailed threat assessments, but require certainty about possible scenarios and only the selected scenarios (a limited number) to plan against. Another deficit of this methodology, deficit that affects the flexibility and adaptability of planning is characterized by a fixation on particular enemies, wars, and assumptions about those wars. To overcome these shortfalls, a formalized set of standard threat scenarios can be produced, but one size does not fit all. The challenge for any scenario-based approach is to be able to plan with certainty that the scenarios developed will be the ones to face. That certainty is far in an environment that addresses the multifaceted and ambiguous threats.

Capabilities based planning was developed as an alternative and not opposing to the traditional threat-based planning. Also, the focus is not changed from threat to capabilities. This approach is an answer to the need for increased variability when studying defence planning situations, to better manage the uncertainty.

This method involves a functional analysis of expected future operations. The future operations themselves do not enter the performance evaluations. The outcome of such planning is not concrete weapons systems and manning levels, but a description of the tasks force structure, units should be able to perform, expressed in capability terms. Once the capability inventory is defined, the most cost-effective and efficient physical force unit options to implement these capabilities are derived. This planning methodology differs from the previous traditional ones by two main characteristics: the focus is on what you need to do rather than what you have, and the solutions are not envisaged or suggested too early in the process. In delaying the decision, a large array of options can be maintained during the process and is encouraged the development of more innovative alternatives.

The result of the planning process consists of a solution framework composed by "building blocks" of capabilities that can be combined and adapted in order to respond to general and specific threats.

III. CAPABILITIES BASED PLANNING CONCEPT

Capabilities based planning represents an attempt to provide more transparency and coherence in the planning process, providing a more rational basis for making decisions on future acquisitions, and makes planning more responsive to uncertainty and economic constraints, facilitate risk management and encourages innovation. CBP provides a framework to support analysis and it focuses on goals and end-states. It starts by asking questions regarding *what we need to do* rather than *what equipment we need to acquire*, and the emphasis is put more on *how an adversary might fight* rather than specifically *whom the adversary might be* or *where a war might occur.*

The CBP concept includes the interdependence of systems, doctrine, organization and support when delivering the capability. In order to identify optimum force development investments, different options are examined through a systematic approach, taking into account the performance to meet the strategic objectives and minimizing cost and risk.

As mentioned in the "Guide to Capability-Based Planning" developed by the Technical Panel of the Joint Systems and Analysis Group from The Technical Cooperation Program (TTCP), CBP is composed of four major building blocks:

a) high-level capability objectives derived from government/political guidance (output oriented);

b) top-level doctrine or an overarching operational concept, considering the way in which the force will fight (employment concept at strategic, operational and tactical level);

c) standard groupings – capability clusters based around the ability to perform tasks, or to deliver effects and to make the process more manageable;

d) the resource component; capabilities are to be realized within available resources.

Defence capabilities are to be assessed using plausible situations summarized in planning scenarios. These scenarios should reflect the type of tasks assigned to the defence organization, and also provide a basis for developing goals against which capabilities are assessed.

CBP provides a method to identify the levels of capability needed to achieve the objectives settled by the national or organization strategy. Using scenarios, CBP makes the connection between capability goals and strategic requirements. These goals take into account the development of the needed force options within the available budget, in order to meet the range of contingencies mentioned in the guidance.

The CBP process can include the generic steps [4] presented in Figure 1: starting with the overarching guidance, identifying capability gaps, exploring options, and ending with an affordable investment plan.

When implementing the capabilities based planning, the ultimate aim is to provide a complex picture on possible solutions in capability development area and a balance achievement between risks, priorities and resources. The picture is to be used by the decision makers to find better solutions, and by the planners, in order to implement the decisions through the programs.

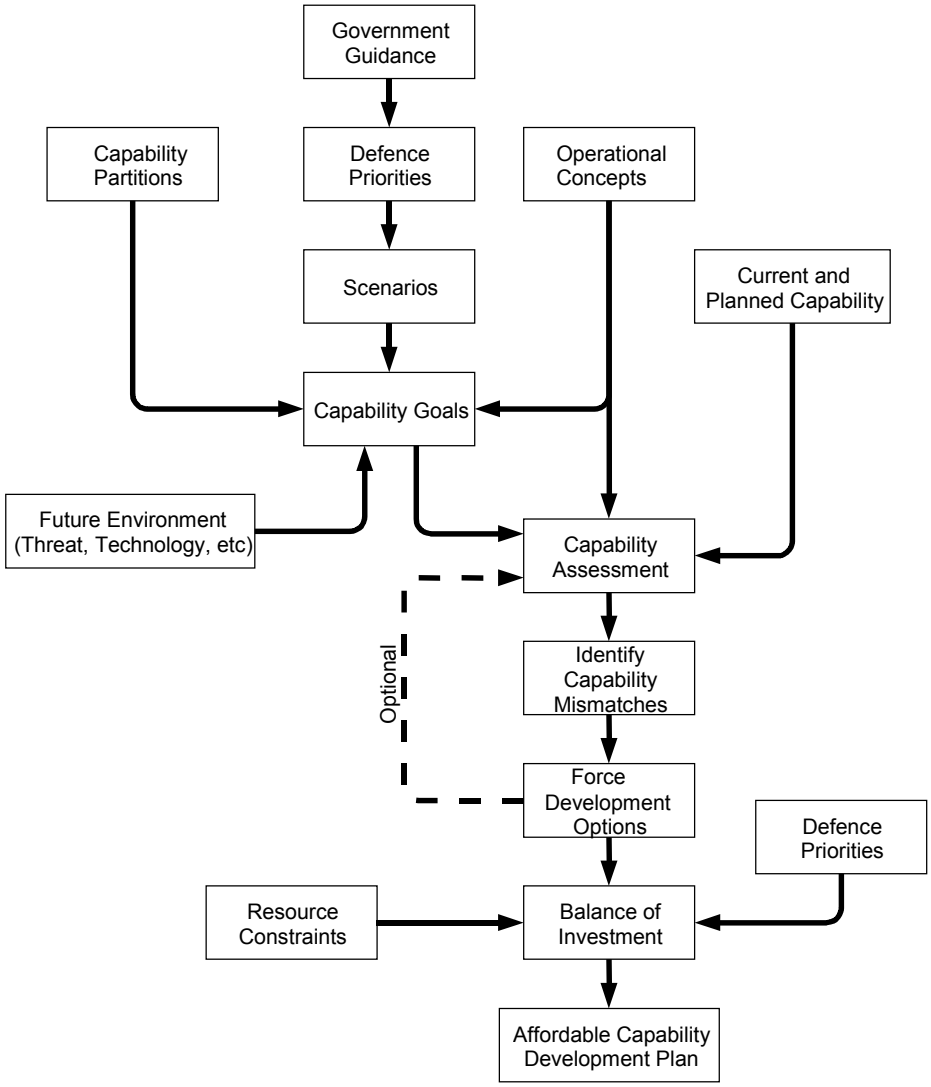

Fig.1 Generic Process Chart of Capability-Based Planning

As quoted by Thomas Goss at the end of his paperwork published in the academic journal *Homeland Security Affairs* [3], the US Secretary of Defence, Donald Rumsfeld described this concept in pragmatic words stating:

"It's like dealing with burglars: You cannot possibly know who wants to break into your home, or when. But you do know how they might try to get in. You know they might try to pick your lock, so you need a good, solid, dead bolt on your front door. You know they might try breaking through a window, so you need a good alarm. You know it is better to stop them before they get in, so you need a police force to patrol the neighbourhood and keep bad guys off the streets. And you know that a big German Shepherd doesn't hurt, either."

IV. CAPABILITIES BASED PLANNING INVESTIGATION

This planning methodology is used already by some nations and international organizations. First reviews revealed advantages in taking this approach, but also some difficulties were underlined when implementing it. Based on the experience collected and shared by the users, the strong points and the challenges associated with this process are presented and described below.

IV.1. Capabilities based planning advantages

Starting from its definition, this planning methodology was developed as an answer to actual challenges and circumstances; it was a necessity to cope with current security environment.

Giving the great degree of the uncertainty and the actual resource constrained situation, capabilities based planning can offer better solutions through its process complexity. CBP is producing a menu of options for decision-makers that is directly related to specific threat capabilities and linked to specific resources.

One of the main benefits of implementing a capability based planning process would be the ability to change the focus from single-service oriented to a joint approach. CBP usually needs to use systems and concepts from multiple services in order to achieve each capability. The intent of the process is to produce capabilities that have jointness built-in from the beginning. This joint focus encourages decision-makers to make judgements in a broader context of defence force goals and not bearing in mind their own service when making

capability decisions. Capabilities based planning provides the common framework used for relating and comparing disparate elements of a defence organization.

Capabilities based planning provides the means to evaluate multiple options in order to achieve the same capability. This will allow a comparative analysis of the potential solutions giving the opportunity to select the best alternative, which respond to the efficiency and effectiveness desired.

CBP improves the quality of information available to decision-makers, defence planners and capability developers. Following all the steps of the CBP implementation algorithm will offer the complex picture of all elements involved in the process.

CBP promotes innovation by moving away from establishing equipment solutions too early in the process. Postponing the moment a decision is to be taken diminishes the possibility to choose prematurely a solution that could not be the best one, and gives the opportunity to maintain alternatives. A solution selected early in the process can be surpassed by the time to be implemented.

Capabilities based planning process is maintaining the link between objectives and acquisition and provides the common framework that can be used to link planning to resources.

Another fundamental benefit of CBP planning process resides in it's explicitly. Formulating the threat assessment and the capabilities menu that results from this analysis, the process is provided transparent. Assumptions and options are tested and confronted in order to continually revise, update, and improve the contingency plans.

Threat assessment in CBP allows a greater focus on the "how" and not the "who" of the threat. For defence planners it matters a little to know who the threat is. The process is facilitating the exploration of a much broader range of eventualities and gives to the defence planners a defined and detailed threat to plan against. The planning efforts will be more effective in overcoming challenges of uncertainty.

CBP can overcome uncertainty with flexibility in planning. This is to be realized formulating plans that can be expressed and adapted as menu of options and preventive response with a range of different degrees.

The CBP process can provide an audit trial. This is essential to demonstrate the validity of the results and gain the confidence of decision-makers. The result of CBP process is a capability development plan that incorporates traceability of decisions. All other reports (impact statements, alternative proposals with pros and cons) necessitate a considerable audit trail to provide the supporting credibility of decisions.

At the international organizations level, capabilities based planning gives the opportunity to meet the organization objectives, preserving at the same time the national specificity in developing the forces or capabilities. Organizational strategic goals will not result in imposing to member nations to develop specific forces. Nations are free to follow their own planning approach. The process will enable the opportunities for effective multinational solutions, provides transparency, and brings the potential to employ military and non-military features in a more cohesive manner.

IV.2. Capabilities based planning challenges

When implementing capabilities based planning process, the first step is to establish a suitable and capable management structure and to define the responsibilities. In order to achieve a well managed process, senior levels commitments is of paramount. Otherwise, the benefits of CBP will be limited. Defining the responsibilities will include the following decisions:

- who will do what work;
- who has responsibility for the outcomes;
- what the outcome or outcomes of the process will be;
- the resources required;
- the length of a planning cycle;
- the products that are to be developed;
- make sure the process will meet the constraints (timelines etc.).

Finally, the allocation of appropriate resources will allow the implementation of the capability development plan.

The management structure can be created in an arrangement as an additional duty with personnel who have other full-time duties (overload work), or a brand new structure (risk of insulating the process from the stakeholders).

CBP is taking advantages only on medium and long term planning. On the short term, capabilities used or adapted are the existing ones in the inventory.

Changing the focus from single-service oriented to a joint approach is not only a benefit. CBP brings the pluralism among defence interests and is increasing the number of stakeholders. If not well managed, these interests can fight each other and the situation can generate a negative competition between interest's supporters.

Capabilities based planning depends upon joint concepts. When available, these concepts must translate strategic guidance into "born joint" capabilities. If not available from the beginning, reflecting the potential benefits of emerging or new concepts may be difficult.

CBP is not treating the threat as a set of single-point values. The approach to the threat is continuum, within prescribed limits. To overcome this weakness, a more specific intelligence warning is required to determine the "where" and the "when" of the threat attack and the detailed tactical planning to react with own capabilities. A generic deterrence value can be provided also using tailored capabilities or capability packages, demonstrating the ability to counter the threats.

Most equipment used for defence is a multi-role one. It contributes to several capability partitions. Sharing the information obtained from one capability partition with the others is a necessity. In doing by this way will prepare future analysis using consolidated force development options. The final force structure can be optimized taking advantage of these multiple contribution of equipment.

In order to be successful, CBP requires a large amount of information. The format for these data should be easy to understand and easy to synthesize. To respond to this requirement a common definition of the terms is to be adopted; detailed process description should be developed, and use of templates implemented.

The environment in which analyses are performed should provide a common ground or similar conditions for similar capabilities. To overcome possible inconsistencies common scenarios must be developed for use by all stakeholders, and to develop and implement across components common approach to modelling and other assessment tools, using common performance data.

The planning environment itself it subject to change. The factors that can bring a supplementary variable in the process include: technology, threat, defence policy, resources and management organization. CBP is by excellence a long term planning process. Decisions for different capability solutions are taken for a long period of time while the factors enumerated before can bring more uncertainties to the general picture. Solutions envisaged should be flexible enough to be adapted to new realities. Besides the variables, there are also some constraints with regard to the options and processes. The constraints can be generated by requirements from outside the defence organization (e.g. governmental level) or by ethics and values. The result will be a reduced number of options available to plan against.

The process requests cost estimates on a consistent basis, including costs for force elements that may not exist yet. It is not an easy job to estimate costs taking into account all

variables, the time frame, the need for flexibility, an increased number of stakeholders and disparate elements of defence organization. Planners should propose to decision-makers well argued costing solutions.

Resources are to be provided for both the development and execution of the capability planning process. It is possible that CBP will require the development of new tools, if not already in the national inventory. These tools can include costing models, force structure analysis tools etc.

CBP process is requiring work at a high level of abstraction. This can be difficult due to the complex nature of the issue being addressed and the analytical rigor needed. A practical solution is to adopt an incremental approach.

When implementing the CBP process is necessary to reflect the coalition context within which operations will be undertaken. As part of an alliance, the probability to act outside the coalition context is very low.

The result of CBP process, the investment plan, is to have a clear linkage with the exercise and training program, providing the mechanism to validate and in necessary to modify the plan.

The planning process objective is to facilitate senior-level decision-making on risk assessment and resource allocation. The process and the investment plan are to be clear, risks, recommendations and decision points identified and emphasized in order to facilitate involvement and ability to make choices.

When a task feeds multiple capabilities, or a capability enables multiple missions, accounting for resources is a difficult job. New concepts are including even greater interaction and interdependencies of forces and systems. This will make more difficult the capability partition problem. The issue could be solved identifying the synergies and dependencies between capability bins. Where necessary, a deconfliction can be made also.

CONCLUSIONS

Capabilities based planning is a relatively new developed process, and is the result of necessities to respond to an uncertain future environment where you cannot predict the enemy. The process is complex and is requiring a well defined analytical architecture, involving more the stakeholders and decision-makers. The planners are to integrate more data and information, and the analytical work will focus more on mission level in defining, developing and testing the capability building blocks.

With regard to the international organizations, the process is better assisting the nations in their efforts to develop the required forces and capabilities, facilitate cooperation and open new opportunities for multinational solutions.

When developing and implementing capabilities based planning process, a clear set of advantages are envisaged in order to benefit of the new approach features. At the same time, several inherent challenges are identified and should be dealt with to take advantage of the full potential of this process.

Through its complexity, capabilities based planning process is providing and adaptable framework to the national or organizational specificity.

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OPTIMIZING THE HUMAN RESOURCE PRACTICAL INSIGHTS FOR THE MILITARY WINTER SPORTS CLUBS

LTC Mădălin HÎNCU

I. INTRODUCTION

The choice of this topic is supported by the fact that I am the manager of the "Bucegi" military winter sports club and, hence, I strongly believe that there are better means to manage and improve the human resource within it. The need for this is also triggered by the current financial and economic reality characterized by swift changes and evolutions at various levels of society (e.g. moral, structural, etc.).

To optimize the human resource from the military winter sports club is to apply a well defined methodology that meets the requirements of the club's mission and scope, while the latter are framed by both the organizational requirements generated by the sports federation it is affiliated to, and by the current rules and regulations governing any military unit. Right now there is no rigorous methodology whose efficiency to be proven either at the level of the military club, or at the level of the sports federations.

The thesis supported by this article is that to manage for performance in a military winter sports club is to identify, define, analyze and optimize two major dimensions of this process: the structural one and the functional one. From this perspective, the management process is a continuous adaptation of structures to functions and of functions to structures. Thus, while the structural dimensions is related to the vertical chain of command and the decision making process that more often than not leads to delays in the aforementioned adaptation, the functional dimension refers to the organization's members and to the relationships among these.

The management of the human resource working in and for winter sports clubs has to be both aligned to the requirements of military management, and to the general management principles underlying the sports field in terms of economic, information, cultural, social and other types of information to be processed and managed.

The human resource involved in the management and running of winter sports clubs is made up of sportsmen and technicians who, jointly, ensure the performance dimension.

Nowadays, the trend to focus on the principles underlying the performance concept is common practice in the countries where winter sports are at home: the northern countries from Europe and the countries from the Alps. Performance is also supported by the logistics provided to organize extensive events in this field and which is funded from the resources provided by the live broadcasts, as well as by the great number of viewers. Thus, the huge amounts of money generated by these events return to the direct beneficiaries, that is sportsmen. In addition, the development of the material, human, information, etc, infrastructure is also highly supported through direct and massive investments.

The hypothesis to be further presented and argued for by this article is that to trigger organizational change and to manage for performance is to optimize the human resource. It is only by taking such an approach that direct results such as medals in the world championships and, why not, in the olympic games can be obtained.

II. THE HUMAN RESOURCE MANAGEMENT SYSTEM AND ITS GOALS

By consulting specialized literature, by analyzing the internal and external organizational environment I strove to elaborate a methodology aimed at optimizing the human resource.

In this respect, I undertook an analysis of the strengths and weaknesses underlying the internal environment, as well as of the opportunities and threats raised by the external factors. The analysis targeted the personnel of the club I run (sportsmen and experienced technicians), military sports specialists, as well as specialists from the other clubs and sports federations. Moreover, as a manager of the military winter sports club for more than ten years I analyzed the training plans, the records, the planning and management documentations and I also observed the organizational culture from within the club and from other winter sports clubs.

One of the guiding lines for my research was the assumption that both the people from within and from outside the military organization must be aware of and respect the club's organizational culture since the latter supports performance improvement.

The goals established with a view to optimizing the human resource from within the military club are:

- Establishing the objectives needed to optimize the human resource management subsystem;

- Identifying the main activities undertaken by the human resource that need to be optimized;
- Establishing the main elements needed to align the human resource management subsystem to the other management subsystems.

To optimize the human resource management system, one must start from the organization's strategy: mission, goals, objectives, strategic alternatives that further trigger the objectives and activities underlying the human resource management subsystem with all its additional elements: number of personnel, structure, etc.[61]

The main analysis means and methods employed during the research undertaken for this paper were:

- The analysis of the the club's strategies and policies for the past five years;
- Discussions with the officers in charge of sports and physical training activities from higher echelons, as well as with sports clubs managers and federation leadership;
- Establishing the exact number of the performance oriented sections that can be supported by the Romanian Ministry of National Defense;
- Establishing the exact number of sportsmen and technicians positions on the club's payroll , as well as the number of people who can be employed by other units as sports instructors once they have achieved their performance goals;
- Elaborating strategies and policies aimed at promoting the recruitment of high performing young people for the sports sector from within the Ministry of Defense and, hence, for the military sports clubs. In this respect, the recruitment process fails more often than not because the criteria for the selection and promotion of sportsmen within the system are not very clear.

The costs of the already mentioned failures are direct and indirect. The direct ones are the costs incurred by the the sportsmen's feeding, equipment, transportation, accommodation, etc. once they enter the military system until they exit. As for the indirect expenditures, these are more difficult to quantify and their most tangible outcome is the lack of results, the decrease of the club's impact at national level. In this respect, the indirect costs are more difficult to cover for in time.

Some of the most frequent causes of selection failure are: organizational cultural barriers, family problems, the coach's superficiality in the selection process and, sometimes,

[61] Ovidiu Nicolescu Ion Verbencu, 2008,Metodologii Manageriale, Edit. Universitară Bucureşti, pag 306

during the training process, health problems, competition dropout, the lack of an adequate strategy for winter sports, etc.

Based on the analysis undertaken, the following action directions became obvious:

- Building physical, physiological, biological, pedagogical, etc. models to be used in the selection of the most competitive sportsmen who could meet high performance standards;
- Continuously training and improving the personnel involved in sports, since nowadays the practice for a sportsman is become a coach without any solid theoretical and methodical knowledge or experience;
- The need for a multidisciplinary team made up of methodists, doctors, psychologists, IT specialists, massage specialists that should contribute and support the efforts of the coach. In this respect, it is already a well known fact that there is no medium or long term vision or programs endorsed by higher echelons aimed at providing financial and material security to the personnel;
- Acknowledging abilities by certifying and formally recognizing professional competences. At the end of their active life all sportsmen should be qualified so that, upon retirement for competitions, they can pursue their knowledge and use their skills in fields related to these.
- The good use of personnel's skills, the filling of vacant positions, the removal of incompetent personnel need to be human resource activities undertaken all along the year and aligned to the requirements of the sports competitions unfolding at a given moment. Form this point of view the number of new entries into the system needs to be equal to the number of personnel exiting it.
- The coordination, training, control, evaluation and monitoring of personnel need to take place all year round.

As a result of all the above, to optimize the management of the human resource is to strengthen the personnel and human resource systems by placing them on three pillars:

- The executive system in charge of managing and fine tuning the whole scope of the military club through rigorously conceived regulations, orders and programs.
- The system of representatives that is the interface between an organization's personality and the external environment and is in charge of negotiating,

consulting and acting as Romanian Armed Forces' spokespersons domestically and abroad;

- The operational system needed to accomplish the set performance goals.

In our opinion, the sports club's manager needs to become the engine of change. In this context, the acquisition of competences is mandatory. Moreover, another major role to be played by the same manager is that of consolidating the culture of the organization he is in charge of by grouping the activities to be undertaken by management system categories:

- The human resource management system;
- The legal management system for the human resource;
- The financial management supporting the human resource management system;
- The security management of the human resource;
- The training and education management system for the human resource.

Special attention must be paid to the interplay of the aforementioned systems since this plays an important role all along the stages of the human resource management: recruitment, selection, training, use, performance measurement and evaluation, retirement.

III. METHODS TO OPTIMIZE THE HUMAN RESOURCE MANAGEMENT SYSTEM

Diagnosis is the systematic compiling of information relevant for approaching change management principles. Initial diagnosis provides information that contribute to identifying the existence of problems that require change. Once these problems are properly defined and understood in terms of their causes and effects[62] one can pursue further the change efforts.

Careful problem diagnosis clarifies and highlights the changes that need to be made, as well as the path to be taken for their implementation without encountering too much resistance. The latter is a factor of utmost importance that requires attention and mitigation measures, since change resilience comes from people's addiction to their current practices and habits. Some of the causes for the emergence of resistance to change are:

- Personal interest: people may perceive that change may trigger privilege loss;
- Misunderstanding/poor understanding of the reasons triggering the need for change;

[62] Gary Johns,1996, Comportament Organizațional, Edit. Economică, pag. 528

- Personality predispositions that make some people find it difficult to adapt/adjust to changes;
- Lack of trust in those suggesting the change;
- A different assessment of the problem on behalf of those who resist change;
- Organizational culture focused on traditions and stability rather than on agility and swiftness.

Once the problem is defined, the action alternative must be selected. This is done by establishing the system inputs and outputs which, in our case are:

- Inputs provided by the selection of the sportsmen based on the model developed;
- System exits: people retiring on various reasons.

The relationship between organizational culture and personnel induction within the club is a based on a process of socialization which familiarizes the employees with the club's history, tradition, records for the past 50 years.

As for the integration of the new employees into the club's culture and practices, a variety of methods must be used so that they acquire the necessary corps d'esprit. In line with this, they must also understand the collaboration and hierarchical relations from within the club. Moreover, positive competition must be encouraged.

There are a number of features that characterize the cultural impact on the evaluation of performance. Therefore, the rigorous planning of each section by explicitly outlining the objectives and the results to be obtained both at individual and team level, as well as a feedback based approach are elements of utmost importance.

The efficiency and effectiveness of the the performance evaluation process are influenced by cultural dimensions like: power distance, feminist, masculinity, relationships with higher echelons.

Cultural change is the most difficult part of organizational change and the challenge consists in changing both the surface aspects manifest at the level of rules, norms, language, symbols, heroes, as well as the inner paradigms, beliefs, values. The latter are actually the one characterized by inertia and hence the most difficult to change[63].

The stronger a culture is, the greater the inertia. Therefore, the change must be based on a step by step approach and on understanding and answering the following questions:

- What do we do?

[63] Carmen Aida Huțu, Cultură schimbare competiție,Editura Economică,2013, p 156

- What will the new structure look like, in case we must change the existing one?

As a result of answering the questions above, one can initiate the job redesign and human resource policy change.

Another aspect worth reminding when initiating a change is the analysis of both the external and internal environment. It is only based on this that one can decide to move forward or to maintain the existing state of affairs.

The factors within the internal environment signaling the need for change are:

- Low performance of some sportsmen leading to conflicts among sportsmen or between sportsmen and coaches;
- Lack of a long term strategy that leads to insufficient and low motivation and morale among the human resource;
- Youth's demotivation to achieve performance standards.

The factors from the external environment are:

- A directive issued by the higher echelons according to which the sportsmen are hired by the club as long as they meet their performance goals and, once they decide to retire on various grounds, they return to their units and are employed as sports coaches.
- Establishing a partnership between the Ministry and the local authorities that would contribute to an increase of the financial and material resources of the club;
- Collaboration contracts with other school sports clubs based on which joint training is provided for junior sportsmen and, upon their graduation, further access to the military club's facilities. In this way, the expenditures with junior training, as well as the number of dropouts decrease.
- Job design based on which the club's sportsmen and technicians fill in positions based on their professional competences and thus meet the system's requirements. In this respect, an important role is played by quality and this can be improved by financially motivating the high performance seekers, as well as by building upon the sportsmen's self esteem, self respect, performance acknowledgment mechanisms, the A.S.A. spirit and the status member within a high performing sports club.

All changes must be followed by subsequent changes in the internal regulations, policies and procedures.

The changes targeting the structure of the club will be two fold. First, the selection pool will be increased by reviewing the selection procedures and the contracts to be signed. Second, new methods of training and development will be used in order to change the

personnel's attitudes and skills. The change will not be huge since the steps to be taken will be incremental. Thus, the organizational development program will unfold for a long period of time including well defined stages. Moreover, continuous adjustments are to be made by reviewing on a permanent base the status of the organizational culture.

In addition to the above directions, a better organization and management of the existing and future funds is needed. Thus, when performance is achieved, the latter can be properly and timely rewarded.

The formal and informal monitoring of the change process will become part of the organizational culture. In this respect, the club's members will take active part in ensuring the efficiency of the management process and in acquiring new capabilities. Building the team spirit will increase the performance and efficiency at team level by improving interpersonal relationships, clarifying performance goals, and assuming failure (should this occur for personal reasons). Therefore, this will be one of the guidelines to be followed on a continues basis via regular analysis and diagnosis meetings that will allow teams to identify and avoid digression or regression tendencies. In addition feedback will be employed as a method to collect data from the club members in order to identify further directions of change and improvement.

One last thing worth mentioning as part of the change process is the reengineering of the processes, namely:

- Reducing the number of intermediate steps in order to ensure process efficiency and remove redundancies, decrease the number of errors and accelerate the obtaining of the envisaged results.
- Allowing for activities to occur simultaneously and hence reducing the number of conflicts and the level of disagreement within the club;
- Job redesign and enrichment aiming at ensuring better management control and as a solution to reducing the number of intermediate steps.

Given the current crisis and its multifarious facets: human, material, financial, morl, educational, etc., the human resource must no longer be viewed as a resource incurring costs, but as a the most important resource. As a result of allocating this role to the human resource, a strategy aligned to the club's and Ministry's strategy and aiming at promoting winter sports both domestically and at international level can be thus framed and developed. In this respect, the club's manager needs to:

- Be versed in personnel recruitment and selection;

- Correlate the human resource strategy with the club's strategy;
- Properly understand the concepts in the filed and act as a professional consultant for all the human resource from within the club.

IV. CONCLUSIONS

Features like the goal, structure, functions and focus on rule observance are an intrinsic part of the military organization. As a result, they impact to a great extent the human resource and configure de design and undertaking of the programs aimed at training and enhancing the skills of this resource[64].

The Ministry of National Defense plays an important role in the configuration of the human resource management system with all its inherent functions. In this respect, the way the importance of this resource is perceived by the higher echelons has an important say in the management of sports activities and, hence, in the result obtained domestically and abroad.

The practice in the field of human resource management proves that job design and redesign must be based on a professional interdisciplinary analysis undertaken on a periodical basis so that a balance aiming the goals, objectives, responsibilities, tasks and competences of the human resource is achieved.

Optimizing a non existent management system is impossible. Hence, the optimization needs to be done at the same time with the establishment of this system.

The change process must be triggered by internal and external factors and its management must be carefully accomplished. Thus, change is based on unfreezing attitudes and behaviors, changing them as targeted and refreezing the newly acquired attitudes and behaviors. Moreover, it is worth reminding that a change in the personnel's attitude must be followed by a change in their behavior.

Once the change process is undertaken Organizational development must be planned and adapted to the efficiency and effectiveness requirements. One of its key components is innovation and it relies on stimulating individual creativity as a basic resource of any sports club. Innovations can spread easily as long as they are not too complex, can be tested, are compatible with the existing practices and provide competitive advantage.

[64] Ioana Tania Stoean, 2013, Profesionalizarea Resurselor Umane,, Edit. Universității Naționale de Apărare,, Carol I" București

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CHANGE MANAGEMENT AND ORGANIZATION CULTURE

LTC Alexandru D. MAIOR

INTRODUCTION

Post – 1989 December period remains, in Romanian modern history, as a stage of fundamental transformations – politic, economic and social – witch influences strongly the destiny of our society at the third millennium beginning. The evolved directions desired for these changes are basically full integration in Euro-Atlantic structures and Romania acceding to deserved place between democratic and prosper states of the world. This huge process includes in the mean time, the trajectory followed by Romanian Army that is now in a full process of transformation on the coordinates that hardly could be anticipated before.

Romanian defense planning is "*a complex process by which are realized projection, building, and functioning of Romanian Military System and includes: strategic planning (projection of strategic conception for defense and the way of force use); operative planning (implementing of strategic conception in force use plans); resources planning, programming and budgeting (establishing and assigning resources of force building and use); resources allocation (having ready for use human resources, equipments, materials and regulations, and developing the process of forming, endowment, training and infrastructure building according to missions for peace time, crisis and war)*"[65].

Based on Romanian conception regarding defense planning system, at national level is established a medium and long term security strategy (The National Security Strategy of Romania) and the program to apply and implement its foresights (White Book – Government measures and actions program to apply the security strategy). In close connection to The National Security of Romania, a strategy for Romanian Army transformation was built for 2005 to 2025.

In the context of changes projected by Romanian Army Transformation Strategy, studying the military organization transformation management is an actual subject; analyzing of processes and events that take place at organizational level in military domain could offer

[65] Ioan Sabău – *Planificarea acțiunilor militare întrunite*, Casa Cărții de Știință, Cluj-Napoca, 2003;

new solutions or sanction the landings which have proved their efficiency in transformation process.

The content of such subject is more complex due to Romania, as NATO member, is involved in redesigning its military system according to assumed standards and requirements. This process imply breaking up the function of some structures, transforming for others and creation of new ones with new capabilities.

Starting from these considerations, for this study was choosing organizational culture and change management with some links in Romanian military space affected by transformation processes started in 1989.

Strongly connected to organizational changing, the implications of organizational development over management and organizational culture was analyzed based on the model of life cycles theory, as a process by which an organization chains more changes in a range of events which has the purpose of continue system growing.

In first part, the model of organizational life cycles will be describe, the characteristics of organization stages being correlated with management style features. After the theoretical part, an analysis of specific changes that occurred in military environment after 1989 will be underlined in the perspective of cyclic evolution approach; the stress will be on the revolutionary change of culture have happened in Romanian Army and the change management.

In the final part, conclusions are referring to the possibility to use the life cycles theory for a better understanding of changing that are happened a the organizational level including the organizational culture and management, and as a complementary way to increase the efficiency of transformation processes.

I. CYCLIC EVOLUTION OF ORGANIZATIONS

The organizational environment faces continuously with old or new phenomena that affect organization evolution. To adapt organization to new challenges or change it according to new trends and environmental constraints is a matter of management. Some examples of phenomena which I would like to mention are: condensing activities, splitting in layers or substructures and decentralization – they belong to the group of old ones and, others: new informational infrastructure, fast informational flow, new technologies, globalization trends, and new expansion of virtual world. The impact of those phenomena in organizational

environment is tough, sometimes could be predictable, and leaders and members should be ready to go though changes that occur inside organizations which must to adapt and sustain their existence and cyclic evolution. What's happened if adaption is missing or leaders can't figure out the challenges? Maybe the end is too closely for those organizations and for their members the song could not be from their favorite playlist.

Trying to understand how organization step over through stage to stage, I found models that presents organization as open system which start its life, goes further to a developed age and, somewhere further in time may touch its end.

Organization's evolution was compared by some theorists with human life and behavior; organization are passing stages as people go from early years, childhood, teenage phases, youth, and maturity through elderly. Other similar life cycle was compared to seasons; the transformation of an organization being considered similar to seasons' cycle in a year.

In fact, among theorists there is a common approach regarding these three phases of organization life: beginning – evolution – ending. Also, some particular views are connected to the evolution part of an organization life which is considered more debatable due to environmental influences.

There is an interesting theory designed by Lawrence M. Miller referring to organizations evolution. Based on Miller's pattern the organizations go through diverse life cycles as people do. For example, people go through infancy, childhood and early teenage phases that are characterized by lots of fast growth. People in these stages often do whatever it takes just to stay alive, for example, eating, looking for protection and sleeping. Often, these people tend to make spontaneous, very reactive decisions rooted in whatever is going on around them at the moment. At the beginnings, new organizations are like this, too. Often, creators of the organization and its various members have to do whatever is necessary just keeping organization in function. Leaders make highly reactive and instinctive decisions. They dread taking the time to hold up and do planning.

In this comparison of organizations to people, could be noted that, as people continue to grown-up, they begin to understand more about the environment and themselves. In time, people develop a sort of wisdom that sees them through many of the challenges in life and work. They learn to plan and to use a definite discipline to put plans in practice. They discover how to manage themselves. To continue to exist and evaluate, organizations ought to do this, the same. Experienced leaders have learned to identify the specific life cycle that an organization is stepping through. These leaders know the kinds of difficulties faced by the organization at some stage in its life cycle. That understanding provides them a good

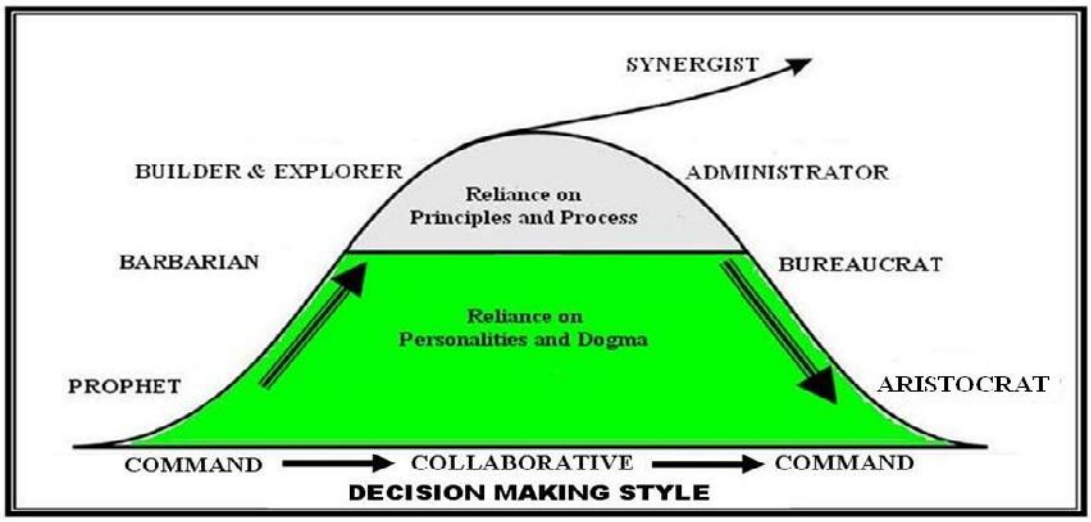
judgment of perspective and helps them to choose how to respond to problems in the workplace.

I.1. Organizational life cycle model

According to Lawrence M. Miller model, there is no doubt, organizations, have a cyclic evolution. Characteristics of new organizations are generally different from older ones. There are broad patterns that seem to follow some natural evolution as there are natural patterns in the birth and growth of infants, animals and even plants. There can be no exact roadmap drawn from history, but there can be wisdom derived from the patterns. The culture at the birth of an organization (or civilization) is of one kind, and that is entirely different than the culture at old age or in decline. The performance of leaders, their relationships, expertise and objectives are different at each age.

Organizational life cycle model designed by Lawrence M. Miller comprises six stages: prophet, barbarian, builder & explorer, administrator, bureaucrat, and aristocrat. Also, there is stage named "synergist" who is characterized by some innovative management, interventions and changing into organization in the way to continue at upper levels the previous stage.

