"CAROL I" NATIONAL DEFENSE UNIVERSITY

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CONTEMPORARY CHALLENGES IN PROJECT AND

PROGRAM MANAGEMENT

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CONTEMPORARY CHALLENGES IN PROJECT AND PROGRAM MANAGEMENT

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SUMMARY

X COMPANY'S EAST DIVISION'S IT&C NETWORK PROJECT

MAJ Adrian CROITORU

I. BUSINESS CASE

I.1 Executive Summary

X Company is extending to a new location, some 1000 km from its headquarters in one year.

This division is going to address the southern-east part of Europe.

The proposed number of people working there is about 100 divided into the same subdivisions as headquarters.

A building facility is in its final stage of construction. The constructor is going to provide some IT&C features, agreed five years ago, when the X Company decided to extend there and signed the contract to build an office facility.

I.2 Business Opportunity

Taking into account that the objectives of the company changed meanwhile, and the stage of the construction, the opportunity is to redesign the IT&C installation according to the nowadays and foreseen objectives of X Company and the newest technology on the today's IT&C market. By installing it properly it will give the X Company the opportunity to cut costs from the employees' travelling. Moreover, the new design will meet the standards to be interoperable with the IT&C installations in headquarters and the other divisions.

I.3 Alternatives

1. Leave the constructor to install what was signed five years ago and let the people to work on it as it is. The services do not meet the actual requirements, but the five years ago needs. It is going to be a high demand of travelling to solve the X company business which will cost more the company.

2. Leave the constructor to install what was signed five years ago and then, based on the installation made, turn it into what is needed. Is going to cost more (another design, other civil works); it is more difficult to change an installation while working on it because the employee cannot do their job properly.

3. Stop the constructor to install the agreed telecom installations, amend the contract, and redesign the IT&C installation to meet the actual company needs and the new technology. This is the most cost and time effective alternative.

I.4 Benefits

Only one investment into a functional IT&C system that will save money:

1. Invest the money for the old agreed installation in the new one;
2. Add the new services as video-tele-conference (VTC) and collaborative tools to drastically reduce the need of travelling between the headquarters and this division and give the employers the opportunity and tolls to work efficiently;
3. The IT&C technology is progressing and the need of the available bandwidth increases day by day, so a fibre optical based network is more appropriate for X Company to meet the needs it has and let space to develop new services;
4. Integrate the new division from IT&C point of view with headquarter and other X Company’s divisions.

I.5 Costs

The cost is approximately the same as stated into the initial contract that X Company signed five years ago for the telecommunication installations. Is going to be a minimal increase of costs related to the new services (VTC, collaborative tools), that will save money reducing the need to travel (travel cost, accommodation, per diem) in the first year.

I.6 Financial Analysis

Equipment	Type	Initial plan	Cost	New plan	Cost	
Cabling	Cat 5	1300 m	1.3k	400 m	1.8k	
	FO	-	0	1400 m		
Routing equipment	Router	1	2k	1	2k	
	Switch	3	4.5k	4	10k	
Workstation	Hardware	100	5k	100	5k	
	Software	100	4k	100	5k	
Servers	Hardware	9	100k	4	60k	
	Software	12	12k	16	30k	
Storage	Hardware	-	0	2	20k	
	Software	-	0	2	2k	
Voice equipment	Switchboard	1	4k	-	0	
	Phone	100	1k	-	0	
	VoIP phone	-	0	20	0.4k	
	Soft phone	-	0	80	1.6k	
	Cable	1000m	1k	100m	0.2k	
VTC	Equipment	-	0	4	30k	
Leased line	Data	10 Mbps	2k	100 Mbps	2.5k	
	Voice	2 Mbps	1k	-	0	
Travel		5 a month	25k	1 a 2months	5k	
Maintenance		A year	25k	A year	20k	
TOTAL			187.8k		204.5k	

I.7 Assumptions

1. The contract with the X Company has been signed;
2. The structure of the new division is similar to that of the headquarters;
3. The needs in terms of communication are similar to other divisions that houses around 100 people;
4. There will be no changes in the X Company objectives in the next 1-2 years.

I.8 Sensitivity Analysis

Taking into account that every week the heads of services from each division have to meet their chiefs from headquarters for co-ordination, and there is a monthly meeting of the CEO with the divisions' heads, using the collaborative tools and the VTC provides the means not to travel. This saves time and money by achieving the same result as in a formal, old fashioned meeting in headquarter.

Moreover, using virtualization in the new plan, one set of servers and storage is used as hot reserve, which increases the availability of data in case of a disaster.

II. SCOPE STATEMENT

II.1 Main goal

The IT&C Company is going to provide X Company with a modern IT&C installation in the new built facility to cover the telecommunication related facilities in a secure and interoperable manner.

II.2 Objectives

1. In one year time, my company installs the IT&C installation so that as the division will have all needed services to reach its full working capacity.
2. In 6 months time, all cables will be installed in a structured cabling according to division needs.
3. In 7 months time, all networking equipment is going to be installed and configured.
4. In 8 months time all terminals composing the network will be installed and given the initial configuration.
5. In 10 months time, the server room will be equipped according to the needed services and all servers will be configured and integrated in the network; Final test of the local network.
6. In 11 months time, the division’s network will be connected to that of headquarters; Final test of the network integrated in the X Company network have to take place.
7. The installation and configuration staff will give on site training for the appointed administrators so that as they have to be able to deal with what was installed there.

III. RESOURCES MANAGEMENT

III.1 Resource pool description

The team that works for this project is composed of 16 people

The equipment planned to be installed during the project is presented in the next table:

Equipment	**Type**	**Quantity**
Cabling	Cat 5	400 m
	FO	1400 m
Routing equipment	Router	1 u.
	Switch	4 u.
Workstation	Hardware	100 u.
	Software	100 u.
Servers	Hardware	4 u.
	Software	16 u.
Storage	Hardware	2 u.
	Software	2 u.
Voice	VoIP phone	20 u.
	Soft phone	80 u.
VTC	Equipment	4 u.
Leased line	Data	100 Mbps

A more detailed view is presented in Appendix 1: **Resources**

III.2 WBS

The WBS consist of 13 activities, starting with the assembling the team, then defining the needs, acquisition of the equipment and materials, installation of cables and equipment, configuration of all equipment, testing the network locally and to the headquarters, training for the administrative staff ,and finally, the handover of the entire network to the X Company.
A more detailed view is presented in Appendix 2: **WBS**

IV. TIME MANAGEMENT PLAN

The X Company's east division's IT&C network project will span on 201 days. Detailed activities' duration is presented in the Appendix 3: **Gantt chart**.

V. COST MANAGEMENT PLAN

Total cost of the project is: 321.692,61 Euro.

Total cost of equipment and material that will be used for the project is 204.500 Euro.

The cost estimate methods used for this project are: **order of magnitude** (the IT&C Company is dealing with such projects) and **budget estimate** (defined during the cost management process)

A more detailed view is presented in Appendix 4: **Budget report**.

VI. QUALITY MANAGEMENT PLAN

1. Briefing about the signed contract. (**Activity 1**). Responsible: **General Manager**, legal advisor.
2. All team members are gathered. (**Activity 2**). Responsible: General Manager, **project manager.**
    a. Identify the team members according to the project needs;
    b. All members are given a specific role.
3. Have identified the IT&C needs of the division in a **Site survey report**. (**Activity 3**) Responsible: Project manager, Project engineer.
    a. Identification of the connection method in place at headquarters;
    b. Identification of the type of the used equipment;
    c. Identification of the type of software the headquarters uses;
    d. Identification of the server room;
    e. Identification of the rooms allocated to each subdivision;
    f. Identification of the needs of the equipment/materials for each room.
4. The **project manager** and the **project engineer** designs a **Proposal plan** to be submitted for formal approval to the headquarters IT&C board (**Activity 4**).
    a. Design of a diagram based of the site surveys that have to consist of:
        i. Division’s plan;
        ii. The path of the cable to be run;
        iii. The equipment’s position;
        iv. The power supply’s position.
5. **The list of type, quantity and estimated cost of the equipment/materials** to be purchased. (**Activity 5**) Responsible; Project engineer and project manager.
    a. Write down a list of equipment to be installed to meet the requirements in the approved plan;
    b. Count how much cable and how many servers, workstations, routers, switches are needed to install according to approved plan;
    c. Determine the type of equipment to be installed in order to meet the requirements in the approved plan:
        i. Technical characteristics;
        ii. Features.
    d. Write down a list that consists of type, number and foreseen cost for the needed materials/equipment.

6. Purchasing all **equipment/materials** needed. (**Activity 6**); **Head acquisition and project engineer.**
    a. Write down the technical specification that each type of equipment/material have to meet;
    b. Hold the biding;
    c. Select the provider that meet the requirements from specification in a most cost-effective manner;
    d. Receive the equipment/materials from the selected provider;
    e. Pay the agreed amount of money for the delivered equipment/materials.
7. Have **installed all the cable conduit, cables, sockets and patch panels** according to the approved diagram. (**Activity 7**); Responsible: Project engineer, **installation team leader.**
    a. Drill the walls according to the network diagram;
    b. All cable conduit should be installed according to the plan;
    c. All cables have to be installed inside the cable conduit;
    d. All the needed sockets are installed for each room;
    e. All patch panels are installed according to the approved plan;
    f. The connectivity between sockets and patch panels has to be insured, the attenuation should be less than 0.1 dB on fibre optical and 0.2 dB on CAT 5 cable.
8. Have **installed and configured all the networking equipment** in order to permit connectivity among terminals and to the server room. (**Activity 8**), Responsible: Project engineer, **configuration team leader.**
    a. Install all routing equipment in the designed places;
    b. Configure the routing equipment to meet the requirements in the approved plan;
    c. All the routing equipment has to be connected. The ping should be less than 20ms.
9. Have **installed and configured all the terminals** in order to have connectivity among terminals and to the server room. (**Activity 9**); Responsible: Project engineer, Installation and configuration team leaders.
    a. The terminal equipment has to be installed in each room according to the approved plan;
    b. Each equipment must have installed the operating system as a basic configuration;
    c. All terminal equipment has to be reached from the networking equipment. Ping answers: less than 25ms.
10. Have **installed and configured all the servers** in order to insure all designed services for the division’s network. (**Activity 10**); Project engineer, Installation and configuration team leaders.

a. The 3 racks are to be installed in the server room:
    i. One for the interconnection equipment;
    ii. One for the operational equipment;
    iii. One for the back-up solution;
b. The servers and storages are to be installed and connected so that as to meet the approved plan:
    i. Two servers and storage are to be installed in the operational rack;
    ii. The other set of two servers and a storage are to be installed in a the back-up rack;
c. Configuration of the installed equipment:
    i. Install the virtualization software;
    ii. Install the operating system on servers;
    iii. Install the operating system on storages;
    iv. Install the applications as needed.
d. The installed and configured servers are to be connected to the server switch;
e. Check the installed services from each terminal; the available services have to be accessed from each terminal.

11. Have the **IT&C connectivity** between the division and headquarters. (**Activity 11**); Responsible: Project engineer, Installation and configuration team leaders.
    a. Receive and check the leased line:
        i. the speed have to be 100Mbps;
        ii. BER < 10E -8.
    b. Configure the installed routing equipment in order to insure the connection to the headquarters;
    c. Connect the leased line to the routing equipment;
    d. Test results:
        i. The ping answers have to be less than 50ms;
        ii. The speed has to be 100Mbps.
12. Every **service has to work reliable and without delay** inside the local network and over the WAN. (**Activity 12**); Project manager, project engineer, head of configuration team.
    a. The average response for a ping in the connectivity test:
        i. Inside local network < 20ms;
        ii. To the headquarters' network<50ms.
    b. Check the services from division's servers to headquarters';
        i. The e-mail server communicates with the headquarters' server;

ii. Global Address list is propagated among the e-mail servers.

c. Check the services between the division's terminals and headquarters' terminals;
   i. From every workstation have to be possible to work collaboratively on Microsoft Office software package.
d. The VTC system have to work without any discrepancy between the image and sound;
   i. No frizzing on the image;
   ii. The sound have to be loud and clear;
e. The VoIP system have to work properly:
   i. The sound have to be loud and clear;
   ii. No drops of signal have to occur in a 10 minutes long conversation;
f. The onsite course have to be comprehensible so that as:
   i. The administrators have to be able to reinstall al equipment and applications installed in the division;
   ii. The administrators have all data to work with the telecom provider in order to fix the connectivity to the headquarters.

13. The **handover of the network** have to meet the agreed contract. (**Activity 13**); Responsible; Project manager.
    a. The handover documents are prepared by the project manager and the project engineer;
    b. The handover documents are signed by the project manager, the director of the division and one representative of the headquarters.

VII. COMMUNICATIONS MANAGEMENT PLAN

No	Stakeholders	Type	When (Phase)	Expectation/concerns	Type of message	Periodicity
1	**The X Company owners**	D	P	C(h), Q(m), s(m)	Report	After each milestone
2	**The X Company management**	D	P	C(h), Q (h), S(h)	Report, Presentation	After each activity
		I	P,E,C			
3	**Director of the south-east division**	D	P,E,C	C(m), Q(h), S(h)	Report Presentation	After each sub activity
		I	P,C			
4	**X Company south-east division's employees**	N	O	C(l), Q(m), S(m)	e-mail	Once a month
5	**X Company costumers**	N	O	S(l)	Advertisement	Once a week after the terminals were installed
6	**General manager**	D	P	C(h), Q (h), S(h)	Report Presentation	weekly
		I	A			
7	**Project manager**	D	A	C(h), Q (h), S(h)	Report, Presentation, e-mail Telephone	Daily
		I	P,E,C			
		P	A			
8	**Project engineer**	D	E,C,CL	C(m), Q (h), S(h)	Report, Presentation, E-mail, Telephone	Daily
		I	P,E,C			
		P	A			
		E	E			
9	**Team leaders**	D	E	C(l), Q (h), S(h)	e-mail Telephone Presentation	Twice a day
		E	E			
		P	E			
10	Workers	P	E	C(l), Q (m), S(m)	Presentation	Twice a day

LEGEND:

No	Type	Phase	Expectation/concerns	Rating
1	P= performer	P= planning	C= cost	h= high
2	I= influencer	E=execution	Q= quality	m= medium
3	D= decision maker	C=controlling	S= schedule	l= low
4	E= expert	CL=closing		
5	N= nonessential	O=operating		
6		A=all		

VIII. RISK MANAGEMENT PLAN

VIII.1 Risk identification methodology

Documentation reviews, assumptions analysis, and brainstorming.

VIII.2 Risks:

1. Delay in having in time the necessary equipment and materials;

The acquisition manager is going to take this risk in order not to delay the beginning of the installation.

2. Risk of employees injuries;

All employees are insured by an insurance company.

3. Technology match the project;

The project engineer designs the network in accordance with what the X Company needs and to be interoperable with the headquarters network.

4. Maturity of technology;

The project manager and the project engineer design the new network based on a mature technology to avoid the unstable products being part in the network.

5. Technology experience of project team;

The team working for the project has the knowledge and all necesary skills to deal with the technology for the new network

6. Disaster recovery;

In the planning phase, the project manager and the project engineer plan to install one set of equipment as hot reserve to increase the availability of data in case of equipment failure. Moreover, the training at the final of installation will give the administrators all needed skills to deal with all installed equipment in all imagined conditions.