In figure nr. 1, the graphic presents, cyclic evolution of organizations from beginning to the end, going through integration to disintegration process, or having the chance to step on new start under the synergist intervention and transformation.[66]



LIFE CYCLE STAGES AND MANAGEMENT STYLES

Fig.1

[66] Lawrence M. Miller – *Barbarian to bureaucrats, corporate life cycle strategies, Lessons from the rise and fall of civilizations* – Fawcett Columbine, New York , 1990;

I.1.1 The Prophetic Age: Inspiration and Innovation

The prophetic stage is in fact generated by inspiration and innovation. According to Miller's model, "in the beginning is the word, the creative act, the spirit of renewal. Creative personalities, including religious prophets, seem to follow a pattern of withdrawal-and-return. They disappear into the mountains or desert. They remove themselves from the distractions of the current order and seek some vision of a better future. Their power to inspire others is only seen on their return when they are intentionally disruptive. A revolution begins and their followers can hardly be called an organization, more a group of disciples. It is disruption, not order. It is the nature of creative personalities. The vision of these prophets is like a rocket blast, a surge of energy that disturbs the old and propels movement toward something new. Often these prophets are incapable of doing their work within the framework of the old order, but must but be exiled to a new land."[67]

Characteristics for organization in the Prophet stage

- it is lead by a visionary and creative person on whose ideas the organization was founded;
- organization is at risk because it is a beginner in the environment;
- there is more chaos than organization, with things changing frequently, reporting relationships ambiguous, structure and processes uncertain;
- there is an excitement and deep belief in what leader and members are trying to accomplish.

Leader as a Prophet

- ideas are long range and visionary;
- is willing to make great sacrifices in time and energy to see your ideas realized;
- tends to withdraw for long periods to work through your ideas;
- sees challenges others don't see;
- others see leader as being "different";
- is probably not very well organized, and is impatient with details and administration.

Example: Alexander the Great, Thomas Edison, Henry Ford, Alexandru I. Cuza

I.1.2 The Barbarian Age: Crisis and Conquest

The prophet founders of organizations are soon followed by, or become themselves, *barbarians*, the commanding generals whose strength of will focuses energy in crisis. The initiative and inspiration must be continued with decisive action in building the organization.

[67] Lawrence M. Miller – *Organizational Life Cycles: the Creation and Destruction of Wealth*, http://www.lmmiller.com/assets/docs/Organization-Life-Cycles.pdf, 2013;

"Every new organization is in a crisis, a fight for survival. The ability to move quickly, with discipline and unity of energy and effort, is the key to victory".[68]

Characteristics for organization in the Barbarian

- it is rapidly expanding, taking in new territory and integrating the conquered;
- the decision making process is fast and only a small group of members are implied in decision procedure;
- administration, processes and organization structure are well definite;
- the demand for performance is high and those who can't are left behind or expelled.

Leader as a Barbarian

- mission is understandable and imperative;
- the priority is to conquer and go forward faster;
- is in charge and very comfortable making decisions;
- others view the leader as being authoritarian and not consulting them on decisions;
- is very action-oriented and has little patience with planning and administration.

Example: Alexander the Great, Hernando Cortez, Attila the Hun, George S. Paton, Michael the Brave.

I.1.3 The Age of the Builder and Explorer: Specialization and Expansion

The period of the Prophet may be a brief moment in the history of the organization. The age of the Barbarian should also be short. The organization's leadership should not remain in the Barbarian Age, trying to move on and enter a period of specialization, a time when the organization is developed whit specific systems and structure.

Now leadership has to take on a different quality. It must be joint, delegated, and increasingly collaborative. While the decision making process must continue in a creative way and fast moving, leaders must also develop new particular competences. If this happens, this stage may last for centuries in the case of civilization and decades for largest organizations.

Characteristics for organizations in the Building and Exploring Age

- rapidly growing based on competitive services and products;
- great efficiency;
- needed staff to develop management systems and to make processes routine and stable;
- numbers of members increase rapidly.

[68] Ibidem

Leader as a Builder

- enjoy the "real work" of organization, involved in making the products, outputs or delivering the service;
- enjoy measuring the results of work;
- lead the decision process with efficiency, decisions are made quickly, action is a priority, and results must be seen;
- know is not a visionary and don't waste a lot of time dreaming about the future;
- committees are avoided, the schedules are precisely structured and time is considered worthy.

Leader as an Explorer

- is a convincing and enthusiastic communicator;
- sometimes feels that work to accomplish objectives and others often seem to be obstacles in reaching the organization's goals;
- believe the organization should place a high priority on expansion;
- is curious and naturally explore for new opportunities for organization;
- is competitive by nature and has records of performances.

I.1.4 The Age of the Administrator: Design Systems, Build Structure and Provide Security

Increasingly the challenge is within, not from the external environment. Increasingly the leaders are seeking to bring order to the chaos of differentiated organization created in the previous stage. Counting and recording, systems and structure, are now important. And increasingly the processes of administration become dominant in their minds, and the leaders are drawn from the administrators. In time, with Administrators in charge, counting and recording become more important than the substance and spirit of creativity, the response to the external challenge that was the source of initial growth. Increasingly the focus is on internal, rather than external, challenges. The unchecked priorities of administration will soon lead to bureaucracy. [69]

Characteristics for organizations in the Administrative Age

- the managers are focused on modernizing and updating procedures;
- stability and confidence in relation with others;
- the stability cover the possibility of surprising situations or crises;

[69] Lawrence M. Miller – *Organizational Life Cycles: the Creation and Destruction of Wealth*, http://www.lmmiller.com/assets/docs/Organization-Life-Cycles.pdf, 2013

- workplaces, staff headquarters and offices have an expensive endowment;
- new services and new performance are expected to come from the staff research and development group.

Leader as an Administrator

- develop his career in the corporation's staff functions;
- is considered by himself as expert at the procedures and coordination of management;
- order, consistency, and smooth operations are high priorities for him;
- he devotes more time to checking on what has happened, as reflected in analytical and other reports, than he spend focused on future growth in services and outputs, or exchanges with other organizations.

I.1.5 The Age of the Bureaucrat: the Tight Grip of Control

The transition from the Administrative Stage to that of the Bureaucrat occurs without any plan or intention. Old age comes to pass. It needs no support. No one in the history of organization ever created a design team to design and implement bureaucracy.

As soon as the leader imposes increasing levels of control in his love for order, he becomes a bureaucrat and loses understanding of the original organizing principle that was the energy created by the "word," the creative act that was the reason to unite and sacrifice. Now the lack of creativity leads to impotence in the marketplace, and survival is dependent on cost cutting and control and anyone with the creative spirit, potential Prophets who possess the very cure that is so needed are driven to exile or crucified for their violation of order. The decline will soon lead to death. The bureaucracy causes the exile or execution of those who are creative but unable to conform to the required order. With the departure of creativity, the fate of the company is sealed. [5]

Characteristics for organizations in the Bureaucratic Age

- organization is growing more by acquisition than by internal new services creation;
- organization has reorganized more than once in the past three years;
- it is more interested in the internal challenges of the organization than the external relationships and interchanges;
- organizations members and leaders alike feel that they couldn't alter the company's fortunes;
- the stories about "good old days" are often told by managers and members.

Leader as a Bureaucrat

- spend most of his time in meetings reviewing what has already happened or should have happened;
- cannot remember when he last participated in the development of a new product or service, or output and, doesn't think that's job belong to the leader;
- is more concerned with how he and him organization are viewed by analysts than by members or customers;
- believe tighter control will solve many of organization's problems;
- activities at the top management, meetings with central staff members are too frequent and the based line and structures are quite isolated and faraway from leaders.

I.1.6 The Age of the Aristocrat: Alienation and Revolution

Management derives its power from its legitimacy, and in the Aristocratic Age legitimacy is lost. It is lost because the managers have stopped doing their job, that of leading, creating vision, and building unity of energy and effort across diverse people and interests.

Legitimacy is a matter of perception, and it is the perceptions of the constituent groups that matter. In every relationship there must be a balance of power, a mutual concern, and respect. When these mechanisms break down, leadership acts on its own interests, and contrary to the interests of its followers; rebellion inevitably results. [70]

Characteristics for organizations in the Aristocratic Age

- there is a complete separation in perception, expectations, and communication between those workers and managers who produce and provides and those who claim to be the leaders of the corporation;
- the leader thinks of himself (herself) as indispensible and almost synonymous with the organization;
- a great deal of the time and energy is spent in internal warfare, both between horizontal units and vertical "classes";
- reshaping and reorganizing are almost continuous;
- there is a continual effort to cut costs, hold down salaries;
- leaders are constantly warning of the situations and organization problems;
- leaders compensation is increasing without any relationship to the efficiency.

[70] Lawrence M. Miller – *Organizational Life Cycles: the Creation and Destruction of Wealth*, http://www.lmmiller.com/assets/docs/Organization-Life-Cycles.pdf, 2013

Leader as an Aristocrat

- manages an organization that has not successfully developed and marketed a new product or service for several years, and the only expectation for growth is through acquisition;
- most of leader time is spent on restructuring the organization, planning, budgeting and the organization outcomes are somewhere far-off ;
- leader offices are plush with expensive artwork, have expensive services, and spend a lot of time at expensive social gatherings, for organizational maters;
- leader feels that only him and a small circle of advisers are capable of understanding the strategy of the organization.

Synergist:

Miller says a synergist is *"... a leader who has escaped his or her own conditioned tendencies toward one style and incorporated, appreciated and unified each of the styles of leadership on the life-cycle curve. The best managed companies are synergistic."*[71] Miller asserts that the synergist is a synergy of the other management styles, and therefore, is best described by a set of principles.

II. ROMANIAN ARMY TRANSFORMATION PROCESS AND ORGANIZATIONAL CULTURE

History gives us significant data about evolution of Romanian Army during time. There are three cycles I would like to mention: 1859-1945, 1946-1989, and 1990-present time. First period mentioned had started with reforms implement during the lead of Alexandru I. Cuza, continued by King Carol the 1st, going through Independence War, First World War, and ended right after the Second World War. Second period was under the communist regime and also under the Soviet Union influence. After 1990, Romanian Army faced a new cycle in evolution.

Starting from the characteristics of stages described by life cycles theory, I wrote down some ideas regarding the revolutionary change of culture have happened in military environment right after 1989. It is obvious, in 1989, the Romanian Army touched a sort of end for a one of its comprehensive cycle and faces to new challenges and maybe started a new stage in its evolution.

[71] Carter McNamara – *Basic Overview of Organizational Life Cycles*, http://managementhelp.org/organizations/life-cycles.htm, 2013;

Some features could link the Romanian Army stage in the 1989th to a sort of aristocrat age. The aristocrat stage is characterized by the preparation of a revolution done by leaders (aristocrats). The facts happened in social real life as the theory presumes. Some aristocrats created revolution and the revolutionaries have the mission to do it. Changes in social environment determine a lot of transformation at institutional levels and military organization begun a revolutionary transformation process from 1990. At that time people imagined a lot of changes and as a burning revolutionary flame, they not only dreamed and expected them, but fought to have those changes. The revolutionary people dreamed in a way and leaders did the job in their proper styles. Maybe, wherever the revolutions have happened, there are significant differences in the real world beyond the dreamed lines.

There are two important levels where the revolutionary change of culture has happened. First one, which is an almost soft level, comprises changes in sentiments, beliefs, personal behavior and leadership. The second one is a significant level and includes changes in system and structure embedding the principles of a new culture in a practical process.

For the first level, some views over sentiments, beliefs, personal behavior and leadership in military environment will be presented as results of direct observation of occurrences and others coming from event analysis.

Right after 1989, young people wanted to deal with new professional challenges, expected a new world of requirements and they were going ahead without worries about their private life, having the belief they will do the best and many returns they will have.

At that time, just senior professional were thinking and behaving differently, that could be a mater of motivation, but they really expected dissimilar returns which were anchored in a sort of stability, continuity at the level of professional power more balanced to an essential option for a social powerful situation.

What about leaders? They have to manage new challenges from the perspective of a new environment and to work along with organization's goals and missions. Many leaders were tending to keep the balance between old culture and new challenges.

Who were right? In the options and dreams mater, it is right to assume each of them were correctly but the big question is "Which was the best way to face the change?"

Were young people touching their dreams?

Do the senior professionals receive power and continuity in their social status?

Do the leaders manage the organization toward a new age or do they just assume and rich the existing goals and missions?

Let's joggle somehow with what was possible to happen if they will face again whit the similar situations. I assume the fact as a personal opinion, al of them, young people, senior professionals and leaders have changed their dreams, beliefs, behavior and decisions if the life bring them in similar situations.

Regarding this first level of revolutionary changes, I would like to mention the fact, leaders have the entire responsibility regarding the path organization have to follow, they must respond creatively with challenges, understood what people wanted before people wanted, imagine the future, be models, manage the environment, build structures, design systems, generate values based on behavior, be and create models.

Were these responsibility done? Maybe yes or sometimes they were done partially. Seeing around and encountering the organizational environment which is totally different, new organizations, new structures had appeared, changes after changes have been done, new types of leaders in charge, new structures, new missions, theatres of operations, heroes, it could be said "Yes, they were done". But those changes did not occur just with positive results. There were a payroll containing a lot of disappointments for some organization members and those bad results must be assumed by leaders as lessons learned and important information for the future decision-makers.

Regarding the level which includes changes in system and structure embedding the principles of a new culture in a practical process, I will mention the key elements of Romanian Army transformation roadmap.

After 1989, transformation of Romanian Army was considered a key element for the new democratic and economic environment. The reformation of security system was connected to a new transformation program, which will modify the Romanian military system and its main components: structure, education, training, logistic, action, mentalities. The main goal was to build a new army, with optimal dimensions, ready to serve efficiently the national security interests and to participate in cooperative security. The transformation means also to achieve some objectives: a new legislative framework in defense field, distinct and comprehensible attributes for political and military command structures, civilian and democratic control over military system, modernize army structures and endowment, simplify de command act, redesign the education and training system, develop the relationships with other army.

The new strategic goal for Romania – integration in NATO, brought for the Army other changes: Partnership for Peace, new security concept as part of government program, decentralization of Ministry of Defense management by giving to Army Services larger

responsibilities, establishing distinct attributes and competences for Ministry of Defense, also for General Staff and chiefs of Army Services, concept of "sufficient defense".

An important fact in this process was the appointment of the first civilian as Minister of National Defense, in person of politician Gheorghe Tinca in 1994.

Till 2000, new important documents completed the transformation framework: Romanian National Security Strategy, White Book of Romanian Government and Romanian Military Strategy.

The changes made in Romanian Constitution in 2003 were the base lines for a framework that offered the possibility to be part in collective security structures and suspended the obligatory military service in peace time switching to voluntary military service.

Becoming NATO member in 2004 and EU member in 2007 Romania had to reconfigure its strategy considering new conditions. Those facts have influenced all domains where Romania had built strategies. In such kind of situation was the defense domain where the National Security Strategy would have been changed. That had happened and, in 2007 a new National Security Strategy was built. Based on National Security Strategy, Romanian Army had to build its own strategy. In this way the new Strategy of Romanian Army was born in 2007. Transformation of Romanian Army started from the argumentation of necessity of military transformation based on the evolution of security environment. Some new concepts appeared: military vision, fundamental mission of transformation, the objective of transformation. NATO transformation, the processes developed at the level of EU military structures and regional initiatives influenced transformation of Romanian Army.

In present, Romania is deeply involved in international efforts to manage the new threats in global security environment. Romanian armed forces have participated in abroad missions, in theatres of operations with units, structures and military personnel. Also, Romanian Army is involved in peace keeping operations or peace support operations under the ONU mandate, leading by NATO and UE.

Transformation process continues and Romanian Army has new challenges to step through: capability based planning system, new informational infrastructure, new level of ambition for NATO, new capabilities required, changing and reshaping the political and military command structures in NATO, changing and adapt its structures, smart defense, pulling and sharing, and all of them under the constraints of not enough resource allocations.

It could be said, till now, Romanian Army have been managed well the transformation process, and this means the way Army goes on is the path of integration through a builder and explorer stage.

CONCLUSIONS

The theory of life cycle could be use to analyze the stages military organizations go on. Also the model designed by Lawrence M. Miller offers some interesting tools that could be useful in understanding the present and the future of huge organizations including here also the military ones. Beyond the characteristics of organization ages it is obvious that, there is a strong link between management styles, organizational culture and life stages of organizations. Managers should know the stage organization they lead go through and in this way they could be innovative, creative during decision they made in order to establish conditions to integrate and develop the organization and keep it in a growing and efficient trends. Managers should know the kinds of difficulties faced by the organization at some stage in its life cycle. It is a mater of management to change and reform an organization in order to lead it through a new stage of integration and development. An improper management could easily conduct to disintegration and failure for organizations. People could behave better and perform well in an organization they know and, also, they could be confidently involved in changes that face organization environment and its management.

The managers ought to assume the changes needed to be made and keep a balance between organization life, performance and evolution in one side and the organization members' interests and determine members to be part in transformation processes.

The present stage of Romanian Army is strongly linked to the ambition of fulfilling the assumed roles established with NATO an EU, reforming the structures and developing the capabilities planned.

The next stage for Romanian Army could be also influenced by transformations that are done in NATO and EU. As a hypothetical forecast, it could be considered, the future of Romanian Army will be more oriented to maintain the existing capabilities, develop defense industry, generate capabilities to defend against informational attacks, protect the energetic system, and developing capabilities needed to face the natural disasters in the country – inundations, earthquakes, forests on fire, massive snowfalls, pollutions or large virus contaminations.

It is important to mention this paper contained just some arguments and facts that support the use of *Organizational life cycle* model analyzing the evolution of an institution as Romanian Army. The results and the conclusions drawn here should be considered just a beginning for a possible extended research that will complete the landscape showing the previous, present and the future stages of Romanian Army.

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HUMAN RESOURCES – THE MOST IMPORTANT RESOURCE OF THE MINISTRY OF NATIONAL DEFENSE

LTC Dumitru-Petrica NICOLAE

INTRODUCTION

The current period is complex and, in many ways, unusual. It is characterized by many and intense changes in all fields. There has been a background change: change has become rule; stability, which was a priority, being of the past. Modern society is, as can be seen, a network of organizations which appear, develop and disappear.

In these circumstances, people are a shared resource and also a vital resource for today and tomorrow for all organizations, which ensure the survival, development and their competitive success.

Without effective presence of people who know **what, when and how** to do it, is simply impossible for organizations to achieve their goals. In this context, human resource management specialists suggest questions and answers as:

"What is an organization without its employees? There is nothing; in the absence of human resources, possibly a lot of expensive equipment."

"If we dismiss employees of different organizations, what we have left? Not a big deal."

Human resources are one of the most important investments of an organization, whose results become more evident over time. Investing in people has proven to be the safest way to guarantee the survival of an organization or to ensure the competitiveness and future.

Human resources are the first organization's strategic resources. The success or failure of their long term depend ultimately on the existence of the right people in the right place at the right time, considering that the labor market supply and demand may have important implications and may create difficulties.

"People are an organization's most important asset and the only source of lasting competitive advantage for businesses today. Everything else can be replicated - products, services, infrastructure - but not people"[72].

Human resources are unique in terms of their potential for growth and development and their ability to know their own limits and overcome in order to face new challenges and demands of the present and future.

Human resources are valuable, rare, difficult to imitate and, relatively, the only irreplaceable resource capable of producing and reproducing all other resources available to an organization.

People are active resources of the organization because their potential, experience, passion, initiatives and development actively contribute to increasing organizational efficiency and effectiveness.

Success or failure in any human activity depends, to a large extent, on how the available resources are used, so it depends on the management. As a practical action, management designates a system of principles, requirements, rules and methods of leadership and managers' talent to apply them. In other words, management is a complex of actions taken in order to ensure normal and efficient functioning of organized human communities, as a whole, and of each structural links.

MoND, as an organization with ample responsibilities in national defense and security, receives from the community material, human, financial and information resources that need to be used more efficiently and in full compliance with the goals and objectives for this state institution. In other words, there is a defense resource management which can be designed as a system through which components the military human resources subsystem are in.

Human resources are part of the military resources made available by the society in which military organization exists, to perform its constitutional tasks legally entrusted. In turn, they have a specific management, which *"... is a set of measures interdisciplinary designed regarding recruitment, selection, classification, using the ergonomic organization of labor, material and moral stimulation, until the termination of work"*[73].

The issue of human resource management in the MoND acquires a special significance because of both strong and rapid changes in Romanian society, as well as structural and content changes of the military. Harmonization of changes in the military environment to

[72] Marc EFFRON, Robert GANDOSSY, Marshall GOLDSMITH, *Human Resources in the 21st Century,* Hoboken, New Jersey, John Willey&Sons, 2003, p. 1
[73] Petre BURLOIU, Managementul resurselor umane, Bucureşti, Editura Lumina Lex, Ediția a III-a , 2001, p.41

those generated in human resource management is a permanent and difficult task for those with responsibilities in this field. In addition, the impact of technical progress and the information revolution, joined with the reform of the military institution on human resources must be taken into account in the programs of recruitment, selection, training, development and deployment of military and civilian personnel.

Meanwhile, Romania's integration into NATO and EU membership has significant, systematic and consistent influence on defense resources. The whole approach of those responsible for human resource management in the military will always have regard to the requirements made by the two organizations mentioned above.

By default, this includes the development, adoption and implementation by the law, the appropriate and explicit strategies in terms of human resources in the military.

However, these strategies have taken the form of normative acts - laws, government decisions, regulations, orders of the minister of defense, provision - which regulates the complex task of managing human resources in the military.

I. GENERAL FEATURES OF HUMAN RESOURCE MANEGEMENT

I.1. Role and characteristics of human resources within the organization

Organizations exist because people have physical and intellectual capabilities, and the ability to have and develop organizations. As a result, organizations involved people and, finally, depending on human effort.

The essence of any organization is human effort, and efficiency and effectiveness are greatly influenced by the behavior of people in the organization.

Organizations spend significant amounts of their employees, not only compensation but also staff hiring, retaining and development are some of the most obvious investment in human resources.

However, the traditional attitude toward workforce is treating people as simply "executors of the orders" or as part of human resource costs. In opposition to tackling the human factor in the form of costs or of ordinary performers, many HR professionals attract attention to the need to treat staff as a basis of further development of the organization.

*"**A company is only as good as its employees** - this is the motto consistently embraced by the Schaeffler Group. Our family-owned company combines long-term strategic orientation with state-of-the-art management methods and attractive jobs. Our employees' creativity and speed and their awareness of the importance of their personal performance ensure that we maintain our competitive edge. Our personnel development is characterized by*

continuing education. Our employees benefit from a wide range of opportunities for career advancement both in-house and through temporary transfers to other brands of the Schaeffler Group"[74].

All other resources of the organization are important and useful, but human resources and their management are very important and very valuable in dealing with the unknown.

In other words, since all organizations involving people, they need to ensure those people to gain their services, to develop their skills, to motivate them to higher levels of development and to ensure that they continue to maintain attachment to the organization.

Human resource is both the subject and the purpose of various activities, while being creator and consumer of resources. Human resources are also the only inexhaustible source of creativity, solutions and new, original and valuable ideas.

Human resource is a particular resource of the organization. People know what, when, where and how to act to achieve the strategic objectives of the organization, they are only ones able to produce goods and services, to innovate, transform and organize work.

In human resources domain, management decisions are the most difficult because must have moral, ethical and legal valences. Hiring, promotion, development, motivation, dismissal etc. are complex managerial acts because it involves people with specific needs, personality, with its own goals and personal problems.

Management decisions have to be taken with respect for human dignity, regardless of the position they occupy in the organization, treating people decently and with condescension. This approach is the only one able to contribute positively to motivate employees participating in the joint effort to achieve the strategic objectives of the organization.

I.2. Staffing vacancies: sources and resources

"Human Resources management is fundamentally about matching human resources to the strategic and operational needs of the organization and ensuring the full utilization of those resources. It is concerned not only with obtaining and keeping the number and quality of staff required but also with selecting and promoting people who 'fit' the culture and the strategic requirements of the organization"[75].

In order to be able to have proper human resource for the organization, it needs to plan all the activities regarding both quantity and quality of people, the ways in which people will be employed and developed, when will appear the need of new employee. Of course always will

[74] http://www.schaeffler.ro/content.schaeffler.ro/ro/career/career.jsp
[75] Michael ARMSTRONG, *Human Resource Management Practice*, London, Kogan Page Ltd, 1999, p. 307

appear a gap between the plan and the real life, coming from the difficulty to predict the future, changes of the organization's strategies, changes of the countries' policies etc, but doesn't mean there is no place for human resource planning.

Besides a thorough knowledge of the position that a company wants to make hiring, recruiters should be able to find the sources of human resources. Since human resource offer changes continuously, there will be times when finding adequate human resources will prove more difficult than in other periods. Human resources specialists continuously monitor labor market to know how to recruit appropriate human resources and what kinds of strategies and tactics to use to attract candidates in a competitive market.

One of the most important key points of the recruitment and selection process is that the main goal of it is to appoint the person who can perform the job to an established standard.

"Recruitment and selection is one of the key processes of any business. It is the means by which the business sources and acquires its most precious asset, its people. When it is carried out hastily, it is fraught with dangers. When it is carried out with skill, it can be one of the most important investments you ever make"[76].

Sources of available human resources for a position can be generally classified in two ways (Figure 1):

- Sources within the organization – internal labour market
- Sources outside the organization – external labour market

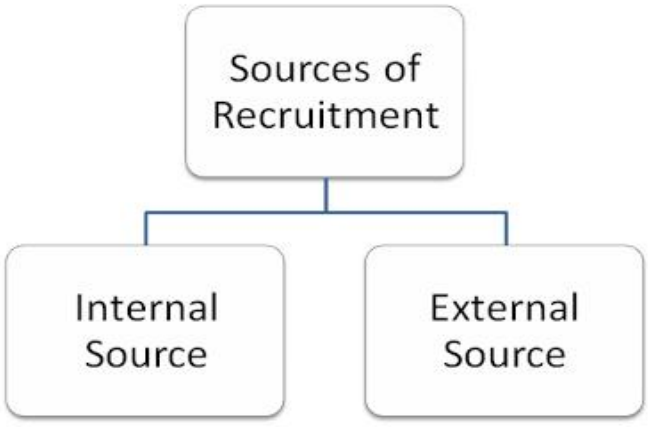

Figure 1 Sources of Recruitment[77]

[76] Eric GARNER, *Recruitment and Selection: Hiring the people you want,* Eric Garner&bookboon.com, 2012, p. 11

[77] http://kalyan-city.blogspot.com/2011/07/internal-and-external-sources-of.html

Sources within the organization

A number of people already working for the organization may be well qualified to fill a position. This can be done by promoting or transferring a suitable candidate. Promotion means to give a higher position, status, salary and responsibility to the employee. Transfer means a change in the place of employment without any change in the position, status, salary and responsibilities of the employee.

This method has some advantages like:

- It is time saving and economical;
- No need of induction training;
- It improves employee's morale;
- It encourages the employees to work harder;
- It retains the employees in the organization;
- It develops loyalty and a sense of responsibility.

As limitations of this method, we can found:

- It prevents 'new blood' from entering the organization – innovative ideas, fresh thinking and dynamism;
- It has limited scope – not all types of vacancies can be filled up;
- The position of the person who is promoted or transferred becomes vacant;
- There may be bias or partiality;
- Those who are not promoted will be unhappy;
- It develops loyalty and a sense of responsibility.

This can be the main way to have qualified employee in a key positions, which require experience and loyalty, maybe better than other sources. For that issue the company has to plan the development, training, promotion and succession of available human resource.

Sources outside the organization

Sources outside the organization comprise the local, regional, national and international labour markets. If a post can not be filled by anyone in the organization management has access to various sources of human resources from outside the organization. These sources include:

1. Competitors - one of the sources of human resources is often used by the organizations represented competing. Since there are a number of advantages due to attract human resources from competitors, this type of 'piracy' has become a common practice. Among the advantages are:

- that person knows work;
- the competitor has paid to prepare the person;

- the competitor will be somehow weakened by the loss of that person;
- once engaged, the person will be a valuable source of information about how can best compete with the competitor.

2. Recruitment agencies - help people to find jobs and helps organizations to find candidates for their open positions. These agencies can be public or private. Public recruitment agencies work for free, while private agencies charge a fee from person employed or from organization that has hired, after the completion of employment.

3. Readers of certain publications - perhaps the most commonly used external source of human resources. The Human Resource Department of the organization advertises the vacancy in newspaper, internet, etc. This advertisement shall describe the company, the position available and that the organization accepts applications from qualified individuals. This source it gives a very wide choice but is very costly and time consuming.

4. Educational institutions - many recruiters go directly to educational institutions to interview graduates. Recruitment efforts should focus on educational institutions that offer the highest probability of finding appropriate human resources for the open positions. Suitable candidates are selected by the recruiters based on their academic records, communication skills, intelligence, etc. This source is commonly used to recruit qualified but inexperienced candidates.

Using the sources outside the organization has advantages like:

- it encourages 'new blood' with new ideas to enter the organization;
- it offers wide range for selection;
- there are less chances of bias or partiality;

As limitations of using this method, we can found:

- it is very costly – advertisements, tests, medical examination, etc;
- it is time consuming – the selection process is long;
- the existing personnel may leave the organization if newcomers get higher post;

"*Although HR managers may be responsible for designing employee recruitment and selection system in the company, the manager needs to understand and use this system. After all, attracting and hiring the right kind and level of talent are critical elements of business effectiveness*"[78].

[78] Luis R. GOMEZ-MEJIA, David B. BALKIN, Robert L. CARDY, *Managing Human Resources*, Pearson Education Ltd., 2006, p. 147

II. HUMAN RESOURCE MANAGEMENT IN THE MILITARY

II.1. Human resources management in MoND - generalities

MoND is part of the global social system, along with the economic, political etc. subsystems, so changes in other subsystems drawing changes in the military subsystem, because of their interaction. MoND - the main component of the military subsystem - is an institution with its own system of organization, management and hierarchy whose activity is, above all, in accordance with national laws, thus occupying an important role in power system, the political factor drawing military purpose and objective, in order to respond to new military requirements and regional policies.

Being a particular institution, MoND applies a specific set of rules in human resources management, accordingly with the national legislation, of course. In military the activity regarding human resource management works with special limitations, in different ways than in civilian, starting from recruitment, during the service and continuing after the personnel's retirement.

Meeting the interoperability with NATO members imposed substantial changes in the management of Romanian military personnel, including the most profound changes which were caused by the modification of Law no.80/1995 by Emergency Ordinance 90/2001 and adoption of Military Career Guide. The need to ensure interoperability with the armed forces of NATO countries requires adopting appropriate strategies in crucial stages of human resource life cycle: entry into the military, career development, promotion, out of the military.

A qualitative reconsideration of military organization functioning may start from rehabilitation of the social status of military based on the recruitment and selection, then ensuring transparency and involvement of the military in shaping each own professional path; very important is the proper motivation for increased performance, as well the design of viable plans for professional reorientation of those who leave the system.

Beside the qualitative changes, in the military it has been taken a lot of measures to reduce the personnel. Not only reducing the total number, but also changing the structure among the personnel categories, trying to project a pyramidal structure. Unfortunately, *"the pyramid of military hierarchy is 'swelling' in the middle, being recorded a personnel deficit at the bottom (lieutenant, sergeant) and a surplus of functions of major, lieutenant-colonel, sergeant-major)"*[79]. Starting in 2010, after the MoND minister order No. MS 109, some function's ranks were increased and the situation seems to become even worst; because it looks like in few years the pyramid will become upside down. We cannot blame the order, because it has a good intention. After the order appeared,

[79] http://www.actrus.ro/buletin/2_2004/a6.pdf

part of the military personnel has decided to remain in the system – and that means stability but, as a negative consequence, the system is locked, everybody staying in the position.

In these circumstances the role of human resource management in MoND becomes even more important.

II.2. Human resources management in MoND –from recruitment to retirement

As I stated before, MoND is a particular institution, with a strictly hierarchy chart. In this account, the regularly rules are applied different than in civilian. MoND has its own educational system, for all levels, starting from Military High Schools to National Defense University. It means that all HRM process is affected, from recruitment and selection, continuing with training, education and development to retirement, and even after leaving the system.

Regarding recruitment and selection, MoND has established a national wide network, consisted of 48 Informing and Recruitment Offices at the level of Military Centers (which function in every county and in all 6 sectors of Bucharest) and 3 Zonal Selection Centers (Alba Iulia, Breaza and Campulung Moldovenesc). The activity of these centers is coordinated by Human Resources Directorate/General Staff, respecting the principles and rules established by Order of the Minister of National Defense No.M.30/05.04.2012.

"MoND gives you a profession, a place of work, a prestigious career, the opportunity to assert yourself to improve, a competitive work environment, decent living, and then when you retire from active service, we will help you to start a new profession, a new career. Instead of, we ask from you responsibility, competence, enthusiasm, confidence, integrity, adaptability, discipline. Willingness, loyalty, respect for the law and rules, ability to work in teams"[80].

Having these institutions, MoND performs its recruitment and selection process in a particular manner, taking this responsibility from the units' and moving it to the specialized structures. In this way the commanders and Human Resources responsible have almost nothing to do in this phase, only to "publish" the vacant positions in the unit. Publishing the vacant positions is not like in the civilian, it is only a hierarchal report.

Centralized recruitment and selection system led to a particular situation in which those responsible for human resources in the units do not execute human resource recruitment and selection anymore, they just submit reports about empty positions.

Again, the exception is the employment of civilian personnel, because the civilians are directly employed by the unit. Human resources specialists deal with planning the staff career,

[80] http://dmru.mapn.ro/index.php?pag=recrutare

assuring the right route for everyone, according the regulations and they are in charge in manning de units' establishment, for peace and war time.

At the level of Military Centers, the Informing and Recruitment Offices do the advertisement regarding military profession, using almost the same methods as the recruiters in the civilian. They visit schools, publish written announces in local magazine and on Internet and participate at the activities organized by County's Labor Force Employment Agencies. At this level they compile a file for each candidate, containing a sum of documents requested by a very strict procedure (I will not insist on this topic). This file will be sent to the Zonal Selection Centre, were the candidates will be tested (differentiated by personnel categories) and finally, selected for the military career. Candidates for Military High Schools, Services Academies and NCOs and Warrant Officers Schools will proceed for a new exam before being admitted. Candidates for professional soldiers will follow their training period in Services Training Battalions without any other exams.

I want to mention a particularly dimension: at this level is the access in MoND mostly for the lower level of military career, which means candidates who apply for Military High Schools and Services Academies or those who want to become professional soldiers.

Next step in military career is following the educational institution, depending on personnel categories and military specialties. After graduating the educational institutions, each military personnel will be appointed to a military unit, choosing an empty position according to the graduation mark.

Every Service (Land Force, Air Force, Navy Force, Communication and Information Commandment and Joint Logistics Commandment) has his own training and education network, for all personnel categories and military specialties. It means they are in charge and direct interested in training and education of their subordinates.

In this phase the Human Resource managers from all levels are more involved, doing the HR planning and assuring the right development for entire personnel. Studying continuously the educational institutions offers, applying the domain's rules and knowing the training needs of the staff, HR specialists will be able to manage the entire process. All staff needs to be aware of the key stages in the training process. This is often referred to the training cycle (Figure 2).

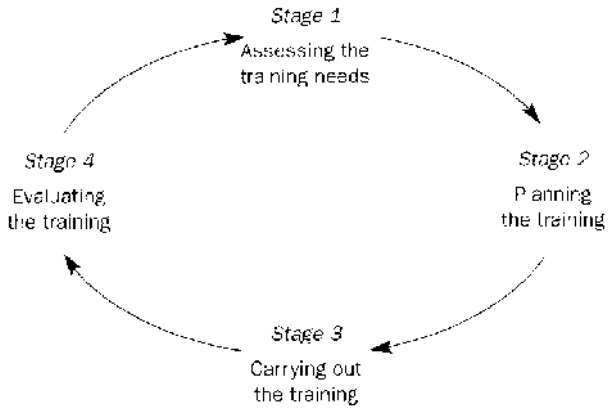

Figure 2 The training cycle[81]

Of course everyone is responsible for his own career, but the HR specialist should guide the staff in attending the required courses to be promoted or in occupying different kind of position in order to be eligibly for sort of higher position, etc.

For all this steps the HR compartment has only admin attributions because the decision is taken at a level of the one of the 17th Selection Boards[82]. This entities function at several levels, as a decisional factor in military career management. Based on based on clear rules and norms, the action of making decision is better than the old way, when a person had to decide.

The same Selection Boards decisions are also taken in those situation when military personnel applies for an empty position within the MoND and when military personnel is supposed to be promoted (getting a higher rank). The HR compartment has to follow the HR plans and to submit proposals in according with special regulations, having unit's commander prior approval.

What is common in all these situations, all the movement regarding human resources starts with a personal report submitted by the staff. To go to a career course, to get promotion in a higher position or to move in other unit, military personnel has to submit a personal report. More than that, in order to increase the process' transparency, all vacancy positions are published in a monthly publication named "The Informative Bulletin of the Armed Forces". Military personnel from entire MoND can see the empty positions and can apply for, and all the requests will be analyzed in an equitable manner in one of the Selection Boards, accordingly with military categories, ranks and services.

[81] Margaret Foot, Caroline Hook, *Introducing Human Resource Management*, Pearson Education Ltd., 2002, page 192

[82] Order of the Minister of National Defense No. M.22/5.02.2010, approving the Norms regarding the organization and functioning of selection system and hierarchy in evolution in career of military personnel of the MoND, Annex 1

Advancing in military career, implacable will come the time for retirement. Few years ago this situation could appear at a different age, according to the rank and age. Now the retirement occurs when a person reaches the age stipulated in the Law No. 263/2010 regarding the unified public pension system (in the Annex is stipulated the retirement age according with the date of birth). Even the retirement of military personnel is analyzed in the Selection Boards, but, if is not a proposal to maintain some persons in the system, it will be only a formality.

After the retirement, ex-military personnel receive a service pension, paid from the MoND budget. The amount of pension varies by the contribution during the entire activity so, is closely related with the monthly payment.

In this period the retired persons could benefit from the services offered through the professional reconversion programs. These programs consist of training personnel to achieve new skills, wanted on the labor market in civilian life.

Once again the County/Zonal/Sector Military Centers, by Reservists' Requests Solving Offices, are in charge to receive the request of the retired personnel, even if the solutions are taken at a higher level.

There are some particularities regarding the civilian personnel from MoND.