Appendix 1

Resources

Division East's IT&C network

ID	Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
1	Project Manager	Work		P		100%	5,000.00 Eur/mon	50.00 Eur/hr	0.00 Eur	Prorated	Standard
2	Project Engineer	Work		P		100%	4,000.00 Eur/mon	40.00 Eur/hr	0.00 Eur	Prorated	Standard
3	Acquisition manager	Work		A		100%	4,000.00 Eur/mon	40.00 Eur/hr	0.00 Eur	Prorated	Standard
4	Acquisition expert	Work		A		100%	3,000.00 Eur/mon	30.00 Eur/hr	0.00 Eur	Prorated	Standard
5	Acquisition specialist	Work		A		100%	2,000.00 Eur/mon	20.00 Eur/hr	0.00 Eur	Prorated	Standard
6	Head Installation Team	Work		H		100%	3,000.00 Eur/mon	30.00 Eur/hr	0.00 Eur	Prorated	Standard
7	Installation member 1	Work		I		100%	2,000.00 Eur/mon	20.00 Eur/hr	0.00 Eur	Prorated	Standard
8	Installation member 2	Work		I		100%	2,000.00 Eur/mon	20.00 Eur/hr	0.00 Eur	Prorated	Standard
9	Installation member 3	Work		I		100%	2,000.00 Eur/mon	20.00 Eur/hr	0.00 Eur	Prorated	Standard
10	Installation member 4	Work		I		100%	2,000.00 Eur/mon	20.00 Eur/hr	0.00 Eur	Prorated	Standard
11	Head Configuration Team	Work		H		100%	3,300.00 Eur/mon	30.00 Eur/hr	0.00 Eur	Prorated	Standard
12	Configuration member 1	Work		C		100%	2,800.00 Eur/mon	25.00 Eur/hr	0.00 Eur	Prorated	Standard
13	Configuration member 2	Work		C		100%	2,800.00 Eur/mon	25.00 Eur/hr	0.00 Eur	Prorated	Standard
14	Configuration member 3	Work		C		100%	2,800.00 Eur/mon	25.00 Eur/hr	0.00 Eur	Prorated	Standard
15	Configuration member 4	Work		C		100%	2,800.00 Eur/mon	25.00 Eur/hr	0.00 Eur	Prorated	Standard
16	Account manager	Work		A		100%	0.00 Eur/hr	0.00 Eur/hr	204,500.00 Eur	Start	Standard

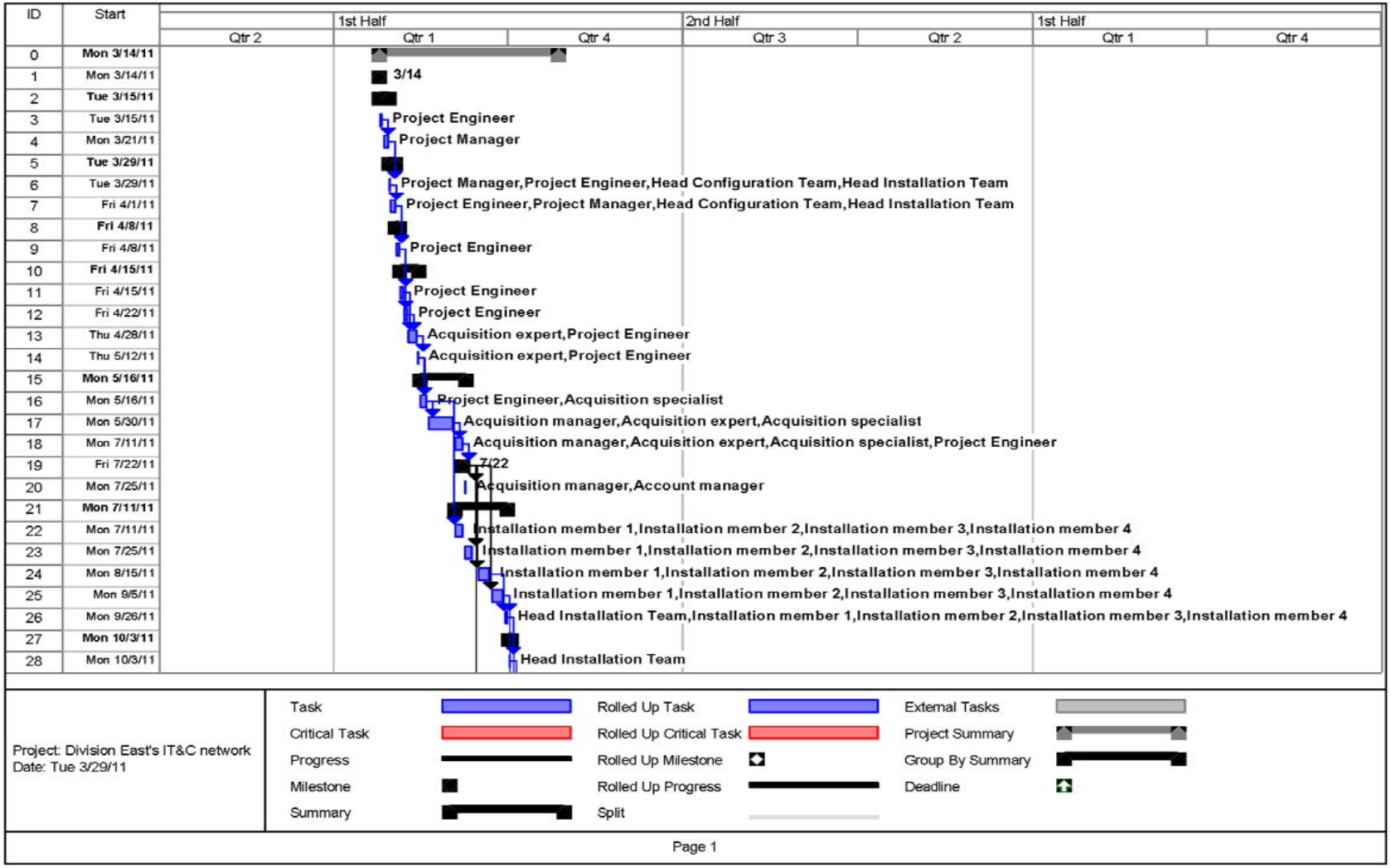
Appendix 2

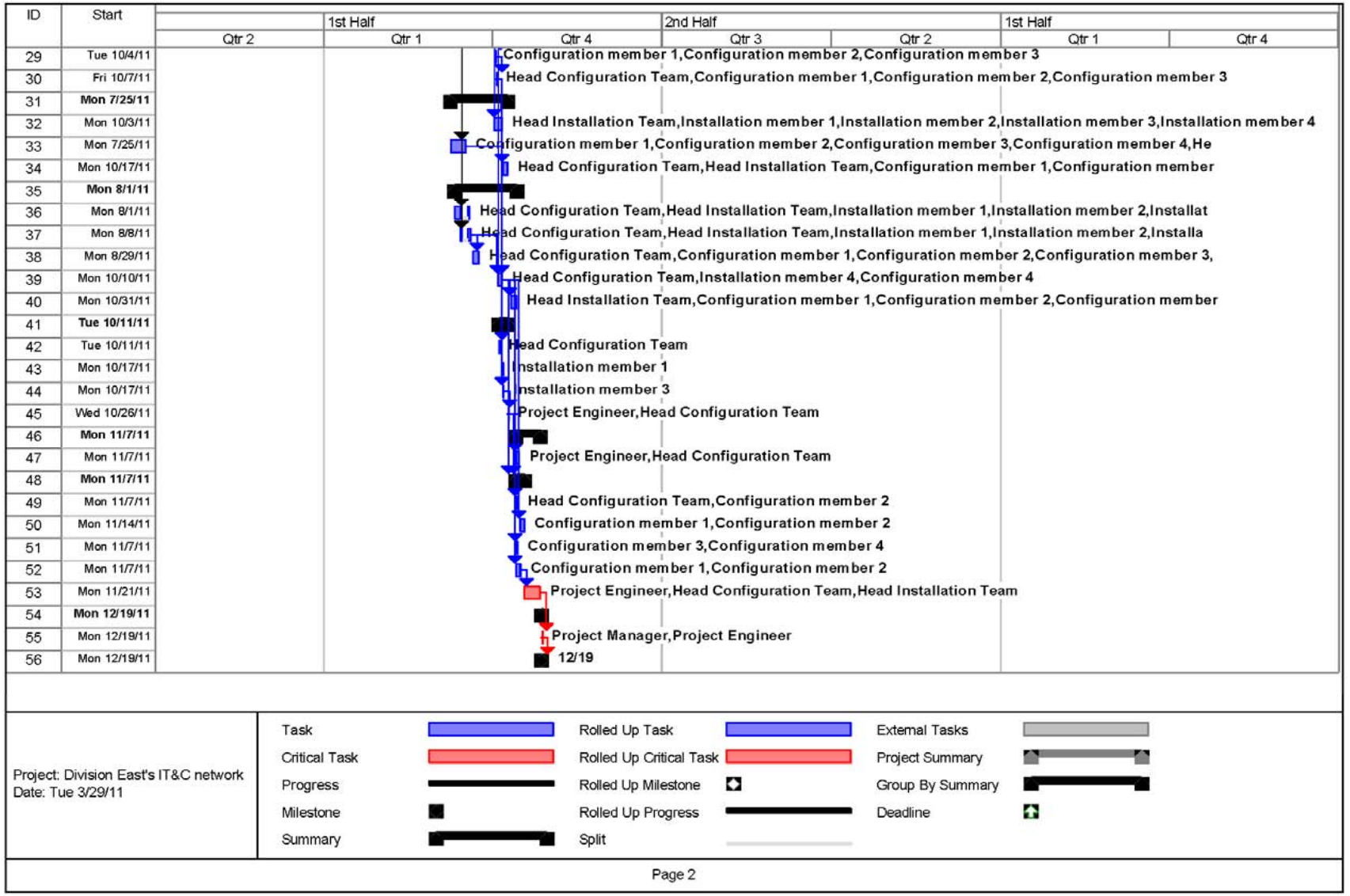
WBS

ID	Task Name	Duration	Start	Finish	Predecessor	Resource Names
0	Division East's IT&C network	201 days	Mon 3/14/11	Mon 12/19/11		
1	1 Getting knowledge of the signed contract	0 days	Mon 3/14/11	Mon 3/14/11		Project Manager
2	2 Assembling the team	10 days	Tue 3/15/11	Mon 3/28/11		
3	2.1 Identify the members	4 days	Tue 3/15/11	Fri 3/18/11		Project Engineer
4	2.2 Appoint the identified members to the team	6 days	Mon 3/21/11	Mon 3/28/11	3	Project Manager
5	3 Defining the division needs	8 days	Tue 3/29/11	Thu 4/7/11		
6	3.1 Site survey at headquarter	3 days	Tue 3/29/11	Thu 3/31/11	4	Project Manager,Project Engineer,Head Configuration Team,Head Installation Team
7	3.2 Site survey at the facility of the division	5 days	Fri 4/1/11	Thu 4/7/11	6	Project Engineer,Project Manager,Head Configuration Team,Head Installation Team
8	4 Design of the network plan	5 days	Fri 4/8/11	Thu 4/14/11		
9	4.1 Draw the network plan	5 days	Fri 4/8/11	Thu 4/14/11	7	Project Engineer
10	5 Determine the type and the quantity of the material to be purchased	21 days	Fri 4/15/11	Fri 5/13/11		
11	5.1 Determine the type of the equipment from the plan	5 days	Fri 4/15/11	Thu 4/21/11	9	Project Engineer
12	5.2 Determine the quantity of the equipment	4 days	Fri 4/22/11	Wed 4/27/11	9	Project Engineer
13	5.3 Market research	10 days	Thu 4/28/11	Wed 5/11/11	12, 11	Acquisition expert,Project Engineer
14	5.4 Develop a list of the material to be purchased with an estimated cost	2 days	Thu 5/12/11	Fri 5/13/11	13	Acquisition expert,Project Engineer
15	6 Acquisition of material according to the designed plan	53 days	Mon 5/16/11	Wed 7/27/11		
16	6.1 Develop the specifications	10 days	Mon 5/16/11	Fri 5/27/11	14	Project Engineer,Acquisitions specialist
17	6.2 Biding	30 days	Mon 5/30/11	Fri 7/8/11	16	Acquisition manager,Acquisition expert,Acquisitions specialist
18	6.3 Providers' selection	10 days	Mon 7/11/11	Fri 7/22/11	17	Acquisition manager,Acquisition expert,Acquisition specialist,Project Engineer
19	6.4 Materials' reception completed	0 days	Fri 7/22/11	Fri 7/22/11	18	Project Engineer,Acquisition manager
20	6.5 Paying the purchased material	3 days	Mon 7/25/11	Wed 7/27/11	19	Acquisition manager,Account manager
21	7 Cabling installation	60 days	Mon 7/11/11	Fri 9/30/11		
22	7.1 Drilling the walls	10 days	Mon 7/11/11	Fri 7/22/11	16	Installation member 1,Installation member 2,Installation member 3,Installation member 4
23	7.2 Installing the cable conduit	10 days	Mon 7/25/11	Fri 8/5/11	19	Installation member 1,Installation member 2,Installation member 3,Installation member 4
24	7.3 Installing the cables	15 days	Mon 8/15/11	Fri 9/2/11	19	Installation member 1,Installation member 2,Installation member 3,Installation member 4
25	7.4 installing the sockets and patch panels	15 days	Mon 9/5/11	Fri 9/23/11	19	Installation member 1,Installation member 2,Installation member 3,Installation member 4
26	7.5 Test of the installed cabling	5 days	Mon 9/26/11	Fri 9/30/11	24,25	Head Installation Team,Installation member 1,Installation member 2,Installation member 3,Installation member 4
27	8 Install networking equipment	5 days	Mon 10/3/11	Fri 10/7/11		
28	8.1 Physical installation of the networking equipment	1 day	Mon 10/3/11	Mon 10/3/11	26	Head Installation Team
29	8.2 Configuration of the networking equipment	3 days	Tue 10/4/11	Thu 10/6/11	28	Configuration member 1,Configuration member 2,Configuration member 3
30	8.3 Test the networking equipment installed in the network	1 day	Fri 10/7/11	Fri 10/7/11	29	Head Configuration Team,Configuration member 1,Configuration member 2,Configuration member 3
31	9 Install terminals	67 days	Mon 7/25/11	Tue 10/25/11		
32	9.1 Physical installation of terminals	11 days	Mon 10/3/11	Mon 10/17/11	25	Head Installation Team,Installation member 1,Installation member 2,Installation member 3,Installation member 4
33	9.2 Initial configuration of terminals (installing the operating system)	20 days	Mon 7/25/11	Fri 8/19/11	19	Configuration member 1,Configuration member 2,Configuration member 3,Configuration member 4,Head Configuration Team
34	9.3 Test of terminal connectivity to the networking equipment	7 days	Mon 10/17/11	Tue 10/25/11	33,30	Head Configuration Team,Head Installation Team,Configuration member 1,Configuration member 2,Configuration member 3,Configuration member 4,Installation member 2,Installation member 3,Installation me
35	10 Install server room, configuration all servers and the connection of server room to the local network	72 days	Mon 8/1/11	Tue 11/8/11		
36	10.1 Physical installation of the racks , and power supply for the server room	9 days	Mon 8/1/11	Wed 8/24/11	19	Head Configuration Team,Head Installation Team,Installation member 1,Installation member 2,Installation member 3,Installation member 4
37	10.2 Physical installation of the servers and the storage devices	8 days	Mon 8/8/11	Fri 8/26/11	19	Head Configuration Team,Head Installation Team,Installation member 1,Installation member 2,Installation member 3,Installation member 4,Configuration member 1,Configuration member 2
38	10.3 Configuration of servers and storages	10 days	Mon 8/29/11	Fri 9/9/11	37	Head Configuration Team,Configuration member 1,Configuration member 2,Configuration member 3,Configuration member 4
39	10.4 The interconnection of the server room with the local network	2 days	Mon 10/10/11	Mon 10/17/11	37,30,28	Head Configuration Team,Installation member 4,Configuration member 4
40	10.5 Test the local network in terms of services	7 days	Mon 10/31/11	Tue 11/8/11	39	Head Installation Team,Configuration member 1,Configuration member 2,Configuration member 3,Configuration member 4
41	11 Connection of the local network to headquarters' network	12 days	Tue 10/11/11	Wed 10/26/11		
42	11.1 Leased line reception	1 day	Tue 10/11/11	Tue 10/11/11	30	Head Configuration Team
43	11.2 Installation of the equipment	1 day	Mon 10/17/11	Mon 10/17/11		Installation member 1
44	11.3 Interconnection	2 days	Mon 10/17/11	Tue 10/18/11	30	Installation member 3
45	11.4 Test the connection	1 day	Wed 10/26/11	Wed 10/26/11	44	Project Engineer,Head Configuration Team
46	12 Final test the network	30 days	Mon 11/7/11	Fri 12/16/11		
47	12.1 Test the connectivity	5 days	Mon 11/7/11	Mon 11/14/11	45,39	Project Engineer,Head Configuration Team
48	12.2 Test the core services	11 days	Mon 11/7/11	Mon 11/21/11	45,39	
49	12.2.1 Test the e-mail	4 days	Mon 11/7/11	Thu 11/10/11	45,39	Head Configuration Team,Configuration member 2
50	12.2.2 Test the collaborative tools	6 days	Mon 11/14/11	Mon 11/21/11	45,39	Configuration member 1,Configuration member 2
51	12.3 Test the VTC services	4 days	Mon 11/7/11	Fri 11/11/11	45,39	Configuration member 3,Configuration member 4
52	12.4 Test the VoIP	6 days	Mon 11/7/11	Tue 11/15/11	45,39	Configuration member 1,Configuration member 2
53	12.5 On site training	20 days	Mon 11/21/11	Fri 12/16/11	52	Project Engineer,Head Configuration Team,Head Installation Team
54	13 Handover the system	1 day	Mon 12/19/11	Mon 12/19/11		
55	13.1 Prepare the handover documents	1 day	Mon 12/19/11	Mon 12/19/11	53	Project Manager,Project Engineer
56	13.2 Sign the handover documents	0 days	Mon 12/19/11	Mon 12/19/11	55	Project Manager