CONCLUSIONS

Evolving in Romanian society, MoND uses the same source of human resources as civil companies. Comparing MoND and civil companies' offers, especially the multinationals, we can say that in terms of financial MoND can not compete with them. But for many young people, the MoND may be an opportunity for the starting their careers. Many of them find it more important a stable job, even if the payroll system is reduced compared with civilian companies. Some of them choose military career thinking just as a beginning, taking into account the continuing professional training while fulfilling their duties. In this way, even if they do not advance in the military system, they will become more capable to apply to other better paid jobs.

"Fairness, transparency and equal opportunities for military career progression are basic principles which coordinate the legal norms, regulations and internal instructions for the field"[83].

Looking at the previous statement I cannot refrain of pointing a strange situation of the candidates for professional soldiers. Starting from the consideration of reducing personnel who receives compensation for rent, those who live in the same garrison with the future unit they will

[83] http://dmru.mapn.ro/index.php?pag=cariera

work, will receive so much points on the file, so at the level of Zonal Selection Center nobody will overcome them.

Going over the financial aspects of the offer, military recruitment and selection process operates according to its own standards. For some services are applied even stricter rules, especially regarding the physical and mental condition of the candidates.

A predominant feature of the military selection and recruitment system is that for candidates from outside the system are offered positions at the beginning of the career. An exception to this rule applies to civilian personnel functions in MoND, who may apply to fill in including the senior positions. However, on the MoND site we find many reasons why young people might choose a military career, ending with the expression: *"...where you could find many arguments «pro» together? And if you're still not convinced or persuaded ... Here's another one ... Military profession is for you because simply ... catch you!"*[84].

It looks like the new challenges available for the entire society are feasible for MoND, too. Looking for the right people, at right time, in right positions, MoND proves one more time it is a important organization which "fights" with civil companies in order to attract the best individuals from labor market. Exploiting the high position occupied in the population's trust rate, MoND tries to ensure the candidates about the transparency of recruiting and selection process and offering an overview for the entire military career.

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A CRITICAL ANALYSIS OF INTERNET RESOURCES

LTC Florin OLARIU

INTRODUCTION

Searching the World Wide Web can be both useful and exasperating. You may discover immense amounts of information, or you may not find the exact kinds of information you are looking for. Searching online will give you a wealth of information, but not all of it will be helpful or of the highest quality.

The World Wide Web is a wonderful resource, but it doesn't include all the information that you can find at a library. Do not expect to limit your search to what is on the Internet, and do not expect search engines to find everything that is on the Web.

Studies of search engine usage confirm that search engines are increasing exponentially in their indexing of new Web sites and information. Indexing is the Web name for finding and including new Web pages and other media in search results. For example, in 1994, Google indexed approximately 20 million pages. As of 2013, that number is more than 20 billion! However, search engines still only index a fraction of what is available on the Internet and not all of it is up to date. Search engines may only get an image of the sites every month or so; information that has been updated since that time will be invisible to the search engines. After you try several search engines, you will see that you get different results from different sites. Also, remember that some information appears and then disappears from Web sites. Finally, search engines do not always search the entire page; if a page is larger many search engines will only index the first part of the page. So there could be valuable information that is being overlooked by a search engine even in pages that are indexed.

Not all of the information located on the Internet can be found via search engines. Some researchers call this information the "invisible Web" or "deep Web". Invisible Web information includes certain file formats, information contained in databases, and pages omitted from search engines.

So, using search engines is not the only way to find material on the Web, but these search engines are one tool you can use. Knowing a few search strategies and hints can make the search more profitable.

I. WHY INTERNET?

I.1. Most popular source of information

According to a recent poll in the United States, the internet is by far the most popular source of information and the preferred choice for news ahead of television, newspapers and radio. But just a small fraction of U.S. adults considered social websites such as Facebook and MySpace as a good source of news and even fewer would opt for Twitter.

More than half of the people questioned in the survey said they would select the Internet if they had to choose only one source of news, followed by 21% for television and 10% for both newspapers and radio. Only 10% described social websites as an important for news, and despite the media buzz about Twitter, only 4% would go to it for information.

The Internet was also selected as the most reliable source of news by nearly 40% of adults, compared to 17% who opted for television and 16% who selected newspapers and 13% for listened to the radio. The poll reinforces the idea that efforts by established newspapers, television and radio news outlets to push their consumers to their respective websites is working.

Almost half of 3,030 adults questioned in the online survey said national newspaper websites were important to them, followed by 43% who preferred television websites. Blogs were less of a necessity than websites with only 28% of those polled saying blogs that shared their political viewpoint were important. "That the websites of traditional news outlets are seen by a wide margin as more important than blog sites - most of which are repositories of opinion devoid of actual reportage - could be seen as an encouraging development for the media at large," Zogby (second best known polling brand in the U.S.).

When asked to peer into the future, an overwhelming 82% said the Internet would be the main source of information in five years time, compared to 13% for television and 0.5% chose newspapers. About 84% of Americans have access to the Internet, according to industry studies.

In Romania GemiusAudience study contains data about the profile of Romanian Internet users, frequency of use of the Internet and a ranking of the most popular websites.

In August 2013 there were 8.9 million Romanian internet users, 66.28% of whom live in urban areas, while 33.72% are from rural areas. A significant percentage of 68.65% of Romanian internet users have more than 5 years of experience in using the Internet.

The results show that in August 2013 the Romanian 5.8 million Internet users sought news online. 55% are men and 45% are women. Most people interested in news are aged between 25 and 44 years old and live in urban areas.

I.2. Search engines

The Internet is made up of a vast amount of computers networked throughout the world via data lines or wireless routers. New computers and Web sites are added every day, and no larger organizational system exists to document and catalogue them all. The Internet is a dynamic, growing, and changing system, which makes navigating it or searching it thoroughly difficult.

This is where search engines and Web directories come in. Search engines, such as Google or Yahoo, are large databases of information that store and retrieve relevant website results based on **keywords**. Web directories, such as the Open Directory Project, are attempts to organize the best of the existing Web sites into categories and subcategories. No search engine or Web directory will have the same sites listed in the same order, and none will have all of the possible sites on the Internet listed. Furthermore, the ranking of a Web site within a search engine (how high up on the results list it appears) has as much to do with politics as it does with quality information. The search engine rankings are determined by a number of factors including the amount of information on the site, the amount of other sites that link to it, the number of people who select that link when searching, the length of time that the site has been listed in the search engine database, and the code of the site.

Recently, some search engines have also been providing "sponsored links" - links that appear on the first few pages of the search results and that are paid for by advertisers. This means that you may end up clicking on something that is not relevant to your search, but instead actually advertising.

What does this mean for a researcher? Understanding the nature of the Internet, how to navigate it, and how it is organized can help you assess the quality of information and Web sites, filtering out that which does not relate or is of questionable quality.

II. Drawbacks and advantages of internet resources

II.1. Drawbacks

Because the Internet is a distributed environment, with no overall **authority**, no editorial review is required for inclusion. In practical terms, this means that no standards exist for content or format, and anyone can be an author or publisher. At the least, this can result in typographical and grammatical errors, misspellings, and poor layout and design. At worst, opinion can pose as fact, and information can be misleading or erroneous. Moreover, since no requirements exist for identifying authorship, dates of publication or revision, or source of the information or bibliography, evaluation of the site's authority and accuracy is difficult. The integrity of the data is further compromised by the possibility that data has been altered, whether intentionally or because of the way the information is stored and transmitted. Consequently, the real possibility exists for inaccurate or false data to be received or used by unwary users, and multiple, different or contradictory versions of information may be simultaneously available, further adding to the user's dilemma.

Even if a massive amount of data is transmitted daily across the web, **the ratio of valuable information** can be terribly low. Much of what is available on the web is of little or no value, except perhaps to the individual who produced it, and the sheer quantity of sites makes the search for quality that much more difficult. Moreover, as an unregulated media, the web is rife with commercialism and garishness. Screens are frequently so cluttered with ads and promotional hype that they become difficult to use. In terms of balance, judging from the larger web site lists such as Yahoo, the web is clearly tilted towards recreational and commercial uses. Business and technology are more heavily represented than are the humanities, and information is more likely to be current than historical. And finally, with its origins in the U.S., the language and "culture" of the web are heavily weighted towards English and North America. Anatoly Voronow, director of the Russian Internet provider Glasnet, denounces the dominance of English as "the ultimate act of intellectual colonialism." He says, "The product comes from America so we either must adapt to English or stop using it … If you are talking about a technology that is supposed to open the world to hundreds of millions of people you are joking. This just makes the world into new sorts of haves and have nots". In time, the web may come to reflect a more diverse and global culture, but that will be driven more by market forces than by humanitarian principles.

Turning to the question of reliability, in a technical sense, we find a **highly unstable environment** where sites can come and go with alarming ease. Web sites are notorious for changing location and leave no "forwarding address," or disappearing altogether. Consequently, individuals or libraries who have come to rely upon a site as a primary source

of information are stymied. With heavy traffic, servers become overloaded and access is delayed or denied. At best, this volatility causes inconvenience and frustration, at worst, it could have serious consequences for researchers who suddenly find that data is no longer available. It is observable that a library may come to depend on access to a certain resource or database on the web, but will have no control over whether that item continues to be offered. As such, using the web as a primary resource can be a hazardous.

As discussed earlier, an important contribution of the field of librarianship is a set of principles and practices for organizing published materials so that the information they contain may be found. One of the most persuasive arguments against describing the web as a "virtual library" is the **lack of bibliographic control** and the consequent difficulty of retrieving relevant information. Though classified lists of sites and search engines are attempting to organize the web, and initiatives such as OCLC's InterCat are applying cataloging standards to Internet sites, the current state of bibliographic and intellectual access is rudimentary. Browsing and serendipity play greater roles in locating relevant information than do traditional bibliographic searching techniques.

II.2. Advantages

One of the web's strongest assets is its ability to provide **current and timely information**. Sites with business data (currency exchange rates, stock market data), geo-political information, weather, and current news exploit the webs potential to provide up to date information than is impossible in print. The volatility of this data and the time lag between gathering, publishing, and making it available on the library's shelves strongly militates against disseminating it in traditional print media.

The web's **interactive capabilities** provide functions not possible through standard print sources. An increasing number of sites have interactive features where calculations such as unit conversion, local times around the world, and distance calculations are performed automatically. Moreover, interactivity with librarians is increasingly possible, as numerous library reference departments now provide the opportunity for users to ask reference questions via the library's web site. One of the principle innovators of this service in the U.S., is the Internet Public Library (http://ipl.org), which provides an interactive information service. Guidelines are provided and users submit question on online form or initiate an interactive reference session.

In the traditional library, print is the primary means by which information is acquired and disseminated. Separate media centers may provide audio and video recordings, but largely there is little integration of these media with the print collection. Web sites, like the new generation of DVDs, provide for true integration of text, sound, and image, including video (**multimedia capability**), for example, the web hosts dictionaries which include audio pronunciation guides, and sites which integrate music and dance clips into the text. Moreover, with its dynamic system of links, the web is able to draw related materials and information together far more seamlessly and effectively than is possible in print.

Unlike traditional library collections, which must be used in a specific place and time, the web offers greater flexibility regarding where and when its information can be accessed (**availability**). While achieving this capability requires powerful and properly configured hardware, necessary software, and ability to connect to the network, the consequent availability in the classroom, lab, office, or home, offers unprecedented accessibility. Despite the instability of web sites and unpredictable access to servers, the web offers the advantage of simultaneous use by multiple users. Since library materials can only be used by one person at a time, and are subject to being lost or mutilated, web access to a heavily used resource can help ensure its availability to users.

II.3. Altered information

Propaganda is a commonly misused term. Because of its historical use, such as in the name of the infamous "National Ministry for Public Enlightenment and Propaganda" run by Joseph Goebbels for the Nazi government of Germany, many people associate propaganda with inflammatory speech or writing that has no basis is fact. In reality, propaganda may easily be based in fact, but facts represented in such a way as to provoke a desired response.

Political campaign speeches and party political statements are often, in reality, a form of propaganda. They fit this definition when they present the opposing point of view in an unfavorable light. All political organizations do this on a variety of issues.

When you read documents or listen to audio or video files that characterize opinions or positions in terms of their integrity or moral content, you may well be in the presence of propaganda. Remember, the purpose of propaganda is to ‘implant a particular attitude’: to encourage you to think a particular way. Think for yourself: base your opinion on the facts, not the hype.

Misinformation differs from propaganda in that it always refers to something which is not true. It differs from disinformation in that it is "intention neutral": it is not deliberate, it is just wrong or mistaken.

One of the most popular forms of misinformation on the Internet, especially e-mail, is the passing along of urban legends. Urban legends are fabricated or untrue stories that are passed along by sincere people who believe them and somehow consider necessary to "notify" others.

Misinformation is perhaps the most difficult information lookalike to diagnose. Why? What strategies could you develop to determine whether what you are reading constitutes information or misinformation? Urban legends sometimes begin in malice. They become misinformation when they are repeated by sincerely misguided people.

You have now reached the lowest of the low. Never underestimate the evil intentions of some individuals or institutions to say or write whatever suits a particular purpose, even when it requires deliberate fabrication. In fact, the Internet is an excellent vehicle for **disinformation**.

Always validate or confirm information on individuals, institutions or groups, and countries that you find on the Internet**.** If you don't know who wrote what you read or why they wrote it, you don't know if it's trustworthy.

II.4. Items to consider

Authorship is perhaps the major criterion used in evaluating information. Who wrote this? When we look for information with some type of critical value, we want to know the basis of the authority with which the author speaks.

Accuracy or verifiability of details is an important part of the evaluation process, especially when you are reading the work of an unfamiliar author presented by an unfamiliar organization, or presented in a non-traditional way.

Currency refers to the timeliness of information. In printed documents, the date of publication is the first indicator of currency. For some types of information, currency is not an issue: authorship or place in the historical record is more important. For many other types of data, however, currency is extremely important, as is the regularity with which the data is updated.

Point of view or bias reminds us that information is rarely neutral. Because data is used in selective ways to form information, it generally represents a point of view. Every writer wants to prove his point, and will use the data and information that assists him in doing

so. When evaluating information found on the Internet, it is important to examine who is providing the "information" you are viewing, and what might be their point of view or bias.

Referral to and/or knowledge of the literature refers to the context in which the author situates his or her work. This reveals what the author knows about his or her discipline and its practices. This allows you to evaluate the author's scholarship or knowledge of trends in the area under discussion. Example of criteria: the document includes a bibliography; the author alludes to or displays knowledge of related sources, with proper attribution; the author displays knowledge of theories, schools of thought, or techniques usually considered appropriate in the treatment of his or her subject; if the author is using a new theory or technique as a basis for research, he or she discusses the value and/or limitations of this new approach; if the author's treatment of the subject is controversial, he or she knows and acknowledges this.

III. We need to inform

Don't limit your Internet searching to using search engines. Be creative and think about which Internet sites might have the information you are looking for. For example, might any of the following lead you to the sites that will provide the information you are looking for?

Looking for information about job opportunities? Look at some of the sites listing job vacancies. Try university websites that sometimes list jobs through their placement offices, or try professional organizations which also sometimes list jobs in that field. Or look through the websites of various large companies because they usually have a section on job opportunities in their company.

Looking for information likely to be discussed on newsgroups or chat rooms? Look through the lists of newsgroups or use a search engine.

Looking for information about a current topic? Check the newspaper and current newsmagazine sites. Most have a search engine for articles in their publications.

Looking for health information? Check health information portals or large medical libraries.

III.1. Academic research and not only

The World Wide Web is not, and cannot be, a library. The issue is not physical space, or shelves of books and journals, but a set of principles on which libraries ideally operate. At their best, libraries select resources which have some assurance of quality, organize them for

easy access, and provide professional research support, instruction, and assistance to users. A good library is not a passive repository of texts or documents, but an actively selected collection of the best materials available and affordable which support the educational, research, or recreational mission of the individual library. To help ensure the authority and reliability of library materials, librarians can depend upon reputable publishers, review media, and selective bibliographies to make acquisitions decisions. Moreover, libraries organize their materials so that users can find the books, articles, or reports they need. From the development of the Anglo American Cataloging Rules and the MARC record, to the Dewey Decimal and Ranganathan Colon Classification systems, to online catalog systems, libraries have established mechanisms to describe and organize library materials, and make them assessable to users. Finally, libraries provide value-added services in the form of professional personnel who not only select and organize the materials, but who assist users in finding the material or information they need, as well as teaching them to find information on their own. These library standards, as we shall see, have not yet migrated into cyberspace, and referring at this point to the World Wide Web as a "virtual library" does an injustice to the institution of libraries.

Contrasted to the ideal of a library, chaos and unpredictability reign on the World Wide Web. On the web, anyone can be an author or publisher, so the notion of quality, authority or expertise is not guaranteed. Finding the information one needs is a challenge, and there's no guarantee that it will still be there tomorrow. On the other hand, the web enables a librarian from the middle of the United States to explore the wonders of the Kruger National Park and listen to songs of school children in Cape Town, without leaving her desk. At its best, the web overcomes the limitations of time and space to put information that transcends the printed page onto desktop of the user.

Perhaps the most powerful feature of the web, however, is the wealth of information it contains, much of which is not available in even the largest library collections. If the intrepid librarian succeeds in wading through the morass of advertising, popular culture, and hype that accompanies using the web, he or she finds that useful sites actually do exist. Foremost among these are the home pages of libraries, universities and research centers, and professional organizations, which frequently contain value added resources. For instance, the U.S. Library of Congress site (http://www.loc.gov) includes historical photographs and audio recordings, specialized databases such as the Vietnam War Era POW/MIA Database, and exhibits, in addition to providing access (via telnet) to their online catalog.

Though commercial databases such as the full text of Encyclopedia Britannica are available through the web, their use is restricted to subscribers. Nevertheless, librarians can access a considerable amount of unrestricted (i.e., free) information, such as national and commercial telephone directories, dictionaries, almanacs, etc. Numerous libraries have organized links to these electronic reference sources (see http://www.ipl.org/ref/RR). In some cases, however, quality may be sacrificed for convenience as the some of these resources are not as authoritative or dependable as their print counterparts.

Journal literature is of particular interest to scholars, and delivery of current, authoritative articles to a desktop is a researcher's dream. Since this literature is subject to copyright restrictions, however, full text articles are generally available only on a subscription basis, frequently through a vendor such as OCLC's FirstSearch. Though an increasing number of electronic journals published on the net are freely available (see http://www.edoc.com/ejournal for a classified listing) they may not be subject to the peer review quality-control process. The availability of newspapers is somewhat better, since an increasingly diverse collection of newspapers from around the world is online (see http://www.yahoo.com/news/newspapers). While these are rarely the exact equivalent of the paper copy, they nonetheless provide vital information beyond the library's budget to acquire in print.

In summary, the web's potential for expanding a library's existing resources is considerable. Whether providing timely information such as international news, interactive information services, multimedia, or connections to remote libraries, the dynamic nature of the web offers a rich complement to the static and stable print collection.

III.2. What is the Invisible Web ?

Is it some kind of conspiracies deal that only those with secret clearance on their pockets can access? Well, not exactly. The name "invisible web" mainly refers to the vast repository of information that search engines and directories do not have direct access to, like databases. Unlike pages on the visible Web (that is, the Web that you can access from search engines and directories), information in databases is generally inaccessible to the software spiders and crawlers that create search engine indexes.

In a word, it is huge. Bright Planet estimates the invisible, or deep, web as being 500 times bigger than the searchable or surface Web. Considering that Google alone covers around 20 billion pages, that is just mind boggling.

Why Is It Called "The Invisible Web"?

Spiders meander throughout the Web, indexing the addresses of pages they discover. When these software programs run into a page from the Invisible Web, they do not know quite what to do with it. These spiders can record the address, but can't tell you squat about the information the page contains. Why? There are a lot of factors, but mainly they boil down to technical barriers and/or deliberate decisions on the part of the site owner to exclude their pages from search engine spiders. For instance, university library sites that require passwords to access their information will not be included in search engine results, as well as script-based pages that are not easily read by search engine spiders.

Why Is The Invisible Web Important?

Perhaps you think it would be easier to just stick with what you can find with Google or Yahoo. Maybe this is not a bright idea. However, it is not always easy to find what you are looking for with a search engine, especially if you are looking for something a bit complicated or obscure. Think about the Web as a vast library. You would not expect to just walk in the front door and immediately find information on the history of paper clips lying on the front desk, right? You might have to dig for it. This is where search engines will not necessarily help you, and the Invisible Web will.

Plus, the fact that search engines only search a very small portion of the web make the Invisible Web a very tempting resource. There is a lot more information out there than we could ever imagine.

How Do I Use The Invisible Web?

Fortunately there are many people that have asked themselves the exact same question, and have put together great sites that serve as a launching point into the Invisible Web. Here are some gateways for different subjects:

- health and science: http://psycnet.apa.org/index.cfm?fa=search.defaultSearchForm, http://www.scirus.com/, http://healthfinder.gov/, http://www.rxlist.com, http://193.169.156.200/app/nom1/anm_list.asp.
- mega portals: http://infomine.ucr.edu/, http://vlib.org/
- other invisible sources : http://aip.completeplanet.com

This is just the tip of the iceberg. The links above barely begin to touch the vast resources available on the Invisible Web. As time goes on, the Deep Web will only get bigger, and that is why it is a good idea to learn how to use it now.

III.3. Health information

The demand for reliable information on health is increasing. Undoubtedly, digital technologies have profoundly transformed the way we share information. The Internet now provides access to a wide variety of electronic channels (e-channels) - websites, blogs, various applications and social media. Thus, people can not only look and take information, but instantly share comments or personal experiences with other people all over the world, as evident from the analysis by EY Romania.

Electronic channels have become sources of information about various diseases, about alternative treatments on clinical diagnostics and more. We might think that the general health management has thus become one of the biggest beneficiaries of this digital revolution.

Some health industry companies have embraced this vast online information environment, others do not. Unfortunately for healthcare organizations, providing information in this digitized world entails increasing the complexity of the risks they face, especially those of a legal and regulatory framework. Risks arise when content loaded on to a paperless healthcare company violates the legal provisions regulating the marketing of a product in its segment and postmarketing surveillance. The Internet has become an agora for the exchange of information.

The Internet has become a primary source of information for all the key players in the health industry, be they patients, doctors or companies - when looking for information, transmit, or store information pursuing health-related or on certain medications (see table below). This increased flow of visitors and activity entails an increase in the level of risk in this highly regulated industry.

patients	physicians	pharmaceutical companies
72% of European consumers online (over 18 years) use internet or social media to obtain health information	80% of European doctors use online channels and networks and are interested to use social networks dedicated just for doctors and pharmaceutical representatives	91% of pharmaceutical companies have allocated internal resources of e-marketing

Source: EY Performance 5.3 Magazine, august 2013

Online content has no borders, so your post must be carefully evaluated in terms of the implications that may result in different markets. Changes in regulatory complexity are further complicated by the lack of general normative coming from major regulatory bodies.

To compensate for this lack, some smaller market trade associations took the initiative to define best practice guides the behavior and use of new social media platforms. A second level of complexity is the ubiquity of the Internet, which raises the question how a company can comply with country-specific limitations and requirements for communication on the Internet.

Over the last decade, the types of information and electronic media channels have expanded far beyond usual generated content and distribution; it now includes online dialogues and user generated postings. For companies in the health industry, efficient management of the flow of information is a formidable challenge. An organization can create and possess their own content on these channels or, for example, can generate content that will go directly to the website or from, a website dedicated to the treatment of certain diseases.

Given how complex the issue has now become regulation and management of online content dedicated to specific products, countries or stakeholders in the health industry companies turn often unprepared to face communication through electronic channels. Many of them have not yet defined risk policies for digital content and are surprised to find how much content is developed actually by customers.

To maximize the benefits of electronic communication channels, and also to reduce associated risks, companies in the healthcare industry must invest in the development of complex programs in implementing rigorous processes and content management systems prevention, identification and monitoring of risks.

Understanding the actual fingerprint of the company and its constant monitoring, companies must observe their presence in electronic channels, in order to identify and to analyze vulnerabilities and critical channels.

Creating periodical “risk maps” on the content generated by the company and the users for each channel and for each type of risk, companies can determine where there may be weaknesses in its strategy, its processes the skills available and if it has appropriate systems and technologies.

Investing in constant training, monitoring and risk management programs for employees will make a good basis for developing clear policies and procedures to help employees understand the importance of using electronic channels, as well as human capital ready and available to answer any since any of these electronic channels.

Used wisely, electronic channels are sources that add value to the relationship with customers and simplify human contact. However, as with any opportunity, they are not

without risks. Companies in the health industry should look into the risks of these channels and their mapping hazardous areas. In addition, they should assume developing and implementing a comprehensive plan that would protect the organization in the world of electronic channels.

On the other hand patients have at their disposal a lot of resources from health information portals (like this: http://healthcare.intuit.com/portal/) to the world's largest medical library (http://www.nlm.nih.gov/) or additional health search engines.

CONCLUSIONS

The World Wide Web gathers information and data from all over the world. For the reason that so much information is available, and because that information can appear to be fairly "anonymous", it is necessary to develop skills to evaluate what you find. When you make a research in academic library, the books, journals and other resources have already been evaluated by scholars, publishers and librarians. Every resource you find has been evaluated in one way or another before you ever see it. When you are using the World Wide Web, none of this applies. There are no filters. Because anyone can write a Web page, documents of the widest range of quality, written by authors of the widest range of authority, are available on an even playing field. Excellent resources reside along side the most dubious. The Internet epitomizes the concept of Caveat lector*: **Let the reader beware***.

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CONFLICTS AND STRESS FACTORS IN MILITARY ORGANIZATION

LTC. Mircea PANCU

INTRODUCTION

"In a successful negotiation, everyone wins. The objective should be agreement, not victory. Every desire that demands satisfaction and every need to be met is at least potentially an occasion for negotiation; whenever people exchange ideas with the intention of changing relationships, whenever they confer for agreement, they are negotiating.[85]"

As a positive influence, stress can force us to get action. It can show the way to new attentiveness and exciting new viewpoints. As a negative influence, it can result in judgment of distrust, rejection, anger, and depression, which in turn can lead to physical condition problems such as headaches, rashes, upset stomach, ulcers, insomnia, high blood pressure, stroke, and heart disease. With the death of a loved one, the birth of a child, a job promotion, or a new relationship, we experience stress as we readjust our lives. As a result, after adjusting to different situation, stress will help or hinder us depending on how we react to it.

I. DEFINITIONS OF CONFLICT AND STRESS FACTORS

I.1. Conflict definitions:

What is conflict?

a) A natural disagreement resulting from individuals or groups that differ in attitudes, beliefs, values or needs. It can also originate from past rivalries and personality differences. Other causes of conflict are negotiating before the timing is right or before needed information is available[86];

b) A relationship among two or more opposing parties whether marked by violence or not, based on actual or perceived differences in desires, interests and goals. Conflicts are part of human interaction, can be managed productively;

[85] http://www.counselingcenter.illinois.edu/self-help-brochures/stress-and-anxiety/stress-management/
[86] http://eng.1september.ru/2006/01/3.htm

c) All forms of human activity in any social, cultural, religious, economic, or political group (family, village, tribe, church, industry, association, or nation) include conflict. Human conflict may exist within or between a single individual's differing emotions and desires, putting one at odds with oneself, or in the clash of different persons' and different groups' interests or principles. Such feelings and desires often collide, causing opposition within and between individuals either covertly or openly, internally or externally;

d) Conflicts are a natural and inevitable part of people working together, sharing thoughts, concerns, perspectives, beliefs and goals[87].

I.2. Stress factors definitions:

What is Stress?

a) **Stress** is the "wear and tear" our bodies experience as we adjust to a continually changing environment; it has physical and emotional effects on us and can create positive or negative feelings[88];

b) **Workplace stress** is the harmful physical and emotional response that occurs when there is a poor match between job demands and the capabilities, resources, or needs of the worker;

c) A combination of external stressors and our response or the physical and psychological strain we experience as a result;

d) The stress experience is determined by the appraisal of what is at stake and the analysis of the resources available to meet the demand;

e) A relationship between a stressor and an individual's reaction to it, a lack of fit between a person (in terms of their personality, aptitudes and abilities) and the environment;

f) A condition in which the body reacts to respond or to retort at solicitations, threats or happiness.

II. TYPES OF CONFLICT AND STRESS FACTORS

II.1. Types of conflicts:

a) Intrapersonal conflict occurs inner sight us, when we are torn between choices, we are frustrated with our goals, accomplishments, very often leads to conflict with others;

[87] http://www.counselingcenter.illinois.edu/self-help-brochures/stress-and-anxiety/stress-management/
[88] http://www.counselingcenter.illinois.edu/self-help-brochures/stress-and-anxiety/stress-management/

b) Interpersonal conflict between two or more individuals. We might get into a heated debate in a meeting, get an argument with a colleague, or have a bad encounter with our superior;

c) Intergroup conflict between two or more groups, nations, gangs, work areas;

d) Conflicts of interests;

e) Conflicts of identity;

f) The narrowest view would look for physical violence, a related approach would ask for conscious breaches of rules, the most lenient definition would be a mere absence of cooperation, a situation where one person claims that another one has not behaved as to have been expected to do and as detrimental for others.

II.2. Types of stress factors:

a) **Eustress** is defined in the model of Richard Lazarus (1974) as stress that is healthy or gives one a feeling of fulfillment;

b) **Distress** is the most commonly-referred to type of stress, having negative implications, whereas **eustress** is a positive form of stress, usually related to desirable events in person's life. Both can be equally taxing on the body, and are cumulative in nature, depending on person's way of adapting to a change that has caused it;

c) **Resilience** in psychology is the positive capacity of people to cope with stress and catastrophe. It is also used to indicate a characteristic of resistance to future negative events. In this sense "resilience" corresponds to cumulative "protective factors" and is used in opposition to cumulative "risk factors".

II.3. Causes of conflict and stress factors

All organisms appear to exhibit a number of fundamental drives that have been variously classified in a hierarchy of needs, usually in terms of their end object: food, sex, dominance, self-preservation, territory, independence, self-actualization, and society. Conflict arises when individuals or groups act to achieve the end desires of their own drives. In most cases, a hint of conflict triggers an escape mechanism rather than hostile action because a threat to self-preservation elicits fear that overcomes other needs.

Conflict is antagonistic, sometimes violent, and (except for some limitations in international law or tacit consent) relatively unconstrained. Competition, on the other hand, is less antagonistic, less violent, and usually governed and regulated better than conflict.

III. WHY ARE CONFLICT AND STRESS FACTORS NECESSARY?

III.1. Why is conflict necessary?

a) A boss has to deal with conflict situations both as a moderator, solving other's conflicts, or as a direct participant when he is in conflict to someone;

b) Unfortunately, managers often make the mistake of treating all conflicts as negative confrontations that should be avoided or solved as promptly as possible; in reality many conflicts provide an important opportunity to improve business result. Disagreements and differing points of view, when managed properly are essential to growth and innovation, new ways of thinking, additional management options[89];

c) For the most part, conflicts are not big, emotional blowouts, or scenes of physical violence, although these ones can occur, especially in workplaces where conflicts are not well managed.

III.2. Why are stress factors necessary?

a) As we have seen, positive stress adds anticipation and excitement to life, and we all thrive under a certain amount of stress.

b) Deadlines, competitions, confrontations, and even our frustrations and sorrows add depth and enrichment to our lives. Our goal is not to eliminate stress but to learn how to manage it and how to use it to help us.

c) Insufficient stress acts as a depressant and may leave us feeling bored or dejected; on the other hand, excessive stress may leave us feeling "tied up in knots." What we need to do is find the optimal level of stress which will individually motivate but not overwhelm each of us.

III.3. Causes of conflicts:

a) Reality is dirty. People murder, injure each other, they steel and lie; they rape and insult their neighbors. All this causes conflicts, but not all conflicts are undesirable, some forms of conflicts may, on the contrary, be characteristic for healthy social interaction;

b) A conflict or negotiation situation occurs at work, at home, in everyday life due to conflict of interests when what one wants isn't necessarily what the other wants and both sides prefer to search for solutions, rather than giving in or breaking off contact;

[89] http://www.counselingcenter.illinois.edu/self-help-brochures/stress-and-anxiety/stress-management/

c) Personal causes of conflict come from ego, selfishness, lack of empathy, concern, past friction, different backgrounds, values or beliefs and prejudice, different approaches to a problem, perspectives on a issue, sources of information;

d) The main reasons of emerging conflicts in a military organization are: difficulty of missions, different opinions, various interests, motivation, measures after control, inspection, hierarchy, changes, transformation and transition to a modern one;

e) Few of us enjoy dealing with conflicts, either with bosses, peers, subordinates, friends, or strangers, particularly when the conflict becomes hostile and when strong feelings become involved. Resolving a conflict can be mentally exhausting and emotionally draining. It is important to realize that conflict resolution is neither good nor bad, there can be positive and negative outcomes, it can be destructive but can also play a productive role for you personally and for your relationships both personal and professional;

f) The important thing is to manage the conflict, not to suppress it, and not to let conflict escalade out of control. Many of us seek to avoid conflict when it arises but there are many times when we should use conflict as a critical aspect of creativity and motivation;

g) You will be constantly negotiating and solving conflict throughout all of your professional and personal life. Given that organizations are becoming less hierarchical, less based on positional authority, less based on clear boundaries of responsibility and authority; it is likely that conflict will be an even greater component of organization in the future[90];

h) Studies have shown that negotiation skills are among the most significant determinants of personal and career success, there are specific techniques that anyone can learn;

i) Conflict is feared and avoided by many people because they don't know how to deal with it.

III.4. Causes of conflicts in the armed forces:

Based on hierarchy, discipline, physical interconnection, bureaucracy, its own rules, a modern military organization is facing:

- ❖ decline of mass armed forces and the shift to the professional one;
- ❖ diminishing between civilian and military sphere;
- ❖ change of organizational authority and managerial technique;
- ❖ change of officers recruitment and military career pattern;

[90] http://desafioempreendedor.blogspot.ro/2007/11/negotiations-and-resolving-conflicts.html

- ❖ change of armed forces missions;
- ❖ insufficient financial funds and material resources;
- ❖ differences of opinions between commanders and subordinates, between subordinates, or even between commanders;
- ❖ instability of work position expressed like: reorganization, position cuttings, unit dissolving, small numbers of job position available for applying;
- ❖ low level of life for military personnel especially NCOs;
- ❖ home life (upheavals at home due to family illness, care of elderly parents, unhappy marriage, debt problems, divorce, retirement, unemployment);
- ❖ individual perception of role/job;
- ❖ ability to adapt to change, incompatibility with commander's style considering subordinate's desire to keep his job and tendency to riposte against the commander;
- ❖ Low trained military personnel, commander's desire to accomplish his mission and his lack of authority in selection and dismiss.

The image of this phenomenon, conflicts in military organizations could be illustrated by raising some questions like:

- ➢ Are the conflicts known and recognized by the military?
- ➢ How are these conflicts seen?
- ➢ Between whom do the conflicts occur more frequently?
- ➢ What are the causes that start them?
- ➢ Who should solve the conflicts?
- ➢ How much do the conflicts affect the military activity?

The answers to related questions have shown that there are a lot of conflicts, very frequently, especially between commanders and subordinates, between subordinates, or between commanders, as to the question who should solve the conflict, or responsibility.

The conflicts should be treated with more objectivity, seriousness, transparency and confidence. In the armed forces, most of the conflicts are hidden, latent like unspoken grievances, dissatisfaction instead of opened declarations, public accusation, justification requests cause a military organization is a very rigorously environment, strictly reglemented which doesn't allow visible manifestations of dissatisfaction, disapproval which could easily lead to indiscipline and insubordination, things not tolerable.

III.5. Causes of stress factors in the armed forces factors:

a) There is no single level of stress that is optimal for all people. We are all individual creatures with unique requirements. As such, what is distressing to one may be a joy to another. And even when we agree that a particular event is distressing, we are likely to differ in our physiological and psychological responses to it [91];

b) The person who loves to arbitrate disputes and moves from job site to job site would be stressed in a job which was stable and routine, whereas the person who thrives under stable conditions would very likely be stressed on a job where duties were highly varied. Also, our personal stress requirements and the amount which we can tolerate before we become distressed changes with our ages;

c) It has been found that most illness is related to unrelieved stress. If you are experiencing stress symptoms, you have gone beyond your optimal stress level; you need to reduce the stress in your life and/or improve your ability to manage it[92];

d) Diversity, complexity and newness of daily target;

e) Great responsibilities that lead to certain pressures caused by future of organization.

IV. MANAGEMENT OF CONFLICT AND STRESS FACTORS

Stress management encompasses techniques intended to equip a person with effective coping mechanisms for dealing with psychological stress, with stress defined as a person's physiological response to an internal or external stimulus that triggers the fight-or-flight response. Stress management is effective when a person utilizes strategies to cope with or alter stressful situations.

Conflict resolution is the process of attempting to resolve a dispute or a conflict. Successful conflict resolution occurs by listening to and providing opportunities to meet the needs of all parties, and to adequately address interests so that each party is satisfied with the outcome. Conflict Practitioners talk about finding the win-win outcome for parties involved, vs. the win-lose dynamic found in most conflicts. While "conflict resolution" engages conflict once it has already started, "conflict prevention" aims to end conflicts before they start or before they lead to verbal, physical, or legal fighting or violence.

[91] http://www.counselingcenter.illinois.edu/self-help-brochures/stress-and-anxiety/stress-management/
[92] http://www.counselingcenter.illinois.edu/self-help-brochures/stress-and-anxiety/stress-management/

Other common terms include **Conflict Management, Conflict Transformation** and **Conflict Intervention**.

Resolution methods can include conciliation, mediation, arbitration or litigation.

These methods all require third party intervention. A resolution method which is direct between the parties with opposing views is negotiation. Negotiation can be the "traditional" model of hard bargaining where the interests of a group far outweigh the working relationships concerned. The "principled" negotiation model is where both the interests and the working relationships concerned are viewed as important. Often, face saving and other intangible goals play a role in the success of negotiation.

It may be possible to avoid conflict without actually resolving the underlying dispute, by getting the parties to recognize that they disagree but that no further action needs to be taken at that time. In many cases such as in a democracy, a dialogue may be the preferred process in which it may even be desirable that they disagree, thus exposing the issues to others who need to consider it for themselves: in this case the parties might agree to disagree and agree to continue the dialogue on the issue.

It is also possible to manage a conflict without resolution, in forms other than avoidance.

Everyone uses a variety of styles in conflict situations, when looking at conflict resolution, the persons involved, importance of issue, emotional states and desired outcomes may come into play. Solving conflicts has to do with willingness to be cooperative, helping others to get what they want.

Some strategies and techniques used to solve or decrease, handle the conflicts in the military organization could be: increasing responsibility of each level, training of the decision makers, decreasing the bureaucracy, encouragement of subordinates initiative, stopping the abuses, care for life conditions of subordinates and their families.

IV.1. Styles of dealing with conflict:

a) Avoiding means to withdraw and detach from the issue, not willing to assert their own needs, to help others to get what they want, like mind your own business, look the other way, we don't want to be involved, we decide it's not worsted;

b) Accommodating means to do whatever it takes to help others achieving their needs in their own detriment, they give up their needs only to avoid disagreement;

c) Competing to be right, solving conflicts in personal ways, no interest in helping others, very defensive in position, having difficulties in understanding others reasons.

Those who compete often take advantage of those who accommodate. We compete when we strongly believe in our ideas;

d) Compromising means to give and take, both parties to be either satisfied or unsatisfied with the result, to make concessions. We compromise when we are in a hurry;

e) Collaborating means to fulfil everyone's needs, as a team, working creatively and oriented. We use collaboration when we want everyone involved to feel ownership for the result.

Encourage your subordinates to acknowledge, deal with, and appreciate disagreements. Dealing with conflict leads to open communication, conscious cooperation and increased efficiency, effectiveness.

IV.2. Techniques used for preventing or solving conflicts:

a) Conciliation needs services of a conciliator who has no authority to seek evidence or call for witnesses, doesn't write decisions;

b) Mediation needs a mediator to assist the parties in finding solutions to their problems;

c) Arbitration a legal alternative to the courts whereby the parties to a dispute agree to submit their respective position to a neutral third party, the arbitrator for resolution;

d) Negotiations a process whereby interested parties solve disputes, agree upon courses of action, and bargain for individual or collective advantage.

IV.3. How Can I Manage Stress Better?

Identifying unrelieved stress and being aware of its effect on our lives is not sufficient for reducing its harmful effects. Just as there are many sources of stress, there are many possibilities for its management. However, all require work toward change: changing the source of stress and/or changing your reaction to it. How do you proceed?

a) Become aware of your stressors and your emotional and physical reactions.

- Notice your distress. Don't ignore it. Don't gloss over your problems.
- Determine what events distress you. What are you telling yourself about meaning of these events?
- Determine how your body responds to the stress. Do you become nervous or physically upset? If so, in what specific ways? [93]

[93] http://www.counselingcenter.illinois.edu/self-help-brochures/stress-and-anxiety/stress-management/

b) Recognize what you can change.

- Can you change your stressors by avoiding or eliminating them completely?
- Can you reduce their intensity (manage them over a period of time instead of on a daily or weekly basis)?
- Can you shorten your exposure to stress (take a break, leave the physical premises)?
- Can you devote the time and energy necessary to making a change (goal setting, time management techniques, and delayed gratification strategies may be helpful here)? [94]

c) Reduce the intensity of your emotional reactions to stress.

- The stress reaction is triggered by your perception of danger: physical danger and/or emotional danger. Are you viewing your stressors in exaggerated terms and/or taking a difficult situation and making it a disaster?
- Are you expecting to please everyone?
- Are you overreacting and viewing things as absolutely critical and urgent? Do you feel you must always prevail in every situation?
- Work at adopting more moderate views; try to see the stress as something you can cope with rather than something that overpowers you;
- Try to temper your excess emotions. Put the situation in perspective. Do not labour on the negative aspects and the "what if's." [95]

d) Learn to moderate your physical reactions to stress.

- Slow, deep breathing will bring your heart rate and respiration back to normal.
- Relaxation techniques can reduce muscle tension. Electronic biofeedback can help you gain voluntary control over such things as muscle tension, heart rate, and blood pressure;
- Medications, when prescribed by a physician, can help in the short term in moderating your physical reactions. However, they alone are not the answer. Learning to moderate these reactions on your own is a preferable long-term solution[96].

e) Build your physical reserves.

[94] http://www.counselingcenter.illinois.edu/self-help-brochures/stress-and-anxiety/stress-management/
[95] http://www.counselingcenter.illinois.edu/self-help-brochures/stress-and-anxiety/stress-management/
[96] http://www.counselingcenter.illinois.edu/self-help-brochures/stress-and-anxiety/stress-management/

- Exercise for cardiovascular fitness three to four times a week (moderate, prolonged rhythmic exercise is best, such as walking, swimming, cycling, or jogging);
- Eat well-balanced, nutritious meals;
- Maintain your ideal weight;
- Avoid nicotine, excessive caffeine, and other stimulants[97];
- Mix leisure with work. Take breaks and get away when you can;
- Get enough sleep. Be as consistent with your sleep schedule as possible.

f) Maintain your emotional reserves.

- Develop some mutually supportive friendships/relationships;
- Pursue realistic goals which are meaningful to you, rather than goals others have for you that you do not share;
- Expect some frustrations, failures, and sorrows;
- Always be kind and gentle with yourself -- be a friend to yourself.

Stress-related disorders encompass a broad array of conditions, including psychological disorders (e.g., depression, anxiety, post-traumatic stress disorder) and other types of emotional strain (e.g., dissatisfaction, fatigue, tension, etc.), maladaptive behaviors (e.g., aggression, substance abuse), and cognitive impairment (e.g., concentration and memory problems). In turn, these conditions may lead to poor work performance or even injury. Job stress is also associated with various biological reactions that may lead ultimately to compromised health, such as cardiovascular disease.

Mood and sleep disturbances, upset stomach and headache, and disturbed relationships with family and friends are examples of stress-related problems. The effects of job stress on chronic diseases are more difficult to see because chronic diseases take a long time to develop and can be influenced by many factors other than stress. Nonetheless, evidence is rapidly accumulating to suggest that stress plays an important role in several types of chronic health problems-especially cardiovascular disease, musculoskeletal disorders, and psychological disorders.

IV.4.Techniques used to decrease stress factors

A range of techniques are used by individuals to improve their state of relaxation. Some of the methods are performed alone, and some require the help of another person, often

[97] http://www.thegalz.com/Health/Stress_Management/Manage_Stress/

a trained professional; some involve movement, while some focus on stillness; and some methods involve other elements.

A **Relaxation technique** (also known as **Relaxation training**) is any method, process, procedure, or activity that helps a person to relax; to attain a state of increased calmness; or otherwise reduce levels of anxiety, stress or tension. Relaxation techniques are often employed as one element of a wider stress management program and can decrease muscle tension, lower the blood pressure and slow heart and breathe rates, among other health benefits.

Certain relaxation techniques known as "formal and passive relaxation exercises" are generally performed while sitting or lying quietly, with minimal movement and involve "a degree of withdrawal".[2] These include Autogenic training, Biofeedback, Deep breathing, Meditation, Progressive Muscle Relaxation, Pranayama, and Visualization.

Movement-based relaxation methods incorporate Exercise such as walking, gardening, yoga, Tai chi, Qigong, and more. Some forms of bodywork are helpful in promoting a state of increased relaxation. Examples include massage, acupuncture, the Feldenkrais method and Reflexology.

Some relaxation methods can also be used during other activities, for example, Autosuggestion and Prayer. At least one study has suggested that listening to certain types of music, particularly New Age music and classical music can increase feelings associated with relaxation, such as peacefulness and a sense of ease. Homeopathy has been used to support relaxation, and some find Humor to be helpful.

CONCLUSIONS

Military organizations have had troubles recently, in maintaining their people, especially people who worked in technical branches, IT, engineers, and moreover the ones who have graduated specialized courses, universities abroad. Throughout its military educational system like application schools, technical faculties, and so on, the military organizations have lost important resources and time preparing, training, educating people for being as much as possible professional one. The problem is that our military system does not have enough resources to provide good salaries, bonuses, other material benefits to keep them in the system, to offer a better solution than choosing the civilian jobs, and now the system is facing the fact that the remaining ones are closer to retirement or they are young, inexperienced, without other options. Gone are days when people works into a single job until

retirement, having blind loyalty. As long as a person feels that one organization provides him the needs necessary to have a good life to have a good life not to survive, then their loyalty remains intact. Each one of us wants to feel appreciation, recognition, to be rewarded for a job well done, we want grow in our organization, the reasons that can keep a person to stay for a long time could be: Challenging job assignments, salary, interesting work, benefits, flexibility in working hours, good boss, feeling a purpose, pride, convenient location of workplace, feeling appreciation for what they do, career opportunities, relationships, team spirit, autonomy, having friends at work, no time to look for a new job. So all center around the work environment being challenging, interesting, and flexible as well as appropriate pay and benefits.

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RISKY BUSINESS – THE MILITARY

LTC eng Dan PĂCURARU

INTRODUCTION

Risk is a concept that the man has been aware of since early ages. Even though it was something that he had been confronted with since the beginning, for a long time he did not dedicate any effort to understand the root causes of its occurrence and subsequently to work toward diminishing its impact on his life. It was only relatively recent that man actually started some serious analysis of the risk scale with the intent of pursuing with a scientific approach aimed to better anticipate and control risks.

The spectrum of risks we face in the present world is much more diverse and thus more challenging that the one in the past. The risk factors have significantly multiplied as a result of the evolution of two elements: technology and society. Both of them have flourished especially during recent history and that meant huge benefits for the mankind, but also some extra burden in terms of risks.

The first element, technological progress, represents a constant which accompanied man's evolution. Due to his restless pursuit for understanding the world, man has gone beyond any imagination with his research. Many ancient mysteries and unknown aspects from different domains such as human body, nature, or universe were unveiled and explained by science. Due to his inventive nature man has developed various machines and devices by which he accessorized his life for the purpose of serving his needs. Unfortunately this was not exclusively beneficial as many of the greatest discoveries of mankind proved to be excessively risky while some even turned against man. Our lives got dramatically dependent on the hardware and software created to support our day-to-day lives. All these advancements have their reverse as they all inject supplementary risks in man's life. None of the objects that have been created to help us can be assessed as being risk free.

The second element responsible for the diversification of risks is the level of social development. Explicitly, the more evolved the society is the larger gets the range of risks to

be dealt with. The explanation would reside in the different types of social arrangements spread worldwide, or the numerous sorts of organization that coexist and interact with each other in the present society. All these types of groups are inducing additional risk payloads which are specific to their purview. It is fairly easy for instance to spot particular risks associated with the medical organizations, the media environment, the political organizations, or the military system. The aim of this paper is to identify the application of the basic risk management principles into the military organization.

I. GENERAL CONSIDERATIONS ON RISK MANAGEMENT

There are plenty of references to be addressed when it comes to studying risk management. The process itself has been approached in different manners by experts from various domains. In most of the cases, managers with vision have directed organizational changes in order to accommodate positions designed to address risk management. A general risk management language has also been developed as a foundation of thee new developments in this area. Subsequently it was followed by terminology adapted to different fields of application. Most important is that the notions of *risk* and especially of *risk management* did not remain at the theoretical level as many organizations have implemented different procedures for a pragmatic handling of the risks they encounter on regular basis.

I.1. Risk - definitions and classifications

There is a wide range of definitions that have been developed over time for the term *risk*. Initially the concept has been perceived as having exclusive negative connotation as revealed by the following definition: *"a chance or possibility of danger, loss, injury or other adverse consequences*[98]*"*. A variety of definitions developed by other international prestigious organizations acknowledge also the possibility for risk to have either a positive outcome or an uncertain one. Relevant entries in this respect are the definitions developed by the International Organization for Standardization (ISO): "*effect of uncertainty on objectives. Note that an effect may be positive, negative, or a deviation from the expected. Also, risk if often described by an event, a change in circumstances or*

[98] The Oxford English Dictionary

a consequence[99]", and the definition proposed by the British Institute of Risk Management (IRM): "*risk is the combination of the probability of an event and its consequence. Consequences can range from positive to negative*".

Based on the different possible outcomes of a risk and also on the characteristics that they can be associated with, risk can be categorized as follows[100]:

- *hazard risks* (or pure risks). These are operational risks which are presumptively accepted by organizations and managed with accordingly. They refer exclusively to negative events that may occur with a level of certainty, such as the malfunction of a machine, or the self-injury of workers. Hazard risks are the ones which are best addressed within organizations by well established and detailed processes of risk management.
- *control risks* (or uncertainty risks). Usually related to project management, these are more slippery and difficult to be tackled with due to the variables they carry and the uncertainty of the results. Once a project starts, even if it has been thoughtfully prepared, various events may occur along the way, which represent risks that can turn out into both positive and negative endings. These good or bad surprises during the development of a project are real turn points which can affect dramatically the outcome.
- *opportunity risks* (or speculative risks). They are consciously taken from time to time by organizations to challenge some assumed positive returns. Managers taking this kind of risks ought to have full liberty of choice, and they must be skilled in anticipating market fluctuations and opportunities, should those be related to specific products or to timing of certain operations.

Risks can also be classified taking into account various criteria such as their nature (financial, economical, political etc.) or their anticipated impact upon the organization (short term, medium term, long term). More recently specialists have proposed a new approach on risk management – the Enterprise Risk Management (ERM). This is supposed to address risk management in a holistic manner by absorbing and modulating different approaches into a single unified vision.

[99] ISO Guide 73, ISO 31000
[100] Paul Hopkins, Fundamentals of Risk Management – understanding, evaluating and implementing effective risk management, The Institute of Risk Management, 2010

I.2. Risk description

As managers became more and more knowledgeable on the risk impact over their organizations, they thrived to accommodate an organizational risk framework consisting of the so called RASP [3] functional elements: *Risk Architecture* (communication and reporting), risk *Strategy*, and risk *Protocols* (guidelines and procedures).

Specialists agree that upon the occurrence of every single type of risk, it has to be clearly understood and categorized. Hence certain information and specific features have to be attributed to each of them, including but not being limited to the following:

- Name of the risk;
- Scope of risk and possible dependencies;
- Risk characteristics including its nature, classification and timescale of potential impact;
- Internal and external stakeholders;
- Risk attitude, appetite, tolerance or limits for the risk;
- Probability of occurence and severity of consequences;
- Established control mechanisms and related activities;
- Responsibility for developing risk strategy and policy;
- Potential for risk improvement and level of confidence in existing controls;
- Risk improvement recommendations and deadlines for implementation;
- Responsibility for implementing improvements;
- Responsibility for auditing risk compliance.

A very illustrative approach on risk management is the representation of probability of risk occurrence against its expected impact, in other words likelihood against magnitude. This is known as the risk matrix which can be represented at different levels of details, the simplest representation being the following:

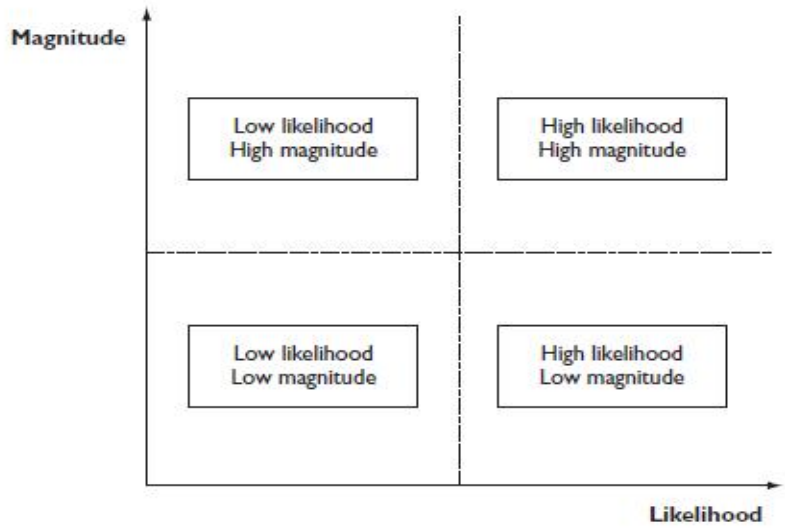

Figure 1. Risk matrix principle

Depending on the domain and on the particular risk that is being assessed, such matrix can be further expanded. Each axis usually has more than two levels of severity, to which explanatory notes and color codes may be attributed for a rapid visual identification of the risk footprint. For instance the amplitude of a risk may vary from negligible through minor, moderate, major (or critical) up to severe (or catastrophic). Likewise, the likelihood axis can accommodate values like rare, unlikely, possible, likely, and almost certain:

		Outcome				
		Severe	Major	Moderate	Minor	Negligible
Likelihood	Almost certain	U	U	H	H	M
	Likely	U	H	H	M	M
	Possible	H	H	M	M	M
	Unlikely	H	M	M	M	A
	Rare	M	M	M	A	A

Fig.2. Risk matrix example

I.3. Attitudes to risk

Risks are being perceived and addressed in different manners by organizations. The attitude against risk depends on several factors such as: the role and nature of the

organization, the maturity level; the legal framework that the activity is based upon; the manager's approach. For example, an investment company or a real estate business would be more open to risk than some state company which has a limited budget and reduced competences. In this respect companies' behavior may vary from *risk aggression* to *risk acceptance* or *risk aversion*.

The business nature of the organization plays an essential role in positioning against risk because the more profit-oriented is an organization the more risk aggressive that organization can be. The character and implication of the manager are also a very important in this process. He is the one supposed to have the medium or long term vision of the organization. Based on that vision he/she establishes the goal, sets the directions and tunes the risk management process in order to facilitate the accomplishment of that goal.

I.4. Risk management process

As part of the risk framework put in place by different organizations, a particular role has been attributed to defining a risk management process tailored to their needs. Different models of risk management process are available today. One of the most common descriptions is provided by ISO 31000:

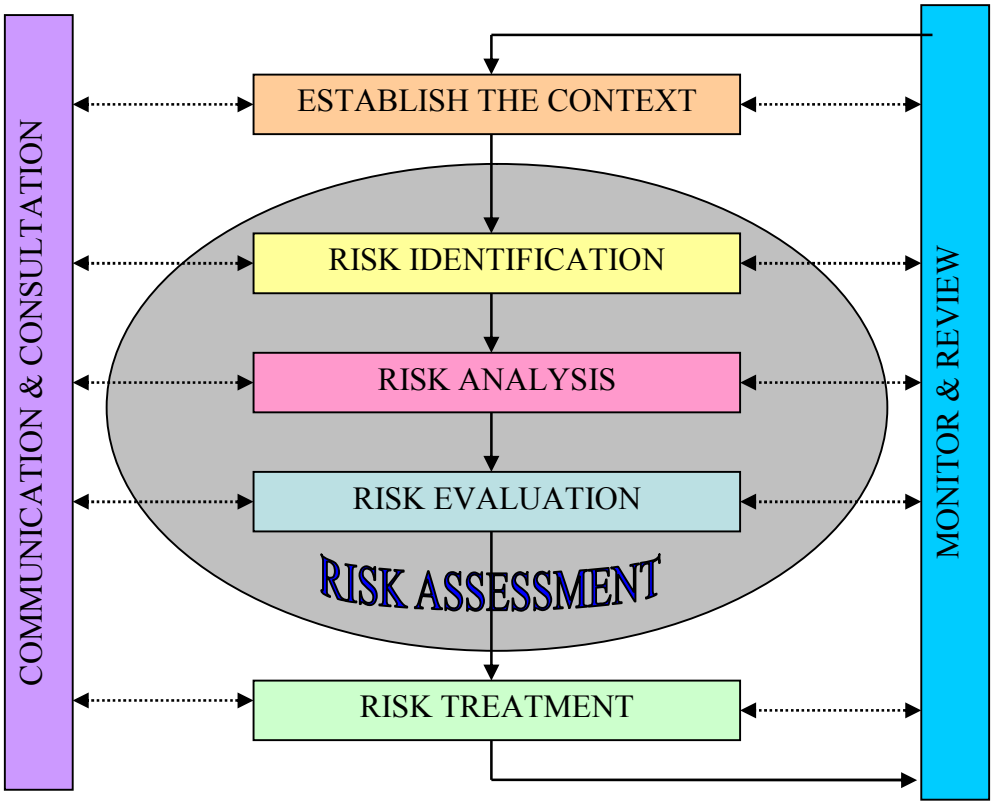

Fig.3. ISO 31000:2009 Risk Management – Process overview

When it comes to hazard risks which have been investigated and responded to in a much extended manner, one theoretical approach mentions the concept of "*7Rs and 4Ts"* [3] for risk management. The *7Rs* depict the sequential flow of the process: *Recognition, Ranking, Responding, Resourcing, Reaction, Reporting*, and *Reviewing*. Feedback loops are based on the available information or gathered experience. The *4Ts* delineate the possible responses to hazard risks:

- *Tolerate* - risks are accepted hence the dominate type of risk control is detective;
- *Treat* – risks are tackled with for reducing the impact, so the main type of controlling the risk would be corrective;
- *Transfer* - risks are passed to another player, usually based on protocols or contractual provisions, thus the main method of controlling the risk is directive;
- *Terminate* – risks are avoided or eliminated by closing the activity that generated the risks. The control method in this case is preventive.

The reaction of the organization to risks is part of its risk management framework. This may dependent on the size or nature of risks encountered but the organization's risk management strategy has to indicate what type of attitude should prevail on normal circumstances. It actually makes the difference in terms of outcome. The organization can adopt one of the following positions:

- acknowledge and accept the non-compliance, meaning limited action towards some REFORM;
- pursue of actions to ensure full compliance, a medium commitment which means efforts to CONFORM;
- focus on improvement and make the best use of opportunities, thus effort to PERFORM, or be as less active as possible due to an excessive emphasize on risk management, which causes the activity of the organization to DEFORM.

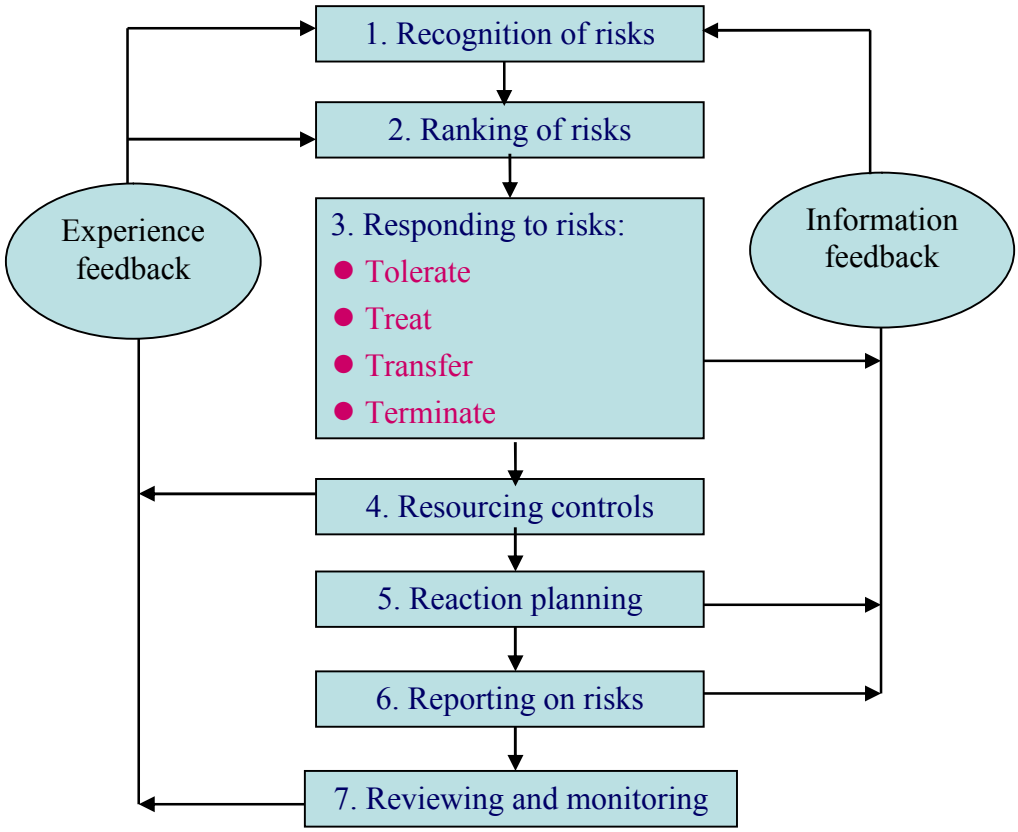

Figure 4. The 7Rs and 4Ts hazard risk management process

Risk assessment represents probably the most important sequence within the risk management process. It includes the sequential steps of risk identification, risk analysis and risk evaluation.

Risk assessment can be subjective or objective. Subjective risk assessments deal with individual and group perceptions of a hazard[101]. These can be influenced by previous experiences, by political pressure, by the media etc. Objective risk assessments use a range of scientific and engineering techniques to identify the likelihood and consequences of particular hazards. These include laboratory studies, epidemiological investigations, probabilistic risk analyses and surveys of accident or incident data.

Depending on the nature of the organization and on how well is the risk management process established, several methods or combinations of methods are used in the risk assessment process such as [3], [4]:

[101] Chris Johnson, *Military Risk Assessment: From Conventional Warfare to Counter Insurgency Operations,* University of Glasgow Press, Glasgow, Scotland, August 2012

- questionnaires – aimed at gathering primary data that help delineating and recognizing risk factors;
- brainstorming sessions – oriented toward anticipating the occurrence of risks related to certain activities or projects, and to assessing their potential impact;
- inspections, audits – conducted for assessing whether the preset conditions for an activity is compliant with the rules and regulations in place;
- SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis – oriented towards determination of the strong and weak points related to an organization's activity, and also to scrutinizing the possible future prospects. It should involve inputs from both internal members and external stakeholders or clients;
- PESTLE (Political, Economical, Social, Technological, Legal, Environmental) analysis – approach structured on analysis of various facets of the environment out of which risk may emerge;
- HAZOPS (Hazard and Operability Studies) – analysis of potential hazards and of their potential impact by multi-disciplinary teams in order to reduce to minimum the omission of key requirements or subjectivity;
- FMEAC (Failure Modes, Effects and Criticality Analysis) – successfully embedded into technical manuals or standards. It takes into consideration not only the initial development of a system but also the requirements related to maintenance and decommissioning. It also analyzes different possible mission profiles and determines the potential risks in which they result, such as: ill-timed operation (too early or too late), failure to operate, incorrect output, intermittent output, loss of output.

II. RISK FACTORS IN THE MILITARY ORGANIZATION

The military organization is a particular enterprise which has to address a wide range of risk factors. Being a military is by definition risky as there are many sizes and shapes in which risk factors affect the system and its members. Specifically, with its well defined boundaries and its clear roles and responsibilities within the society, the military deals mainly with hazard risks and control risks and much more rarely with opportunity risks.

II.1. GENERAL RISKS ENCOUNTERED BY THE MILITARY

- *"Jimmy's got a gun"*. It is part of every military's life to participate in periodical exercises with live shootings. This facet of individual training incurs a clear hazard risk to which the military organization responds by carrying out a detailed analysis of the elements that compose the risk of the entire activity. Specific safety instructions are developed and practical measures are put in place to oppose to each of these risk elements. Examples of such actions are: theoretical training before the shooting session; separate transportation of the ammunition and personnel; weapons maintenance sessions before and after the firing; special means of transportation for the ammunition; a set of severe safety measures in the firing range.
- *Handling classified documentation*. By definition the military have access to various sensitive information and documentation. Therefore they are required to detain specific security clearances which authorize them to access classified information. It is the responsibility of both the organization and the person to adequately manage this risk In the military the binomial principle against which this risk is assessed and treated is called "*Need to know*" and "*Responsibility to share*". Job descriptions have specific references to this aspect. Specific regulations enforce clear rules aimed to prevent mishandling of sensitive national or NATO classified documentation. This is a typical hazard risk which is tackled with through a regulatory and procedural framework pertaining information management.
- *Maintain good physical condition*. Since their admittance in the systems and throughout their entire career, the military have to stay in good physical shape. They are required to successfully pass periodical physical tests. The organization monitors periodically the physical performance of the personnel. It also enables reaching good results by providing specific infrastructure in the military units, and by introducing training sessions in the weekly schedule.
- *Maintain strong health*. The armed forces only need healthy personnel from both physical and psychological condition. The organization monitors the health of the personnel and imposes them to carry out periodical sets of medical tests. For certain specializations such as pilots, or divers, the time span between the tests is smaller and the tests batch is much more demanding. The results of these checkups are carefully assessed by units' medical teams. The result of this determination

may range from simple recommendations made to the persons who have taken the tests, up to recommendations made to the commanders when serious conditions are spotted which may endanger person's health, or life, or may prevent the military from fulfilling his job duties (e.g. grounding the pilots with serious health issues).

II.2. RISK CONCERNING HUMAN RESOURCES

- *Annual efficiency reports*. The performance of every military is subject to periodical evaluation. If properly managed this tool is very effective in motivating the personnel. Even if the annual report form is not perfect and does not rely entirely on quantifiable parameters, it can indicate some topics of interest, changes in behavior and the risks associated with the military's personality or performance. The report can sure influence or direct the future career of a person. The really important things are the objectivity in determining the shortfalls and the effectiveness in treating the associated risks through corrective actions.
- *Personal conflicts or collective dissatisfaction*. This is a really dangerous element which can grow into serious disruptions in the organization. Therefore it has to be avoided by permanently monitoring the needs, complaints, and reports of the personnel, and by applying the military regulations concerning human resources management. Any form of insubordination or self settling of disputes is not to be tolerated in the military environment. If not properly responded to, such manifestations weaken the military body and undermine the authority of the commanders. Therefore corrective actions have to be taken when order needs to be restored, and these measures are not to deviate a bit from the provisions of military regulations.
- *Unchanged assignments or unmoving collectivities*. These risks are particularly sensitive due to a couple of factors. For a military who performs the exact same activities for many years the appearance of routine is not necessarily a good thing. If he/she is not challenged from time to time or moved to another position he /she becomes self-limited and looses the ability to react adequately to new tasks. Moreover, after years of repeating the same operations he/she may not be familiar any longer with the rationale behind that automation. Therefore tasks are recommended be periodically at least enhanced if not changed, and people rotated through different assignments. The second aspect – unmoving military gatherings is also hiding some risks. In years of not changing the scene people become more

familiar with each other and build up an informal network of relations outside the duty hours. The architecture of the organization being hierarchical this may affect the authority of some superiors, provided he/she have graciously responded to regular invitations submitted by their subordinates. Luckily the military system responds quite well to such factors as most usually people are shifted through various positions during their career.

- *Lack of motivation*. Can be spotted by observing the day-by-day decrease in performance and the passive attitude displayed by the personnel. As soon as motivation disappears, apathy takes place. The root causes of the lack of motivation are usually hidden but they have to be dug out, assumed and corrected before they affect the performance of the organization. The generating factors may be: a lack of merits recognition combined with excessive blaming; reward actions in the favor of personnel less committed or with less good results; the misusage of expertise; the lack of involvement in new projects.
- *Changes in the organization*. They usually induce the fluctuation of human resources and may eventually lead to loss of expertise, which is a significant risk. When changes occur in the system they must be in line with the organization's level of ambition and with the full spectrum of mission that a unit has to fulfill. Otherwise it may result in either under-sizing or over-sizing the manpower of a military organization. The need for change and its parameters should be known in advance to allow some alignments or readjustments are made by shifting tasks and re-orientating the existing personnel. Once the change process starts it should be as transparent as possible. After a new setup is established it needs to be carefully monitored in order to assess whether the change was beneficial or not. As for the personnel, the posts have to be filled ideally on the grounds of expertise and skills.
- *Need for continuous training and improvement*. The military organization is less and less numerous nowadays, yet it has to respond to a broader variety of missions. As challenging as this may look, it is possible to overcome the quantitative disadvantage by augmenting the knowledge and by improving the processes. The more sophisticated the military equipment is the higher the requirements are set for continuous self-improvement of the personnel. This mean more training courses and exercises. To complete the picture one should add on top the need for language skills improvement due to the fact that personnel participate in quite frequent multinational exercises and operations.

II.3. RISKS IN MILITARY ACQUISITIONS

The procurement of military equipment is a very complex and sometimes very sensitive issue. Armed forces are becoming less numerous and in order to maintain or improve their effectiveness they are required to be better trained and equipped. On the other hand the producers of military equipment invest a lot in research and development and they are interested in having as many contracts as possible with significant payoffs. In most of the cases the military equipment is not available off-the-shelf, nor do nations prefer to buy such systems as they always look for tailoring the equipment to their particular needs.

There is also another category of manufacturers who produce items which are not exclusive for military use. Some of these are common items such as food, common tools, common spares, are procured by the military as they are offered on the market. Some other items, more expensive, are additionally featured or accessorized to respond to the needs of the military (special clothing, ruggedized IT devices, dedicated software etc.). The responsibility for procurement in the military organization is attributed to different bodies depending on the object and quantity of the procurement. Specifically, the military equipment is procured solely by dedicated armaments departments within the Ministry of Defense (MoD), whilst the other goods can be acquired by different services/commands.

As exploring the procurement activity within the military one could identify specific risks as the ones mentioned hereafter:

- *Inadequate or inaccurate delineation of the technical requirements*. These requirements are usually defined by the beneficiary who is supposed to have the right expertise. Should they be less cognizant or experienced, the requirements they formulate can be either insufficient or exaggerated. If the requirements level is too low the consequence would translate into dissatisfaction regarding the performance of the final product. Luckily, the probability of such occurrence is quite insignificant as the specifications developed by the subject matter experts are carefully assessed and gradually endorsed by decision makers at different level. On the other hand, specialists may request a level of technical performance that is too difficult to be met either as a result of insufficient awareness of what reasonable specifications are, or due to mandatory operational requirements. In the first case usually together with the appropriate knowledge comes the back off from the exaggerated claims. The other case is rather exceptional because it requires a strong budgetary sustainment. Should these challenging specifications derive from

operational requirements which are no subject to adjustment then the program's budget has to be prepared to support the development of a equipment which implies higher costs for research and development. Overall the risk of inaccurate formulation of requirements is avoided as much as possible by solid documentation of the subject matter experts and of the project manager.

- *Life-cycle costs omission*. All the life stages of military equipment are to be considered by the beneficiary and by the bodies responsible for acquisitions. In terms of costs this include the equipment itself; the embedded software and the necessary updates; the spare parts; the test equipment and its periodical calibration; the training of the operators and maintainers; the maintenance facilities; and the phasing out of the equipment. Should any of those products or services be missed from the initial objectives of a program, they may be procured later with higher costs. Another danger is that after executing the procurement program and operating a system for a period, some of the hardware, spares or software may become obsolete and that creates a real cost problem.
- *Financial risk*. Surprisingly, this is a control risk type which may occur in different stages of the acquisition process. Usually project managers face decreases in their budget to which they respond by accepting delays in delivering the capability, or by building up gradually the respective capability. Much more seldom, and mostly for acquisition of common items, the budget may be increased. Additionally, if the extra money is to be spent within a limited time span the task is even harder. The outcome of this could be positive when good deals are made (acquisition of goods off-season, when they are offered in sales promotions or in larger quantities based on the principle of economy of scale). It can also turn bad when the expenditure is made on the run, without taking into account gaps to be filled and priorities.
- *Quality Assurance (QA).* The acquisition of equipment or materials for military use has to comply with the requirements of a severe quality assurance process. The issuance of Certificates of Conformity (CoC) and Certificates of Acceptance (CoA) represent key points by which the beneficiary is being assured that the end product responds to the needs as formulated per the technical requirements. The process involves a series of activities such as: documents inspections, factory tests, environmental tests etc. This is extremely important as part of the acceptance of a new equipment is the phase of consulting the development documentation where the results of hundreds and thousands of hours of tests which cannot be duplicated,

are captured. The MoD's armaments department in charge with the major defense procurements has the right expertise in QA and is fully committed to adequately address this stage of the program.

- *Contractual disputes*. This is a real challenge especially when major weapon systems are being procured because the big armaments vendors have extremely well trained and experienced teams of negotiators. Commercial negotiations are much tougher than the technical ones because they address domains like legal framework, commercial best practices, disputes, liabilities. Compared to the big companies that produce and sell military equipment the MoD may encounter difficulties in gathering the adequate level of knowledge and experience in all the above-mentioned domains.

II.4. RISKS IN MILITARY EXERCISES AND OPERATIONS

II.4.1. RISKS IN THE DEPLOYMENT PHASE

Military exercises or operations are extremely demanding for both the personnel and the equipment. It involves a series of actions that require meticulous preparation and perfect coordination. The deployment of the personnel and equipment, the conduction of the exercise or operation, the maintenance activities, the environmental challenges are all risk heavy.

As soon as the planning stage is over, the exercise or operation initiates the practical sequence by deploying the equipment and personnel to the firing range or to the theatre of operations. This deployment consists of several elements to which specific risks are associated as follows:

- *Preparation of the equipment for deployment*. Technical manuals list what checks have to be performed and what maintenance interventions are mandatory for a proper preparation of the equipment for relocation. Skipping any of those operations may result in malfunction or damages to the equipment, or even severe injuries of the personnel. Therefore the equipment has to be properly prepared for the march by executing specific operations: complete the fuels and lubricants, check the rolling and gear systems, check the towing elements, secure and protect the sensitive parts against accidental movement etc.
- *Preparation of the personnel for deployment*. Includes instructions for building up awareness on the mission's main parameters such as: type of the mission/operation, expected duration, climate conditions, time constraints etc. If the minimum relevant information is not transferred to the personnel they may

have difficulties in finding motivation, building up confidence and ensuring adequate logistic preparation.

- *Determination of the details for transportation*. A good logistic preparation has to assess various factors such as: best possibilities for the deployment of the personnel and the equipment (on land, by air, by sea); required type and number of means of transportation and their technical status; distances to be covered; safety rules required by the nature of the equipment to be deployed or induced by the time of the day (nighttime vs. daytime); alternate routes and possible disruptions; time estimates for departure and arrival; weather conditions.