Appendix 3

Gantt chart




ID
Start
Qtr 2
1st Half
Qtr 1
Qtr 4
2nd Half
Qtr 3
Qtr 2
1st Half
Qtr 1
Qtr 4
29 Tue 10/4/11
30 Fri 10/7/11
31 Mon 7/25/11
32 Mon 10/3/11
33 Mon 7/25/11
34 Mon 10/17/11
35 Mon 8/1/11
36 Mon 8/1/11
37 Mon 8/8/11
38 Mon 8/29/11
39 Mon 10/10/11
40 Mon 10/31/11
41 Tue 10/11/11
42 Tue 10/11/11
43 Mon 10/17/11
44 Mon 10/17/11
45 Wed 10/26/11
46 Mon 11/7/11
47 Mon 11/7/11
48 Mon 11/7/11
49 Mon 11/7/11
50 Mon 11/14/11
51 Mon 11/7/11
52 Mon 11/7/11
53 Mon 11/21/11
54 Mon 12/19/11
55 Mon 12/19/11
56 Mon 12/19/11
Configuration member 1,Configuration member 2,Configuration member 3
Head Configuration Team,Configuration member 1,Configuration member 2,Configuration member 3
Head Installation Team,Installation member 1,Installation member 2,Installation member 3,Installation member 4
Configuration member 1,Configuration member 2,Configuration member 3,Configuration member 4,He
Head Configuration Team,Head Installation Team,Configuration member 1,Configuration member
Head Configuration Team,Head Installation Team,Installation member 1,Installation member 2,Installat
Head Configuration Team,Head Installation Team,Installation member 1,Installation member 2,Installa
Head Configuration Team,Configuration member 1,Configuration member 2,Configuration member 3,
Head Configuration Team,Installation member 4,Configuration member 4
Head Installation Team,Configuration member 1,Configuration member 2,Configuration member
Head Configuration Team
Installation member 1
Installation member 3
Project Engineer,Head Configuration Team
Project Engineer,Head Configuration Team
Head Configuration Team,Configuration member 2
Configuration member 1,Configuration member 2
Configuration member 3,Configuration member 4
Configuration member 1,Configuration member 2
Project Engineer,Head Configuration Team,Head Installation Team
Project Manager,Project Engineer
12/19
Project: Division East's IT&C network
Date: Tue 3/29/11
Task
Critical Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Critical Task
Rolled Up Milestone
Rolled Up Progress
Split
External Tasks
Project Summary
Group By Summary
Deadline

Appendix 4

Budget report

Budget Report as of Tue 3/29/11
Division East's IT&C network

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
0	**Division East's IT&C network**	**0.00 Eur**	**Prorated**	**321,692.61 Eur**	**0.00 Eur**	**321,692.61 Eur**	**0.00 Eur**	**321,692.61 Eur**
15	**Acquisition of material according to tl**	**0.00 Eur**	**Prorated**	**228,100.00 Eur**	**0.00 Eur**	**228,100.00 Eur**	**0.00 Eur**	**228,100.00 Eur**
20	Paying the purchased material	0.00 Eur	Prorated	205,100.00 Eur	0.00 Eur	205,100.00 Eur	0.00 Eur	205,100.00 Eur
31	**Instal terminals**	**0.00 Eur**	**Prorated**	**25,625.00 Eur**	**0.00 Eur**	**25,625.00 Eur**	**0.00 Eur**	**25,625.00 Eur**
21	**Cabling installation**	**0.00 Eur**	**Prorated**	**22,750.00 Eur**	**0.00 Eur**	**22,750.00 Eur**	**0.00 Eur**	**22,750.00 Eur**
46	**Final test the network**	**0.00 Eur**	**Prorated**	**14,865.40 Eur**	**0.00 Eur**	**14,865.40 Eur**	**0.00 Eur**	**14,865.40 Eur**
33	Initial configuration of terminals (installing	0.00 Eur	Prorated	14,500.00 Eur	0.00 Eur	14,500.00 Eur	0.00 Eur	14,500.00 Eur
17	Biding	0.00 Eur	Prorated	13,500.00 Eur	0.00 Eur	13,500.00 Eur	0.00 Eur	13,500.00 Eur
35	**Instal server room, configuration all s**	**0.00 Eur**	**Prorated**	**11,698.46 Eur**	**0.00 Eur**	**11,698.46 Eur**	**0.00 Eur**	**11,698.46 Eur**
53	On site training	0.00 Eur	Prorated	9,970.00 Eur	0.00 Eur	9,970.00 Eur	0.00 Eur	9,970.00 Eur
18	Providers' selection	0.00 Eur	Prorated	6,500.00 Eur	0.00 Eur	6,500.00 Eur	0.00 Eur	6,500.00 Eur
5	**Defining the division needs**	**0.00 Eur**	**Prorated**	**6,120.00 Eur**	**0.00 Eur**	**6,120.00 Eur**	**0.00 Eur**	**6,120.00 Eur**
10	**Determine the type and the quantity of**	**0.00 Eur**	**Prorated**	**6,000.00 Eur**	**0.00 Eur**	**6,000.00 Eur**	**0.00 Eur**	**6,000.00 Eur**
24	Installing the cables	0.00 Eur	Prorated	6,000.00 Eur	0.00 Eur	6,000.00 Eur	0.00 Eur	6,000.00 Eur
25	installing the sockets and patch panels	0.00 Eur	Prorated	6,000.00 Eur	0.00 Eur	6,000.00 Eur	0.00 Eur	6,000.00 Eur
34	Test of terminal connectivity to the netwo	0.00 Eur	Prorated	5,625.00 Eur	0.00 Eur	5,625.00 Eur	0.00 Eur	5,625.00 Eur
32	Physical installation of terminals	0.00 Eur	Prorated	5,500.00 Eur	0.00 Eur	5,500.00 Eur	0.00 Eur	5,500.00 Eur
40	Test the local network in terms of service	0.00 Eur	Prorated	4,388.46 Eur	0.00 Eur	4,388.46 Eur	0.00 Eur	4,388.46 Eur
22	Drilling the walls	0.00 Eur	Prorated	4,000.00 Eur	0.00 Eur	4,000.00 Eur	0.00 Eur	4,000.00 Eur
23	Installing the cable conduit	0.00 Eur	Prorated	4,000.00 Eur	0.00 Eur	4,000.00 Eur	0.00 Eur	4,000.00 Eur
7	Site survey at the facility of the division	0.00 Eur	Prorated	3,825.00 Eur	0.00 Eur	3,825.00 Eur	0.00 Eur	3,825.00 Eur
13	Market research	0.00 Eur	Prorated	3,500.00 Eur	0.00 Eur	3,500.00 Eur	0.00 Eur	3,500.00 Eur
16	Develop the specifications	0.00 Eur	Prorated	3,000.00 Eur	0.00 Eur	3,000.00 Eur	0.00 Eur	3,000.00 Eur
38	Configuration of servers and storages	0.00 Eur	Prorated	2,770.00 Eur	0.00 Eur	2,770.00 Eur	0.00 Eur	2,770.00 Eur

Budget Report as of Tue 3/29/11
Division East's IT&C network

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
26	Test of the installed cabling	0.00 Eur	Prorated	2,750.00 Eur	0.00 Eur	2,750.00 Eur	0.00 Eur	2,750.00 Eur
2	**Assembling the team**	**0.00 Eur**	**Prorated**	**2,300.00 Eur**	**0.00 Eur**	**2,300.00 Eur**	**0.00 Eur**	**2,300.00 Eur**
6	Site survey at headquarter	0.00 Eur	Prorated	2,295.00 Eur	0.00 Eur	2,295.00 Eur	0.00 Eur	2,295.00 Eur
36	Physical installation of the racks, and pov	0.00 Eur	Prorated	2,145.00 Eur	0.00 Eur	2,145.00 Eur	0.00 Eur	2,145.00 Eur
48	**Test the core services**	**0.00 Eur**	**Prorated**	**2,040.40 Eur**	**0.00 Eur**	**2,040.40 Eur**	**0.00 Eur**	**2,040.40 Eur**
27	**Instal networking equipment**	**0.00 Eur**	**Prorated**	**1,995.00 Eur**	**0.00 Eur**	**1,995.00 Eur**	**0.00 Eur**	**1,995.00 Eur**
37	Physical installation of the servers and th	0.00 Eur	Prorated	1,990.00 Eur	0.00 Eur	1,990.00 Eur	0.00 Eur	1,990.00 Eur
4	Appoint the identified members to the tea	0.00 Eur	Prorated	1,500.00 Eur	0.00 Eur	1,500.00 Eur	0.00 Eur	1,500.00 Eur
29	Configuration of the networking equipmen	0.00 Eur	Prorated	1,260.00 Eur	0.00 Eur	1,260.00 Eur	0.00 Eur	1,260.00 Eur
50	Test the collaborative tools	0.00 Eur	Prorated	1,120.00 Eur	0.00 Eur	1,120.00 Eur	0.00 Eur	1,120.00 Eur
51	Test the VTC services	0.00 Eur	Prorated	1,120.00 Eur	0.00 Eur	1,120.00 Eur	0.00 Eur	1,120.00 Eur
8	**Design of the network plan**	**0.00 Eur**	**Prorated**	**1,000.00 Eur**	**0.00 Eur**	**1,000.00 Eur**	**0.00 Eur**	**1,000.00 Eur**
9	Draw the network plan	0.00 Eur	Prorated	1,000.00 Eur	0.00 Eur	1,000.00 Eur	0.00 Eur	1,000.00 Eur
11	Determine the type of the equipment fror	0.00 Eur	Prorated	1,000.00 Eur	0.00 Eur	1,000.00 Eur	0.00 Eur	1,000.00 Eur
49	Test the e-mail	0.00 Eur	Prorated	920.40 Eur	0.00 Eur	920.40 Eur	0.00 Eur	920.40 Eur
47	Test the connectivity	0.00 Eur	Prorated	895.00 Eur	0.00 Eur	895.00 Eur	0.00 Eur	895.00 Eur
52	Test the VoIP	0.00 Eur	Prorated	840.00 Eur	0.00 Eur	840.00 Eur	0.00 Eur	840.00 Eur
3	Identify the members	0.00 Eur	Prorated	800.00 Eur	0.00 Eur	800.00 Eur	0.00 Eur	800.00 Eur
12	Determine the quantity of the equipment	0.00 Eur	Prorated	800.00 Eur	0.00 Eur	800.00 Eur	0.00 Eur	800.00 Eur
41	**Connection of the local network to he**	**0.00 Eur**	**Prorated**	**788.75 Eur**	**0.00 Eur**	**788.75 Eur**	**0.00 Eur**	**788.75 Eur**
14	Develop a list of the material to be purch	0.00 Eur	Prorated	700.00 Eur	0.00 Eur	700.00 Eur	0.00 Eur	700.00 Eur
30	Test the networking equipment installed ir	0.00 Eur	Prorated	585.00 Eur	0.00 Eur	585.00 Eur	0.00 Eur	585.00 Eur
54	**Handover the system**	**0.00 Eur**	**Prorated**	**450.00 Eur**	**0.00 Eur**	**450.00 Eur**	**0.00 Eur**	**450.00 Eur**
55	Prepare the handover documents	0.00 Eur	Prorated	450.00 Eur	0.00 Eur	450.00 Eur	0.00 Eur	450.00 Eur

Budget Report as of Tue 3/29/11
Division East's IT&C network

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
39	The interconnection of the server room wi	0.00 Eur	Prorated	405.00 Eur	0.00 Eur	405.00 Eur	0.00 Eur	405.00 Eur
45	Test the connection	0.00 Eur	Prorated	323.75 Eur	0.00 Eur	323.75 Eur	0.00 Eur	323.75 Eur
44	Interconnection	0.00 Eur	Prorated	200.00 Eur	0.00 Eur	200.00 Eur	0.00 Eur	200.00 Eur
42	Leased line reception	0.00 Eur	Prorated	165.00 Eur	0.00 Eur	165.00 Eur	0.00 Eur	165.00 Eur
28	Physical installation of the networking equ	0.00 Eur	Prorated	150.00 Eur	0.00 Eur	150.00 Eur	0.00 Eur	150.00 Eur
43	Installation of the equipment	0.00 Eur	Prorated	100.00 Eur	0.00 Eur	100.00 Eur	0.00 Eur	100.00 Eur
1	Getting knowledge of the signed contract	0.00 Eur	Prorated	0.00 Eur	0.00 Eur	0.00 Eur	0.00 Eur	0.00 Eur
19	Materials' reception completed	0.00 Eur	Prorated	0.00 Eur	0.00 Eur	0.00 Eur	0.00 Eur	0.00 Eur
56	Sign the handover documents	0.00 Eur	Prorated	0.00 Eur	0.00 Eur	0.00 Eur	0.00 Eur	0.00 Eur
		0.00 Eur		**321,692.61 Eur**	**0.00 Eur**	**321,692.61 Eur**	**0.00 Eur**	**321,692.61 Eur**

Development and implementation of a communication system for an operational command in order to support execution of command and control act

Lieutenant commander Neculai GRIGORE

1. Project title

Development and implementation of a communication system for an operational command in order to support execution of command and control act

2. Project sponsor:

NATO Infrastructure Committee and Ministry of National Defense

3. Business case

Considering the challenges of the modern command and control act execution it is necessary to improve de communication capabilities of an operational command that have to implement new protocols and standards for voice, data, and video services.