II.4.2. RISKS IN OPERATING AND MAINTAINING THE EQUIPMENT

One of the most important tasks assigned to the military is the operation and maintenance of the equipment both in peacetime and during crisis or conflict. The military are trained to operate and maintain from individual infantry armaments to complex military offensive or defensive systems. Each of those high-tech systems, otherwise quite reliable and resistant, has specific risks that it can be associated with (mostly hazard). The main risks factors concerning the utilization of military equipment are related to::

- *Shortfalls in Command, Control, Communication, Computer, Intelligence, Surveillance and Reconnaissance (C4ISR)*. During a military exercise or operation a vital role is assigned to these attributes of modern warfare. Approved processes and clear procedures are to be followed for commanding and controlling the forces. It can be done based on extensive knowledge and expertise built upon skills developed in practice. Then the communication among the key players has to be undisturbed, unjammed and secure as it is the main vehicle though by which the acts of command and control can be executed successfully. A proper communication flow allows preventing miscoordination or fratricide. Capable and highly reliable computers with dedicated software complete the capabilities picture of a weapon system. All these are corroborated with accurate and relevant information from intelligence and reconnaissance. The failure of any element from this complex picture represents a risk by itself because it may endanger the fulfillment of the mission.
- *Hazard risks related to the type of the equipment*. These are captured in the technical manuals used for operating or maintaining the equipment, and the most severe ones are also visibly displayed on the equipment itself. One can easily

enumerate hazard risks associated with the operation and maintenance of: aeronautical products, be them fixed wing, rotary wing or UASs (Unmanned Aeronautical Systems); armored vehicles; battle ships; submarines; radars or other equipment providing electromagnetic radiation; C-IED equipment (Counter-Improvised Explosive Devices) etc. The military are consciously exposing themselves to a tremendous amount of risk while operating or maintaining any type of equipment. Some protective measures may be implemented in terms of safety distances (from radiating radars), protection equipment (e.g. the night Vision Goggle – NVG, and the flying suit for pilots) etc.

For some of the equipment, not being compliant with the minimum set of safety requirements is a show stopper, as neither the operator, nor the commanders will trespass these boundaries. As an example, the aeronautical products have to be airworthy, this meaning that approved processes are in place and have been executed by qualified personnel and accredited organization, for initial certification, continuing airworthiness (referring to proper maintenance process) and continued airworthiness (type design preservation). A similar approach may be considered for a ship to be seaworthy.

- *Handling hazardous materials*. When operating or maintaining the equipment military get in contact with different hazardous materials such as inflammables, explosives, highly chemical aggressive fuels, irradiating materials etc. That is extra burden for the military. Whilst airplanes, ships or vehicles are also operated and maintained by civilians with due regard to the implied risks, the military equipment carry mounted weapons and ammunition. Regardless one refers to the ammunition or to other hazard materials, several means of treating these risks can be identified. Periodical training and test sessions are being conducted with the personnel for maintaining them knowledgeable and aware. Hazardous materiels are visibly advertised within the technical manuals, as well as on the equipment itself. Last but not least, dedicated protection clothing is provided for operators and maintainers requested to get in contact with the hazardous material.
- *Extreme environmental conditions*. Military equipment is usually designed to allow being operated in extreme weather conditions. It is therefore intensively tested in the development phase. Nevertheless those tests are not exhaustive and certain specific aggressive factors may be missed. Therefore especially when an exercise or operation involves deployment, the operators and maintainers have to

be made fully aware of the specific conditions of that area. If the equipment is not prepared and the personnel have no clue on the challenges in the filed, frequent failures may occur. It happened for instance with some of the equipment deployed in Afghanistan which was seriously affected by sand.

- *Live firing*. It is the ultimate challenge for which the combat equipment has been designed and the personnel have been trained. The operational or technical manuals on one hand, and the regulations and procedures developed specifically for this type of activity on the other hand, include clear safety measures and breakdown of the activities.
- *Decommissioning the equipment*. This is the ending phase of the equipment life cycle when specialists are usually requested to perform specific activities such as: demilitarizing the equipment for having it exhibited in a civil environment; dismantling the equipment; neutralizing hazardous chemical substances; disaffecting ammunition. The military organization responds to this risk factor by developing explicit procedural checklists, instructing the participants, validating the technological processes and procedures to be followed, putting up together teams of specialists from various domains, and performing controls.
- *Cyber risk*. This is a relatively new threat that affects both the organizations and the individuals. The anticipation of the potential harm of such intrusion into the military organization has resulted into immediate consideration of a new concept: cyber defense. By all means the military information system has to remain inaccessible to such terrible attacks because of the dreadful consequences they can induce. Consequently the military have developed and enforced a set of rules aimed to reduce the vulnerability. Internal IT systems are completely separate from Internet workstations, various dedicated proprietary software are inventoried and secured, severe checkups are carried out regularly to all systems, access to different networks is closely monitored etc.

III. MILITARY RISK MANAGEMENT

The risk management process has been approached by the armed forces in all its components. Sometimes even unintentionally the military system has accommodated the general knowledge on risk management into the specific rules, regulations, and procedures upon which their activity is based on. One can spot very easily in military real life the

elements of the theoretical risk management process. For instance all military activities start with a very well defined stage of recognizing the environment in which they will act. This may refer to identifying the existing legal context, pursuing reconnaissance missions, checking others' similar experiences, understanding the environmental challenges etc. After establishing the context follows the risk assessment process with all its steps. Once the risks are indentified the military come up with plans and concrete actions for treating them so that the impact upon the organization is minimal. Similarly to a classical risk management process, all the sequence of activities described above is also permanently tuned through a series of activities aimed to ensure adequate flow and adjustment of information (communication and consultation), and a constant observation of the status and of the effects resulted form actions already completed (monitor and review).

However, when it comes to risk assessment the complex nature of many military operations undermines the utility of objective risk assessments [4]. Despite the common grounds and a certain level of commonality, the military risk assessment process has some distinctive features which makes it different from the civil process. One differentiating factor is the intrinsic attitude of the military organization which is rather oriented towards risk taking for the sole purpose of achieving tactical advantages. Then comes the fact that the military have to manage multiple and concurrent risk factors whilst taking complex decisions which are expected to have significant impacts. Thirdly is the fact that risk reporting after a combat mission is a common effort and is based on inputs received from far more players than a civil company may ever expect. These operate usually in teams and it could be difficult to individualize a safety report from a group's contribution.

Understanding the real benefits of establishing effective risk management processes commanders became very keen on establishing accurate mishap reporting systems and lessons learned practices. Explicit responsibilities have been assigned for collecting data and recording occurrence of previous failures upon which certain estimations can be made regarding prospective failures and their impacts. Risk registers have been put in place in which detailed files are being maintained for specific activities. Similarly to the much more developed lessons learned process, the military are continuously improving the risk assessment by compiling the results into field manuals and standards, expectation being that similar decisions are being reached in similar situations. Primary information regarding risks encountered in exercises or missions are collected via various methods: inspections, close oversight, debriefing sessions, Situation Reports (SITREPs), After-Action Reviews (AARs).

But what needs to be reported and what not? Is it really that easy to produce an exhaustive list of incidents which are considered important and need reporting? Usually organizations develop explicit guidelines for a better understanding of what is worthy for reporting. Another approach is to define some threshold above which all incidents are reported. This threshold is linked to determination of major loss, be it human, material or environmental.

For a military involved in an operation most likely the fulfillment of the mission comes first. But when unsafe situations occur, commanders from different levels in the military hierarchy must stress out that the focus has to shift on safety. It is defined like this in the NATO Tactical Evaluation missions when a military unit or a capability is assessed[102] against NATO requirements: "*Safety comes first*".

The military operations are conducted these days against various enemies, and within various environments. Consequently the military equipment and the personnel are exposed to a much broader spectrum of risks. Complex training exercises are smartly developed to simulate as many as possible from these factors while still maintaining a safe and controlled environment. On the other hand risk management processes have significantly different complexities among different armed forces. Many of these differences stem from the variations in terms of type and magnitude of operations they are involved in. Hence this is about the nature and the volume of risks encountered which flows into gathered expertise.

CONCLUSIONS

Risk management has grown into a real discipline which has benefitted from the contributions of many authors. Initially emerged from business sector it has spread rapidly to various organizations interested in a better management of the risks they encounter in their day-by-day activity, towards a better outcome.

The military organization, otherwise a risky business by definition, understood that much more attention should be given to risk management. Consequently the military body understood the opportunity and adapted itself to accommodate some risk management processes. Obviously the findings from the civil organizations could be used only to a limited extent into the military organization due to its unique footprint.

[102] NATO ACO Forces Standards vol I-VI

Having the role of a security provider meant for the military organization a tremendous amount of risks taken upon itself.

In the civil world the risk management process is enhanced constantly with findings from various fields of activity. The military organization follows the same trend by continuing to build up risk management knowledge and by assigning resources in order to complete and refine a military risk management architecture.

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ESTABLISHING PROJECT ORIENTATED TEAMS IN THE MILITARY - BASIC PRINCIPLES

CDR Remus SCURTU

INTRODUCTION

"A project is a sequence of unique, complex, and connected activities having one goal or purpose and that must be completed by a specific time within budget, and according to specification."[103] A project is an endeavor that consists of a number of activities completed in a specific order. These connected activities are unique because a project has never happened before and will never happen again under the same circumstances. The project has a definable objective, consumes resources and operates under time, cost and quality constrains. A Project manager who must be given authority and resources to accomplish it handles projects.

Project Management is an important technique for all organizations. It is a method and a set of activities based on the accepted principles of management when used for planning estimating and controlling work activities to reach a specific objective in a given amount of time, cost and performance.

Project management is appropriate in all sizes of organizations. In small organizations, it is not as complex as in larger ones, but can be very effective and efficient if it is used in adequate forms. Projects are used in both hierarchical and matrix organization. The complexity of projects usually requires this innovative matrix structure.

Military organization is by definition a hierarchical one and sometimes will become a matrix organization even though it violates one of the principles have long ago accepted: Unity of command.

Military organizations are matching perfectly with the Max Weber theory of Bureaucracy. In the 1930s Max Weber, a German sociologist, described the bureaucratic form as being the ideal way of organizing government agencies. Max Weber's principles spread

[103] Robert K. Wysocki, Effective Project Management, Fourth Edition, page 4.

throughout both public and private sectors. Even though Weber's writings have been widely discredited, the bureaucratic form lives on and military organization is not part of exception.

According to Max Weber, the bureaucracy is governed by six principles[104]:

- *A formal hierarchical structure* – This means that each level controls the level below and is controlled by the level above. A formal hierarchy is the basis of central planning and centralized decision-making.
- *Management by rules and regulations* - Controlling by rules and clear regulations allows decisions made at high levels to be executed consistently by all lower levels.
- *Organization by functional specialty* – with other words, the *w*ork is done by specialists, and people are organized into units based on the type of work they do or skills they have.
- *An "up-focused" or "in-focused" mission* - if the mission is described as "up-focused," then the organization's purpose is to serve the stockholders, the board, or whatever agency empowered it. If the mission is to serve the organization itself, and those within it, then the mission is described as "in-focused." Military organization is generally up-focused mission, except military organizations in some states leaded by dictatorial regimes.
- *Purposely impersonal* - the idea is to treat all employees equally and not be influenced by individual differences.
- *Employment based on technical qualifications* – selection and promotion are based on impersonal technical ability instead of nepotism. There may also be protection from arbitrary dismissal.

Other negative aspects of bureaucracy that have misses to Weber could be:

- Ritualism, the rules have the tendency to become scopes by itself instead of being tools, which is conducting to inflexibly and formalism.

- Individuals use an official and formal style of communication and eventually the hierarchy might jeopardize responsibility, initiative and creativity.

- Predisposition to grow in staff "above the line"- the management and functional staff tends to grow at predictable rates, almost without regard to what the line organization is doing.

[104] http://www.bustingbureaucracy.com/excerpts/weber.htm

When a project is built up inside of a military, the project manager is given some degree of autonomy from the regular chain of command. *They are given delegated authority to complete the projects and this allows them to negotiate with the rest of the organization for resources, including the human resources to effectively complete their projects*[105].

They are still subordinated according with the chain of command, but they are not closely controlled.

I. CHOOSING THE PROJECT MANAGER

Project managers are the leaders of the projects. They are responsible for completing the project on time, within budget, and according to requirements. Harold Kerzner,[106], one of the leading authority in the project management field says *"Probably the most difficult decision facing upper level management is the selection of project managers"*.

Project managers face a demanding job environment having limited resources and time to accomplish these new tasks beyond the functional duties. Some candidates would do well on long-term project where decision-making is done at a slow pace, but would not be effective on operational field that requires a rapid decision-making and a quick decisive action. Some engineers might be stressed by being selected for project management because they are usually inexperienced in economics and human resources management skills, but very effective in technical skills. These engineers are becoming excellent project managers if they are provided with education and training sessions in economics and human resources management.

A very stressing factor for some individuals that have being appointed as project manager is that in the same time they should perform also them functional responsibilities because in military organizations is not possible to have a matrix structure.

I.1 When to select the project manager

The timing in selecting a project manager could vary. The best-case scenario is to have the project manager in chair at the very beginning of the project so he will participate in developing of scoping and definition phases. *"The sooner the project manager and team are involved in planning the project, the more committed they will be to its implementation."*[107] Early involvement of team's members brings expertise during the planning process and increase commitment to the project.

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[105] James K. McCollum, Cristian Silviu Banacu. Project management a practical approach, page 90

[106] Kerzner Harold. Project management: a systems Approach to planning, scheduling and controlling

[107] Robert K. Wysocki, Effective Project Management, Fourth Edition, page 248

A special case are major weapon systems acquisitions when the programs 'documents (Mission Needs Document and Operational Request Document) are developed at Services level and are approved at General Staff level, but as program manager will be appointed a specialist from a specialized structure like Armaments Department.

I.2 Selection criteria

Because the roles and responsibilities of the project manager are so important, his selection should be commander responsibility. A project manager should be experienced, capable and competent in getting the project done on time, within budget and according with specification.

Therefore, according with Robert Wysocki, a project manager should have the following general skills:

- *Background and experience.* Obviously, background and experience in good project management practices are difficult to find in military organizations especially in low echelons structures. The solution for many military structures is to create a "learning laboratory" for wannabe project managers those who want to acquire management skills and competences by putting in place a hierarchy of project management assignments. The hierarchy must start at team member and then progress at task manager and finally project manager from small-scale to large-scale projects. By participating in on-the-job experience training, an individual can gain the necessary skills to be a good project manager.
- *Leadership.* The project manager's job is to manage the work of the team. Because the team's member is under functional manager authority, the project manager has to get the team members' cooperation and support without having direct authority over them.
- *Technical expertise.* Usually, in military organizations, due to the complexity of projects, the project managers should have a high level of technical expertise or at least, to have a sufficient knowledge to know what question to ask, how to interpret the answers, or whether he is being provided with the technical information needed to make a management decision.
- *Interpersonal competence.* Sooner or later, in the course of the project, the project manager will interact with the team, other project managers, functional managers and command group members. These interactions will challenge all his

interpersonal skills related to the negotiations, conflict management and problem solving.

- *Managerial ability.* These managerial skills include skills such as strategic planning, staff planning, and personnel development.

II. PROJECT TEAM

The project team is comprised of the people who have assigned roles and responsibilities for carrying out the project. Team members should be involved in development of the project's planning and decision-making even though the role and responsibilities are usually assigned. The type and number of project team members can often change as the project progresses. The project management team is a part of the project team and is responsible for project management activities such as planning, controlling, and closing. This group can be called the core, or leadership team. For smaller projects, the project management responsibilities can be administered solely by the project manager.

Project manager is 100% responsible for the processes used to manage a project. Project manager is also responsible for team's management even though the responsibilities are shared with the functional managers. Some specialists consider that the project team's management is the most demanding and important responsibility of project manager.

Anytime, project manager have to admit the necessity of managing the project team.

If the project has a small-scale, the project manager will use a reduced palette of techniques and processes for project team's management. Probably the commander assigns the team's project. There are not too many opportunities for team members' development and is not necessary to apply a rigorous human resources management excepting the need to be sure that team members know their responsibilities and the tasks are effectively fulfilled.

If the project has a medium or large scale, it is necessary to apply the whole processes of project team's management, including acquiring and developing of project's team.

According with the Project Management Body of Knowledge (PMBOK) the Human Resources Management processes include the following:

- Human resources planning - Identifying and documenting project roles, responsibilities, and reporting relationships, as well as creating the staffing management plan.
- Acquire Project Team – Obtaining the human resources needed to complete the project.

- Develop Project Team – Improving the competencies and interaction of team members to enhance project performance.
- Manage Project Team – Tracking team member performance, providing feedback, resolving issues, and coordinating changes to enhance project performance

In fig 1.1 it is shown the human resources management flow.

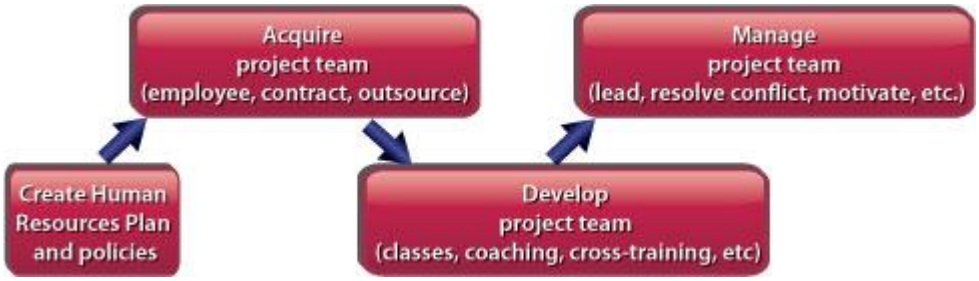

Fig. 1.1 Human Resources Management processes flow

II.1 Human resources planning

The first step in building an effective project orientated team is to build a resource plan. A resource plan allows you to understand and identify the work to be done and the human resources necessary to complete it. An initial resource plan is often a high-level outline and will be derived from the work breakdown structure. At the start of a project, the resource plan can merely identify the functional departments that will need to commit resources, and the approximate number of individuals and man-hours that are required.

Human Resource Planning determines project roles, responsibilities, and reporting relationships, and creates the staffing management plan. Project roles can be designated for persons or groups. If a role is designated to a group then, it should be developed distinctive responsibilities for each member of group.

In fig 1.2 it is described the Human resources planning process[108]

[108] Project Management Body of Knowledge (PMBOK)

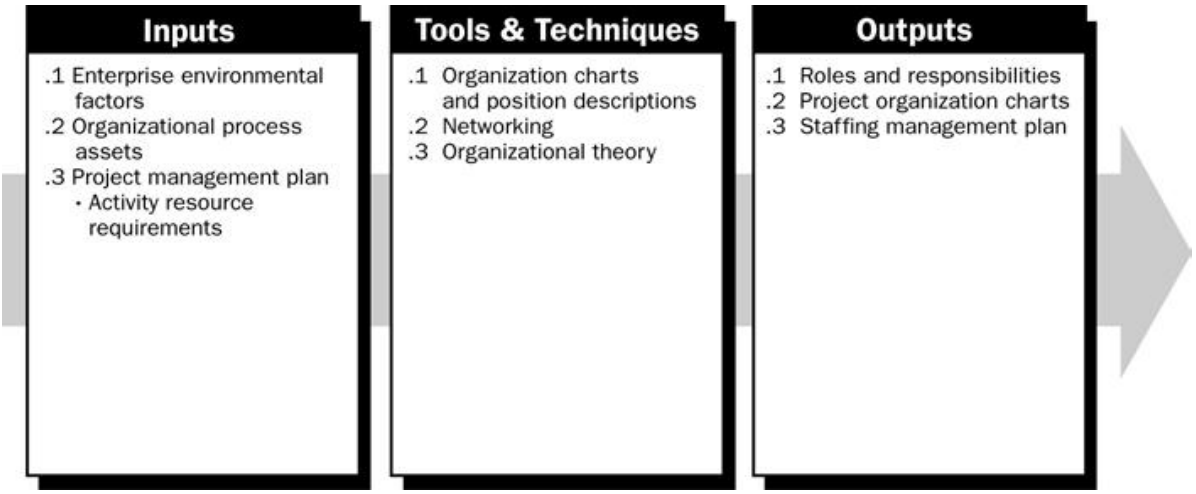

Fig 1.2. *Human Resource Planning: Inputs, Tools & Techniques, and Output*

II.1.1 Human Resource Planning: Inputs

For defining the role and responsibilities, it should be understand the environmental factors involving organizational culture and structure. Some of the most important environmental factors can be classify as follows:

- *Organizational.* Which functional structures will be involved in project?
- *Technical*. What are the different technical specialties that will be needed to implement the project? What are different types of equipments and software involved?
- *Interpersonal*. What are the candidates' job descriptions? What are the relationships among possible candidates for team project?
- *Logistics*. How much distance is between people and units that are part of the project?
- *Political*. Which groups of people have informal power in the area of the project?

Organizational process assets represent the experience and lessons learn from previous human planning activities materialize in templates and checklists. These are very useful tools, which are helping to reduce the amount of planning time needed at the beginning of a project and reduce the likelihood of missing important responsibilities.

The project management plan includes the activity resource requirements, plus descriptions of project management activities, such as quality assurance, risk management, and procurement, that will help the project management team identify all of the required roles and responsibilities.

II.1.2 Human Resource Planning: Tools and Techniques

There are different formats to develop documents with members' team roles and responsibilities. Most of the formats can be group into one of the three types describe bellow:

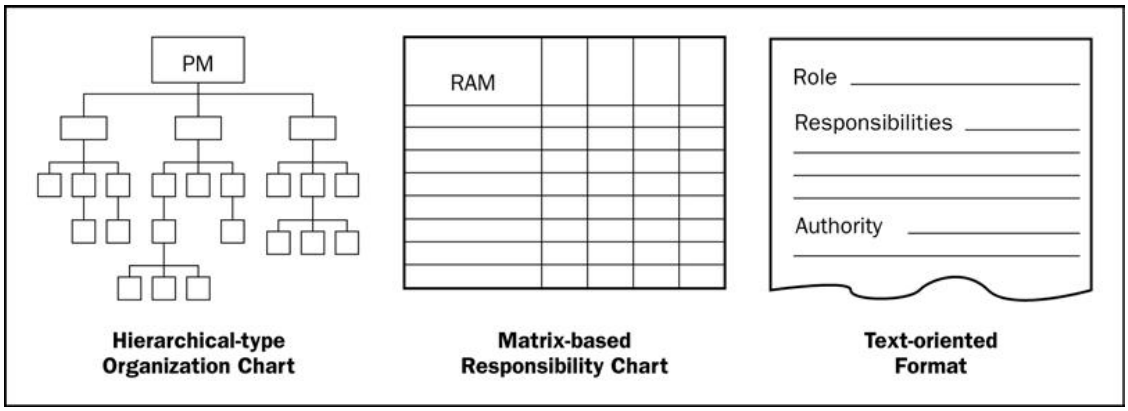

Fig.1.3 Roles and Responsibility Definition Formats[109]

Usually, in the military organizations it is more fitted text orientated format, also called position description, which provide information regarding responsibilities, authority, competencies, and qualifications. These descriptions and forms make excellent templates for future projects, especially when the information is up-dated throughout the current project by applying lessons learned.

Human resources networking activities include proactive correspondence, meetings, and informal conversations. While concentrated networking can be a useful technique at the beginning of a project, carrying out networking activities on a regular basis before a project starts is also effective.

Organizational theory provides information regarding the ways that people, teams, and organizational units behave. Applying proven principles shortens the amount of time needed to create the Human Resource Planning outputs and improves the likelihood that the planning will be effective.

II.1.3 Human Resource Planning: Outputs

At the end of this process, the document with roles and responsibilities should addressed, at least the following:

- *Role.* The label describing the portion of a project for which a person is accountable. As project's roles should be mention project manager and experts in operational, logistic, communication & IT, planning and programming domains. Role clarity concerning authority, responsibilities, and boundaries is essential for project success.
- *Authority.* The right to apply project resources, makes decisions, and sign approvals. Examples of decisions that need clear authority include the selection of a method for

[109] Project Management Body of Knowledge (PMBOK)

completing an activity, quality acceptance, and responses to project variables. Team members operate best when their individual levels of authority matches their individual responsibilities.

- *Responsibility.* The work that a project team member is expected to perform in order to complete the project's activities.
- *Competency.* The skill and capacity required to complete project activities. If project team members do not possess required competencies, performance can be jeopardized. When such mismatches are identified, proactive responses such as training, hiring, schedule changes, or scope changes are initiated.[110]

Generally**,** it is recommendable that project team should consist of, at least, persons/groups, depending on the scale of the project that will accomplish the following roles:

- Project manager
- Financial responsible
- Technical responsible

These three roles are essential for the project implementation. Depending on the nature of the project, besides these roles, might be included persons responsible for communication, IT, public relations, etc.

The position description documents of members' team should be an annex, with a limited validity, to the main position description from functional department.

Another very important output of the Human Resource Planning process is Staffing Management Plan, which is subset of Project Management Plan. The staffing management plan can include how and when project team members will be acquired, the criteria for releasing them from the project, identification of training needs, plans for recognition and rewards, compliance considerations, safety issues, and the impact of the staffing management plan on the organization.

II.2. Acquire Project Team

In figure 1.4 it is described the Acquire project team process.

[110] Project Management Body of Knowledge (PMBOK)

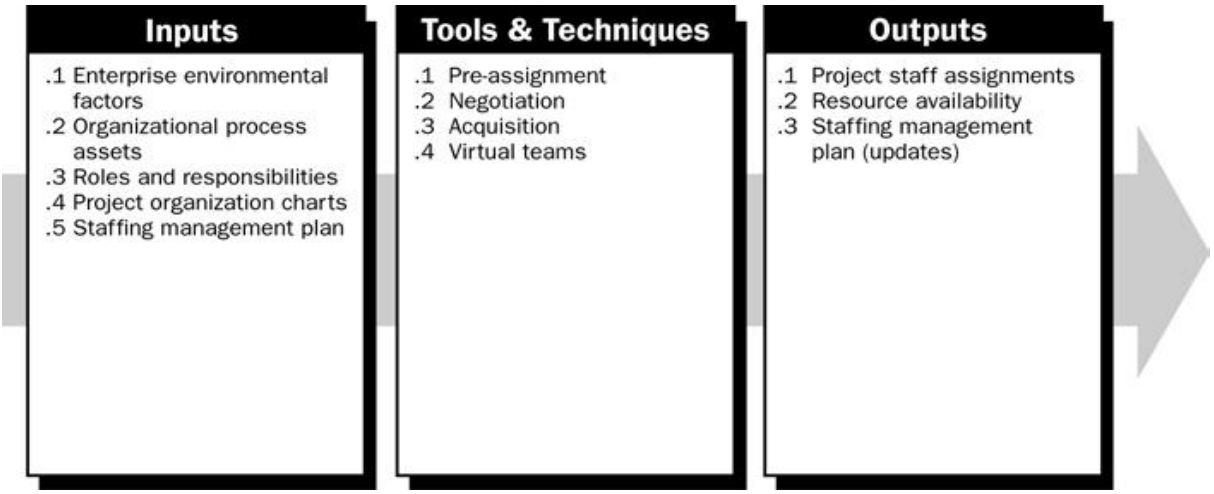

Figure 1.4. Acquire Project Team: Inputs, Tools & Techniques, and Outputs.[111]

II.2.1 Acquire Project Team: Inputs

In this process, besides the organizational environmental factors and process assets, have been added the outputs from the previous process respectively roles and responsibilities, project organizational chats and staffing management plan.

In the majority of the situations, the project manager should share the human resources and use these part-time in order to execute the activities. In military structures, there are often adopted structures like matrix organizations to allow the implement of projects. In this approach, the individuals are allocated full-time to a functional department, but in the same time, they can be allocated part-time to project activities. In these cases, the functional managers are responsible for one part of the work volume and the project manager is responsible for the other part. This system works very well if the functional and project manager admit the challenges and collaborate each other to the structure benefit. The availability of the human resources that has been designated to the project should be confirmed on a monthly base.

To have an effective project team it is necessary to consider very seriously all the personalities that compose the team, because in the majority of the cases, the team might be formed according with the principle "who is available at this moment".

Some essential traits that should be consider mandatory to individuals to become team members are:

- The ones who are looking for accomplishing the tasks;
- The ones who are dealing with the relationships among the team;

[111] Project Management Body of Knowledge (PMBOK)

- The ones who are looking for ideal solution;
- The ones who are striving to finalize and control;
- The ones who are looking for immediate action;
- The ones who are preferring to ponder meticulously over the options;

Hence, the project manager should be sure that the members' team are coming into it not only with the knowledge, expertise, experience needed, but also with the adequate personalities traits.

II.2.2 Acquire Project Team: Tools and techniques

Between the most used tools and techniques to acquire project teams could be mention:

- Pre-assignment; sometimes, the team is created from the very beginning if the project is depending on the expertise of a particular person.
- Negotiation; project manager should negotiate very often with the functional managers to receive appropriate competent staff or could negotiate with other project managers to assign scarce or specialized resources appropriately.
- Outsource; this tool is not so usual, hiring very specialized people from outside of military organization being very difficult. To have very specialized individuals, it is often asked to higher echelons who could underpin the project.
- Virtual teams; due to the improvement into the communications tools, nowadays is very easy to cooperate with a team member, which is located in other place. Team could meet together using videoconferences, telephone communications, internet.

II.2.3 Acquire Project Team: Outputs

Three are the main outputs of the acquire project team process.

- Project staff assignment which identify the people who are on the team;
- Resource availability correspond to time period each member team can work on the project;
- Staff management plan update is necessary because people seldom fit the exact staffing requirements that are planned.

II.3 Develop Project Team

Regardless how the project team has been assigned, the project manager should be sure that all of them have the appropriate skills to accomplish their tasks. If they do not have

needed abilities and the project manager cannot offer them the appropriate environment to acquire them, the project could be in danger.

Therefore, Develop Project Team process has the goal to improve the competencies and interaction among team member to enhance the project performance. The main objectives of this process could include the improvement of skills of team members and increasing of feeling of trust and cohesiveness among the team member in order to obtain good outcomes through better teamwork.

Effective teamwork include assisting one another when workloads are unbalanced, communicating in ways that fit individual preferences, and sharing information and resources. Team development efforts have greater benefit when are conducted early, but should take place throughout the project life cycle.

The figure 1.5 describes the Develop Project Team process.

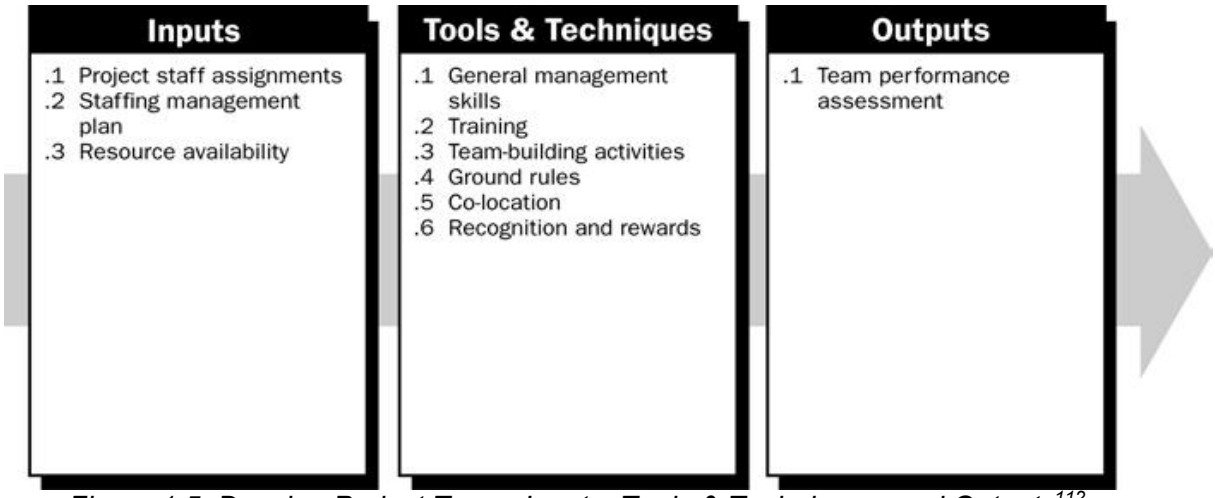

Figure 1.5. Develop Project Team: Inputs, Tools & Techniques, and Outputs[112]

II.3.1. Develop Project Team: Inputs

The inputs for this process are the Project Staff Assignments document, which identify the people who are in the project and Staffing Management Plan which identify the needs for training and plans for development. Resource availability document identify the times when these activities could take place.

[112] Project Management Body of Knowledge (PMBOK)

II.3.2. Develop Project Team: Tools and Techniques

Personal development should primarily be an individually responsibility. Besides personal development, training represents the best option to enhance the competences of member's team if the acquired abilities can be applied immediately and directly to the project. Training can be formal or informal. Examples of training methods include classroom, online, computer-based, on-the-job training from another project team member, mentoring, and coaching.

Team buildings activities are designed to improve interpersonal relationships. The main role of these activities is building trust and establishing good working relationships. Teambuilding strategies are particularly valuable when team members work virtually from remote locations, without the benefit of face-to-face contact.

Ground rules establish guidelines regarding acceptable behavior by project team members. Once the ground rules have been established and agreed by all team member, they should by obeyed and enforced all the time. Desirable behaviors should be recognize and reward.

Nowadays, the technological progress and software development allows member teams to work in different locations. However, no technology can replace direct contact or discussions face to face. Co-location of the most active team members is an important tool to enhance the team performance especially in moments when strategic decisions are made.

II.3.3. Develop Project Team: Outputs

As development efforts such as training, team building, and co-location are implemented, the project management team makes informal or formal assessments of the project team's effectiveness.

Team performance assessment could include indicators such as:

- Improvements in skills that allow a person to perform assigned activities more effectively
- Improvements in competencies and that help the team perform better as a group
- Reduced staff turnover rate.

The key to success in training, no matter in which form is done, consist in the ability to apply the knowledge in the project right away after acquiring them.

II.4. Manage Project Team

Manage Project Team process encompasses the majority activities of team's management.

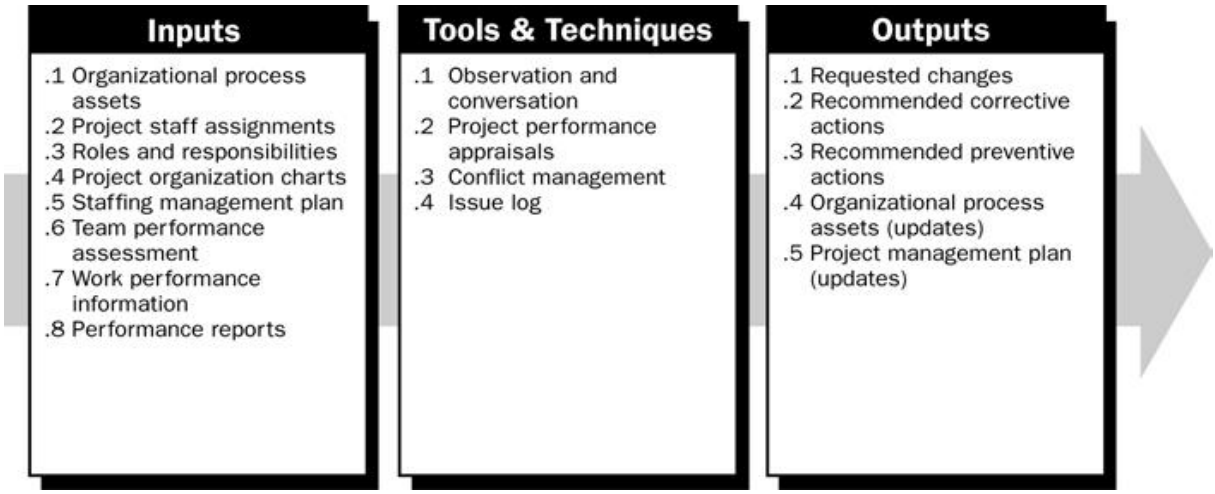

Figure 1.6. Manage Project Team: Inputs, Tools & Techniques, and Outputs[113]

Project team management includes performance monitoring, providing feedback on performance and resolving people issues, simultaneously with assuring a high level of performance to the project. The final goal of this process is to identify the needed changes to enhance the project performance.

Project team management implies a set of tools and techniques, which could be used in a proactive or reactive manner depending on the team necessities.

Management of the project team is complicated when team members are accountable to both a functional manager and the project manager within a matrix organization. Team members are in multiple roles and often report to different leaders, possibly creating conflicting loyalties. From the human resource perspective, even though the team's members do not depend on project manager on functional tasks, their work into the project should be reflected in annual performance assessment report. This aspect should be discussed and agreed between functional manager and project manager.

II.4.1. Manage Project Team: Inputs

As inputs for the Manage Project Team process are used all the outputs of the previous processes. These inputs include organization's policies, procedures, and systems for rewarding employees. From the performance evaluation perspective, among inputs there are the list of the project team members, the roles and responsibilities document used to monitor

[113] Project Management Body of Knowledge (PMBOK)

and evaluate performance and the plan where are listed the time periods that team members are expected to work on the project, along with information such as training plans, certification requirements, and compliance issues.

II.4.2. Manage Project Team: Tools and Techniques

The main tools and techniques used in this process could be grouped into the followings:

- *Observation and Conversation* – used to monitor and collect information about the work and attitudes of team members. Proactive communication is very important. Which bother the most is not the fact that somebody fails accomplishing the tasks in time, but the fact of not being informed in advance.
- *Project Performance Appraisals* – even though the main role of project manager is not to provide feedback on formal performance evaluation report, it is no doubt that project manager should provide feedback to team members because they must know how they are performing their tasks and how they meet the expectations. Managers should not be afraid to provide feedback on performance of team members as soon as the issue can affect the team productivity.
- *Conflict management* – successful conflict management produces not only a better working environment, but also can lead to increased creativity and better decision-making. Team ground rules, roles and responsibilities, effective communication among the team reduce the affective interpersonal conflict which can be very destructive if transcend a certain threshold. Conflicts should be addressed from the very moment and usually in private using a collaborative approach. Conflict is not always an obstacle to team performance; if it is a substantive conflict, it may fuel the creativity necessary to complete the task.
- *Issue log* – as issues arise during the project implementation a written issue log can be very effective in solving them because can be set a specific target date and allow to monitor them until there are resolved.

II.4.3. Manage Project Team: Outputs

The outputs of the Manage Project Team process are used to identify the necessary changes in human resource domain, induced by choice or by uncontrollable events that can affect the plan, and recommended preventive or corrective measure. Corrective action for

human resource management includes items such as staffing changes, additional training, and disciplinary actions. Staffing changes can include moving people to different assignments, outsourcing some work, and replacing team members who leave. The project management team also determines how and when to give out recognition and rewards based on the team's performance. Preventive actions can include cross-training in order to reduce problems during project team member absences, additional role clarification to ensure all responsibilities are fulfilled.

Other output will be to provide inputs for regular organizational performance appraisals of any project team member. All knowledge learned during the project should be documented so it becomes part of the historical database of the organization.

Lessons learned in the area of human resources can include:

- Project organization charts, position descriptions, and staffing management plans that can be saved as templates;
- Ground rules, conflict management techniques, and recognition events that were particularly useful;
- Procedures for virtual teams, co-location, negotiation, training, and team building that proved to be successful;
- Special skills or competencies by team members that were discovered during the project;
- Issues and solutions documented in the project issue log.

The last but not least will be the updates to the staffing management plan, a part of the project management plan.

III. PROJECT MANAGEMENT IN THE MILITARY: SOME FEATURES

Establishing project orientated team's constrains are drifting from the specificity of military organizations. It is mandatory to understand the differences between military and corporate organizations in order to understand constrains.

The military is a large and complex organization that is *not* corporate in nature. There are differences between the military and corporate organizations that may relate to goals structure, downsizing, leadership, interorganizational cooperation, and a host of other topics.

The rules governing the military make its organizational operations more or less different. Accordingly, the main differences are:

- Military's fundamental mission – defending the country;
- The budget is approved on a year-by-year bases. This poses limitations on the military's ability to make organizational plans beyond the current fiscal year and means that funds unspent in a given fiscal year cannot be carried over to the next. The budget also has an impact on authorized number of personnel for each year;
- There are several separate but related sets of personnel in the military, such as active-duty service members, military enlisted personnel, civilian employees all with different human resource management regulations. To be more specific, these categories of personnel are recruited differently, managed differently, evaluated differently, often held to different performance standards, serve different terms of office, and differ from each other in a number of other ways;
- The military has a fixed rank structure and the number of incumbents at each rank is fixed. This requirement has as one of its consequences, for example, that the military has no ability on a short-term basis to change its organizational management strategy by flattening or expanding its rank structure to better accommodate its mission-based needs;
- Military personnel cannot organize for the purposes of collective bargaining, or for the negotiation of working conditions, pay, or benefits. The pay structure of the military is fixed. It is entirely determined by rank and time in service. Merit is recognized through the issuance of (nonmonetary) awards and medals. In the end, superior performance is recognized in a number of ways, such as special honors, earlier than usual promotion and selection for a higher position on the rank pyramid. However, the short-term use of salary and bonuses to motivate and encourage achievement cannot be utilized, nor can failure to award a bonus be used as a sign of disapproval. The use of salary-based incentives and rewards is not under the control of the immediate commander;
- The military's rules of conduct have the force of law. In most organizations, a violation of company policy may result in being fired; in the military, violation of company policy may result in formal charges, trial, and imprisonment;
- All active-duty military personnel are on permanent 24-hour call;

- Major decisions in the military are often confounded with civilian political issues that are not necessarily related to the military's plans or effectiveness;
- The acquisition of major weapon systems is determined by many political and economic factors not only operational factors;
- Although consultation with senior military officers is routine, major and strategic decisions are determined by the political process and are often responsive to extraorganizational priorities and pressures;
- The budget is not directly linked to organizational performance, and it may contain mandates for specific programs or operations that have absolute priority: they can be neither cancelled nor deferred. The provision of resources for these externally established programs cannot be offset by adding personnel; staffing must be provided by diverting personnel from other programs or operations;
- The domains of civilian personnel, nonoperational travel, and procurement are particularly constrained. At any point, a recruitment action may require the hiring of an employee whose job in another part of the organization or government has been terminated. It requires difficult and heavily bureaucratic procedures to discharge a poorly performing or nonfunctional civilian employee;
- The structure of the officer force in the military is pyramidal in nature: the higher the rank, the fewer the incumbents. The finality and inexorableness of the system promotes both excellence and competition, but it also produces anxiety and disappointment;

This list is not complete, nor are all the items of equal importance. They do give a start to suggesting differences between the military as an organization and some of the other organizations more frequently examined by corporately oriented organizational theorists.

IV. CONCLUSIONS

Today's organizational environment challenges require the integration of diverse knowledge and expertise and the cooperation of everyone with the requisite understanding and capabilities. In this context, project orientated teams usually do outperform other groups

and individuals. However, teams are not the solution to every organization's organizational needs. They will not always solve every problem, or enhance organization results.

The basic unit of project work is the project team. Unfortunately, project environments are so dynamic that teams operating in such environments do not look like regular teams. In military organizations, on projects, team members are borrowed resources. They come to the project, do their work and then return to their functional homes.

The main goal of a project manager is to effectively plan and manage his project, insuring that it renders the expected results and that it achieves its objectives. While issues such as project performance or milestone achievement take priority, they are, in fact, direct consequences of the efficiency of the project's team. Building an effective project team is the most important thing a project manager must do to insure a project's success. The team's spirit and enthusiasm will be reflected in the quality of the result and the extent to which the organization will appreciate this outcome as a valuable performance.

It is very important for a project to have, besides the best project manager and the best team, a powerful mentor. The mentor is not generally a member of the team, but may attend key meetings or parts of meetings. Most of the teams started to implement the project with good intentions, full of energy and often with many offers for support from the higher management. Without a powerful mentor, things look very soon uncertain. Consequently, team's members feel they have been remained alone, deserted, even being accused by others. Objectives, looking very clear in the past, are now under circumstantial factors, which look like having the real power of decision-making. Team members are sent back to their permanent work position, or they are reallocated to other high priority programs.

A team's success is built upon a few common principles:

- A shared belief in the value and achievability of the team's goals
- Recognition that the team's success requires the contribution of every individual
- Fostering a collaborative environment, where members are free to express and share their thoughts, ideas and concerns
- Creating a learning environment for coaching junior members
- Rewarding good team results (in financial or non-financial ways)
- Celebrating successes

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THE IMPORTANCE OF THE LIFE CYCLE COST IN THE MILITARY AQUISITIONS

Capt. Cdr. Visinel STEFAN

INTRODUCTION

In the last few years the evolution of international military environment and the economical – financial constraints have amplified the difficulty in the decision-making process concerning the military equipment acquisition, which has to sustain the projected forces capable to achieve the objectives of the National Security Strategy.

The military capabilities are directly related to essential military equipment, which has to be purchased within the integrated management system of defense acquisitions.

When we decide to buy an essential military asset, we have to take into consideration not only the acquisition cost but also the costs hidden in the Operations & Support phase of the asset and in the disposal cost (see Exhibit 1).

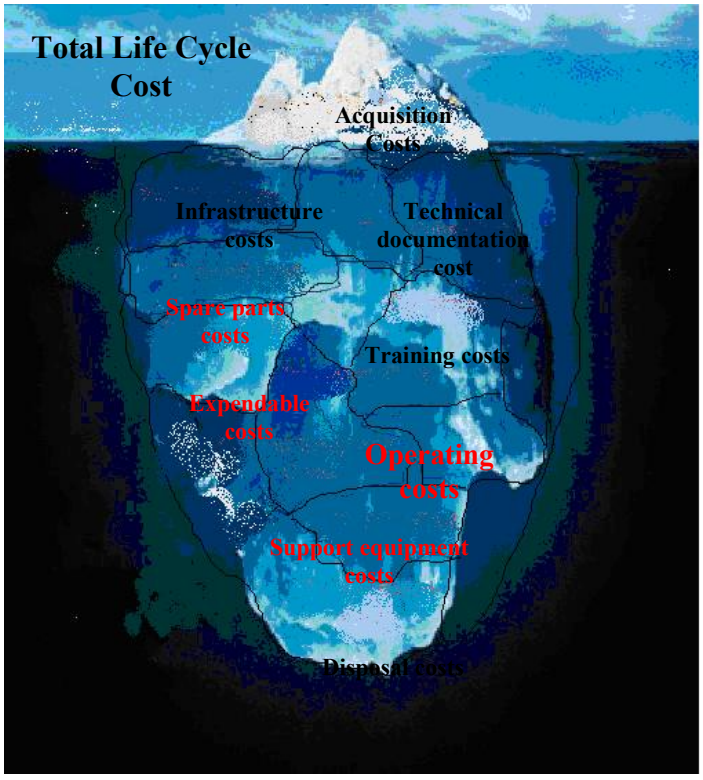

Exhibit 1 The Iceberg model of the Total Life Cycle Cost of military equipment

We have also to estimate in advance how much costs the entire Life Cycle (LC) of the essential equipment is going to generate, in order to take the appropriate decision to choose between two or more assets that have the same capabilities, but different costs.

Usually, the primary criteria for equipment or system selection are the procurement costs. This criterion is just the tip of the iceberg and has to be used only for small and nonessential expenditure, wherefore a Life Cycle Cost Analysis (LCCA) is not worthwhile.

We have to use more complicated Life Cycle Cost Analysis for bigger expenditures, related to very important assets, for which the cost schedule over time is not very clearly defined from an economic point of view, and which also have many costs associated with the "underwater" portion of the Life Cycle Cost (LCC) iceberg.

An adage of John Ruston said: *"It's unwise to pay too much, but it's foolish to spend too little"*[114]. That means that when we decide to buy military equipment, we have to take in consideration and make a balance between benefits or opportunities and costs. It is wise to use a Life Cycle Cost Analysis when the costs is above 25, 000 EUR[115], otherwise is not necessary to make a costs estimate.

In all cases of acquisition of essential military equipment, the most important characteristic is the sustainability of the equipment over the entire Life Cycle. In this paper I've tried to emphasis the importance of O&S as part of LCC, using a small case study "Operation and Support for IAR 99 STANDARD" on three years of sustainment for 10 assets, using the LCC theory and parts of cost elements structure specific to this type of aircraft.

I. LIFE CYCLE COST OVERVIEW

I.1 History and evolution of military equipment LCC concept in NATO

The concept of LCC comes into military attention in the sixties, when the USA Department of Defense began to recognize that the decision for military procurement using only the price bid is a fallacy.

Regarding NATO, the beginning of LCC concept is considered to originate two decade back, at the level of the "Conference of National Armaments Directorate", when the importance of the concept of equipment management cost over the entire life cycle was re-enforced.

[114] John Ruston – economist, had positin in Sales&Marketing to Rollpak Corporation, Berry Plastics , Triple S
[115] H. Paul Barringer, "A Life Cycle Cost Summary", P.E. Barringer & Associates, Inc., Humble, Texas, USA, 2003,Page 2

In 2002, NATO issued the "Life Cycle Management in NATO, A report to CNAD", second edition. This document recommended the creation of a group, who should provide the tools needed to implement the System Life Cycle Management (SLCM) in military acquisitions. Thus, the Life Cycle Management Group (LCMG)(AC/327) was created.

Until now, the LCMG has issued the "NATO Guidance on Life Cycle Costs", where the general policy for SLCM and ILS (Integrating Logistic Support) is established.

At the 1999 level, the alliance concluded that there is little integration regarding that LCC concept. That conclusion was issued because of lack of a commonly agreed definition and standard terminology related to the concept, especially on the Cost Breakdown Structure (CBS). Every nation used its own cost terminology, definitions and terms. To solve this issue, the NATO RTO (Research and Technology Organization) was created, which has issued in 2003 four technical reports that established the principle, terminology, cost structures and tools needed to estimate and manage LCC in a unitary manner. Those publications are useful especially in assessment of costs for multinational military acquisition programs.[116]

In the Romanian Armed Forces, the most important publications related to this subject were issued by the Romanian General Staff. I want to mention here the most significant orders:

-SMG 40/2011, concerning to cost nomenclatures and costs data base of Life Cycle maintenance for equipment who are already in our military service;

-SMG 69/2012, concerning to military equipment ILS implementation on Life Cycle;

- "The Conception of equipment cost estimation and evaluation on Life Cycle", Logistic Directorate.

I.2. Theoretical approaches on Life Cycle Costs

2.1. LCC definition, phases and estimating methods

To understand better what is the Life Cycle Costs we have to define first this concept. In the LCC theory there is a lot of definitions who explains more or less the meaning of this notion. I will present two of them:

[116] RTO-TR-SAS-028 ,"Cost Structure and Life Cycle Costs for Military Systems";
RTO- TR-SAS-054, "Methods and Models for Life Cycle Costing";
RTO-TR-SAS-069, "Code of Practice booklet for Life Cycle Costing";
RTO-TR-SAS-076, "Independent cost estimating and the role of LCC in Capability Portofolio Analysis".

1. "Life Cycle Cos t(LCC) represents all the costs that will be borne during the life of a System (Main and Support System) to acquire, operate, support it and eventually dispose of it"[117]

2. "Life Cycle Costs (LCC) are cradle to grave costs summarized as an economics model of evaluating alternatives for equipment and projects"[118]

Both definition linked together confer in my opinion the best meaning for this concept.

Because the LCC is a process it should have phases. A typical LCC presentation is showed below in Exhibit 2 where we could see the most important phases of the process : R&D, Production , O&S and Disposal. In most cases between Production and O&S phases there is other important phase called Aquisition.

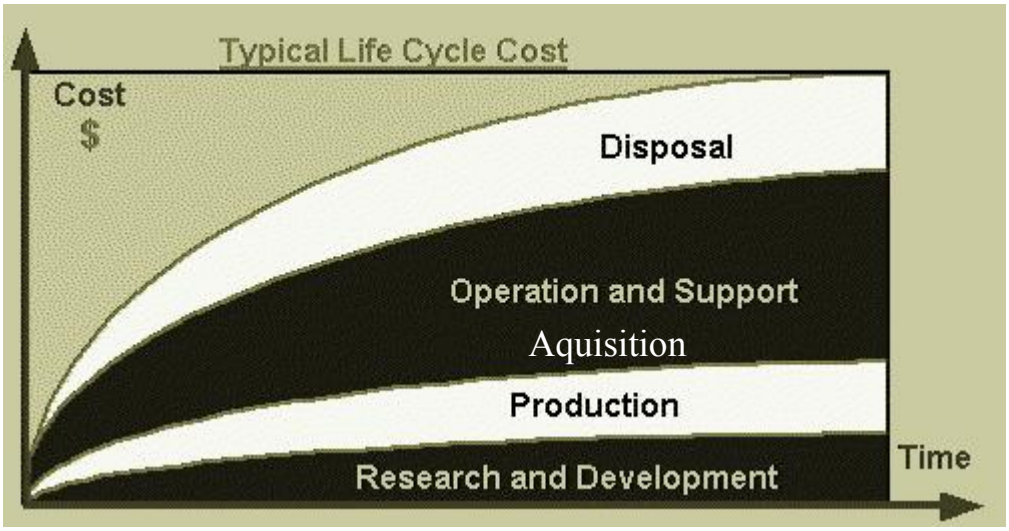

Exhibit 2 Typical LCC

In Ro Armed Forces because majority of military essential equipments comes from abroad we usually use only the Aquisition, O&S and Disposal phases of LCC.

The costs involved in LCC phases could be estimated using difrent methods of estimations that are presented below:

[117] RTO TR-058/SAS-028, Page 5
[118] H. Paul Barringer, "A Life Cycle Cost Summary", P.E. Barringer & Associates, Inc., Humble, Texas, USA, 2003, Page 2

Table 1.

No.	Phase name/ Method of estimation	Analogy estimation	Parametric estimation	Project data estimation	Extrapolation estimation	Remark
1	**Concept, R&D**	**X**	**X**	**-**	**-**	Aproximate estimation
2	**Production**	**-**	**X**	**X**	**-**	Precise estimation
3	**O&S**	**-**	**X**	**X**	**X**	Precise estimation
4	**Disposal**	**X**	**-**	**-**	**-**	Aproximate estimation

The best way to reduce the LCC is to take appropriate decision in the first phase of the process (evaluating diffent system design) because we could set the willable direction controlling the system from the first beginning of it's life.

The most interesting method of estimation of costs is the parametric estimation that has application in design optimisation and bid evaluation.

2.2.O&S parametrical estimation method

In this subsection I will present a theoretical calculation method using modified formula state in *O-CR-001,"Common requirements Life Cycle Cost for System and Equipment", Norsok Standard, Rev.1, April 1996, Page 6,7 and 8.*

To estimate O&S cost in one year we have to add the following *fractionally cost* elements:

1.Manhour cost

2.Spare parts cost

3.Logistic suport cost

4.Energy consumption cost

1.Manhour cost

The manhour cost is a sum of total corrective, preventive maintenance manhous and servicing manhours cost.

1.1.Corrective maintenance (unscheduled maintenance):

$$\mathrm{T}\,CMM = \sum_{i} \lambda_{Ti} \cdot 8760 \cdot MTTR_i \cdot A_i \cdot M_i \quad (1)$$

Where:

TCMM= total corrective maintenance manhours cost

λ_{Ti}=total failure rate for specific subsistem or parts of a equipment (number of failure per hour)

8760=total number of hour in a year

$MTTR_i$=Mean Time to Repair for specific subsistem or parts of a equipment

Ai=number of maintenace personnel who do the specific work to sign off the discrepancy

Mi=the manhour rate for specific work

1.2.Preventive maintenance (scheduled maintenance)

$TPM=\sum_i \left(N_i \cdot MH_i \cdot M_i \right)$ (2)

Where:

TPM=total preventive maintanance cost

N_i= number of specific preventive maintenance per year

MH_i=number of hour needed to do specific scheduled maintenance

M_i=specific manhour rate

i=specific type of maintenance

1.3.Servicing manhour

This cost calculations is the same with preventive maintenance cost.

2.Spare parts cost

This cost is a sum of spare parts cost used to make corrective, preventive maintenance and servicing .

2.1. Corrective maintenance

$TCMSP=\sum_i$ (λ_{Ti} x 8760 x *average corrective spares)* (3)

TCMSP=total average annual corrective maintenance spares consumption cost

λ_{Ti}=total failure rate for specific spare(number of failure per hour)

8760=total number of hour in a year

2.2. Preventive maintenance

$TPMSP = \sum_i N_i \cdot APM_i$ (4)

TPMSP=total preventive maintanance spare consumtion cost

N_i=number of specific preventive maintenance per year

APM_i=average consumption of spare on specific preventive maintenance

2.3.Servicing

Costs are calculated using the same formula nr. (4)

3.Logistic support cost

This cost is a sum of all logistic support activities performed in orde to maintain right the military equipment or system.

4.Energy consumtion cost

If the power consumtion of an equipment is constant throughout entire life time the average annual consumption could be calculated using the following formula:

$$\mathrm{T}\,EC = \sum_{l=0}^{100\%}\left[\frac{Q_l \cdot O_l}{\mu_{l1} \cdot \ldots \cdot \mu_{\ln}}\right] \cdot C \quad (5)$$

Where:

TEC=total energy consumtion

Q_l=power consumption at level l of operate for equipment

O_l=fraction of time to operate at level l

l=level of operate in per cent from 0 to 100%

μ_l=efficiency of how equipment will operate at level l

C=kWh cost

NOTE: All annual costs calculated with (1) to (5) formulas shall be discounted using the following formula:

$$\text{Fractionally cost discount} = \sum_{t=0}^{N}\frac{s_t}{(1+k)^t} \quad (6)$$

Where:

S_t = fractionally cost in year t

N = the number of years of lifetime of the equipment/system

k = the discount rate

II. OPERATING AND SUPPORT COST ELEMENTS

II.1 The necessity of O&S costs estimates

Operating and support costs, as part of Life Cycle Cost of the military system, are the most costly component and represent the ultimate value that help the leaders in decision-making process related to military acquisition. Commitments to research and develop, acquisition, operating, support and disposal have to be made after estimating the projected costs over the entire operational lifetime of the military asset or system.

As the theory states, we have four components of the Life Cycle Costs of the military system: R&D, investment, O&S and disposal. The cost distribution through those components could vary .We could have cost increases or cost decreases in each phase of the life cycle of an equipment.

In Table 2 we could see how the cost division and the percentage of costs related to TLCC main elements can vary from particular military equipment to another.

	R&D	**Investment**	**O&S**
F-16 Fighter	**2%**	**20%**	**78%**
M-2 Bradley Fighting Vehicle	**2%**	**14%**	**84%**

Table 2 Percentage of life-cycle costing incurred in various program phases[119]

The military equipment will be operational and ready for use when it is considered operationally capable and is transferred from the manufacturer to the end user. If it is already in use, we have to monitor the equipment from the first stage of transfer, in order to evaluate its capabilities and also the effects aging may have on it.

Where it is suitable, modification or upgrade have to be taken into consideration, in order to extend the equipment service life. If the O&S costs in one year became 60% of the acquisition costs, we have to send the equipment to the disposal phase, even if the life cycle of the O&S has not yet ended.

We could use the estimated O&S costs to choose between two competing system. In the tender evaluation process, the estimated O&S costs could be used to make a contract with the company whose equipment or system meets all technical specifications at minimum costs. In this case, we have to weigh the cost of investment in order to reduce the maintenance requirements or the cost of support equipment for the entire life of the system, against spending money on the overall system.

If we want to take into consideration the cost-effectiveness of the O&S phase, we have, at the same time, to consider the acquisition of the equipment and the operating, maintenance and support costs.

The estimated O&S costs can be utilized as a baseline for negotiation with a contractor, in order to sign off a logistic support contract for the military equipment that will be purchased.

Very often O&S costs, estimated over a proper period of time, could give us more valuable information than the cost estimation over the entire life cycle of the equipment.

[119] "Operating and Support Cost – Estimating Guide",Office of the Secretary of defence Cost Analysis Improvement Group, USA, May 1992, Page 2-3

Using a shorter period of time gives us a more accurate assessment of the initial acquisition costs, whilst a longer time-period gives us the recurrent ownership costs.

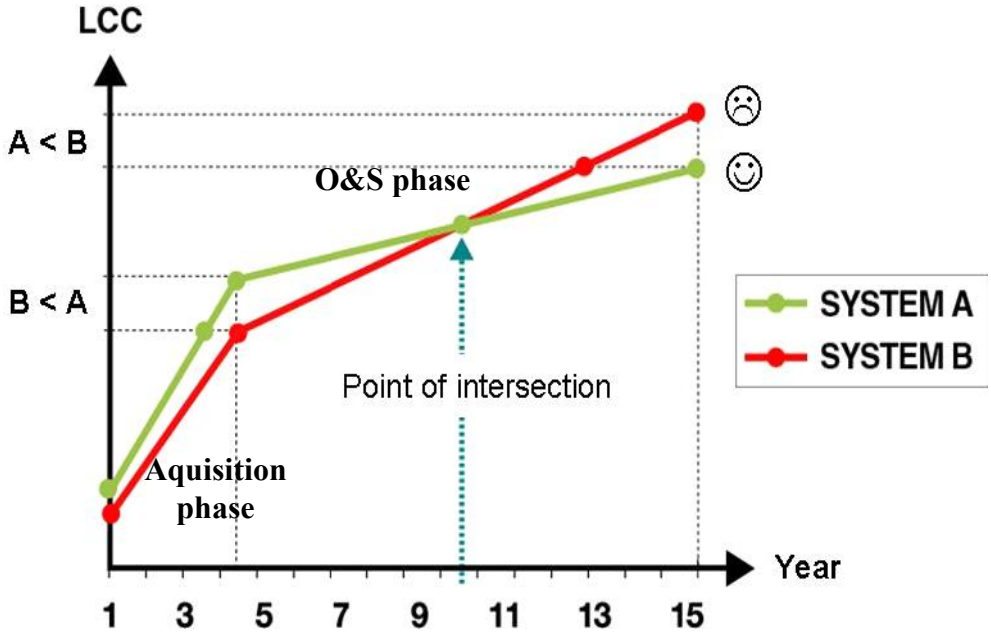

Exhibit 3 Example of time-period consideration[120]

Exhibit 3 shows the comparison between two similar competing systems. In the acquisition phase, the system A has a higher cost than system B and the cost in O&S phase is higher until the year 10. In year 10 we reach a "Point of intersection" where we have the same cost for both systems. After the year 10, the LCC for system A became lower than that of system B. If the LC of this system will be 20 to 25 years of service, the acquisition of system A is more appropriate. The "big deal" from the ownership perspective is to evaluate which will be the "Point of interest".

The exhibit shows how complicated is to choose the right LC period of time to include that in a tender evaluation. The selection of a LC period of time has to be tailored and very well balanced in order to achieve the right objective.

To evaluate all tenders impartially, the procurement agency has to define its own CBS (cost breakdown structure) and also to define all the cost elements.

II.2 O&S costs estimates methodology

2.1. Cost assessment criteria

To assess the costs, in almost all cases we could use the following criteria:

[120] RTO-TR-SAS-054, Chapter II, Page 2-16,Figure 2.11

- **Completeness**: all significant costs and also the key cost drivers have to be included into cost analyses.
- **Reasonableness**: The cost has to be compared with the historical cost data bases or with the estimates regarding a reasonably similar system.
- **Consistency**: we have to take into consideration the inflation rates or the differences between previous and present estimates.
- **Documentation**: This criterion refers to the source of documentation for each cost element and the detail level of each document that includes a cost element.
- **Credibility:** This criterion shows if the cost model was validated and if different types of data were identified.

2.2. Selection of a reference system

A reference system is the equipment or system that already exists and was used in the operations. That system has similar mission capabilities with the new system who will replace it. We could use the old system as a substitute, if the data of the new one are not available. Because the old system is usually in the field, we have a lot of data associated to the reference system, such as technical characteristics, operational performance, and fuel consumption and so on. Much of this information could be obtained using contractor or manufacturer data base or historical agency acquisition reports.

The assumptions for both the reference system and new system have to be similar. This allows the analyst to see the difference between two similar weapon systems regarding resource consumption. This method of estimating costs is known under the name of analogy method.

2.3. Developing rules and reasonable assumption

A condition to have useful O&S costs estimates is to have detailed definition about operating, maintaining and supporting capabilities during the peacetime. The rules have to include the description of most significant mission of the system, as well as the entire technical data or policies related to maintenance and support.

The rules and reasonable assumption have to be identified in the feasibility study.

2.4. Selecting relevant CES

A cost element structure (CES) is used to identify and classify the costs type in a standard manner. When we decide to use CES in order to estimates O&S costs, we have to choose only the relevant elements that are reasonable, well documented and credible.

II.3 Aircraft O&S cost element

In this subsection I will present the most important cost element that helps to evaluate the O&S expenses, which will be used further to the IAR 99 STANDARD case studies. The main source was "*Operating and Support Cost – Estimating Guide", Office of the Secretary of defense Cost Analysis Improvement Group, USA, May 1992, Appendix C* adapted to the Romanian Air Force maintenance and support of the aircrafts.

The main structure of O&S is presented below:

Table 3

No	Main activities	Sub activities costs
1	Mission personnel	1. Operation 2. Maintenance
2	Unit level consumption	1. POL/Electricity consumption 2. Spare parts and expendable consumption 3. Depot –level reparable 4. Pyrotechnics costs
3	Intermediate maintenance (external to unit)	1. Maintenance 2. Spare parts and expendable consumption
4	Depot maintenance	1. Overhaul 2. Upgrades
5	Contractor support	1. Interim contractor support 2. Contractor logistic support
6	Sustaining support	1. Support equipment replacement 2. Modification kit for upgrades 3. Engineering support 4. Software maintenance support 5. Simulator operations
7	Indirect support	1.Personnel support 2.Infrastructure and facilities support

Cost element definition:

1. Mission personnel

This cost element has to include the wages for the pilots, maintenance personnel and logistic support personnel, both military and civilian, who are direct involved in the sortie generation for the aircrafts. For the unit who operates more than one type of aircraft, the

calculation of cost has to take into consideration only the payment made on workload basis. We have to take into consideration the manning table and the personnel skill level.

- Operation

This sub cost includes the wages of the aircrew (pilots or crew technicians).

- Maintenance

This sub cost has to include the wages for maintenance personnel, military and civilian, who perform all level of maintenance to the specific aircraft.

The level of maintenance is shown below:

- Organizational Maintenance "O"-level (personnel who execute on-equipment maintenance performed in the flight line);
- Intermediate Maintenance "I"-level (personnel who execute off-equipment maintenance performed to the unit back shop);
- Other type of maintenance (personnel who execute support equipment maintenance or simulators maintenance).

2. Unit level consumption

The unit level consumption includes usually the following costs:

- POL/Electricity consumption
  - the unit-level costs of jet fuel for aircrafts, diesel for support equipment, gasoline for aircrafts or support equipment, oil and lubricants, fuel additives;
  - the unit level consumption of electricity that could be commercial electricity, unit power plant electricity or both;
- Spare parts and expendable consumption
  - the costs of aircraft spare material (spare parts and expendable) consumed over all types of maintenance performed on or off equipment (maintenance material, operational materials and mission support material);
- Depot –level reparable
  - the costs of spare parts (exchangeable item) purchase from the manufacturer or other company used to supply the existing stock;
- Pyrotechnics costs
  - the costs of pyrotechnics devices used by ejection seats, fire suppression system and also aircraft ammo, rocket or missile.

3. Intermediate maintenance (external to unit)

This implies the costs of "I"-level maintenance performed by contractors or other maintenance personnel external to the unit (the personnel who belongs to Air Force organization, have skills to perform specific maintenance to specific aircraft and is send by the AF MAJCOM to the unit to perform different maintenance tasks that could not be performed by the unit maintenance personnel, due to their lack of training, skills or designed equipment). We have to take into consideration both the labor cost and spare parts, and also the expendable cost.

4. Depot maintenance

Higher costs are generated by this level of maintenance, due to the imbalance between the demand and supply. In almost all cases, the manufacturers or companies who perform "D"-level maintenance for aircrafts keep the price high because usually they are the sole competitors in the tender.

- Overhaul
  - the costs of aircraft refurbishing, performed by a specific company;
- Upgrades
  - the costs of off-equipment upgrades or improvement, replacement of an entire system, appliances of service bulletin due by manufacturers or companies.

5. Contractor support

- Interim contractor support
  - this cost implies the contractor labor costs related to an aircraft or aircraft system on base, until the unit maintenance personnel assimilate the task and are ready to perform the maintenance without contractor help.
- Contractor logistic support
  - the costs of labor, material or spares used by the contractor at unit level in order to provide specific maintenance or upgrades to an aircraft system or support equipments, or to provide personnel training.

6. Sustaining support

- Support equipment replacement
  - the cost incurred to replace the support equipment used to operate or support the sortie generation (e.g. AGE, tools, tester set);
- Modification kit for upgrades
  - the costs of procurement of modification of spare kits for aircraft designated system;

- Engineering support

  - the costs of engineering labor in the flight line (e.g. concrete runway snow removal);

- Software maintenance support

  - the costs incurred in order to purchase specific maintenance software or upgraded software for the aircraft system or aircraft equipment testers;

- Simulator operations

  - the hourly flight simulator cost.

7 .Indirect support

- Personnel support

  - the cost of special training for pilots, maintenance personnel, logistic support personnel (e.g. specialty courses, carrier courses are excluded)

- Infrastructure and facilities

  -all cost incurred to properly maintain the specific buildings, hangars, runway facilities that are used by the personnel involved in sortie generation or in different level of aircraft operation and support.

III. CASE STUDY: OPERATION AND SUPPORT FOR IAR 99 STANDARD

III.1. Asset description

Table 4

Asset	Training and ground attack jet – Acronym: IAR 99 STANDARD
Quantity	10
Destination	The asset is a subsonic jet with one engine and two cockpits, that was design to train the RO Air Force pilots. It could do also CAS mission using bombs or rockets.
Manufacturer	S.C. AVIOANE CRAIOVA S.A.
Fabrication date	From 1988 to 1994
Serviceable life	3000 hours for the main frame, No time restriction
O&S study period	2012-2014

III.2. Initial input data

1. I've took into consideration 10 IAR 99 STADARD (maximum aircrafts number of Boboc Jet Squadron);
2. Average availability :5 assets of 10 in 2012, 7 assets of 10 in 2013 and 2014;
3. Average sortie duration : 50 minutes;
4. Average flight hours/ aircraft/ year: 140 hours.

III.3. O&S costs for IAR 99 STANDARD

3.1. Maintenance costs

3.1.1. Scheduled maintenance costs

Table 5

No	Activities	Year	Quantity (no. of intervention)	Costs(LEI)	Comments
1	"O" level maintenance	2012	298	165,092	Flight line
		2013	285	157,890	Flight line
		2014	300	166,200	as planned
2	"I" level maintenance	2012	86	1,658,369	Back shop
		2013	118	1,550,355	Back shop
		2014	166	1,691,308	as planned
3	"D" level maintenance	2012	2	9,000,000	overhaul
		2013	2	9,000,000	overhaul
		2014	3	13,500,000	as planned
Total scheduled maintenance costs		2012	10,823,461		
		2013	10,708,245		
		2014	15,357,508		

3.1.2. Seasons maintenance costs

Table 6

No	Activities	Year	Quantity (no. of intervention)	Costs(LEI)	Comments
1	Summer and winter maintenance	2012	18	161,010	
		2013	17	152,065	
		2014	16	143,120	
Total seasons maintenance costs		2012	161,010		
		2013	152,065		
		2014	143,120		

3.1.3. Preservations costs

Table 7

No	Aircraft parts for preservation	Year	Quantity (no. of intervention)	Costs(LEI)	Comments
1	Airframe	2012	3	622	non flyable aircrafts
		2013	1	207	non flyable aircrafts
		2014	1	207	non flyable aircrafts as planned
2	Engine	2012	20	20,792	Engine from supply + non flyable aircrafts
		2013	20	20,792	Engine from supply + non flyable aircrafts
		2014	20	20,792	as planned
3	Gun	2012	20	2,780	
		2013	20	2,780	
		2014	20	2,780	
Total Preservations		2012	24,194		

costs	2013	23,779
	2014	23,779

Total maintenance costs = Scheduled maintenance costs + Season maintenance costs + Preservations costs

Table 8

Total maintenance costs	**2012**	**11,008,665 LEI**
	2013	**10,884,089 LEI**
	2014	**15,524,407 LEI**

3.2. Supply costs

3.2.1. POL costs

Table 9

No	POL product	Year	Quantity	Unit cost	Costs(LEI)	Comments
1	Jet fuel	2012	761 tones	4820 lei/tone	3,668,020	1100 kg/hour
		2013	715 tones	4820 lei/tone	3,446,300	
		2014	880 tones	4820 lei/tone	4,241,600	could vary
2	Engine oil	2012	689 kg	47,12 lei/kg	32,466	1,5Kg/hour
		2013	975 kg	47,12 lei/kg	45,942	
		2014	1200 kg	47,12 lei/kg	56,544	could vary
3	Hydraulic fluid FH-51	2012	550 kg	19,16 lei/kg	10,538	90 kg/100hours
		2013	650 kg	19,16 lei/kg	12,454	
		2014	850 kg	19,16 lei/kg	16,286	could vary
4	Vaseline NK-50	2012	70kg	157,48lei/kg	11,024	4kg/100hours
		2013	70kg	157,48lei/kg	11,024	
		2014	80kg	157,48lei/kg	12,598	could vary
5	Life support oxygen	2012	1800m^3	3lei/m^3	5,400	3m^3/flight hour
		2013	1900m^3	3lei/m^3	5,700	
		2014	2000m^3	3lei/m^3	6,000	could vary
Total POL costs		2012	3,727,448			
		2013	3,521,420			
		2014	4,333,028			

3.2.2. Pyrotechnics costs

Table 10

No	Aircraft parts for preservation	Year	Quantity	Costs(LEI)	Comments
1	Ejection seats pyrotechnics	2012	2 sets	79,901	
		2013	6 sets	399,918	
		2014	2 sets	133,306	
Total Pyrotechnics costs		2012	79,901		
		2013	399,918		
		2014	133,306		

3.2.3 Spare parts and expendables costs

Table 11

No	Aircraft spare parts and expendable	Year		Costs(LEI)	Comments
1	Supply recovery	2012		2,867,543	e.g. engine overhaul
		2013		9,865,27	
		2014		9,000,000	as planned
Total spare parts and expendables costs		2012	2,867,543		
		2013	9,865,27		
		2014	9,000,000		

Total supply costs = Total POL costs + Total Pyrotechnics costs + Total spare parts and expendables costs

Table 12

Total supply costs	**2012**	**6,674,892 LEI**
	2013	**13,786,608 LEI**
	2014	**13,466,334 LEI**

3.3. Man Power Costs

3.3.1. PPE (Personal Protective Equipment) costs

Table 13

No.	Man power category	No of personnel	Unit cost/year (lei)	Total costs/year (lei)
1	Pilot's	11	2172	23,892
2	Engineers	1	826	826
3	Maintenance personnel	22	826	17,346
4	AGE technicians	2	826	1,652
5	Movement personnel	10	820	8,200
TOTAL PPE Costs				51,916

3.3.2. Wages costs

Table 14

No.	Man power category	No of personnel	Unit cost/year (lei)	Total costs/year (lei)
1	Pilot's	11	15,000	165,000
2	Engineers	1	6,000	6,000
3	Maintenance personnel	22	4,000	88,000
4	AGE technicians	2	3,000	6,000
5	Movement personnel	10	3,000	30,000
TOTAL Gain Costs				295,000

TOTAL Man Power Costs = TOTAL PPE Costs + TOTAL Gain Costs

Note: Man Power costs are the same for the entire period studied

Table 15

Total Man Power Costs	**2012**	**346,916 LEI**
	2013	**346,916 LEI**
	2014	**346,916 LEI**

3.4. Support and test equipments costs

Table 16

Total Support and test equipments costs	**2012**	**0 LEI**
	2013	**0 LEI**
	2014	**45,525 LEI**

3.5. Upgrades costs

Table 17

No.	Configuration name	Year	No. of aircrafts	Unit cost (lei)	Total costs(lei)
1	Flight Data Recorder System Type: SAIMS	2012	0	234,847	0
		2013	2	234,847	469,694
		2014	8	234,847	1,878,776
2	GPS	2012	0	100,000	0
		2013	0	100,000	0
		2014	10	100,000	1,000,000
Total Upgrades Costs		**2012**	**0**		
		2013	**469,694**		
		2014	**2,878,776**		

3.6. Technical data manuals costs

Table 18

No.	Documentation name	Year	No. of volumes	Unit cost (lei)	Total costs(lei)
1	Flight Data Recorder System Type: SAIMS technical annual	2012	0	5,000	0
		2013	1	5,000	5,000
		2014	0	5,000	0
2	GPS technical manual	2012	0	5,000	0
		2013	0	5,000	0
		2014	1	5,000	5,000
TOTAL Technical data manuals costs		**2012**	**0**		
		2013	**5,000**		
		2014	**5,000**		

3.7. Training and training support costs

Table 19

No	Type of training	Year	No of hour/year	Unit cost (lei)	Total cost/year
1	Flight simulator	2012	650	1,391lei/hour	**904,150**
		2013	695	1,391lei/hour	**966,745**
		2014	800	1,391lei/hour	**1,112,800**

3.8. Infrastructure and facilities costs

Table 20

TOTAL Infrastructure and facilities costs	**2012**	**202,160 LEI**
	2013	**377,560 LEI**
	2014	**444,160 LEI**

III.4. IAR 99 STANDARD, IAK 52, IAR 316B **costs summary**

4.1. IAR 99 STANDARD costs summary

Table 21

No.	Specific activities	**2012** costs (LEI)	**2013** costs (LEI)	**2014** Budget project (LEI)
1	Maintenance costs	11,008,665	10,884,089	15,524,407
2	Supply costs	6,674,892	13,786,608	13,466,334
3	Man Power costs	346,916	346,916	346,916
4	Support and test equipment costs	0	0	45,525
5	Upgrade costs	0	469,694	2,878,776
6	Technical data manuals costs	0	5000	5,000
7	Training and training support costs	904,150	966,745	1,112,800
8	Infrastructure and facilities costs	202,160	377,560	444,160
TOTAL COSTS (LEI)		**19,136,783**	**26,836,612**	**33,823,918**
TOTAL COSTS (EUR)		**4,300,400**	**6,030,699**	**7,600,880**

1EUR=4,45LEI

$$\text{AVERAGE TOTAL COSTS} = \frac{4{,}300{,}400 + 6{,}030{,}699 + 7{,}600{,}880}{3} = 5{,}977{,}326 \text{ EUR}$$

Acquisition costs for 10 aircrafts = 4,000,000 X 10 = 40,000,000 EUR

O&S costs for 25 years for 10 aircrafts = 5,977,326 X 25 =149,433,150 EUR

Acquisition costs for 10 aircrafts represent 22% of LCC and the O&S costs represent. 78% of LCC for 25 years of service.