The existing communication system of operational command is not capable to route and control automatically the information requested by the forces during the missions.

In this moment it is only possible to communicate only using the voice circuits and the number of modern equipments, capable to allow communications to the newest standards, are less than 20 % of total number of equipments necessary for planning communications circuits capable to assure the mentioned services.

The life-cycle of the existing equipments is at the end of the operation and maintenance period and the costs of maintaining in function of these represent 50% of a cost of implementation of the new one (considering the warranty period of the new one, availability of the spare parts and the cost of these old pieces) and the quality is remarkably different considering the modes of operation (voice, data, formatted messages against voice operation), the covered areas (short distance-national interest, log distance-strategic interest), the power of transmitters and the stability of communications (10 KW against 1 KW) .

Supporting the forces executing missions at long distances requests high power and implementation of protocols that will offer the certainty of receiving of the information.

The integration of the existing equipments doesn't allow the planning of circuits, remote control of the equipments and the interconnection with the other national commands is substandard.

If the interoperability, projection of force having as result promotion of country and the standards implemented at the level the operational command are not a priority for Armed Forces, this system could not be implemented.

The lack of implementation will generate strong limitation of executing of command and control act, high costs (considering the warranty period costs, costs of spare parts) of maintaining in function of old equipments for a short period generated by lack of the spare parts, more expenses for communication personnel (lack of integration), unacceptable uncertainty of receiving of information at long distances confirm by users of the existing system and lack of network centric architecture representing the most important concept at the level of NATO and implemented in more countries of this alliance.

The results will be the poor information available for executing of forces command.

Development and implementation of this system will offer support for national land and air forces commands and NATO Headquarters through the interconnection between the communications systems.

Among the **main beneficiaries** of this project, one may mention the following:

- Ministry of National Defense
- NATO Headquarters in the Southern Region
- Romanian Naval Forces
- Other Services of Romanian Army

The project initiating team is envisaged to consist of the following individuals: 1 IT specialist, 1 IT security specialist, 1 COMSEC (Communication Security) specialist, 2 telecommunications specialists, 1 infrastructure specialist. However, the human resources for each activity will be explicitly mentioned in the Microsoft Project responsibility matrix. The overall cost is estimated at approximately 10,000,000 EURO, out of the human resources costs paid from military budget of Naval Forces.

The estimated implementation period of this project is: 05.01.2011 – 07.11.2012.

4. Project scope management

4.1. Project goal

The project goal is to develop and implement of a communication system for an operational command in order to support execution of command and control act.

4.2. Project objectives

For the goal defined above, we identified the following objectives:

1. Accomplishing the electromagnetic compatibility study by the external company X until the 25 of March 2011
2. Approving of financing authorization document by NATO Authority until the beginning of June 2011.
3. Finalizing the acquisition procedure of the contract for implementation of the communication system by the end of August 2011.
4. Finalizing the acquisition procedure of the contract for infrastructure works by the end of August 2011.
5. Accomplishing of all infrastructure works until 15 of February 2012.
6. Installation of all components of the communication system by 24 of October 2012.
7. Execution of final acceptance of communication system by the end of the year 2012.

4.3. Project activities and sub-activities corresponding to objectives

O1. Accomplishing the electromagnetic compatibility study by the external company X until the 25 of March 2011

1. Accomplishing of EMC study

1.1. Negotiate the conditions of collaboration

1.2. Site survey

1.3. Finalizing the first draft

1.4. Analyze the draft and sending the comments

1.5. Finalizing electromagnetic compatibility study

1.6. Delivery of the CEM study

O2. Approving of financing authorization document by NATO Authority until the beginning of June 2011

2. Approval of TBCE.

2.1. Finalizing the TBCE

2.2. Sustain TBCE

2.3. Approval procedure for TBCE

2.4. Delivery of TBCE to parties involved

O3. Finalizing the acquisition procedure of the contract for implementation of the communication system by the end of August 2011

3. Acquisition procedure for COMMS system

3.1. Development of documentation for acquisition

3.2. COMMS acquisition procedure

3.3. Signing the contract

3.4. Delivery of contract/extract to parties involved

O4. Finalizing the acquisition procedure of the contract for infrastructure works by the end of August 2011

4. Acquisition procedure for infrastructure works

4.1. Feasibility study

4.2. Approval of feasibility study

4.3. INFRA acquisition procedure

4.4. Signing the contract

4.5. Delivery of contract/extract to parties involved

O5. Accomplishing of all infrastructure works until 15 of February 2012

5. Accomplishing of infrastructure works

O6. Installation of all components of the communication system by 24 of October 2012

6. Installing of COMMS components

6.1. Development/delivery of equipments

6.2. Development/delivering of auxiliary equipments of subcontractors

6.3. Installation of the system

6.4. Information of parties involved

O7. Execution of final acceptance of communication system by the end of the year 2012

7. Final acceptance procedure for the system

4.4 Project deliverables

The project deliverables are presented in the chapter 8 together with the quality indicators, specifications and requirements for all of them.

4.5 Project organization

No.	STAKEHOLDERS	INTERES		POWER	
		LOW	HIGH	LOW	HIGH
1.	NATO Authorities		X		X
2.	Minister of Defense		X		X
3.	Project manager		X		X
4.	Project management Team		X	X	
5.	Environmental Ministry	X			X
6.	National Security Agency	X			X
7.	Department of Armaments	X		X	
8.	Communication and Information Directorate		X		X
9.	Logistic Directorate		X		X
10.	Financial Directorate	X			X
11.	Security Directorate	X			X
12.	Chief of Naval Staff				
13.	Members of Naval Staff	X		X	
14.	End users of the system		X	X	
15.	People living in the proximity of the sites	X		X	
16.	Companies located in the proximity of the sites	X		X	
17.	Acquisition Authorities		X		X

Table 1. Stakeholders

5. Project Time Management

The start date and the end date of each activity and sub-activity are presented in the Gantt chart annexed to the hereby project.

For smoothly development of the project the terms for following milestones will be consider as a priority:

1. Delivery of the CEM study
2. Delivery of TBCE to parties involved
3. Delivery of contract/extract to parties involved
4. Delivery of contract/extract to parties involved
5. Information of parties involved

As this strategy to be possible it is necessary to pay attention to the tendency of the project environment to the bureaucracy that could generate delays.

6. Human Resources Management

The human resources necessary during each phase of the project, as well as the corresponding costs are presented in the Microsoft Project sheet annexed to the hereby paper.

7. Project Cost Management

The costs incurred by the hereby project are detailed in the Human Resources Costs Sheet annexed to the present project.

The cost for this project was estimated considering order of magnitude of the similar developed projects.

During the planning phase we will consider a budget estimate approach that should be more precise than the order of magnitude.

In case the cost of the project will be more than allocated, we have the possibility for overrunning procedure.

8. Project Quality Management

Next, the deliverables and quality indicators are presented in connection to each objective and activity:

OBJECTIVE NO.1 AND THE ACTIVITIES NO. 1 AND 1.1-1.5:

1. **A complete study delivered by company X until 25 of March 2011 containing:**
    a. **Configuration of antenna field**: number of antennas, types of antennas, polarization of each antenna, emission characteristics (horizontal and vertical), coverage areas, mutual influence, disposal
    b. **Mutual influence with systems in the proximity of disposals areas**: generated perturbations, level of the generated electromagnetic field, level of the natural electromagnetic field in the receiving area
    c. **Influence over the people**: the level of electromagnetic over the personnel areas, conformance with the national and international specific standards
    d. **Interconnection of the antennas field with the hardware of the system**
    e. **Configuration of the communication system:** emission site, receiving site, remote control system configuration, messaging system configuration
    f. **Infrastructure works requested by system implementation**

The review process will be accomplished by CIS Naval HQ Department between 14 of March and 18 of March 2011.

OBJECTIVE NO.2 AND THE ACTIVITIES NO. 2 AND 2.1-2.3:

2. **An approved financing authorization document will be draw up by CIS Naval HQ Department between 28 of March and 20 of April 2011 and ,in accordance with Type B Cost Estimate Guide, will contain details about:**
    a. **Applied reference documents**: Minimum military requirements, Capability Package documents, Project Implementation Plan
    b. **Applied standards for every equipment/component**: interoperability communication standards, specific standards for NATO Communications systems
    c. **Implementation procedures**: adaptation of NATO requirements for locations chosen for implementation
    d. **Architecture of every component installed in each location:** diagrams in accordance with NATO system target architecture
    e. **Interdependencies:** identified interdependencies with existing systems and future intentions of the NATO
    f. **Procurement strategy:** details referring to the acquisition procedure
    g. **Implementation milestones:** specify the terms
    h. **Expenditure profile:** estimate cash flow
    i. **Cost breakdown structure:** an annex with all costs involved by the hardware, software, infrastructure, contingencies, initial logistic support

The review process will be accomplished by NATO communications specialists working group between 21 of April and 01 of June 2011.

OBJECTIVE NO.3 AND THE ACTIVITIES NO. 3 AND 3.1-3.3:

3. **A signed contract between acquisition authority and the contractor will be delivered until 31 of August 2011 and will contain details about:**
    a. **Conditions and responsibilities of the parties**: IAW procedure AC 2261
    b. **Annexes with templates for all documents involved in life-cycle of the system** : according to chosen procedure

c. **Technical documentation**: as approved in the financing document and detailed in the scope statement

The review process will be accomplished by acquisition authority between 02 of June 2011 and 24 of August 2011.

Between 02 of June 2011 and 13 of July 2011 the CIS Naval HQ Department will develop statement of work.

OBJECTIVE NO.4 AND THE ACTIVITIES NO. 4 AND 4.1-4.4:

4. **A signed contract between acquisition authority and the contractor will be delivered until 31 of August 2011 and will contain details about:**
    a. **Conditions and responsibilities of the parties**: IAW national procedure OUG 34/2006
    b. **Annexes with templates for all documents involved in life-cycle of the system** : according to chosen procedure
    c. **Technical documentation**: as approved in the financing document and detailed in the scope statement, feasibility study.

The review process will be accomplished by acquisition authority between 21 of April 2011 and 24 of August 2011.

Between 21 of April 2011 and 13 of July 2011the Infrastructure Directorate will develop feasibility study and statement of work.

OBJECTIVE NO.5 AND THE ACTIVITY NO. 5:

1. **Improvement of the surface of the sites (removing of trees, bushes and leveling the site):** according to the requests resulted from the CEM study
2. **Building a fence:** barbed wire fence, two meters high, amagnetic material
3. **Improvement of antennas basement:** according to the specifications and operation modes of each antenna specified in the CEM study
4. **Digging and executing the cableware for antennas, power supply cables:** according to the positions resulted from CEM study and the needs to have access to the potential damages wires (50 meters between visit holes, wires protecting tubes, 1 meter deep)
5. **Rebuilding the existing build, power supply system:** according to the requested room and power supply for all components of the COMMS system specified in the offer of the contract
6. **Implement external CATV system:** the video cameras will have auto video recording capability, 360°, external operation, water, dust and salt proof, wired interconnected with a local surveillance system

The review process will be accomplished by acquisition authority and CIS Naval HQ Department all over the period.

The infrastructure works will be executed by the company Y until 15 of February of 2012.

OBJECTIVE NO.6 AND THE ACTIVITIES NO. 6.1-6.4:

No.	Description	Quantity	Quality
MESSAGING SYSTEM			
1.	**Server**	**2**	Windows 2003 server, RAID1,5, channel of communications management capable
2.	**Terminal**	**6**	Windows XP, operation of all

No.	Description	Quantity	Quality
			installed applications capable
3.	**Switch**	**1**	Capable of switch minimum 8 channels, remote controlled
4.	**Router**	**1**	Capable of switch minimum 8 channels, remote controlled, Ethernet, G 703 protocols and interfaces
5.	**Software application**	**1**	According to the specifications of STANAG 4406 Annex E, ACP 127
REMOTE CONTROL SYSTEM			
6.	**Server**	**1**	Windows 2003 server, RAID1,5, operation of the application dedicated to remote control for equipments in the system
7.	**Terminal**	**3**	Windows XP, operation of all installed applications capable
8.	**Switch**	**1**	Capable of switch minimum 8 channels, remote controlled
9.	**Router**	**1**	Capable of switch minimum 8 channels, remote controlled, Ethernet, G 703 protocols and interfaces
10.	**Software application**	**1**	Capable of interconnection and controlling of all equipments in the system, display the status of the system
INTERCONNECTION SYSTEM			
11.	**Multiplexer**	**1**	Allow interconnection of all equipments from the site and have a percent of the spare interfaces of 20%
12.	**Crypto device**	**8**	Interoperable with alliance and national devices specified for specific circuits, NBSV, WBSV, TADPOLE, IPsec
13.	**Modem**	**8**	Adjusted to the number of circuits, 8, MIL-STD-110B capable
14.	**Isolator**	**1**	Approved to the level of alliance
15.	**ARQ server**	**4**	Approved to the level of alliance
EMISSION SITE EQUIPMENTS			
16.	**Multiplexer**	**1**	Allow interconnection of all equipments from the site and have a percent of the spare interfaces of 20%
17.	**Modem**	**8**	MIL-STD-110B capable
18.	**Router**	**1**	Capable of switch minimum 8

No.	Description	Quantity	Quality
			channels, remote controlled, Ethernet, G 703 protocols and interfaces
19.	**Switch**	**1**	Capable of switch minimum 8 channels, remote controlled
20.	**Transmitter**	**8**	10 KW, solid state, remote controlled, STANAG 4481, 5506 and 4406 Annex E capable
21.	**Antenna matrix**	**1**	IAW CEM study
22.	**Antennas**	**TBD**	IAW CEM study
23.	**Power supply system**	**1**	IAW CEM study
24.	**CCTV system**	**1**	Integration of the system in the installed COMMS architecture
25.	**Remote control system**	**1**	Remote control and monitoring of the equipments from the site, interconnection with the server using the available channels
RECEIVING SITE			
26.	**Multiplexer**	**1**	Allow interconnection of all equipments from the site and have a percent of the spare interfaces of 20%
27.	**Modem**	**8**	MIL-STD-110B capable
28.	**Router**	**1**	Capable of switch minimum 8 channels, remote controlled, Ethernet, G 703 protocols and interfaces
29.	**Switch**	**1**	Capable of switch minimum 8 channels, remote controlled
30.	**Receiver**	**8**	Soft define radio, remote controlled, STANAG 4203, 5506 and 4406 Annex E capable
31.	**Antenna matrix**	**1**	IAW CEM study
32.	**Antennas**	**TBD**	IAW CEM study
33.	**Power supply system**	**1**	IAW CEM study
34.	**CCTV system**	**1**	Integration of the system in the installed COMMS architecture
35.	**Remote control system**	**1**	Remote control and monitoring of the equipments from the site, interconnection with the server using the available channels

Table 2. Deliverables and quality indicators for communications sites

The review process will be accomplished by acquisition authority and CIS Naval HQ Department all over the period.
The installing works will be executed by the company Z until 24 of October of 2012.

OBJECTIVE NO.7 AND THE ACTIVITY NO. 7

Deliverables of this activity will contain alliance and national standardized documents referring to the security accreditation, final reception of deliverables and acceptance of the system.
The review process will be accomplished by acquisition authority, alliance authorities and CIS Naval HQ Department all over the period.
The final acceptance procedure will be executed by acquisition authority, alliance authorities and CIS Naval HQ Department and the company Z until 07 of November of 2012.

9. Risk Management Plan

For the smooth running of the project, we have identified some of the risks that may hamper the activities to various degrees:

No.	Risk name	Risk description	Risk level	Risk approach
Mission and Goals				
1.	Project fit to customer organization	The project does not support or relate to customer goal	Low	The system will be developed in accordance with NATO and Naval Forces MMR and target architecture
2.	Project fit to provider organization	The project does not support or relate to provider goal	Low	During the acquisition procedure will be chosen only the companies that developed similar projects
3.	Customer perception	Customer expects this organization to provide the system on time	Medium	The planning of cash flow and execution of the activities will be considered as a priority
4.	Work flow	Changes that could affect the work flow	Medium	The end user representatives will monitor and will report to project manager changes that could generate delays
Decision Drivers				
5.	Political influences	Particular politically-driven choices being made	Low	The implementation of the system is totally agreed and approved by the sponsors
6.	Convenient date	The process of establishing the date for delivery	Low	Delivery date for delivery of the deliverables was made on the beginning of the project considering the prior experience in similar activities. All details are stipulated in the contract.
Organization management				
7.	Organization stability	Changes in the management structure	Low	Members of organization are well prepared for the tasks allocated to them

No.	Risk name	Risk description	Risk level	Risk approach
8.	Organization roles and responsibilities	Understanding of own roles and responsibilities and those of others by the members of structure	Low	Monthly discussions with the members of structure. Members of organization are well prepared for the tasks allocated to them.
9.	Projects objectives	Verifiable project, objectives, reasonable requirements	Low	Review scope statement
Users				
10.	User involvement	Not involved in the training process	Low	During the project development training periods are planned
11.	User experience	Users have no previous experience with similar projects	Low	The users work and are trained on similar equipments
12.	User acceptance	Users accept most of concepts and details of system;	Low	The initial details are accomplished together with end users
13.	User training needs	User training needs consider	Low	During the project development training periods are planned. I will ask for including of notions in the normal training process of communication personnel.
14.	User justification	User justification complete	Low	The system is developed accordingly to the approved architecture
Project characteristics				
15.	Project size	Medium, moderate complexity, decomposable	Medium	The scope statement will contain as much as possible details. The control and monitoring of the activities will be a priority.
16.	Budget Constraints	The role of allocation of budget for the project	Low	The costs are established considering similar systems. The budget is sufficient.
Product content				
17.	Requirements stability	Some change expected against approved set	Low	The architecture is clear and the control and monitoring process will support good decision
18.	Testability	Parts of product to test	Low	Will be approved only the equipments with certificates mentioning the tests results
19.	Design difficulty	Well defined interfaces	Low	All interfaces are define initially

No.	Risk name	Risk description	Risk level	Risk approach
20.	Implementation difficulty	Content is reasonable for the teams	Medium	The specific conditions for implementation will be presented initially and all details of equipments will be presented to the team
21.	System dependencies	Clear defined dependencies	Low	All interdependencies are considered initially and mentioned in the TBCE
Development process				
22.	Alternatives analysis	Analysis of alternatives	Low	Alternative analysis perform in the defining stage of the product
23.	Quality assurance approach	Procedures establish, but not well followed	Medium	Implement SOP.
24.	Early Identification of defects	Team expects to find all defects with testing	Medium	It is planned to test implemented modules
25.	Defect tracking	Defect tracking process in place	Medium	Control and monitoring will assure remedial on time
Development environment				
26.	Physical facilities	Some modifications needs, some existent	Medium	The list of works will be planned initially
27.	Tools availability	Lack of electrical power supply	Medium	Will be used existing system and in parallel will be developed the new system.
28.	Disaster recovery	Data security, back up of system	Low	All people involved in the project will sign an confidential paper; A back up will be perform after each phase and a general back will be made after the project will be finish
Maintenance and support				
29.	Design complexity	Easily maintained	Low	Issue maintenance handbooks. The system will be deliver with maintenance tools
30.	Support personnel	Sufficient numbers	Low	Establish the precise numbers of employees needed to be train
31.	Vendor support	Complete support at reasonable price	Low	Establish at the beginning the warranty period

Table 3. Project risks – name, description, level, approach

10. Communication plan matrix

For the purpose of successful project implementation, various communication lines and methods have been suggested, as the attached table shows.

The communication plan has as main objective the avoiding of delays generated by bureaucracy. For this reason the project manager will plan the exchanging in time of interest information to all stakeholders to cover the effects of the following main risks.

No.	Risk name	Risk description	Risk level	Risk approach
1.	Customer perception	Customer expects this organization to provide the system on time	Medium	Project manager will deliver all requests in proper time for accomplishing the phases of the project. The planning of cash flow and execution of the activities will be considered as a priority
2.	Work flow	Changes that could affect the work flow	Medium	Project manager will plan meetings/VTC weekly to avoid potential changes. The end user representatives will monitor and will report to project manager changes that could generate delays
3.	Project size	Medium, moderate complexity, decomposable	Medium	Project manger will be in contact with experts and during the planning phase he will consider all recommendations of them. The scope statement will contain as much as possible details. The control and monitoring of the activities will be a priority.
4.	Implementation difficulty	Content is reasonable for the teams	Medium	Project manager and experts will present to the team the specific conditions for implementation and all details of equipments

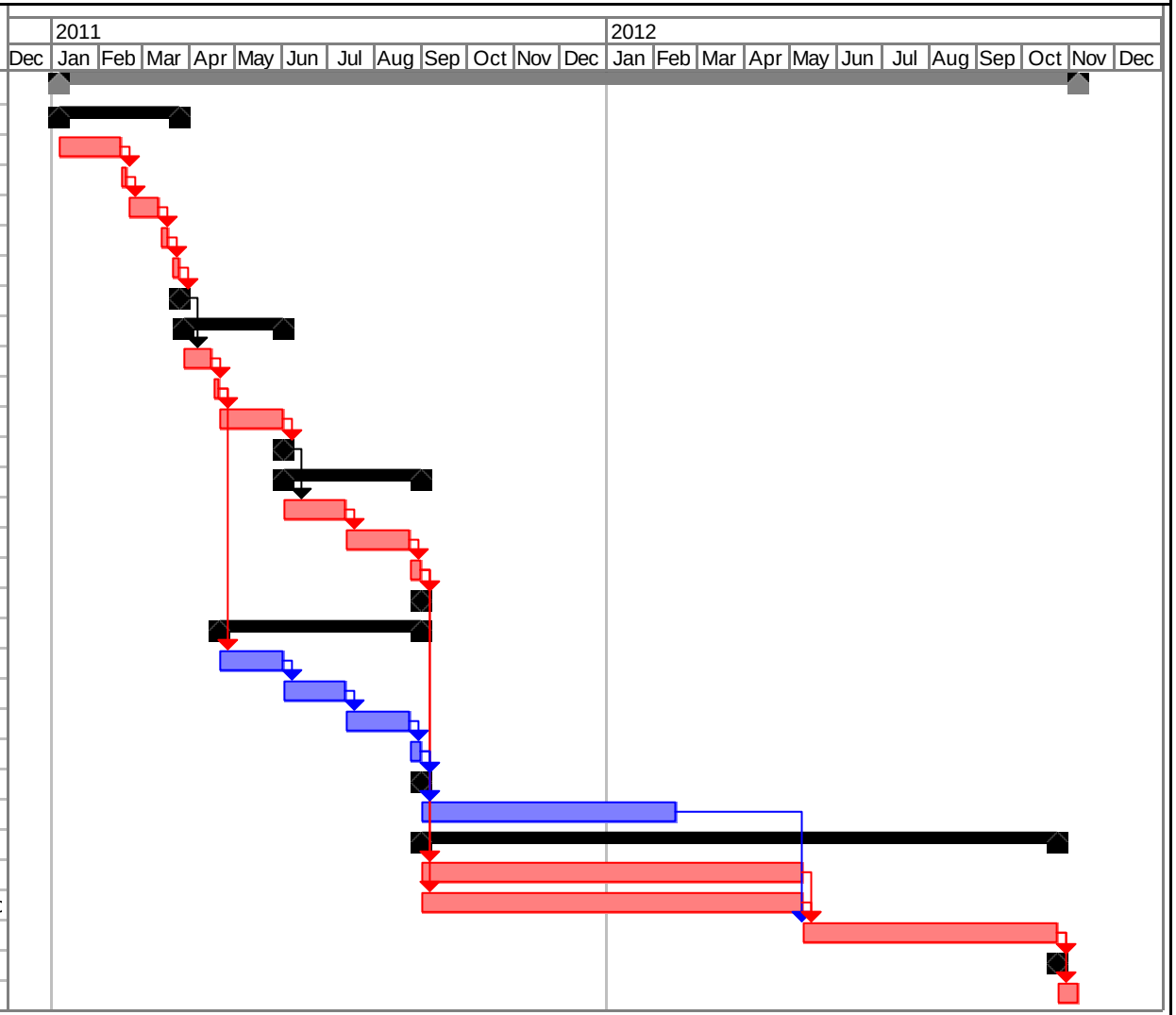
Table 4. Project risks avoided using communication

Implementation of operational comand communications system

ID	Task Name	Duration	Start	Finish	Predecessc	Resource Names
0	**IMPLEMENTATION OF COMMS SYSTEM**	**481 days**	**Wed 1/5/11**	**Wed 11/7/12**		
1	**1 Accomplishing of EMC study**	**58 days**	**Wed 1/5/11**	**Fri 3/25/11**		
2	1.1 Negotiate the conditions of collaboration	30 days	Wed 1/5/11	Tue 2/15/11		Project manager
3	1.2 Site survey	3 days	Wed 2/16/11	Fri 2/18/11	2	Project manager,CEM Comp spec
4	1.3 finalizing the first draft	15 days	Mon 2/21/11	Fri 3/11/11	3	CEM Comp spec
5	1.4 Analyze the draft and sending the comments	5 days	Mon 3/14/11	Fri 3/18/11	4	IT manager,IT security manager,COMSEC manger,TELECOMM off,Project manager,Chief of COMMS
6	1.5 Finalizing electromagnetic compatibility study	5 days	Mon 3/21/11	Fri 3/25/11	5	CEM Comp spec
7	1.6 Delivery of the CEM study	0 days	Fri 3/25/11	Fri 3/25/11	6	
8	**2 Approval of TBCE.**	**48 days**	**Mon 3/28/11**	**Wed 6/1/11**		
9	2.1 Finalizing the TBCE	15 days	Mon 3/28/11	Fri 4/15/11	7	Project manager
10	2.2 Sustain TBCE	3 days	Mon 4/18/11	Wed 4/20/11	9	Project manager,Chief of COMMS ,INFRA DEP spec
11	2.3 Approval procedure for TBCE	30 days	Thu 4/21/11	Wed 6/1/11	10	AUTH NATO reprez
12	2.4 Delivery of TBCE to parties involved	0 days	Wed 6/1/11	Wed 6/1/11	11	
13	**3 Acquisition procedure for COMMS system**	**65 days**	**Thu 6/2/11**	**Wed 8/31/11**		
14	3.1 Development of documentation for acquisition	30 days	Thu 6/2/11	Wed 7/13/11	12	COMMS ACQ AUTH
15	3.2 COMMS acquisition procedure	30 days	Thu 7/14/11	Wed 8/24/11	14	COMMS ACQ AUTH
16	3.3 Signing the contract	5 days	Thu 8/25/11	Wed 8/31/11	15	COMMS ACQ AUTH
17	3.4 Delivery of contract/extract to parties involved	0 days	Wed 8/31/11	Wed 8/31/11	16	
18	**4 Acquisition procedure for infrastructure works**	**95 days**	**Thu 4/21/11**	**Wed 8/31/11**		
19	4.1 Fezability study	30 days	Thu 4/21/11	Wed 6/1/11	10	INFRA ACQ AUTH
20	4.2 Approval of fezability study	30 days	Thu 6/2/11	Wed 7/13/11	19	INFRA ACQ AUTH
21	4.3 INFRA acquisition procedure	30 days	Thu 7/14/11	Wed 8/24/11	20	INFRA ACQ AUTH
22	4.4 Signing the contract	5 days	Thu 8/25/11	Wed 8/31/11	21	INFRA ACQ AUTH
23	4.5 Delivery of contract/extract to parties involved	0 days	Wed 8/31/11	Wed 8/31/11	22	
24	**5 Accomplishing of infrastructure works**	**120 days**	**Thu 9/1/11**	**Wed 2/15/12**	**22**	**INFRA Comp**
25	**6 Installing of COMMS components**	**300 days**	**Thu 9/1/11**	**Wed 10/24/12**		
26	6.1 Development/delivery of equipments	180 days	Thu 9/1/11	Wed 5/9/12	16	COMMS Comp
27	6.2 Development/delivering of auxiliary equipments of subcontractors	180 days	Thu 9/1/11	Wed 5/9/12	16	COMMS Comp
28	6.3 Installation of the system	120 days	Thu 5/10/12	Wed 10/24/12	24,26,27	COMMS Comp
29	6.4 Information of parties involved	0 days	Wed 10/24/12	Wed 10/24/12	28	
30	**7 Final acceptance procedure for the system**	**10 days**	**Thu 10/25/12**	**Wed 11/7/12**	**28**	**AUTH NATO reprez,Chief of COMMS ,Project manager,COMMS ACQ AUTH,INFRA ACQ AUTH**

Implementation of operational comand communications system

ID	Task Name
0	**IMPLEMENTATION OF COMMS SYSTEM**
1	**1 Accomplishing of EMC study**
2	1.1 Negotiate the conditions of collaboration
3	1.2 Site survey
4	1.3 finalizing the first draft
5	1.4 Analyze the draft and sending the comments
6	1.5 Finalizing electromagnetic compatibility study
7	1.6 Delivery of the CEM study
8	**2 Approval of TBCE.**
9	2.1 Finalizing the TBCE
10	2.2 Sustain TBCE
11	2.3 Approval procedure for TBCE
12	2.4 Delivery of TBCE to parties involved
13	**3 Acquisition procedure for COMMS system**
14	3.1 Development of documentation for acquisition
15	3.2 COMMS acquisition procedure
16	3.3 Signing the contract
17	3.4 Delivery of contract/extract to parties involved
18	**4 Acquisition procedure for infrastructure works**
19	4.1 Fezability study
20	4.2 Approval of fezability study
21	4.3 INFRA acquisition procedure
22	4.4 Signing the contract
23	4.5 Delivery of contract/extract to parties involved
24	**5 Accomplishing of infrastructure works**
25	**6 Installing of COMMS components**
26	6.1 Development/delivery of equipments
27	6.2 Development/delivering of auxiliary equipments of subcontrac
28	6.3 Installation of the system
29	6.4 Information of parties involved
30	**7 Final acceptance procedure for the system**



Project: IMPLEMENTATION OF COMMS
Date: Tue 3/29/11

Task	Rolled Up Task	External Tasks
Critical Task	Rolled Up Critical Task	Project Summary
Progress	Rolled Up Milestone	Group By Summary
Milestone	Rolled Up Progress	Deadline
Summary	Split	