4.2. IAK 52 costs summary

Table 22

No.	Specific activities	**2012** costs (LEI)	**2013** costs (LEI)	**2014** Budget project (LEI)
1	Maintenance costs	1,443,193	828,593	2,199,366
2	Supply costs	685,222	2,312,770	789,602
3	Man Power costs	489,916	489,916	489,916
4	Support and test equipment costs	0	0	3,992
5	Upgrade costs	0	0	0
6	Technical data manuals costs	0	0	0
7	Training and training support costs	0	0	476,100
8	Infrastructure and facilities costs	200,000	370,000	440,000
TOTAL COSTS		**2,818,331**	**4,001,279**	**4,398,976**

4.3. IAR 316B costs summary

Table 23

No.	Specific activities	**2012** costs (LEI)	**2013** costs (LEI)	**2014** Budget project (LEI)
1	Maintenance costs	323,698	356,176	253,036
2	Supply costs	1,137,114	4,070,534	1,271,398
3	Man Power costs	584,948	584,948	584,948
4	Support and test equipment costs	0	0	6,442
5	Upgrade costs	0	0	0
6	Technical data manuals costs	0	0	0
7	Training and training support costs	0	0	0

8	Infrastructure and facilities costs	200000	370,000	440,000
TOTAL COSTS		**2,245,760**	**5,381,658**	**2,555,824**

CONCLUSIONS

The principle who governs the LCC is a simple one: when we decide to acquire new military essential equipment we have to take into consideration not only the acquisition costs but also the O&S costs during its lifetime. The O&S costs are the highest expense that became the bigger challenge when we have to make choice to purchase equipment or to make a comparison between two similar systems. These costs have to be evaluated from first beginning in order to take the appropriate decision in military acquisition. The case study proves that O&S cost is, like theory said, 60% to 80% of the LCC and the acquisition cost 20% to 30% of the LCC[121].

The lifetime equipment cost management has consequence to maintain long term military capabilities. The main goal of equipment lifetime cost analyses is to maintain the control over the cost change to equipment procurement, operation and maintenance, upgrades and capitalization.

The best opportunities to reduce LCC appear in the first beginning phases of military equipment development when decision-making process to choose between two or more alternative solutions conducts to different course of action. When the level of indeterminacy of different costs is too high the decision-making related to the optimum course of action have to be taken later, when the surety of costs became over the planning costs hypothesis.

There are two main purposes using the LCC as a decision support tool for every organization. Those are: economic appraisal and financial appraisal.

The economic appraisal of military essential equipment is made usually by the political level of decision focus on “well being” of military organization. This assessment is a simple costs-benefits comparison.

The financial appraisal represents the cash flow over the budget articles on entire LCC of the military equipment, hence assess affordability.

[121] "Conceptia privind estimarea şi evaluarea costului echipamentelor pe durata ciclului de viaţă", MApN, SMG, Direcţia Logistică, Bucureşti 2003, Page 15, Fig. 2;

To make the estimation of LCC more precisely the CBS has to be standardized and also has to include the most significant cost. We have also to use appropriate estimation methods, software estimation models or analogy system.

The main challenge of LCC in the near time is to implement this concept in Ro Armed Forces to optimize the general costs (WLC) of military equipment and also to produce the most effectiveness defense capabilities demanded by NATO.

ACRONYMS

AF MAJCOM = Air Force Major Command

AGE = Aircraft Ground Equipment

CAS = Closed Air Support

CNAD = Conference of National Armaments Directorate

CBS = Cost Breakdown Structure

CES = Cost Element Structure

"D" – level = Depot level

GPS = Global Positioning System

"I" – level = Intermediate level

ILS = Integrating logistic Support

LC = Life Cycle

LCC = Life Cycle Cost

LCCA = Life Cycle Cost Analysis

LCMG = Life Cycle Management Group

TLCC = Total Life Cycle Cost

O&S = Operation and Sustainment

"O" – level = Organizational level

POL = Petroleum Oil and Lubricant

R&D = Research and Development

RO = Romania

SLCM = System Life Cycle Management

TO = Technical Order

WLC = Whole Life Costing

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UNDERSEA WARFARE RISK MANAGEMENT

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INTRODUCTION

Undersea warfare is based on a set of armed forces operations that derive from the undersea or are directed into the undersea, sorting from survivable nuclear prevention patrols by ballistic missile submarines to intelligence set by submarines to surveillance by undersea sensors. It includes antisubmarine warfare by aircraft, strategic strikes similar to those operated by the pointed missile submarine, and mine-hunting operations by undersized unmanned vehicles. Not all undersea warfare is done by undersea forces. For instance, antisubmarine warfare and maritime mine warfare are commonly completed by airborne or surface systems and platforms. These cross-domain operations involve watchful coordination of efforts among undersea forces and surface ships, aircraft, space assets, communications systems, and headquarters facilities, but they frequently yield outstanding results and significantly improved efficiency. This is an area where we are applying greater emphasis in maritime operations around the globe.

The secrecy of undersea forces provides a benefit that no other part of the Joint Force can provide: continual, hidden, assured access far forward and the capability to do valuable things with that access. By leveraging concealment, undersea forces can set up forward without being challenging, penetrate area denial perimeters and carry out undetected operations. These operations ought to be precautionary preparatory ship maneuvers, intelligence collection and surveillance, Special Forces sustain or nuclear deterrent patrols.

It is supposed to be needed that these forces can take advantage of the element of surprise and hit at the time and place of our choosing to take full advantage of the desired result while minimizing jeopardy. These attacks may well contain efforts exclusively focused on helping gain right of entry for follow-on general reason forces. Cover up enables survivability while operating autonomously with magazines focused on offensive payloads.

Finally, secrecy enables undersea forces to exploit uncertainty to spread disruption and improbability in opponent operations, diverting rival resources and creating confusion.

Response from our operational commanders specifies that the request for this capability is tough. As the risk grows from advances in sensors and weapons for example cruise missiles, antishipwarfare ballistic missiles and integrated air defense systems, more pressure will be placed on undersea forces. This demand will be supplementary amplified by the propagation of these advanced systems to more adversaries and extra regions.

Besides, the function of the undersea to the globalized industrial economies of the world is hard to overstate and is growing. The intercontinental telecommunications spinal column of the world rides on the marine, with undersea cables carrying over 95 percent of all traffic. Offshore oil and gas production is increasing rapidly, and undersea pipeline communications is proliferating to service fields in Asia, the Middle East, the Gulf of Mexico, Africa, and in the North Sea.

Moving infrastructure such as tunnels, piers, railway bridge supports are easy to get from the undersea, and the growth of shipping traffic and oil drilling into the Arctic as ice cover shrinks will further expand the importance of the undersea to the global economy. Bearing in mind these factors, it is obvious that the weight of the undersea will continue to raise, both in economic and in military terms, for the anticipated future.

NATO has recently proclaimed that "the purpose of the NATO undersea forces is to influence, directly and decisively, events ashore from the sea—anytime, anywhere".[122] The stated Marine Corps tenets for maneuver warfare with naval expeditionary forces in the littorals are to win quickly and decisively, minimize casualties, and dominate the battle space by achieving overwhelming tempo of operations.[123] Will future Navy undersea warfare capabilities allow or obstruct these most wanted capabilities?

Four wide areas of development in undersea warfare capability are envisioned as the means both to recover ground lost in recent years against undersea threats and to increase the freedom of maneuver and action for future maritime forces:

- Distributed deployable/offboard ASW sensor networks;
- Organic Mine Countermeasures (MCM) capabilities for the Fleet;

[122] Johnson, J., "Anytime, Anywhere—A Navy for the 21st Century," *Proc. U.S. Naval Inst.* 123(11), 48–50 (Nov 2007).

[123] Challenges to Naval Expeditionary Warfare, Office of Naval Intelligence/Marine Corps Intelligence Agency (Mar 1997).

- Advanced offboard vehicle concepts (both manned and minimally manned undersea systems);
- Advanced warship self-protection measures against undersea threats (highlighted later by illustrative scenarios).

Each of these capability thrusts is addressed in turn. The propagation of undersea technology and the future undersea warfare capabilities needed to counteract this trend create a multifaceted dispute to the NATO and its allies. In this final paper, I explain a future undersea warfighting idea drawn from some sources, particularly the studies and assessments presented in the bibliography. Nevertheless, the views expressed here are just personal thoughts; they should not be considered as an official position or any part of the Romanian structure. The paper is divided into three parts: the first delineates the challenges posed by proliferating undersea warfare–related technology; the second describes the future undersea warfare capabilities that are needed to counter these challenges and the third part is related to a case study.

I. POTENTIAL UNDERSEA CHALLENGES

Declining numbers of NATO warships (surface combatants and submarines) with increasingly diverse multimission tasking in the post–Cold War era make it impractical to use warships that cost a huge amount or more apiece as sensor nodes in one warfare area for protracted periods. For lesser contingencies or in the early stages of short-warning conflicts, there is likely to be a dearth of warships on the scene. These warships could be widely dispersed in the theater of battle, doing various jobs related to Theater Air Defense, Theater Ballistic Missile Defense, strike/fire support, MCM, special operations, ISR (intelligence, surveillance, reconnaissance), and ASW. In other words, declining detection ranges for organic sensors on individual warships prohibit large-area surveillance (e.g., tens of thousands of square nautical miles in littoral regions of notice) with a few warships. Obviously, in future contingencies and conflicts, it is more attractive and practical to hand out large numbers of ASW sensors than to disburse a comparable number of multimission platforms over the similar area, predominantly in the early phase before the main body of surface forces (warship reinforcements) arrives from the bases.

Keep in mind that surface ships (with their helicopters) and strategic submarines (SSNs) will always have definite key ASW roles: own-platform self-protection, ASW screening operations during the transit of forces, ASW screening and barrier or region clearance operations in fixed areas, ASW operations in far-forward (contested) areas, and

covert tracking operations during rising tensions. Additionally, mobile ASW surveillance platforms may have key roles in C4I and sensor field monitoring, or they may provide special or relocatable sensors. However, more ASW tasks will probable have to drift to maritime patrol aircraft and offboard surveillance systems so that big sensor fields can be distributed without appealing numerous warships for this single-mission focus.

Maritime patrol aircraft is to be the key to investigating surveillance cues, conducting large-area search operations, performing ASW screening operations during force transits, establishing fence operations in certain fixed areas, and conducting overt or covert tracking operations. Up till now, NATO current fleet of maritime patrol aircraft is aging (relying on service-life extension programs); basing also may prove to be challenging for some future contingencies. If basing is a dilemma, a larger ASW burden could fall to sea-based ASW capable aircraft, in spite of the recent recapitalization decision to remove acoustic ASW from the carrier-based fixed-wing aircraft. Sea-based ASW aircraft in the future would contain the helicopters and possibly the Common Support Aircraft (CSA), whose assignment responsibilities could include ASW.

Finally, offboard surveillance systems symbolizes a potentially cost-effective means of conducting both prolonged surveillance operations over intermediate to large areas and extended barrier surveillance operations (so called tripwire). It is confusing to understand, however, that there are no deployable offboard surveillance systems in the NATO Fleet nowadays to quickly respond to contingencies in littoral regions. The merely system in development that can gather this need is the Advanced Deployable System (ADS), which is a cable-based system (cables connecting sensor nodes on the ocean bed, and cables back to a shore site for processing). In the near term, the fiber-optic cable allows high volumes of acoustic data to be reliably passed for processing. In the future term, it is advantageous to get rid of the cable because of concerns about cable affordability and survivability and for the reason that some operational settings need very fast deployments. Air-deployable concepts could get together short response timelines, but using manned aircraft to watch RF communications for long-drawn-out surveillance missions (e.g., many weeks) is unwanted because of competing mission demands, both ASW and non-ASW. ASW planes can be ready available for other missions if self-sufficient surveillance concepts can be developed that let remote monitoring of surveillance fields from command centers (on shore and afloat). The next enabling technologies are solution to the development of reasonable autonomous sensors (and supporting systems):

- In-sensor recognition, classification, and localization processing to get highly trustworthy, automated information processing that decreases data bandwidth requirements for RF transmissions to satellite communication networks;
- Superior energy systems to boost sensor endurance and decrease the need for reseeding surveillance areas;
- Advanced sensor equipment to achieve miniaturization and let large-aperture arrays to be packaged and deployed in typical- sized sonobuoys;
- Higher active acoustic basis technology to enlarge surveillance coverage and contact rates for firm operational situations by using affordable, secure, energy power sources to make active sensor receive arrays;
- Advanced communications to get dependable, jam-resistant RF links to satellites and, in several applications, acoustic links amongst sensors and control nodes;

Advanced sensors and in-sensor processing are the critical components for achieving affordable, deployable, autonomous, disseminated surveillance systems.

With no effective sensor concepts, network-centric–based ASW will go down short of its full potential or fall short unhappily. Even if we have to continue to make certain that our ASW weapons work, ASW starts with efficient surveillance and tactical sensors, as fig. 1.1 depicts. The base of the ASW pyramid needs to rest on this solid establishment.

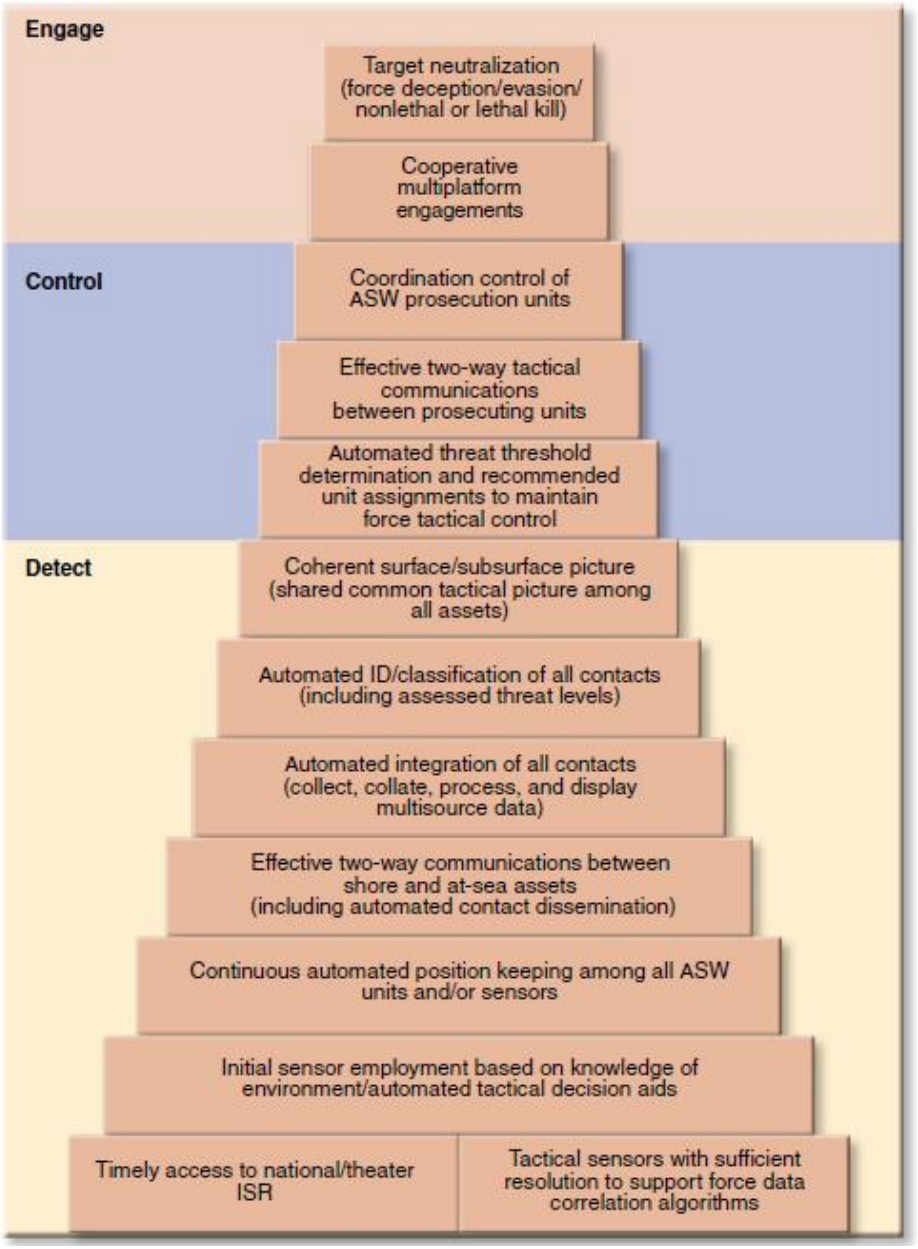

Figure 1.1.1. Network-centric–based ASW force coordination.

Successful ASW begins with effective surveillance and tactical sensors. The depicted pyramid must include a solid foundation (ISR = intelligence, surveillance, reconnaissance).

I.1. Nowadays submarine fight

Significant Undersea Warfare technology is being transferred among the nations of the world.[124] This reassign includes both military technology and money-making off-the-shelf technology having military applications. The equipment areas discussed in the subsequent

[124] National Security Industrial Association, *Free Use of the Sea—An Imperative for the 21st Century*, Washington, DC (Mar 1994).

sections are of particular worry if employed by outlook adversaries in regional contingencies and conflicts.

More than 40 countries have submarines in their navies, including Russia, China, North Korea, India, Pakistan, Libya, Algeria, Iran, and Indonesia. Russia and Germany go in front of the world in export sales of large, modern conventional (nonnuclear) submarines. German suppliers have exported about 80 submarines (mostly of the Type 209 variety) for the period of the last four decades. The Russians have exported more than 20 Kilo submarines to six clients in the last 10 to 15 years. Other nations that at this time design, build, and export large conventional submarines are France, Sweden, the United Kingdom, the Netherlands, China, and Spain. Both German and Russian designs (Type 209 with follow-on and Kilo with follow-on, respectively) symbolize virtually the best diesel-electric submarines that Germany and Russia have to propose. These designs include advanced stealth technology, and the latest Kilo design (Project 636), for instance, was exported to China. According to the U.S. Office of Naval Intelligence, the Project 636 upgraded Kilo is one of the quietest diesel-electric submarines in the world. According to the Chief of Naval Operations (CNO)-N84, "Since 1960, 35 decibels of quieting have reduced [detection] ranges from hundreds of miles to a few kilometers."[125]

The inheritance performance of passive acoustic surveillance sensors has been badly degraded against modern stealthy submarines, particularly in unfavorable littoral environments (with high noise and poor propagation conditions).

German and French companies are leading exporters of totally integrated state-of-the-art combat systems. These systems include the following:

- Advanced acoustic sensors (e.g., cylindrical bow arrays, flank arrays on hull side, towed arrays, passive ranging sonar, acoustic intercept sonar);
- Superior nonacoustic sensors (e.g., electronic support measures for signal intercept and direction finding; optical and laser rangefinders; thermal imaging sensors; and automatic rotation, recording, and display mast systems);
- Global Positioning System (GPS) navigation;
- Modern communications;
- Advanced signal processing and displays;
- High-performance data buses for data fusion and information management (e.g., automated tracking and fire control solutions);

[125] Morgan, J. G., "Networking ASW Systems: Anti-Submarine Warfare Dominanc," Sea Tech., 19–22 (Nov 1998).

Contemporary, highly automated fighting system designs generally integrate "user-friendly" features that let increased proficiency with condensed manning complements (for example, large, modern, conventional submarines requiring 20–40 total crew, compared with well over 50 crew needed with earlier, less automated designs). Russian and other designers wide-reaching are pacing Western European developments in this area, as evidenced by their most up to date submarine designs, which attribute increased automation and reduced manning.

I.2. MCM and related issue

Navy is increasing its importance on "organic" (as contrasting to dedicated) MCM capabilities, that is, integrating MCM capabilities into mainstream multimission NATO Fleet assets (surface warships, submarines, helicopters).[126] Several degrees of specialized MCM platforms and assets will likely be retained for the predictable future, but there is a obvious intent to raise significantly the MCM capability on forward-deployed versatile Fleet units, as is the case for additional warfare areas (e.g., anti-air, anti-submarine, and strike). Some of the prospective benefits will contain providing instantaneous options for extenuating the risk from mines to forward-deployed carrier battle group (CVBG) and amphibious ready group (ARG) assets. Escalating the emphasis on organic MCM also is expected to develop the options for conducting MCM reconnaissance operations in unfriendly environments (for example, with low observable and clandestine unmanned systems) and in general to decrease overall MCM timelines. Eliminating important portions of the dedicated MCM infrastructure could also create some overall cost savings. Two things must take place to compose this warfighting idea a reality. First, the organic MCM-related concepts have to be confirmed and the capabilities fielded in satisfactory numbers to take on a outsized share of the MCM tasking. Second, the shared organic and committed MCM capabilities must be optimized with a systems vision of how to best utilize the emerging organic MCM technologies in combination with the legacy-dedicated MCM systems.

The up-and-coming organic MCM technologies consist of unmanned offboard vehicles (together unmanned undersea vehicles and semisubmersibles) for mine reconnaissance and minehunting operations, as well as variant helicopters prepared with both minehunting and minesweeping systems. The input organic MCM capacity areas that could profit from advanced technology developments are likely to be the following:

[126] Broughton, B., "The (R)evolution of Mine Countermeasures," *Proc. U.S. Naval Inst.* 124(5), 55–58 (May 1998).

- Increased sensor area coverage rates;
- Better clutter discrimination via computer-aided detection and classification;
- Precision bottom-mapping capability;
- Rapid transition from classification to identification of mines;
- Lighter, compact systems for helicopter tow, including effective influence sweeps;
- Advanced offboard vehicle designs to enhance mission effectiveness (safe high-density energy sources, autonomous control, communications, navigation, sensors);
- Effective command and control over offboard vehicles;
- Coherent tactical picture development (automated integration, fusion, and information management);
- Rapid, effective, standoff mine clearance;
- Reduced signatures (acoustic, magnetic, or other) for warships and offboard vehicles.

Even though important progress can be done in these capability regions by leveraging technology, the maximum advantage of these advances will not be understand unless other developments take place in key support areas. Primary, manning and unit/force Countermine Warfare (CMW) instruction concepts have to be developed that are well-matched with the host platforms—surface combatants, submarines, and airplane (the term CMW is synonymous with MCM, but is used to reveal a more complete Joint systems perspective). Second, the mine risk has to be well understood, including outlook trends in stealth drawing, actuation mechanisms, and so far. Third, the coastal environment wherever mines are anticipated must be well understood, including the capability to develop measurements throughout actual contingencies to optimize CMW operations. Fourth, connectivity and communications development for CMW must practically reproduce multiwarfare/ multiservice rivalry for bandwidth. Fifth, the commander needs to be ready aware long previous to the contingency occurs of the vital role that Joint forces can play in facilitating successful CMW operations. This includes opportune access to nationwide or theater ISR assets, offensive strikes not in favor of mine stockpiles and mine layers, and restraint or rollback of opponent sea-denial forces. The previous two Joint contributions would depend mainly on the rules of engagement. Sixth, sufficient inventories of expendable and nonexpendable CMW systems are needed that return both intended utilization rates for various contingencies and potential

losses to mine and non-mine risks derived from realistic assessments of weakness to these threats. [127]

As a final point, an overarching thought of operations (CONOPS) for future CMW forces in the period of mainstreamed MCM capabilities have to be established. This CONOPS must reproduce basing and logistics restrictions and likely mission conflicts on host platforms.

Additional CONOPS-related issues ought to have attention as well:

- Potential paradigm shifts in the use of mine reconnaissance information to reduce timelines, including pattern recognition or "change detection" methods and associated tactical decision aids;
- Benefits and limits of real-time mine detection and avoidance techniques by individual warships;
- Maneuver guidelines and constraints for battle groups in minable waters prior to completion of CMW operations, whether or not mines have actually been identified;
- Best route selection based on knowledge of the bottom, the environment, ship signature, water depths, general shipping patterns, etc.;
- Best command and control structure for CMW operations in various operational settings to ensure adequate planning and execution of CMW operations.

II. OUTBOARD VEHICLES

II.1. Process in progress

Offboard vehicle plans are mainly adaptive in terms of mine reconnaissance applications. These developments are just the beginning of outlook uses for plainly manned or unmanned undersea vehicles (UUVs) in sustain of naval and Joint missions. UUV developments are expected to matching those for unmanned airborne vehicles (UAVs), with substantial importance on ISR assignment applications for enhanced situational awareness and balanced tactical image enlargement. Basically manned minisubmarines could be handed over to comparable ISR missions (with or without team, depending on evident danger). Those would as well be trained of more versatile missions in which through association of human operators was needed, for instance, to amplify the likelihood that accurate decisions are completed during highly lively or ambiguous operational circumstances.

As an illustration, one could imagine a future Navy minisubmarine whose mission applications happen as expected beyond those of the Advanced SEAL Delivery System

[127] Calvano, Charles. "SEA-17 Project Tasker." Monterey: Naval Postgraduate School, 2010

(ASDS), which is at this time being developed. This future minisubmarine could have the subsequent physical characteristics:

- Submerged displacement of 65 to 250 tons or more;
- Regular crew of no more than four;
- Reconfigurable payload packages for specific missions;
- Endurance of 2–4 weeks; submerged endurance (with AIP) of 500–2000 nmi;
- Cruise speed of 3–8 kt; sprint speed of 20–25 kt;
- Ability to operate in waters as shallow as 6–12 m or as deep as 200–500 m;
- Very low observable signatures (acoustic and nonacoustic);
- Robust bottoming and hovering capability;
- The minisubmarine could be towed into acting area by a host platform (an SSN or a surface ship). If it was within the 65 to 130-ton regime it could even be airlifted into theater;

The minisubmarine might be optimized for use in special littoral environments as a complement to the submarine force, working in very restricted seas or in water depths that the submarine would prefer not to enter during certain types of crises, contingencies, or conflicts (like shallow waters). Possible missions could comprise some blend of ISR; special operations force introduction, extraction, or support; special information warfare missions such as cutting undersea cables or RF/acoustic spoofing; secret offensive mine laying; port defense (countering undersea intruders); minefield scouting and neutralization (e.g., employing UUVs); anti-surface operations against fast attack boat or other coastal boat; ASW detect through employ operations against submarines or minisubmarines in exceedingly shallow waters; and restricted tactical fire support/shore salvo with advanced UAVs and weaponry (for instance, against highly portable targets from firing positions near coast). A number of key technologies would require to be relied ahead to make this cleanly manned minisubmarine idea practicable. First, a far above the ground degree of mechanization would be needed to decrease the crew size to smallest levels and yet still let reliable execution of complex missions.[128] This would then permit the vehicle dimension to be dominated by the assignment package rather than by the team complement. Second, reconfigurable task package concepts to lodge miniaturized ultra-modern payloads would be required to let a high degree of operational elasticity on a very small submarine. Third, AIP would offer the

[128] Systems Engineering Analysis Cohort 17, Team B, Advanced Undersea Warfare Systems, Naval Postgraduate School, 2011

submerged survival capability needed to diminish platform weakness when the minisubmarine is operating in near-coast or confined sea regions under control by the opponent. Last, superior hull concepts would be necessary to accomplish favorable hydrodynamic qualities and to supply a high degree of furtiveness.[129]

II.2. Self protection measures

Equally surface combatants and SSNs are probable to be aggressively engaged in outlook regional contingencies to accomplish various objectives of task force leaders. With reducing numbers of warships of growing individual military charge, it is imperative to bound losses during a fight to those deemed adequate with the perceived payoff of achieving the Joint or coalition goals. As was obvious from a single firefight in Somalia and a single terrorist assault on the Marine barracks in Lebanon, NATO policy and participation in a contingency can be considerably altered if losses go beyond the perceived value of the action. In an all-out fight such as a foremost theater war, perceived or concrete undersea threats would not liable cause the NATO or its allies to completely disengage.

Though, such threats may well delay the buildup of maritime forces in the area of operations, or it could limit movements once the forces have arrived, successfully restraining naval contributions to the war until the undersea threats have been adequately neutralized. Increasing warship self-protection from undersea threats would allow the battle group or naval element commander to additional aggressively utilize warships for a variety of missions even earlier than the undersea risk was eliminated. The following theoretical operational situations demonstrate the need for warship self-protection procedures against undersea threats:

- A destroyer is assigned to a task near a key allied harbor at the start of a short forewarning scenario. The ship must rapidly get on station to oppose missile attacks against the port. The water depths in the guard area are shallow, and offensive mining by the challenger is a distinct possibility. This condition requires some combination of the subsequent: offboard vehicle investigation (if accessible and rapid sufficient), onboard ship sonar for real-time recognition and prevention of detected objects that might be mines, optimum route/speed variety, ship signature lessening and control, and, as a last option, skill of the ship to soak up a mine hit and keep fighting. Against mines, neither the dynamic

[129] John R. Benedict, Jr.,Future Undersea Warfare Perspectives, Johns Hopkins APL Technical Digest, Volume 21, Number 2 (2000).

measures (reconnaissance and prevention) nor the inactive measures (signature control and harm resistance) are robust in Fleet units today.

- A large-deck warship (combat logistics ship) is transiting, either to a emergency region or within AOR, and it has no accompany of ASW-capable ships. Is it likely that this warship would be escorted previous to the submarine hazard had been neutralized? The answer is difficult, because the number of surface warships is diminishing and because such a high stage of multimission tasking is expected for the future. It should not be assumed that combat logistics ships operating in theater or even amphibious ships traveling to theater will have the direct support of ASW assets, particularly early in the contingency when few ASW-capable assets may be in theater. What mixture of tactics, signature reduction, hardening, redundancy, damage control procedure, and countermeasures (reactive versus nonreactive, soft kill versus hard kill) would supply acceptable defense for the large deck ship against advanced, highly lethal anti-ship torpedoes. This is a demanding problem that defies basic solutions.
- A submarine is transiting to a frontward area off an opponent's coast at the outset of warfare. A major part of this submarine's transit is in minable waters and adversarial defensive minefields are a possible concern, even though no direct confirmation of mining has yet appeared. What arrangement of offboard vehicle reconnaissance, onboard sonar for detection and avoidance of possible mine objects, optimal route/depth/speed selection, signature reduction and control, and capability of the ship to take up mine hits is needed to achieve acceptable risk mitigation from mines for the submarine?

The image of future warfighting can be described putting in place greater emphasis on warship selfprotection from submarines, torpedoes, and mines than is apparent nowadays. Ship self-defense is not identical with ASCM Defense; somewhat, it includes selfprotection from any possible threats, including the undersea threats mentioned here. In this perspective, submarine self-protection is also upgraded to match the stressing conditions found in lots of littoral environments. The following objectives connected to warship self-protection seem to be the bare minimum entry level for operations in prospect contingencies.[130]

There should be a high probability of getting off the first shot (based on increasing a timely, effective firing solution) in the vast preponderance of encounters with opponent submarines. The enabling technology zones for this ability are advanced sensing mechanisms and signature lessening, rapid localization techniques, quiet-launch and quiet running

[130] John R. Benedict, Jr.,Future Undersea Warfare Perspectives, Johns Hopkins APL Technical Digest, Volume 21, Number 2 (2000)

confrontation armaments, and advanced weapon management and control for difficult targets and surroundings.

It should keep in mind that this goal would not affect to large-deck ships that are likely to have restricted, if any, onboard ASW capabilities (except possibly for ASW-capable aircraft). If the warship fails to avoid a submarine attack (including possible counterfire by the opponent), it should still have a high possibility of denying any own-ship torpedo hits. The enabling technology fields for this capability are torpedo countermeasures (soft kill and/or hard kill) and signature decrease and control (in conjunction with countermeasures). The likelihood that allied ships will actuate a mine while conducting a passage or patrol in a potentially mined area should be low down. The enabling technology areas for this competence are minefield reconnaissance with offboard systems (for example, unmanned vehicles and MCM-capable helicopters from own ship), onboard sonar for mine detection and avoidance, and signature reduction and control (in conjunction with tactics).

III. DECISION MAKING INTO THE RISK

III.1. Problem definition in USW Risk

The number of platforms accessible to conduct USW is at risk of falling short of operational demands in the vicinity of to mid-term future. MCM ships are being replaced by Littoral Combat Ships (LCS), of which the future US Navy is planning to build and operate 55 over the next 30 years. The MCM mission is just one of many, including ASW, that this modular ship is expected to conduct. If an LCS is not outfitted with an MCM or ASW Mission Package, then it would have to enter port and undergo a swap-out in order to contribute to USW missions. Other surface combatants have simultaneous multi-mission capabilities; however, since USW is just one of many missions they may be tasked with, they cannot be fully allocated to the USW force structure.

Asymmetric maritime threats, such as small boat swarms, diesel submarines, and naval mines are easily employed over a wide geographical area by a large number of state and non-state actors. Since the threat axis is essentially 360 degrees and well-planned attacks offer negligible warning, these threats force most naval platforms into a defensive posture. Using surface combatants and SSNs to proactively counter asymmetric threats often subjects these high value assets to unacceptable levels of risk. For example, while a submarine might have

the capability to clear mines or hunt a diesel submarine, these missions risk the loss of a high value asset that is often critical to the overall warfighting effort.[131]

The wide range of potential threats creates a scalability issue for naval platforms. The shipbuilding process cannot possibly keep pace with ever changing threats armed with rapidly advancing technology. Once a naval vessel is built, it is very difficult to scale it to the level of combat it is expected to face. The modular design of LCS is an attempt at scalability, but documented problems with this approach indicate that a different solution may be necessary in the long term. In short, a vessel built to fight and win large naval battles is not necessarily ideal to confront a swarm of small boats, as the risk of loss significantly outweighs the benefit of victory. Conversely, a vessel built to defeat the mine threat is probably not designed to defeat an enemy destroyer.

III.2. Case study

Given the potential problem facing future USW forces, an operational concept is developed for an AUWS that would help those forces meet the challenges of the future. This operational concept aids in further clarifying what capability and capacity gaps AUWS will be required to fill. The specific operational activities that must be performed will vary with the parameters of the operating environment, involved players, and specific threat. So, while every instance cannot be reasonably modeled, the following is a brief description of stressing scenarios, described by threat (near-peer, asymmetric, or autonomous) in which AUWS will accomplish its mission. To validate this operational concept, two independent analyses, conducted by students of the Joint Campaign Analysis course at NPS, examine the operational impact of AUWS in a similar scenario. Both analyses find that AUWS can contribute significantly to overall mission accomplishment, either by improving performance in critical activities such as ASW barrier search or by reducing the number of submarines required to perform high risk missions.

[131] Federation of American Scientists. "Submarine-Launched Mobile Mine (SLMM)." 12 Dec. 1998 fas.org. 19 May 2011, http://www.fas.org/man/dod-101/sys/ship/weaps/slmm.htm

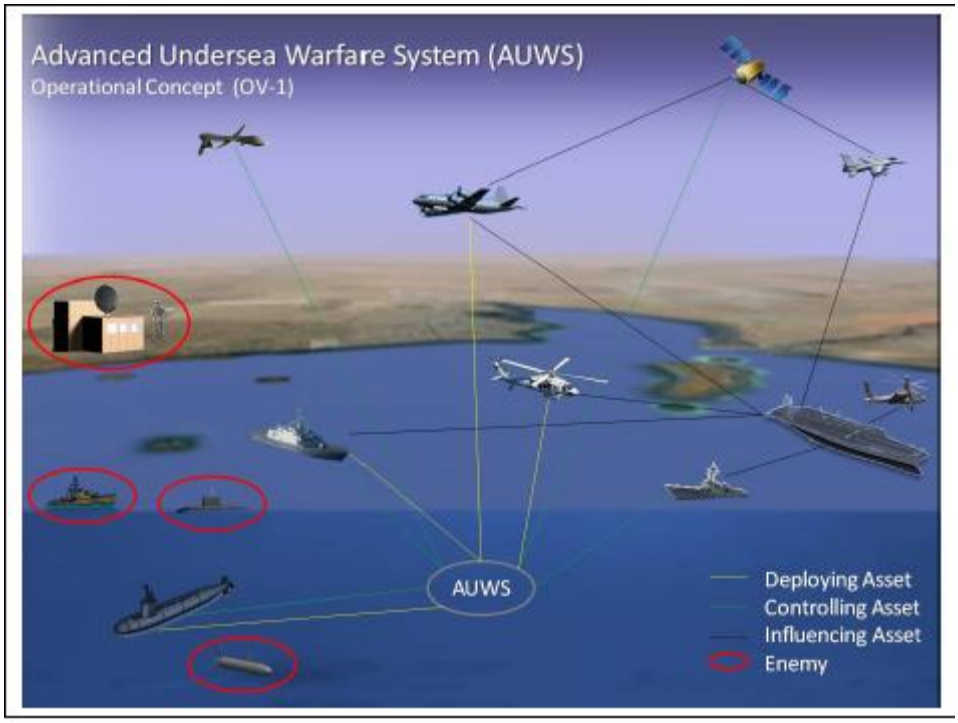

Figure 3.2.1. AUWS Operational Concept

Consider the littoral region, as shown in Figure 2.4, surrounding a near-peer competitor during a tense geo-political climate in the 2030 time frame. The Fleet Commander designates the need for discreet early warning and battlespace preparation in the area. Maritime Patrol Aircraft are airborne and flying their normal routes. Surface ships slow briefly during a transit. SSNs covertly infiltrate the coast just outside of territorial waters. Multiple AUWS units are rapidly and covertly deployed from these platforms. Each AUWS unit energizes, verifies system continuity, and verifies programmed tasking prior to release.

Each unit autonomously transits to its designated patrol zone under its own power, using its own guidance systems. Upon arrival within its assigned patrol region, it commences area monitoring. AUWS covertly conducts ISR to establish baseline traffic patterns and provide early warning of unusual activity. Although the system is equipped with weaponry, only a human operator can initiate an engagement, via the communications gateway node, in the semi-autonomous mode.

Based on the information provided by AUWS, the Fleet Commander orders further AUWS units be deployed in a strategic chokepoint near a major naval port of the adversary. The shallow waters and heavy maritime patrol density make keeping a high-value covert asset, such as a submarine, in situ for real-time ISR a risky proposition, either from a physical accessibility aspect or a counter-detection aspect. Placing a covert distributed sensor system

in the area will provide early warning of increased military traffic, which may be indicative of imminent hostilities, allowing the United States to mass forces as needed to prepare. As a covert sensor, AUWS can also observe activity that occurs in the absence of prominent warships. When not actively communicating with an external network, AUWS enters a dormant mode to conserve power.[132]

Figure 3.2.2. Specific Areas of Need for AUWS

To accomplish a comprehensive comparative performance analysis of different architectures for the same conceptual system, a combination of stochastic modeling and simulation, analogous comparison using empirical evidence, and qualitative methods is employed. The results of those methodologies are then folded together with proper emphasis on individual factors to ensure appropriate analysis. It is imperative that results not just be averaged together to determine the most effective system.[133]

Specific variables to be considered are identified and selected prior to analysis. The system MOEs and associated MOPs are a good place to start, but the amount of data required (some of which is not collectible outside of a Testing and Evaluation scenario) makes for a cumbersome and perhaps ineffectual analysis. To adequately assess the primary functions and identified need areas of AUWS, a set of seven MOEs (or representative MOPs) is selected to scope the analysis. These measures, with their associated units, are listed below:

[132] Systems Engineering Analysis Cohort 17, Team B, *Advanced undersea warfare systems*, NPS, 2011
[133] Truver, Scott C. "What 'Weapons That Wait?'" *Seapower*. Jun. 2011

1. *Probability of Detection* (%): probability of AUWS successfully detecting a real contact. Pd is modeled as the percentage of total contacts encountered by AUWS that are detected.

2. *Probability of Kill* (%): probability of AUWS successfully prosecuting valid threat, resulting in at least a mission kills. Pk is modeled as the percentage of total threats encountered by AUWS that are killed.

3. *Average Data Message Completion Time* (minutes): the time it takes for AUWS to send a message to an external network, from message generation (e.g. ship detection, in the case of a contact report) to the message being transmitted externally.

4. *Capability to Operate for a Minimum of 30 Days* (days): the capability for AUWS to conduct operations in an AOR for 30 days, independent of external C2 or logistical support.

5. *Capability for Deployment by both Contemporary and Future Platforms* (number of platforms): capability for AUWS to be deployable from air, surface, and subsurface assets in the current or projected Navy inventory.

6. *Capability for Recovery by both Contemporary and Future Platforms* (number of platforms): capability for AUWS to be recoverable by air, surface, and subsurface assets in the current or projected Navy inventory.

7. *Capability to provide OPSEC* (rating): capability for AUWS to avoid detection by enemy or neutral entities and, if detected, avoid compromise of sensitive information and equipment. This metric is used as a proxy for the Probability of Detection Avoidance MOE.

	Threshold	Goal	V-CAP	LD-UUV	Glider	Squid
Capability to Operate for Minimum of 30 Days (days)	30	180	123	126	987	16
Average Data Message Completion Time (minutes)	10	0	4.61	3.01	14.13	3.60
Capability for Deployment by both Current and Future Platforms (# of platforms)	1	3	2.5	1.5	1.0	1.0
Capability for Recovery by both Contemporary and Future Platforms (# of platforms)	0	3	3.0	1.5	2.0	0.0
Probability of Detection (%)	0	1	0.81	0.81	0.75	0.98
Probability of Kill (%)	0	1	0.59	0.38	0.19	0.08
Capability to Avoid Detection (rating)	0	1	1.00	1.00	0.25	0.50

Table 3.2.3. Summary of Performance Analysis Results[134]

[134] Government Accounting Office. Defense Acquisitions: Challenges Remain in Developing Capabilities for Naval Surface Fire Support. Washington: GPO, 2006.

The trade-off between risks, benefits, and costs for the seven criteria – C3, ISR, Armament, Maneuver, OPSEC, Power, and Structure – of the four AUWS concepts are identified, quantified, and evaluated. By maintaining focus on technical, schedule, and cost risks, the likelihood and consequence of the critical areas are evaluated. Technical risk is determined by the possibility a requirement will not be achieved based on the combination of individual subcriteria within a risk factor criteria. Any factors influencing the technological development are considered, including budgeting and integration issues. Cost risks are based on the possibility that a system's allocated budget would be exceeded. This includes cost over-runs and budgetary constraints factored over the system life cycle. Schedule risk is based on the possibility of the system failing to meet planned milestones. Schedule risks are often influenced by estimation errors originating in other areas. Taking all of these factors into consideration, risk is calculated as the probability of a risk event occurring (likelihood) multiplied by the severity of impact of that event (consequence).[135]

CONCLUSIONS

Over the next twenty years, the wide range of potential threats proliferating in the undersea environment, ranging from asymmetric to highly advanced, will likely challenge the platform-centric model that the United States Navy uses to maintain dominance in Undersea Warfare (USW). In the contested littoral waters where employment is likely, the Navy cannot accept the risk incurred by relying on multi-billion dollar assets to control the undersea battlespace. Meanwhile, rapidly maturing technology in the fields of autonomous command and control systems, unmanned vehicles, distributed undersea networks, and energy capacity, to name a few, offer greater capabilities to navies around the world while lowering the barriers for entry into USW. Such a paradigm creates an imperative for the Navy to harness emerging technologies to maintain USW dominance amid a dynamic threat environment, while balancing cost, risk, and required performance. This systems engineering analysis utilizes a comprehensive, objective, and forward leaning approach to develop Advanced Undersea Warfare Systems (AUWS) that provide a technological and tactical advantage based on the needs of the warfighter. AUWS proactively maintains USW dominance through weapons, sensing, and communications superiority, capitalizing specifically on netted and unmanned systems.

[135] Smith, Preston G. and Guy M. Merritt, Proactive Risk Management. New York: Productivity Press, 2002.

Identified from extensive stakeholder interviews and analysis, AUWS addresses the following critical need areas: the ability to be deployed and recovered by a wide range of platforms; the ability to operate covertly; the ability to maintain persistent forward presence independent of supporting assets; the ability to develop an internal tactical picture and contribute to an external common operational picture; the ability to operate in a range of modes from fully autonomous to direct human control; the ability to discriminate between threats and non-threats (either autonomously or with human assistance); and the ability to prosecute enemy manned and unmanned assets. Together, these need areas address the most pressing aspects of the problem facing the Navy in the undersea battlespace; however, each area must be balanced with the others, which leads to a design tradespace. Within that tradespace, a multitude of possible alternatives exist that could perform the Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) and prosecution necessary to dominate the USW environment.

Following critical analysis of the possibilities and an objective screening process, four system architectures, and associated operational concepts, are selected for detailed analysis. These alternatives consider both new and proven technologies applied to both traditional and developmental tactics to offer four distinct approaches to enhance USW dominance in the future. Results of comprehensive cost, risk, and performance analyses show that systems that effectively balance risk with required performance provide the most utility for the Navy in the future USW environment. Specifically, the top capabilities defined in this study balance the degree of distribution of the network (i.e. network-centricity) with centralized firepower, as neither extreme proves effective in addressing critical needs.

Analysis of the alternatives reveals three key qualities for AUWS: flexibility, scalability, and tailorability. AUWS is flexible with respect to deployment and recovery platforms, communication networks, and levels of autonomy. This flexibility allows operational commanders the freedom to employ AUWS in a variety of environments and operational phases, while integrating with the larger fleet network to form a human-machine team. AUWS is scalable to a range of operational areas and threat environments because the operational commander can adjust area coverage and performance by incrementally allocating the appropriate number of units to the given mission. AUWS is tailorable to the specific needs of the mission. Whether the priority is early warning or active prosecution, the operational commander can configure AUWS to yield a tactical advantage and frustrate the enemy's ability to counter the system. While this analysis does reveal important characteristics for AUWS, more importantly it shows the need for new warfare systems that can meet future

challenges to the traditional platform-centric model for USW dominance. By using the insights gained from this analysis as a guideline, a path to persistent USW dominance is developed. In the near term, detailed analysis of AUWS and the future undersea battlespace should continue, while rapid prototypes should be fielded in the fleet to garner feedback on how the systems and operational concepts can be improved. In the intermediate time frame, a Program of Record, perhaps similar to the concepts developed in this analysis, should be initiated based on the research of an AUWS Future Naval Capabilities Manager. It is recommended that the technological aspects of AUWS be developed in parallel to prevent specific technologies from stalling an otherwise capable system. In particular, it is recognized that autonomous threat discrimination is the single greatest technical challenge for AUWS; however, even larger non-technical (e.g. political, legal, ethical) issues exist for autonomous weapons. Mitigation measures, such as adjustable autonomy, allow for the development of AUWS in a timely manner. NATO acquisition process should be given significant lead time to allow for full operational capability by 2030. The specific nature of an AUWS program is not as important as the initiation of the process.

The undersea battlespace of the future is a complex, dynamic environment that cannot be neatly divided along platform or community lines. Based on the results of this analysis, the Navy should posture itself – at all levels – to take advantage of the opportunities presented by the changing undersea battlespace. As technology continues to mature, Advanced Undersea Warfare Systems should be a critical element of such a posture. Using the results and recommendations in this analysis will allow the Navy to deploy capabilities that effectively and efficiently meet future operational needs.

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CRITERIA FOR EVALUATING AVAILABLE INTERNET INFORMATION RESOURCES

CDR Ionel ZIBILEANU

INTRODUCTION

The availability of the Internet and the lesser effort we need to go to online have been the decisive factors that have expanded the information sources on the web. It's arguable whether nowadays there is a more powerful source of information then the web. More than that, there is hardly ever the case that we can find not-attributed work in printed sources: printed is expensive, web is virtually free. Unfortunately, there is no quality control evaluation or regulation for the online information, unless the source of that information is quality controlled.

In these situations, there is a visible need of self-education, critical thinking development of us, the information users, it is our duty to select the right sources, to select and use the right information.

During the next pages, structured on two chapters, this paper is trying to provide us, the users, with information that will help in the identification of the right and appropriate information we need.

In the first chapter, we will summarize the specific information available in the Internet: downloadable e-books, articles, newspapers or written content such as specialized web pages, blogs or social websites.

In the second chapter, we will describe some criteria for evaluating the web sources, and what tools and techniques we may use `to validate such sources and information.

I. TYPES OF INFORMATION AVAILABLE ON THE INTERNET

I.1. WHAT IS THE INTERNET

Even though we can talk about the Internet from early stages (the first communication over a network was recorded in 1964)[136], the Internet as we know it today was define only on October 24, 1995, by the American Federal Networking Council (FNC) as a "global information system" that links individual networks and communicates through technically described systems. What was not the internet at that time, the immense source of information we find today.

It is to say that nobody has ultimate control over the Internet. Yes, there are rules and regulations, but those regulate just the technical part of it – allocating IT resources, IPs, domain. There is no (yet and probably never will be) a single organization that regulates the information on the Internet. The Internet has been affected our daily lives. Nowadays, whenever we need information, new ideas or want to communicate with others, we firstly go online rather than go to the library or the book store.

There is no need here to define the structure of the internet, but a glance on where the information comes from worth mentioning. The "domain name" of a website it one of the first features that tries to sort the multitude of websites: there are well established domain names (.com, .org, .net, etc.), country specific (.us, .se, .ro, etc.), or business specific (.mil, .edu, .asia, etc.) or even other domain names that help the Internet user connect to the specific website.[137] Even though the domain name was defined to allow the communication between two specific ends, it can be an indicator as where the information comes from. The communication between computers, servers and other IT systems is usually done through the HTTP protocol (Hyper Text Transfer Protocol). For added security between clients, the S-HTTP protocol is used to send individual messages. For example, banks are required to provide individual private date and will use the S-HTML protocols (e.g. https://www.bankofamerica.com/), compared to opened websites such as news or commercial websites (e.g. http://www.weather.com/). Lately, more and more websites have been trying to offer user-aware information, so they will firstly offer the information available for a specific location or personalized interest (see https://www.google.com/ instead of old fashioned

[136] Barry M. Leiner, V. G. (2012, October 15). *Brief History of the Internet*. Retrieved November 11, 2013, from www.internetsociety.org: http://www.internetsociety.org/sites/default/files/Brief_History_of_the_Internet.pdf

[137] Network Solutions is a web-provider (the company sales domain names, file hosting and E-mail services), at http://www.networksolutions.com/index-v2.jsp, accessed on November 11, 2013.

http://www.google.com/, or https://www.yahoo.com/); once the user has logged in, the information is automatically filter to fit user's *expected* preferences.

Besides all the technology behind the Internet, the *available storage* is the second characteristic we should consider in the analysis. Together with a domain name, most of the Web companies offer web hosting – i.e. is a specific website owner is offered to host the information on provider's server. We can call that "storage on the server". In addition to the websites, the information may be shared through "sharing", i.e. the owner hosts the specific information on a private storage and shares it with other internet users (through peer-to-peer applications, or "torrent-ing".) That information is not visible or available until the user has downloaded it on own storage (be it computer hard disk, tablet or smart-phone).

I.2. TYPES OF INFORMATION AVAILABLE ON THE INTERNET

While talking about evaluating the information on the web, we need to define what types of information we may find on the Internet. Depending on the customer's goal, we may think of:

- Shopping information – that is the customer wants to buy or sell goods or services on the Internet, i.e. he/she should be aware of hardware specifications, seller/buyer information, contracts and financial details;
- Information for "news consumers" – probably everyone accessing the Internet is not searching for specific topics, but acquires the information once gathered through other media, such as newspapers, radio or television; it's just the daily life need for information. This data is available openly on the web, but not infrequently it is company-driven, biased, or even distorted; and
- Subject - focused information – that deals with specific subjects, or it is specifically created for limited interests. The scholastic or academic work falls in this category and makes the primary target of this paper's analysis.

When dealing with academic works, we are focused not only on the accuracy of reference works, but also on the reliability of the information sources. Those sources are:[138]

- *Reference material* – material that discloses facts, general valid truths. Dictionaries, electronic encyclopedias, atlases, catalogs – all may be regarded as reference materials. The online CIA world fact book is a good example.

[138] http://www.library.uq.edu.au/how-to-guides/types-information-sources

- *Electronic books* – more and more available, they are either already released as hardcopy, or published in electronic form only. Amazon.com has a good deal of both paper and electronic books. Scribd.org hosts electronic books only. No matter where the book comes from, most of them have a price associated with. Beside the old-fashioned .pdf, there are electronic books in proprietary formats, suitable for reading on e-book readers (Amazon Kindle, Google e-Book, Nook, e-Pub, etc).
- *Academic (Scholarly) Journals* – released in a proprietary format, issued at regular intervals usually focused on a specific subject or scholar discipline. The articles published in such journals are based on other scholarly material and, sometimes, they are part of a bigger project, like books. Even though often they are offered for a price or under subscription, they may be helpful when the books are not an option. One of the oldest and valuable online article (and lately book) store is JSTOR[139], that offers a variety of old and current articles and books. Such sites are available, besides a regular fee, through the subscription to academic libraries. For example, the Naval Postgraduate School, Monterey, offers an extensive list of researching tools,[140] including free access to academic journals, through Dudley Knox Library subscription.
- *Magazines* – they enclose scientific or factual information, but it is not their goal to demonstrate or convince the audience of a thesis or argument. They are usually aiming toward general audience and they are not very analytical, but informative.
- *News Websites or Online Newspapers*[141] – newspaper articles are published daily and pass on current events or developments. Even though they make a good source of information, they usually are affiliated with political entities or support a specific school of thought.
- *Statistics* – they are now widely available on the Internet, but can be accessed through libraries or official governmental or nongovernmental institutions websites. Statistical information may be found in encyclopedias, such as Mcmillan's International Historical Statistics[142], or statistical handbooks, such as the Statistical Yearbook of the United Nations[143].

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[139] http://www.jstor.org/

[140] http://www.nps.edu/Library/Research%20Tools/Research%20Tools.html

[141] An example of news website is *Yahoo.com* (http://news.yahoo.com/); an online newspaper, such as *The Times* (http://www.thetimes.co.uk/tto/news/) is backed up by the daily publication.

[142] „*International Historical Statistics; 1750-2010* - the 3-volume set is the latest edition of the most authoritative collection of statistics available. Updated to 2010 wherever possible, it provides key economic and

- *Internet Web Pages* – abundance of information may be found in web pages, be it official websites, blogs, or social websites. Government reports, articles, conference papers and so on may be found through search engines, and free available for download. Besides the most popular, user demand search engines (Google, Yahoo, Bing, AOL, etc.) there are more narrow focused search engines (vertical search engines),[144] such as SearcheBooks.com (http://www.searchebooks.com/), Amazon (http://www.amazon.com/), or Google's books and video's search engines (http://books.google.com/ and http://www.youtube.com/ respectfully);
- *Specialist Information* – usually found in legal documents, maps, standards, biographies or tests, available on official institutions' websites.

I.3. INFORMATION SOURCE LEVELS

Depending on the type of research we are doing, we are expected to use different levels of sources. These levels may be distinguished as *primary*, *secondary*, or *tertiary* sources.[145]

Primary sources provide first hand evidence about the people, events, situations or historical settings they relate to. Primary sources are original works, and include diaries, letters, manuscripts, images, films, and even objects. Since the primary sources are information passed on throughout history, it is not easy to find primary sourced information on the Internet. More countries are more developed than others in this respect. An example of where we might find primary sources information in North American societies is The George Lucas Educational Foundation;[146] the National Archives and Life Magazine Photo Archive offer first hand information. The Library of Congress web site is other primary source information.[147]

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social indicators for the last 260 years, serving as an essential reference source" sais the author. The book is edited by Palgrave Macmillan Ltd. and it is available through subscribing institutions at http://www.palgraveconnect.com

[143] Valuable statistical information may be found on UNO's website, under the United Nations Statistic Division (UNSD) webpage, at http://unstats.un.org/unsd/default.htm

[144] There is not a good definition on the web on what is a vertical search, but http://searchengineland.com/ explains it as "searches on topical sites".

[145] http://library.uwsp.edu/guides/webtutorials/primary.htm

[146] http://www.edutopia.org/blog/online-resources-primary-source-documents-monica-burns

[147] For example a electronic copy of "Royalty in a rage or family quarrels", at http://www.loc.gov/pictures/resource/cph.3g09896/

Secondary sources are books and articles that analyze and discuss primary sources. The secondary sources include scholarly articles and monographs, or specialized encyclopedia and dictionaries. Even though "second hand" sources, they are reliable sources, regardless of the interpretation the author has given to the facts in the book or article

Tertiary, or third hand sources, are based on secondary sources and provide a non scholarly treatment of the topic. Tertiary sources include newspapers and magazines, and general encyclopedia and dictionaries.

II. CRITERIA FOR EVALUATING AVAILABLE INTERNET RESOURCES

Why do we need to evaluate the Internet information resources? We usually think on developing ourselves or teaching the others in the right way.

The *reality* in what we say should, then, be paramount. In our efforts to analyze, be it policy analysis or daily life analysis, we either think or hustle data that will support our analysis or evidence. It is these two activities that the outcome of our analysis depends on. Since G.I.G.O. (garbage-in-garbage-out) theory applies, we need both maximize the efficiency of our thinking and our information. It is the focus of the following chapter to define the criteria for evaluating specific resources, those available on the Internet.

And "who", but not "what" is the source of the Internet is other concern of ours. As Steiner's cartoon of 1993 (figure 1) implies, trough the Internet we cannot see upfront who is on the other side of the information … unless we have done our work.

II.1. THE C.R.A.A.P. EVALUATION CRITERIA

Without knowing who's who on the internet, we need to think critically on what the available information has to offer. It is us, the users, who should establish the validity, authorship, and integrity of what we found on the web, by research and thinking; critical thinking.

There is not a school that will teach us the critical thinking, but with the education we learn by ourselves how to think critically, how to analyze what is good or bad, what is right or wrong, what is truth or lie. It was the Chairman of the Joint Chiefs of Staff, Admiral Mike Mullen, who emphasized the importance of critical thinking during a brief lecture on leadership:

"You will recall how you were inspired to think critically and
to question without fear to seek out radically different

solutions, and to voice them without reprisal, to read widely and deeply, and to examine without end and grow intellectually.

What I ask is this – pass it on."[148]

Without going to deep into analyzing what specifics makes a critical thinking strong, it is enough to say that we need cognitive skills, such as interpretation, evaluation, inference, or explanation (see figure 2). Even in early 50, Hemingway acknowledged that "*to invent out of knowledge means to produce inventions that are true. Every man should have a built-in automatic crap detector operating inside him."*[149]

To help the cognitive skills, schools and librarians have developed measuring characteristics that may be followed to evaluate the internet resources.

The C.R.A.A.P. (CRAAP)[150] test is a way to evaluate Internet sources based on the following criteria: Currency, Reliability/Relevance, Authority, Accuracy, and Purpose/Point of View. These characteristics are explained as follows:

a. **Currency** – represents the timeliness of the available information. When analyzing this criteria, we should consider:
   - When the information was published or posted on the web;
   - Whether or not the information has been revised, updated and how often;
   - Is our research time sensitive? Is our research related to current subjects, or historical events?

b. **Relevance** – it is the factor that shows the importance of the information for our needs. Before going too deep in our

Figure 1 ***Core Critical Thinking Skills*, in Critical Thinking: What It Is and Why It Counts, retrieved at http://www.insightassessment.com/pdf_files/what&why2006.pdf, on November 11, 2013**

[148] Adm Mike Mullen gave the graduation speech on June 11, 2009, at the National Defense University, captured by Fred W. Baker III, retrieved from http://www.jcs.mil/speech.aspx?ID=1203, on November 11, 2013

[149] Notes taken by Robert Manning, in 1954, Mr. for a magazine profile, retrieved at http://www.theatlantic.com/past/docs/issues/65aug/6508manning.htm, on November 10, 2013

[150] Initially developed by the Meriam Library of California State University, Chico, the CRAAP test is widely used by many libraries around the United States to help evaluate the information we find on the web. While not exhaustive, the CRAAP criteria are a worthy starting point for analyzing not only the information but also the available resources on the Internet. The original test was retrieved from the Internet may on November 10, 2013, at http://www.csuchico.edu/lins/handouts/eval_websites.pdf

analysis, we should be asking:

- If the information relates to our topic or domain;
- Who is the target audience, what the level of the information: is it the appropriate level for our needs or it is too elementary / advanced?

c. **Authority** – understand who/what the source of that information is. Unless it's a well known author or authority that issued the information, we need to do some research on the releaser:

- Who is the author? What are author's credentials? What are the author's organizational affiliations? Is the author qualified to discuss about the specific domain? What are author's sources, or sponsors? Are the page URLs (Uniform Resource Locator, i.e. paths to web resources) consistent with the topic, resources, authors?

d. **Accuracy** – represents the truthfulness and the correctness of the data. The reliability of the information relies on these two factors. We, then, should understand:

- What level of information is it, primary, secondary, or tertiary?
- How was the information gathered? Is it supported by evidence? Is the evidence first hand or second hand source? Is the information verifiable? Has the information been discussed or debated upon?
- Is the text well written? How are the grammar and spelling? Are there any typos and how many?

e. **Purpose** – what is the intended audience, or why is the information there?

- Is the information objective close to your objectives? Is it there to advertize, inform, open a debate or teach?
- Does the author state his intensions clearly? Does he/she stick to his intentions?
- Does the author show bias in his/her analysis? What type of bias: political, ideological or institutional?

Based on the CRAAP method of evaluating Internet information resources, many school or academic libraries have developed their own evaluation test. One good example is the test published by the Missouri Library Association. In addition of the original CRAAP criteria, the test is *measurable* (see Figure 3).

Ron E. Lewis Library

Thinking Critically about Web Information—Applying the CRAAP Test*

When you search the Web, you're going to find a lot of information...but is it credible and reliable? Use this guide to help you determine this for yourself. Give your Web page a score based on this point system. Is your Web source credible and reliable or is it a bunch of ... ? **SCORE** _____

Checking for C-R-A-A-P!	**POINTS: 0**	**1**	**2**	**3**
Currency or Timeliness How important is it for your topic to have recent information? Science, technology, and health information need to be as recent as possible. If yes, how current is the information?	There is no indication of when the site was created or updated.	The site was created is over 5 years ago with no date given for updating.	The site was created, revised or updated within the last 5 years. If they are citing sources, they are also recent.	The site was created, revised or updated within the last 2 years. If they are citing sources, they are also recent.
Relevance Is this the information you need for your topic? Consider the type of information needed (primary sources or secondary sources) statistics, history or background information.	It mentions my topic briefly but not much else. Or it isn't the type of information I need. Or it isn't enough information.	It provides some information, but it's not enough, or it's not the right type of information.	It provides most of what I need, but I still need more or another type of information.	It is exactly on the subject, is the right amount of information and the right type of information.
Authority. Locate the author or sponsor and Google the name to find out more. What else have they published on the topic? Are there any credentials for the person to establish them as expert? Is it the main organization that provides information about a topic?	There is either no author, or the author is possibly a student or an ordinary person publishing on the Web without expertise. Or the organization is not known. Text errors indicate the author is not an expert.	Author is named but with no credentials. Or the organization is of questionable authority. Web groups can name themselves with names that sound like other credible organizations.	Author is named but the degree of expertise is not that high. Or, the organization, is well-known, and but the degree of expertise on this subject is not clear.	The author's credentials are given and clearly indicate that he/she is an expert. Or the organization is well-known and highly credible on the topic.
Accuracy Are there any sources cited for the information? Are images/photos labeled and credited?	Information is provided with no indication as to where it comes from.	There is a vague reference to the information source. Assumptions must be made as to the source.	There is a general statement about the source of the information but not enough to locate it.	There is a good list of sources that can be located. Images/ photos are labeled and sources given.
Purpose Is the information fact or opinion? Is it stating a point of view, promoting an idea, service or product? If you need opinions, then consider the author's authority, their use of logic and provision of evidence for their opinions.	The purpose of the page is to present a biased point of view, sell or promote an idea, service or product. It is not a factual or balanced point of view. The opinion is either not backed up with facts or the facts are distorted.	The purpose of the page is to sell or promote something, but it also provides some good factual information. Or expressed opinion is somewhat logical and presents some evidence.	The purpose of the page is to educate or to offer mostly factual information. Or expressed opinion is logical presenting enough evidence for the opinion.	The purpose of the page is to provide information of a scholarly, academic or at least high quality. Evidence for opinion is factual, presented as numbers in charts, graphs, tables, or statistics or adequate evidence for the opinion.
Score Total/Meanings:	**0 to 3 points Very questionable source. Don't use.**	**4 to 7 points OK for info, but don't cite it.**	**8 to 11 Good source to use and cite.**	**12 to 15 Excellent source to use and cite.**

*This rubric uses a modified version of the CRAAP Test created by Meriam Library at California State University-Chico.

Figure 2. The CRAAP Test, developed by Ron E. Lewis Library, and available through Missouri Library Association at http://molib.org/conference/2013/presentations/Borgerding-ShowTell-craap-rubric.pdf, retrieved on November 10, 2013.

II.2. DEVELOPING THE C.R.A.A.P. TEST

We have seen by now that the CRAAP criteria help us evaluate Internet information. But the test seems not very comprehensive. If we go back to chapter one of this paper, we see that there is a lot of information that might not be covered by the CRAAP criteria. The test itself does not tell much, but it is a good starting point for us to develop the searching and researching, to expand the evaluation. Through critical thinking, we need to develop or detail the questions, interpret and understand the findings. A proposition of more detailed criterion is presented in the following paragraphs.

A. Initial Evaluation

A.1. **Web page analysis.** From the beginning of our search, the searching engine narrows the results based on multiple criteria, including advertising, key and add words on web pages, author name, subject, keywords or comments attached to documents or images on the web. We need to act critically and filter the searches based on our sense of authenticity and reliability. Then, we may analyze each page at a time.

We need to ask the following questions: What is the web domain of that website? Is it a government site? Or is it educational, organizational, or commercial? Could we identify it by the domain extension? Is the domain consisted with the content? Is the domain extension appropriate for the content?

Usually the official state institutional websites (.gov, .mil) are the most reliable for they work with legal facts and documents. They make a good first-hand source. Educational websites (.edu) are academic sources, but be aware that these websites have both faculty and students issued works. The .org use to be associated with non-profit organizations; this is not the case anymore.

A.2. **Author's Credentials.** One of the most important objectives of the Internet resource evaluation is to establish the responsibilities of that specific information we obtain. We need to figure out who is responsible for creating the information, publish it and sharing it to us; possible to discern what the reason was that the author shares that specific information. We need to make sure that there is no "dog" on the other side of the information, and the author is qualified for what he/she has written.

The following questions need to be answered to: Who is the author? What is the author's educational background and expertise? What are author's other works? Did the author written or publish different other articles, or books, on the same or similar topic? Is the

author's expertise consistent with the domain he is writing? In order to find answers to the questions, we need to search for the author's name, or the organization's name, to see if there is an institution or agency the website belongs to. We are looking for who claims the responsibility for the content. If the authors take on the accountability of what they write, they may want to be credited and consider themselves trustable. We need to look for detailed contact elements, such as telephone/fax numbers, mailing address, E-mail addresses and even online contact forms. If there is no evidence of author, organization or publisher, we may try to truncate back the URL, maybe we may find related work. Another action is to research on the author in Google or Yahoo by using multiple forms of author's name and swap the first, middle and last name while searching. We might search images and pictures related to the author and try to get consistent results; searching for words and images will narrow results; pictures may reveal first hand sources or the relation of the author with other works. For English written information, we might use localized search together with globalized search (in Google, use www.google.com/ncr[151] instead of www.google.com).

In addition to the author research, an additional set of questions may be asked if the information is presented as a book or article: who is the publisher? Is the publisher reputable? Even though a reputable publisher does not guarantee the quality of the text, it may prove the high regard for the author, reliability, trust. Regularly, a university press prints scholarly publications. Also, many well known commercial press companies publish reliable scholarly books.

The publisher's information is usually included in books. If the publisher is not well known, we need to do a fast research on the publisher and see if they issue scholarly books. We may need to do some research in libraries and see whether they own many books published by that publisher and the author.

A.3. **The Currency** is the information's quality to be up to date. Usually, the date of the last page update is stated on the first page of the document, if it's downloadable. For the statistical data, the connection or relation to the original sources (primary sources) should be acknowledged. Usually, the original sources have the same data when the statistical data was collected.

Such questions will reveal how appropriate the information is to our project, from the currency point of view: When was the material published or uploaded on the web? Is the document affected by revision? Which revision is the available document? When was the

[151] *No Country Redirection (ncr)* instruction added to the URL directs Google engine to search in the global, world-wide database. The searching results will not be localized.

web-site last updated? Is the information from a fast-developed domain? If so, is the web-site updated regularly, or it is "dormant"?

For most of the technical topics, such as medicine or science, we need the most recent data. For example, when researching the treatment for cancerous or diabetes, we do not need a report from 70s. For historical data, we need to gather both old information and new information, latest findings. The information is usually included on the copyright page of a book, or on the first page of an article. There is no rule that says where to find the update date on a web-site, so look thoroughly from the top to the bottom of the page. Sometimes, the significance of the release or update date is to tell us whether the author is maintaining the interest in the page, or has neglected it.

If we are researching into books or periodicals, then what is the edition of a book or periodical? Is there an edition record? Has the book been reprinted? How long has the periodical been in print? A later edition may indicate that the book is reliable and has become a standard in the line of work. A reprint may indicate that the subject is current and the interest of the author / book is still high (the book sells well). How big is the periodical's volume number? A 3-digit number shows a well-established resource.

B. Content Evaluation. After we analyzed whether or not the information is worth considering, we need to focus on its utility for our project.

B.1. **Accuracy.** When talking about websites, the accuracy has two components: the information's accuracy and the accuracy of the appearance. To determine the accuracy is usually hard work for most of the information evaluation and validation process, so well established for printed information – books, periodicals, magazines – are nonexistent for the information presented directly on the webpage. Indeed, lately more and more websites, such as Wikipedia.com have started to require copyright or attribution statements.

Is the document cited on other documents or publications? Are there connections, links to other sources? Does the author credit other authors and sources? Are these sources primary or secondary? Is the source mentioned whenever a fact is presented? If there is a bibliography, it shows that the author has done research on the topic and he is familiar with it? In academic research work, the credibility of the writings is certified through footnotes, endnotes or other ways of acknowledgement of credentials.

Even though the presentation accuracy is not a guaranty that the information is valid, most of the time the grammatical and spelling accuracy shows the authors devotion and commitment to communicate the information. On the other hand, a lack of good language and

grammar disqualifies the author. Is shows a deficiency of quality control, it indicates disinterest of both the author and publisher; the provided information cannot be regarded as a trustable data and needs either be discarded or checked with other sources. Are the tables and figures related to the content? Do they support author's idea? They have to be self-explanatory, easy to read.

While online shopping, we often look for reviews: what other say about the goods we intend to buy, what other's opinions are regarding the online store. The same behavior is valid when we search academic information on the web: has the book, article, writing, or website been reviewed before? Most of the time books are reviewed or evaluated in newspaper articles, a journal article, or even on online book stores, such as Amazon.com, Barnandnobles.com. A positive review is usually the indication of a well-written text.

The writing style is another characteristic we need to look into. Is the style comparable to other respectable sources? Are different academic writing styles used? Every discipline develops its own method, style and language. Most of the scholarly journals or articles are required to use recognized, established, professional styles, such as APA, Chicago etc.

B.2. **Purpose.** The information's purpose is defined by the work's domain, field and the complexity of the discussion or argument: is the proposed subject dedicated to a large or narrow public? Is the information provided accordingly to the intended audience?

The language in the document or on the webpage will adjust according to the anticipated audience. Thus, we need to search those websites and documents that fit our needs: general or specialized, shallow or deep research on a specific topic. Usually, magazines use common language and have general audience. If we are looking for raw data, first hand information, magazines may present us statistics, records, pictures. On the other hands, if we need second hand data such as analysis, interpretations, thesis, we need to look for scholastic articles or books.

The **objectivity** of the information show us whether the author is focused on the intended purpose. Is the declared purpose of the paper clearly followed through the writing? Or the author wants to present his own vision, regardless the evidence? Is the author biased? Is the evidence supporting the thesis, the arguments? Does the information seem to be prejudiced? Does the author present just one side of the story? It the author trying to use biased sources to support own biased content? Usually biased information is provided due to the author's intent to get the audience agree with a group's political, behavioral or scientific values. Sometimes biased information may be used to promote the publisher's. When we encounter such information we need to analyze the information very carefully. It is better to

let that information alone than to use it. If it feels that the information is valid and valuable, we need to double-check its authenticity.

CONCLUSION

The Internet nowadays contains much more information we can ever accumulate. Using searching tools, like Google or Yahoo has the advantage to narrow our search. What these tools cannot ensure is that the available information is the rightful one. Because the sources of the information have not legally been forced to provide the right and truthful information, the duty is ours to determine what we sources we use, what information we consider.

In the first chapter, we discussed what specific information we can gather by using the Internet. Besides the books, articles or newspapers we can download from the Internet, there are web pages, blogs or social websites that provide us we unverified information. Even though there are specialized websites that provide credits to their sources, the most of the information on the Internet lack of any tools that will provide us with the credentials or the information sources.

In the second chapter, we took a look on what tools are available and what techniques we may use so that we either filter, select our sources and information on the web, or we confirm the accuracy of the information gathered from the wide web.

We have to always think critically, and if needed use a version of the CRAAP test that fits our needs. We are compelled to adapt and adjust our research and analytical methods as the internet evolves and it is easier for anybody to upload information. We constantly need to keep in mind what we are trying to accomplish in our research and to pick those sources that are relevant to the domain or question we are trying to answer. Nonetheless, we have to critically analyze at every step of the evaluation process.

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