IMPLEMENTATION OF COMMS SYSTEM

ID		Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	Code
1		Project manager	Work		P	Pr. Team	100%	50.00 lei/hr	50.00 lei/hr	0.00 lei	Prorated	Standard	
2		Chief of COMMS	Work		C	Pr. Team	100%	100.00 lei/hr	100.00 lei/hr	0.00 lei	Prorated	Standard	
3		IT security manager	Work		I	Pr. Team	100%	50.00 lei/hr	50.00 lei/hr	0.00 lei	Prorated	Standard	
4		IT manager	Work		I	Pr. Team	100%	50.00 lei/hr	50.00 lei/hr	0.00 lei	Prorated	Standard	
5		TELECOMM off	Work		T	Pr. Team	100%	40.00 lei/hr	40.00 lei/hr	0.00 lei	Prorated	Standard	
6		COMSEC manger	Work		C	Pr. Team	100%	50.00 lei/hr	50.00 lei/hr	0.00 lei	Prorated	Standard	
7		COMMS ACQ AUTH	Work		C		100%	50.00 lei/hr	50.00 lei/hr	0.00 lei	Prorated	Standard	
8		INFRA ACQ AUTH	Work		I		100%	50.00 lei/hr	50.00 lei/hr	0.00 lei	Prorated	Standard	
9		INFRA Comp	Work		I		100%	0.00 lei/hr	0.00 lei/hr	8,000,000.00 lei	End	Standard	
10		COMMS Comp	Work		C		200%	0.00 lei/hr	0.00 lei/hr	10,000,000.00 lei	End	Standard	
11		CEM Comp spec	Work		C		100%	0.00 lei/hr	0.00 lei/hr	80,000.00 lei	Start	Standard	
12		INFRA DEP spec	Work		I	Pr. Team	100%	50.00 lei/hr	50.00 lei/hr	0.00 lei	Prorated	Standard	
13		AUTH NATO reprez	Work		A		100%	0.00 lei/hr	0.00 lei/hr	0.00 lei	Prorated	Standard	

Budget Report as of Tue 3/29/11
IMPLEMENTATION OF COMMS SYSTEM

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
0	**IMPLEMENTATION OF COMMS SYSTEM**	**0.00 lei**	**Prorated**	**38,361,600.00 lei**	**0.00 lei**	**38,361,600.00 lei**	**0.00 lei**	**38,361,600.00 lei**
25	**Installing of COMMS components**	**0.00 lei**	**Prorated**	**30,000,000.00 lei**	**0.00 lei**	**30,000,000.00 lei**	**0.00 lei**	**30,000,000.00 lei**
26	Development/delivery of equipments	0.00 lei	Prorated	10,000,000.00 lei	0.00 lei	10,000,000.00 lei	0.00 lei	10,000,000.00 lei
27	Development/delivering of auxiliary equipments o	0.00 lei	Prorated	10,000,000.00 lei	0.00 lei	10,000,000.00 lei	0.00 lei	10,000,000.00 lei
28	Installation of the system	0.00 lei	Prorated	10,000,000.00 lei	0.00 lei	10,000,000.00 lei	0.00 lei	10,000,000.00 lei
24	Accomplishing of infrastructure works	0.00 lei	Prorated	8,000,000.00 lei	0.00 lei	8,000,000.00 lei	0.00 lei	8,000,000.00 lei
1	**Accomplishing of EMC study**	**0.00 lei**	**Prorated**	**266,800.00 lei**	**0.00 lei**	**266,800.00 lei**	**0.00 lei**	**266,800.00 lei**
3	Site survey	0.00 lei	Prorated	81,200.00 lei	0.00 lei	81,200.00 lei	0.00 lei	81,200.00 lei
4	finalizing the first draft	0.00 lei	Prorated	80,000.00 lei	0.00 lei	80,000.00 lei	0.00 lei	80,000.00 lei
6	Finalizing electromagnetic compatibility study	0.00 lei	Prorated	80,000.00 lei	0.00 lei	80,000.00 lei	0.00 lei	80,000.00 lei
18	**Acquisition procedure for infrastructure wor**	**0.00 lei**	**Prorated**	**38,000.00 lei**	**0.00 lei**	**38,000.00 lei**	**0.00 lei**	**38,000.00 lei**
13	**Acquisition procedure for COMMS system**	**0.00 lei**	**Prorated**	**26,000.00 lei**	**0.00 lei**	**26,000.00 lei**	**0.00 lei**	**26,000.00 lei**
30	Final acceptance procedure for the system	0.00 lei	Prorated	20,000.00 lei	0.00 lei	20,000.00 lei	0.00 lei	20,000.00 lei
5	Analyze the draft and sending the comments	0.00 lei	Prorated	13,600.00 lei	0.00 lei	13,600.00 lei	0.00 lei	13,600.00 lei
2	Negotiate the conditions of collaboration	0.00 lei	Prorated	12,000.00 lei	0.00 lei	12,000.00 lei	0.00 lei	12,000.00 lei
14	Development of documentation for acquisition	0.00 lei	Prorated	12,000.00 lei	0.00 lei	12,000.00 lei	0.00 lei	12,000.00 lei
15	COMMS acquisition procedure	0.00 lei	Prorated	12,000.00 lei	0.00 lei	12,000.00 lei	0.00 lei	12,000.00 lei
19	Fezability study	0.00 lei	Prorated	12,000.00 lei	0.00 lei	12,000.00 lei	0.00 lei	12,000.00 lei
20	Approval of fezability study	0.00 lei	Prorated	12,000.00 lei	0.00 lei	12,000.00 lei	0.00 lei	12,000.00 lei
21	INFRA acquisition procedure	0.00 lei	Prorated	12,000.00 lei	0.00 lei	12,000.00 lei	0.00 lei	12,000.00 lei
8	**Approval of TBCE.**	**0.00 lei**	**Prorated**	**10,800.00 lei**	**0.00 lei**	**10,800.00 lei**	**0.00 lei**	**10,800.00 lei**
9	Finalizing the TBCE	0.00 lei	Prorated	6,000.00 lei	0.00 lei	6,000.00 lei	0.00 lei	6,000.00 lei
10	Sustain TBCE	0.00 lei	Prorated	4,800.00 lei	0.00 lei	4,800.00 lei	0.00 lei	4,800.00 lei
16	Signing the contract	0.00 lei	Prorated	2,000.00 lei	0.00 lei	2,000.00 lei	0.00 lei	2,000.00 lei
22	Signing the contract	0.00 lei	Prorated	2,000.00 lei	0.00 lei	2,000.00 lei	0.00 lei	2,000.00 lei
7	Delivery of the CEM study	0.00 lei	Prorated	0.00 lei	0.00 lei	0.00 lei	0.00 lei	0.00 lei

Budget Report as of Tue 3/29/11
IMPLEMENTATION OF COMMS SYSTEM

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
11	Approval procedure for TBCE	0.00 lei	Prorated	0.00 lei	0.00 lei	0.00 lei	0.00 lei	0.00 lei
12	Delivery of TBCE to parties involved	0.00 lei	Prorated	0.00 lei	0.00 lei	0.00 lei	0.00 lei	0.00 lei
17	Delivery of contract/extract to parties involved	0.00 lei	Prorated	0.00 lei	0.00 lei	0.00 lei	0.00 lei	0.00 lei
23	Delivery of contract/extract to parties involved	0.00 lei	Prorated	0.00 lei	0.00 lei	0.00 lei	0.00 lei	0.00 lei
29	Information of parties involved	0.00 lei	Prorated	0.00 lei	0.00 lei	0.00 lei	0.00 lei	0.00 lei
		0.00 lei		**38,361,600.00 lei**	**0.00 lei**	**38,361,600.00 lei**	**0.00 lei**	**38,361,600.00 lei**

Project comunications management plan

NO.	Category	Stakeholders	Target audience							Persons to convey the message							When the message is conveyed							Format of a message							Message content						
			EC Study	TBCE	COMMS Contract	Infra Contract	Infra Works	COMMS Install	FOC	EC Study	TBCE	COMMS Contract	Infra Contract	Infra Works	COMMS Install	FOC	EC Study	TBCE	COMMS Contract	Infra Contract	Infra Works	COMMS Install	FOC	EC Study	TBCE	COMMS Contract	Infra Contract	Infra Works	COMMS Install	FOC	EC Study	TBCE	COMMS Contract	Infra Contract	Infra Works	COMMS Install	FOC
1	Internal	End users of the system			X	X	X	X	X			Project manager	Project manager	Project manager	Project manager	Project manager			after signing	after signing	weekly	weekly	weekly			Extract of contract	Extract of contract	briefing, e-mails	briefing, e-mails	briefing, e-mails			specific content of contract for every structure	specific content of contract for every structure	status of works	status of works	status of tests
2	Connected	NATO Authorities		X			X	X	X		Logistic Directorate			Logistic Directorate	Logistic Directorate	Logistic Directorate		01.06.2011			biannual	biannual	at the biginning of phase		TBCE template			financial report	financial report	security acreditation documents results of tests templates		final format of TBCE			status of funds	status of funds	security acreditation documents results of tests
		Ministry of Defence Structures	X	X	X	X	X	X	X	Project manager	Project manager	Acquisition authority	Acquisition authority	Project manager	Project manager	Project manager	03.01.2011	15.05.2011	starting/end of procedure	starting/end of procedure	biannual	biannual	starting/end of tests	military report	TBCE template	acquisition documentation/contract template	acquisition documentation/contract template	status reports	status reports	military report	approval request, colaboration conditions	approach for TBCE	acquisition documentation/contract	acquisition documentation/contract	details works and financial situation	details works and financial situation	details of FOC
		Environmental Ministry		X							Chief of Navy Staff							after approval of TBCE							formal letter with details of system							request for approval					
3	External	People living in the proximity of the sites		X							Project manager through maior							after approval of TBCE							formal letter with extract of details of system							information about the risks					
		Companies located in the proximity of the sites		X							Project manager							after approval of TBCE							formal letter with extract of details of system							information about the risks					

REPAIRING AND MODERNIZING A BUILDING PROJECT

MAJ Radu-Adrian MANDACHE

1. PROJECT TITLE

Repairing and modernizing a building

2. PROJECT SPONSOR:

Land Forces Academy "Nicolae Balcescu" Sibiu

3. BUSINESS CASE

Land Forces Academy needs more modern accommodation rooms for our post graduate students because, in this moment, it has no sufficient and good conditions to put up they. So, the command team decided to modernize an old but strong large building (a bloc of bedrooms) from our unit. This old building has large rooms in bad conditions, only one bathroom on the floor, very old water and electrical supply devices and a roof in very bad condition.

Our academy has just developed three master programs during this year. In the same time, the number of students on direct filiera has abruptly increased and the accommodation space has become insufficient for students and post graduate students in the same time. It's

compulsory to put up the military students (the cadets). In that situation, the post graduate students, their parents and their relatives, become disenchanted with the quality of life and instruction provided by the academy.

The frequency and the severity of the problem are very high because, in every weekend, a lot of post graduate students demand to be put up in accommodation rooms. On the other hand, their demands are to live one or two at most persons in a bedroom and not twenty persons in undesirable bedroom as the case is right now. In conclusion, they demand to live maximum two persons on accommodation room and have good conditions for live and study there.

If the accommodation conditions not improve, the image of the academy will be affected and the number of the post graduate students will abruptly decrease. The need of the academy is to increase the number of students and post graduate students, to gain a bigger part of market and consolidate its position.

Students need to have good accommodation conditions – maximum two people in the bedroom, separately bathroom, and a space for study, access to the internet, a refrigerator in the accommodation room, TV set and access to the fitness hall.

So, the problem is very important from the institution (sponsor) perspective. In conclusion, the command team requests me to make a project for modernize an old bloc of bedrooms.

The project importance resides with the following aspects:

1. Provide the necessary accommodation room for all post graduate students of the academy;
2. Create better conditions to learn and life all post graduate students of the academy;
3. Increase academy's image capital inside de European military academic community.

Among the **main beneficiaries** of this project, one may mention the following:

- Land Forces Services;
- Land Forces Academy;
- post graduate students;
- military units from where are the post graduate students;

- local authorities;
- owners of the buildings from vicinity.

The project initiators consider that the project is currently affecting post graduate students from the Land Forces Academy “Nicolae Balcescu” Sibiu.

The academy assumes full responsibility concerning the quality and timeliness of the project activities.

The project team is envisaged to consist of the following individuals: 1 project manager, 1 executive director (buildings administrator), 2 team leaders, 1 communication team representative, 1 P.P.B.E.S. Officer, 1 Acquisitions manager, 2 Acquisitions specialists, 1 finance specialist (accountant), 2 consultants, 1 specialist – CO, specialist – NCO, 2 specialists – civilians, 1 secretary, 2 administrative peoples - NCO, 2 administrative peoples – civilians, 1 logistician (Officer with the materials).

However, the HR for each activity will be explicitly mentioned in the Microsoft Project responsibility matrix. The overall cost is estimated at approximately 969,589 RON ($267,371), out of which the HR costs rise to a rough amount of 371,236 RON ($102,371).

The estimated implementation period of this project is: 01.02.2011 – 16.09.2011.

4. SCOPE STATEMENT

4.1 Main goal

Land Forces Academy will repair and modernize a building to have sufficient accommodation rooms with good living conditions and study for its post graduate students.

4.2 Objectives

1. By mid of February 2011, the Land Forces Academy will finish mission analysis for repair and modernize the building.
2. By the end of February 2011, the Land Forces Academy will finish investment analysis.
3. By mid of April 2011, the Land Forces Academy will obtain all approvals from the superior echelon and local authorities and necessary funds.

4. By the end of May 2011, the academy will finish the acquisition process for services of the company/companies that will repair and modernize the building.
5. By the end of June 2011, all constructor works in “gray” phase will be done by the company.
6. By the end of August 2011, works related to electrical, water and heating installation, interior and exterior will be done by the company.
7. By mid of September 2011, the reception forms will be signed by company and Land Forces Academy representatives.

4.3 Project activities and sub-activities corresponding to objectives

O1. By mid of February 2011, the Land Forces Academy will finish mission analysis for repair and modernize the building

1.1. Mission analysis

1.1.1. Identify Projected Demand for Services

1.1.2. Identify Technological Opportunities

1.1.3. Identify Projected Supply of Services

1.1.4. Mission Needs Analysis and Assessment

1.1.5. Initial Requirements Definition

O2. By the end of February 2011, the Land Forces Academy will finish investment analysis

2.1. Investment analysis

2.1.1. Initial Investment Decision

2.1.1.1. Planning

2.1.1.2. Analysis

2.1.1.3. Documentation

2.1.2. Final Investment Decision

2.1.2.1. Planning

2.1.2.2. Analysis

2.1.2.3. Documentation

2.1.3. Rebase line Decision

2.1.4. Final decision

O3. By mid of April 2011, the Land Forces Academy will obtain all approvals from the superior echelon and local authorities and necessary funds

3.1. Develop and field Report of necessity for repair and modernize the building

3.1.1. Detail Background note for repair and modernize the building

3.1.2. Develop Report of necessity for repair and modernize the building

3.1.3. Field Report of necessity for repair and modernize the building

3.2. Develop and field Investment sheet

3.2.1. Develop Investment sheet

3.2.2. Field Investment sheet

3.3. Send Report of necessity and Investment sheet to the superior echelon

3.4. Develop and field project for Municipality Hall

3.4.1. Develop project for Municipality Hall

3.4.2. Field project for Municipality Hall

3.5. Obtain the environmental permit

3.6. Obtain the electricity permit

3.7. Obtain the notice of the water-channel

3.8. Develop and field request for Municipality Hall

3.9. Keep in touch with superior echelon and local authorities

3.9.1. Keep in touch with superior echelon

3.9.2. Keep in touch with local authorities

3.10. Obtain all approvals from the superior echelon and local authorities

3.10.1. Obtain all approvals from the superior echelon

3.10.2. Obtain all approvals from the local authorities

3.10.3. Send Project for Municipality Hall

3.10.4. Obtain the approval from the Municipality Hall

3.10.5. Municipality Hall response

3.11. Obtain necessary funds for project

3.11.1. Develop a Background note to get money in the budget

3.11.2. Field and send a Background note to get money in the budget

3.11.3. Keep in touch with P.P.B.E.S. from superior echelon

3.11.4. Get a new budget that contain sufficient budgetary provisions for building modernize

3.11.5. Getting the funds

O4. By the end of May 2011, the academy will finish the acquisition process for services of the company/companies that will repair and modernize the building

4.1. Develop and field Report of necessity for acquisition of service

4.1.1. Develop Report of necessity for acquisition

4.1.2. Field Report of necessity for acquisition

4.2. Introduce the service in the Annual Procurement Program

4.3. Develop and field the Specification

4.3.1. Develop the Specification

4.3.2. Field the Specification

4.4. Develop and field the Grade estimation for establishing the acquisition procedure

4.4.1. Develop the Grade estimation for establishing the acquisition procedure

4.4.2. Field the Grade estimation for establishing the acquisition procedure

4.5. Develop and field the Note evidence regarding to choosing the acquisition procedure

4.5.1. Develop the Note evidence regarding to choosing the acquisition procedure

4.5.2. Field the Note evidence regarding to choosing the acquisition procedure

4.6. Develop and field the Note evidence regarding to establishing qualification requirements

4.6.1. Develop the Note evidence regarding to establishing qualification requirements

4.6.2. Field the Note evidence regarding to establishing qualification requirements

4.7. Develop and field the Tender documentation

4.7.1. Develop the Tender documentation

4.7.2. Field the Tender documentation

4.8. Publish Call for papers in Public Acquisition Electronic System

4.9. Submitting applications (offers)

4.10. Open applications (offers)

4.11. Evaluate applications (offers)

4.12. Develop and field Report procedure

4.13. Communicate the result of procedure

4.14. Solve possible appeal

4.15. Sign the contract with the winner company

4.16. Make acquisition file

O5. By the end of June 2011, all constructor works in "gray" phase will be done by the company

5.1. Repair the roof

5.1.1. Scraping the old roof

5.1.2. Install new roof

5.2. Achieve new space repartitioning

5.2.1. Dismantling the old plumbing (installation of water supply and sanitation; heating installation) and electrical installation

5.2.2. Demolish interior walls (less of the resistance walls)

5.2.3. Frame interior walls

O6. By the end of August 2011, works related to electrical, water and heating installation, interior and exterior will be done by the company

6.1. Plumbing

6.1.1. Install water lines

6.1.2. Setting sanitary

6.1.3. Setting heating installation

6.2. Electrical

6.2.1. Install wiring

6.2.2. Install outlets/switches

6.3. Interior

6.3.1. Install drywall on the ceiling and walls

6.3.2. Carrying out carpentry work

6.3.3. Install carpets

6.3.4. Install painting

6.4. Exterior

6.4.1. Repairing façade

6.4.2. Isolating facade

6.4.3. Painting façade

O7. By mid of September 2011, the reception forms will be signed by company and Land Forces Academy representatives

7.1. Make initial reception

7.2. Sign the initial reception forms

7.3. Remedy any problems

7.4. Make final reception

7.5. Sign the final reception forms

7.6. Pay money for work

5. RESOURCES MANAGEMENT

The human resources necessary during each phase of the project, as well as the corresponding costs are presented in the Microsoft Project sheets annexed (Appendix 1 and 2) to the hereby paper.

6. TIME MANAGEMENT PLAN

The start date and the end date of each activity and sub-activity are presented in the Gantt chart annexed (Appendix 3) to the hereby project.

7. COST MANAGEMENT PLAN

The costs incurred by the hereby project are detailed in the Resources Costs Sheet annexed (Appendix 4) to the present project.

8. QUALITY MANAGEMENT PLAN

Next, the deliverables and quality indicators are presented in connection to each activity:

ID	Code of activity	Deliverables	*Nature	**Type	Responsible
0	1	2	3	4	5
1	1.1.5.	Report on Initial Requirements Definition (Mission analysis)	R	Internal	Project manager
2	2.1.1.3.	Report on Initial Investment Decision	R	Internal	Project manager
3	2.1.2.3.	Report on Final Investment Decision	R	Internal	Project manager
4	2.1.3.	Report on Rebase line Decision	R	Internal	Project manager
5	3.1.1.	Background note for repair and modernize the building	T	Internal	Specialist 1
6	3.1.2.	Report of necessity for repair and modernize the building	T	Internal	Specialist 2
9	3.2.1.	The Investment sheet	T	Internal	Specialist 3
13	3.4.1.	Project for Municipality Hall	S	Internal	Specialist 4
18	3.8.	Request for Municipality Hall	O	Public	Communication team representative
20	3.9.1.	Report on keeping in touch with superior echelon	R	Restricted	P.P.B.E.S. Officer
21	3.9.2.	Report on keeping in touch with local authorities	R	Internal	Communication team representative
23	3.10.1.	Report on obtaining all approvals from the superior echelon	R	Internal	P.P.B.E.S. Officer
24	3.10.2.	Report on obtaining all approvals from the local authorities	R	Internal	Executive director
27	3.11.1.	Background note to get money in the budget	T	Internal	P.P.B.E.S. Officer
28	4.1.1.	Report of necessity for acquisition	T	Internal	Specialist 2
30	4.2.	The Actualized Annual Procurement Program	O	Internal	P.P.B.E.S. Officer
32	4.3.1.	The Specification	S	Public	Specialist 1

0	1	2	3	4	5
35	4.4.1.	Grade estimation for establishing the acquisition procedure	T	Public	Acquisitions Manager
38	4.5.1.	Note evidence regarding to choosing the acquisition procedure	T	Public	Acquisitions Manager
41	4.6.1.	Note evidence regarding to establishing qualification requirements	T	Public	Acquisitions Manager
44	4.7.1.	Tender documentation	S	Public	Acquisitions Manager
46	4.8.	Call for papers in Public Acquisition Electronic System	O	Public	Acquisitions Manager
47	4.9.	Report on submitting applications (offers)	R	Public	Acquisitions Manager
48	4.10.	Report on opening applications (offers)	R	Public	Acquisitions Manager
49	4.11.	Report on evaluating applications (offers)	R	Public	Acquisitions Manager
50	4.12.	The Report procedure	T	Public	Acquisitions Manager
51	4.13.	Report on communicating the result of procedure	R	Public	Acquisitions Manager
52	4.14.	Report on solving (possible) appeals	R	Public	Acquisitions Manager
53	4.15.	The contract with the winner company	O	Public	Acquisitions Manager
54	4.16.	The Acquisition file	O	Internal	Acquisitions Manager
55	5.1.2.	The new roof	O	IBS 45	Company representative specialist no.1
56	5.2.3.	The interior walls	O	IBS 15	Company representative specialist no.1
57	6.1.1.	The water lines	O	IBS 38	Company representative specialist no.2
58	6.1.2.	The sanitary	O	IBS 40	Company representative specialist no.1
59	6.1.3.	The heating installation	O	IBS 42, ISS 301	Company representative specialist no.2
60	6.2.1.	The wiring electrical network	O	ISS 1001	Company representative specialist no.2
61	6.2.2.	The outlets/switches	O	ISS 1001	Company representative specialist no.2
62	6.3.1.	The drywall on the ceiling and walls	O	IBS 20	Company representative specialist no.3
63	6.3.2.	The carpentry (windows, doors)	O	IBS 21	Company representative specialist no.3
64	6.3.3.	The carpets (parquet)	O	IBS 22	Company representative specialist no.3
65	6.3.4.	The interior painting	O	IBS 25	Company representative specialist no.3

0	1	2	3	4	5
66	6.4.	The new facade	O	IBS 50	Company representative specialist no.1
67	7.2.	Report on initial reception forms	R	Public	Project manager
68	7.5.	Report on final reception forms	R	Public	Project manager
69	7.6.	Silver bill and receipt	O	IAS 11	Accountant

Legend: ***Nature:** R= Report, T= Specification, T= Template, O= Other

****Type:** All public Deliverables can be retrieved via the Mandache Homepage: http://www.extra.mandache.com

IBS = International Building Standards

ISS = International Security Standards

9. COMMUNICATIONS MANAGEMENT PLAN

For the purpose of successful project implementation, various communication lines and methods have been suggested, as the following table shows:

Target audience	Person(s) to convey the message	When the message is conveyed	Format of a message	Message content
0	**1**	**2**	**3**	**4**
Chief of Land Forces Staff	Commander of the Academy	At the beginning of February and at the end of the project	Information	- business context and benefits - project overview - stage overview - high level operational implication
Commander of the Academy	Project manager	At the beginning of each week	Presentation	- project introduction - teams and members - project phases and deliverables - current status
Project manager	Executive director	Daily	News letter	- project phases and deliverables - current status
Executive director	Team leaders; company project manager that will run the building modernization	Daily	Information	- project phases and deliverables - current status
Team leaders	Executive director	Weekly	News letter	- current status - next phases
Work team	Project manager	Fortnightly	Information	- project introduction - project phases and deliverables - current status
Communication team representative	Project manager	Daily	News letter	- current status - next phases

0	1	2	3	4
P.P.B.E.S. Officer	Project manager	Monthly	News letter	- current status - cost - next phases
Acquisition Manager	Project manager	At the beginning of March	Information	- project overview - stage overview - project phases and deliverables - estimated cost
Accountant	Project manager	Fortnightly	News letter	- current status
Consultants	Project manager	Fortnightly	Information	- project overview - stage overview - project phases and deliverables - problems
Post graduate students	Commander of the Academy	At the beginning of March	Presentation	- project shape - project status - impact on post graduate students
Local authorities	Project manager	At the beginning and at the end of the project	Information	- project shape - project status
Company project manager that will run the building modernization	Executive director	Weekly	News letter	- problems and modality to solve out them - next stage
Owners of the buildings from vicinity	Communication team representative	Monthly	Information	- project shape - project status - project phases - impact on vicinity

Table no.1 - Project communications plan matrix

10. RISK MANAGEMENT PLAN

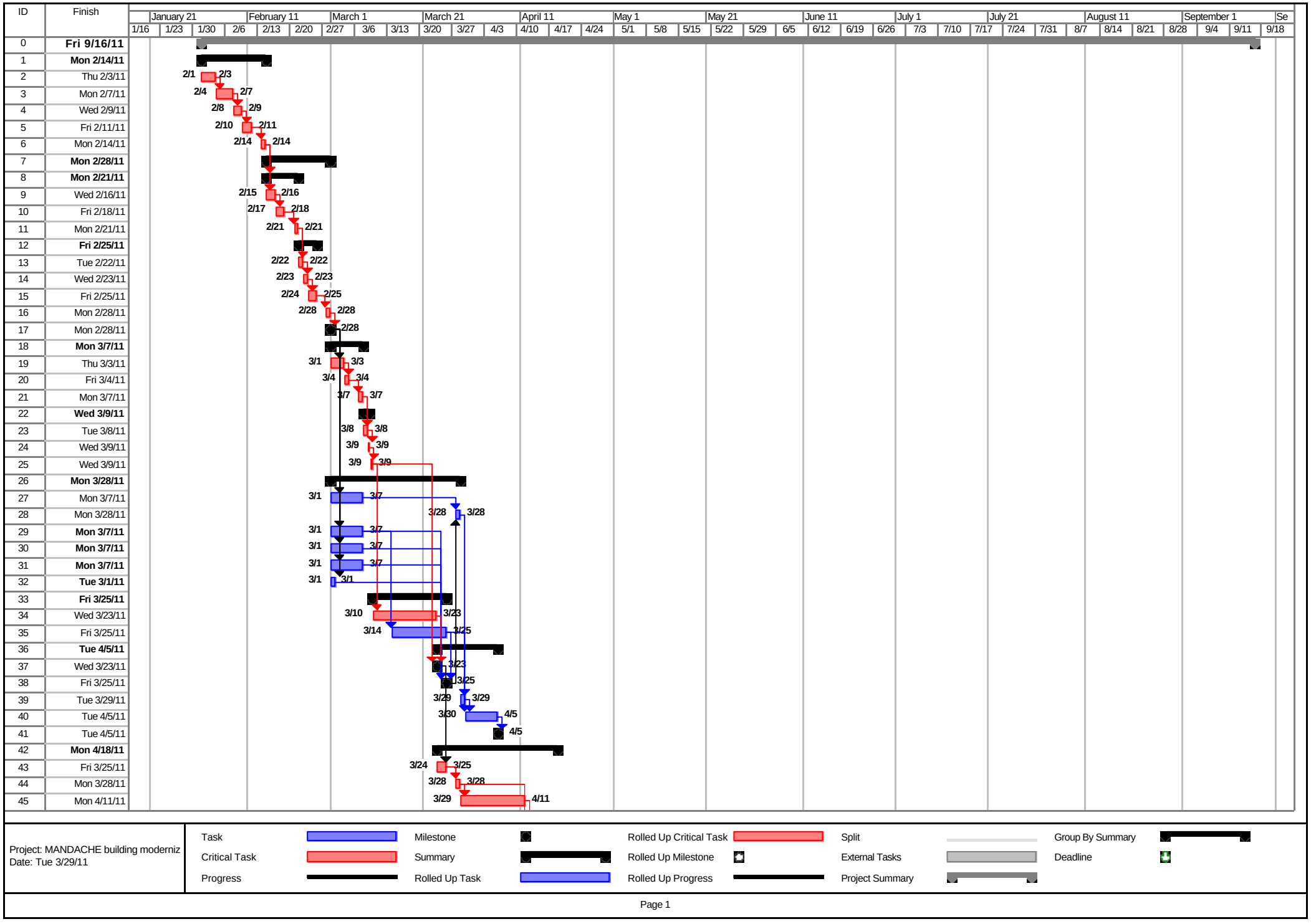
For the smooth running of the project, we have identified some of the risks that may hamper the activities to various degrees:

Risk name	Risk description	Risk level	Risk approach
Project management experience	Project manager has little experience with similar projects and is new to project management	High	Foster communication and empowerment inside the project team to secure collective support
Conflict within project team	Communication problems among team members	Low	Organize briefings and brainstorming sessions to enhance exchange of ideas (vertical and horizontal communication)
Management support	Management team do not support research process	Low	Regularly inform management team on research progress and impact
Lack of resources	No funding received	High	Resubmit project proposal to other funding bodies
Negative influences	Variety of negative influences impacting stakeholders' morale	High	Bottom-up communication with stakeholders to foster idea sharing and progress informing
Interdepartmental interdependencies	Other departments may not support the project team	Medium	Organize briefings to explain the benefits of the project for the entire organization
Company project manager that will run the building modernization experience	Company project manager has average experience with similar projects and is new to project management	Medium	Foster communication and empowerment inside the company team to secure collective support.

Table no.2 - Project risks: name, description, level, approach

ID	Task Name	Duration	Start	Finish	Predeces	Resource Names
0	**Mandache building modernization**	**163.75 days**	**Tue 2/1/11**	**Fri 9/16/11**		
1	**1 Mission analysis**	**10 days**	**Tue 2/1/11**	**Mon 2/14/11**		
2	1.1 Identify Projected Demand for Services	3 days	Tue 2/1/11	Thu 2/3/11		Project manager,Executive director,Specialists[400%],P.P.B.E.S. Officer
3	1.2 Identify Technological Opportunities	2 days	Fri 2/4/11	Mon 2/7/11	2	Project manager,Executive director,Consultants,Specialists[400%]
4	1.3 Identify Projected Supply of Services	2 days	Tue 2/8/11	Wed 2/9/11	3	Project manager,Executive director,Consultants[200%],Specialists[400%],Acquisitions Manager
5	1.4 Mission Needs Analysis and Assessment	2 days	Thu 2/10/11	Fri 2/11/11	4	Project manager,Executive director,Consultants[200%],Specialists[400%]
6	1.5 Initial Requirements Definition	1 day	Mon 2/14/11	Mon 2/14/11	5	Project manager,Executive director
7	**2 Investment analysis**	**10 days**	**Tue 2/15/11**	**Mon 2/28/11**		
8	**2.1 Initial Investment Decision**	**5 days**	**Tue 2/15/11**	**Mon 2/21/11**	**6**	
9	2.1.1 Planning	2 days	Tue 2/15/11	Wed 2/16/11	6	P.P.B.E.S. Officer,Executive director,Acquisitions Manager
10	2.1.2 Analysis	2 days	Thu 2/17/11	Fri 2/18/11	9	Project manager,Consultants[200%],Accountant
11	2.1.3 Documentation	1 day	Mon 2/21/11	Mon 2/21/11	10	Project manager,Executive director,Secretary,Specialists,Team liders,Accountant
12	**2.2 Final Investment Decision**	**4 days**	**Tue 2/22/11**	**Fri 2/25/11**		
13	2.2.1 Planning	1 day	Tue 2/22/11	Tue 2/22/11	11	P.P.B.E.S. Officer,Executive director,Acquisitions Manager
14	2.2.2 Analysis	1 day	Wed 2/23/11	Wed 2/23/11	13	Project manager,Consultants[200%],Accountant
15	2.2.3 Documentation	2 days	Thu 2/24/11	Fri 2/25/11	14	Project manager,Executive director,Secretary,Specialists[400%],Team liders[200%],Accountant
16	**2.3 Rebaseline Decision**	1 day	Mon 2/28/11	Mon 2/28/11	15	Project manager
17	**2.4 Final decision**	0 days	Mon 2/28/11	Mon 2/28/11	16	Sponsor - The Chief of Land Forces Academy
18	**3 Develop and field Report of necessity for repair and modernize**	**5 days**	**Tue 3/1/11**	**Mon 3/7/11**		
19	3.1 Detail Background note for repair and modernize the building	3 days	Tue 3/1/11	Thu 3/3/11	17	Specialists[200%]
20	3.2 Develop Report of necessity for repair and modernize the building	1 day	Fri 3/4/11	Fri 3/4/11	19	Specialists
21	3.3 Field Report of necessity for repair and modernize the building	1 day	Mon 3/7/11	Mon 3/7/11	20	Executive director
22	**4 Develop and field Investment sheet**	**1.5 days**	**Tue 3/8/11**	**Wed 3/9/11**		
23	4.1 Develop Investment sheet	1 day	Tue 3/8/11	Tue 3/8/11	21	Specialists[200%]
24	4.2 Field Investment sheet	0.5 days	Wed 3/9/11	Wed 3/9/11	23	Executive director
25	**5 Send Report of necessity and Investment sheet to the superior echelon**	0.5 days	Wed 3/9/11	Wed 3/9/11	24	P.P.B.E.S. Officer
26	**6 Develop and field project for Municipality Hall**	**20 days**	**Tue 3/1/11**	**Mon 3/28/11**		
27	6.1 Develop project for Municipality Hall	5 days	Tue 3/1/11	Mon 3/7/11	17	Specialists[200%],Consultants,Administrative team,Team liders[200%],Secretary
28	6.2 Field project for Municipality Hall	1 day	Mon 3/28/11	Mon 3/28/11	27,38	Executive director,Specialists
29	**7 Obtain the environmental permit**	**5 days**	**Tue 3/1/11**	**Mon 3/7/11**	17	Administrative team
30	**8 Obtain the electricity permit**	**5 days**	**Tue 3/1/11**	**Mon 3/7/11**	17	Administrative team
31	**9 Obtain the notice of the water-channel**	**5 days**	**Tue 3/1/11**	**Mon 3/7/11**	17	Administrative team
32	**10 Develop and field request for Municipality Hall**	**1 day**	**Tue 3/1/11**	**Tue 3/1/11**	17	Communication team representative
33	**11 Keep in touch with superior echelon and local authorities**	**12 days**	**Thu 3/10/11**	**Fri 3/25/11**		
34	11.1 Keep in touch with superior echelon	10 days	Thu 3/10/11	Wed 3/23/11	25	P.P.B.E.S. Officer
35	11.2 Keep in touch with local authorities	10 days	Mon 3/14/11	Fri 3/25/11	29	Communication team representative
36	**12 Obtain all approvals from the superior echelon and local authorities**	**9 days**	**Wed 3/23/11**	**Tue 4/5/11**		
37	12.1 Obtain all approvals from the superior echelon	0 days	Wed 3/23/11	Wed 3/23/11	25,34	Project manager,P.P.B.E.S. Officer
38	12.2 Obtain all approvals from the local authorities	0 days	Fri 3/25/11	Fri 3/25/11	29,30,31,	Executive director
39	12.3 Send Project for Municipality Hall	1 day	Tue 3/29/11	Tue 3/29/11	28	Communication team representative
40	12.4 Obtain the approval from the Municipality Hall	5 days	Wed 3/30/11	Tue 4/5/11	35,39	Executive director
41	12.5 Municipality Hall response	0 days	Tue 4/5/11	Tue 4/5/11	40	Executive director
42	**13 Obtain necessary funds for project**	**18 days**	**Thu 3/24/11**	**Mon 4/18/11**		
43	13.1 Develop a Background note to get money in the budget	2 days	Thu 3/24/11	Fri 3/25/11	37	P.P.B.E.S. Officer
44	13.2 Field and send a Background note to get money in the budget	1 day	Mon 3/28/11	Mon 3/28/11	43	P.P.B.E.S. Officer
45	13.3 Keep in touch with P.P.B.E.S. from superior echelon	10 days	Tue 3/29/11	Mon 4/11/11	44	P.P.B.E.S. Officer
46	13.4 Get a new budget that contain sufficient budgetary provisions for building modernize	5 days	Tue 4/12/11	Mon 4/18/11	44,45	P.P.B.E.S. Officer
47	13.5 Getting the funds	0 days	Mon 4/18/11	Mon 4/18/11	46	P.P.B.E.S. Officer
48	**14 Develop and field Report of necessity for acquisition of service**	**2 days**	**Tue 4/19/11**	**Wed 4/20/11**		
49	14.1 Develop Report of necessity for acquisition	1.5 days	Tue 4/19/11	Wed 4/20/11	47	Specialists
50	14.2 Field Report of necessity for acquisition	0.5 days	Wed 4/20/11	Wed 4/20/11	49	Executive director
51	**15 Introduce the service in the Annual Procurement Program**	2 days	Thu 4/21/11	Fri 4/22/11	50	P.P.B.E.S. Officer
52	**16 Develop and field the Specification**	**3 days**	**Thu 4/21/11**	**Mon 4/25/11**		
53	16.1 Develop the Specification	2 days	Thu 4/21/11	Fri 4/22/11	50	Specialists[400%],Consultants[200%]

ID	Task Name	Duration	Start	Finish	Predeces	Resource Names
54	16.2 Field the Specification	1 day	Mon 4/25/11	Mon 4/25/11	53	Executive director
55	**17 Develop and field the Grade estimation for establishing the acquisition procedure**	**1.5 days**	**Tue 4/26/11**	**Wed 4/27/11**		
56	17.1 Develop the Grade estimation for establishing the acquisition procedure	1 day	Tue 4/26/11	Tue 4/26/11	50,51,54	Acquisitions Manager,Specialists Acquisition
57	17.2 Field the Grade estimation for establishing the acquisition procedure	0.5 days	Wed 4/27/11	Wed 4/27/11	56	Acquisitions Manager
58	**18 Develop and field the Note evidence regarding to choosing the acquisition procedure**	**1.5 days**	**Wed 4/27/11**	**Thu 4/28/11**		
59	18.1 Develop the Note evidence regarding to choosing the acquisition procedure	1 day	Wed 4/27/11	Thu 4/28/11	57	Acquisitions Manager,Specialists Acquisition
60	18.2 Field the Note evidence regarding to choosing the acquisition procedure	0.5 days	Thu 4/28/11	Thu 4/28/11	59	Acquisitions Manager
61	**19 Develop and field the Note evidence regarding to establishing qualification requirements**	**1.5 days**	**Fri 4/29/11**	**Mon 5/2/11**		
62	19.1 Develop the Note evidence regarding to establishing qualification requirements	1 day	Fri 4/29/11	Fri 4/29/11	60	Acquisitions Manager,Specialists Acquisition
63	19.2 Field the Note evidence regarding to establishing qualification requirements	0.5 days	Mon 5/2/11	Mon 5/2/11	62	Acquisitions Manager
64	**20 Develop and field the Tender documentation**	**1 day**	**Mon 5/2/11**	**Tue 5/3/11**		
65	20.1 Develop the Tender documentation	0.5 days	Mon 5/2/11	Mon 5/2/11	57,60,63	Acquisitions Manager,Specialists Acquisition
66	20.2 Field the Tender documentation	0.5 days	Tue 5/3/11	Tue 5/3/11	65	Acquisitions Manager
67	**21 Publish Call for papers in Public Acquisition Electronic Sistem**	1 day	Tue 5/3/11	Wed 5/4/11	66	Acquisitions Manager,Specialists Acquisition
68	**22 Submitting applications (offerts)**	1 day	Wed 5/4/11	Thu 5/5/11	67	Acquisitions Manager,Specialists Acquisition
69	**23 Open applications (offerts)**	1 day	Thu 5/5/11	Fri 5/6/11	68	Acquisitions Manager,P.P.B.E.S. Officer,Project manager,Secretary,Specialists Acquisition
70	**24 Evaluate applications (offerts)**	5 days	Fri 5/6/11	Fri 5/13/11	69	Project manager,Executive director,Acquisitions Manager,Specialists Acquisition,P.P.B.E.S. Officer,Secretary
71	**25 Develop and field Report procedure**	1 day	Fri 5/13/11	Mon 5/16/11	70	Project manager,Executive director,Acquisitions Manager,Specialists Acquisition,P.P.B.E.S. Officer,Secretary
72	**26 Communicate the result of procedure**	1 day	Mon 5/16/11	Tue 5/17/11	71	Acquisitions Manager,Specialists Acquisition
73	**27 Solve possible appeal**	10 days	Tue 5/17/11	Tue 5/31/11	72	Project manager,Executive director,Acquisitions Manager,Specialists Acquisition,P.P.B.E.S. Officer,Secretary
74	**28 Sign the contract with the winner company**	0.25 days	Tue 5/31/11	Tue 5/31/11	72,73	Sponsor - The Chief of Land Forces Academy,Accountant,Acquisitions Manager,Company project manager
75	**29 Make acquisition file**	1 day	Tue 5/31/11	Wed 6/1/11	74	Acquisitions Manager,Specialists Acquisition
76	**30 Repair the roof**	**6 days**	**Tue 5/31/11**	**Wed 6/8/11**		
77	30.1 Scraping the old roof	2 days	Tue 5/31/11	Thu 6/2/11	74	Company representative specialist that will run the building modernization nr.1,Officer with the material
78	30.2 Install new roof	4 days	Thu 6/2/11	Wed 6/8/11	77	Company representative specialist that will run the building modernization nr.1
79	**31 Achieve new space repartitioning**	**17 days**	**Wed 6/8/11**	**Fri 7/1/11**		
80	31.1 Dismantling the old plumbing and electrical installation	3 days	Wed 6/8/11	Mon 6/13/11	78	Company representative specialist that will run the building modernization nr.2
81	31.2 Demolish interior walls (less of the resistance walls)	5 days	Mon 6/13/11	Mon 6/20/11	80	Company representative specialist that will run the building modernization nr.1
82	31.3 Frame interior walls	9 days	Mon 6/20/11	Fri 7/1/11	81	Company representative specialist that will run the building modernization nr.1
83	**32 Plumbing**	**37 days**	**Fri 7/1/11**	**Tue 8/23/11**		
84	32.1 Install water lines	5 days	Fri 7/1/11	Fri 7/8/11	82	Company representative specialist that will run the building modernization nr.2
85	32.2 Setting sanitary	3 days	Fri 7/8/11	Wed 7/13/11	84	Company representative specialist that will run the building modernization nr.1
86	32.3 Setting heating instalation	5 days	Tue 8/16/11	Tue 8/23/11	94	Company representative specialist that will run the building modernization nr.2
87	**33 Electrical**	**34 days**	**Fri 7/8/11**	**Thu 8/25/11**		
88	33.1 Install wiring	8 days	Fri 7/8/11	Wed 7/20/11	84	Company representative specialist that will run the building modernization nr.2
89	33.2 Install outlets/switches	2 days	Tue 8/23/11	Thu 8/25/11	94	Company representative specialist that will run the building modernization nr.2
90	**34 Interior**	**41 days**	**Mon 6/20/11**	**Tue 8/16/11**		
91	34.1 Install drywall on the ceilling and walls	5 days	Wed 7/20/11	Wed 7/27/11	88	Company representative specialist that will run the building modernization nr.3
92	34.2 Carryng out carpentry work	10 days	Wed 7/27/11	Wed 8/10/11	91	Company representative specialist that will run the building modernization nr.3
93	34.3 Install carpets	5 days	Mon 6/20/11	Mon 6/27/11	81	Company representative specialist that will run the building modernization nr.3
94	34.4 Install painting	4 days	Wed 8/10/11	Tue 8/16/11	91,92,93	Company representative specialist that will run the building modernization nr.3
95	**35 Exterior**	**16 days**	**Wed 8/10/11**	**Thu 9/1/11**		
96	35.1 Repairing façade	2 days	Wed 8/10/11	Fri 8/12/11	92	Company representative specialist that will run the building modernization nr.1
97	35.2 Isolating facade	9 days	Fri 8/12/11	Thu 8/25/11	96	Company representative specialist that will run the building modernization nr.1
98	35.3 Painting façade	5 days	Thu 8/25/11	Thu 9/1/11	97	Company representative specialist that will run the building modernization nr.1
99	**36 Make initial reception**	0.75 days	Thu 9/1/11	Fri 9/2/11	86,98	Executive director,Specialists[400%],Team liders[200%],Administrative team,Acquisitions Manager,Project manager,Company representative specialist
100	**37 Sign the initial reception forms**	0.25 days	Fri 9/2/11	Fri 9/2/11	99	Sponsor - The Chief of Land Forces Academy,Project manager,Executive director,Accountant,Company representative specialist
101	**38 Remediy any problems**	9 days	Fri 9/2/11	Thu 9/15/11	100	Company representative specialist that will run the building modernization nr.1
102	**39 Make final reception**	0.75 days	Thu 9/15/11	Fri 9/16/11	101	Project manager,Executive director,Acquisitions Manager,Specialists,Administrative team,Team liders,Company representative specialist
103	**40 Sign the final reception forms**	0.25 days	Fri 9/16/11	Fri 9/16/11	102	Sponsor - The Chief of Land Forces Academy,Accountant,Acquisitions Manager,Executive director,Project manager,Company representative specialist
104	**41 Pay money for work**	0 days	Fri 9/16/11	Fri 9/16/11	103	Accountant,P.P.B.E.S. Officer,Company project manager that will run the building modernization



Project: MANDACHE building moderniz
Date: Tue 3/29/11

Task
Milestone
Rolled Up Critical Task
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Group By Summary
Critical Task
Summary
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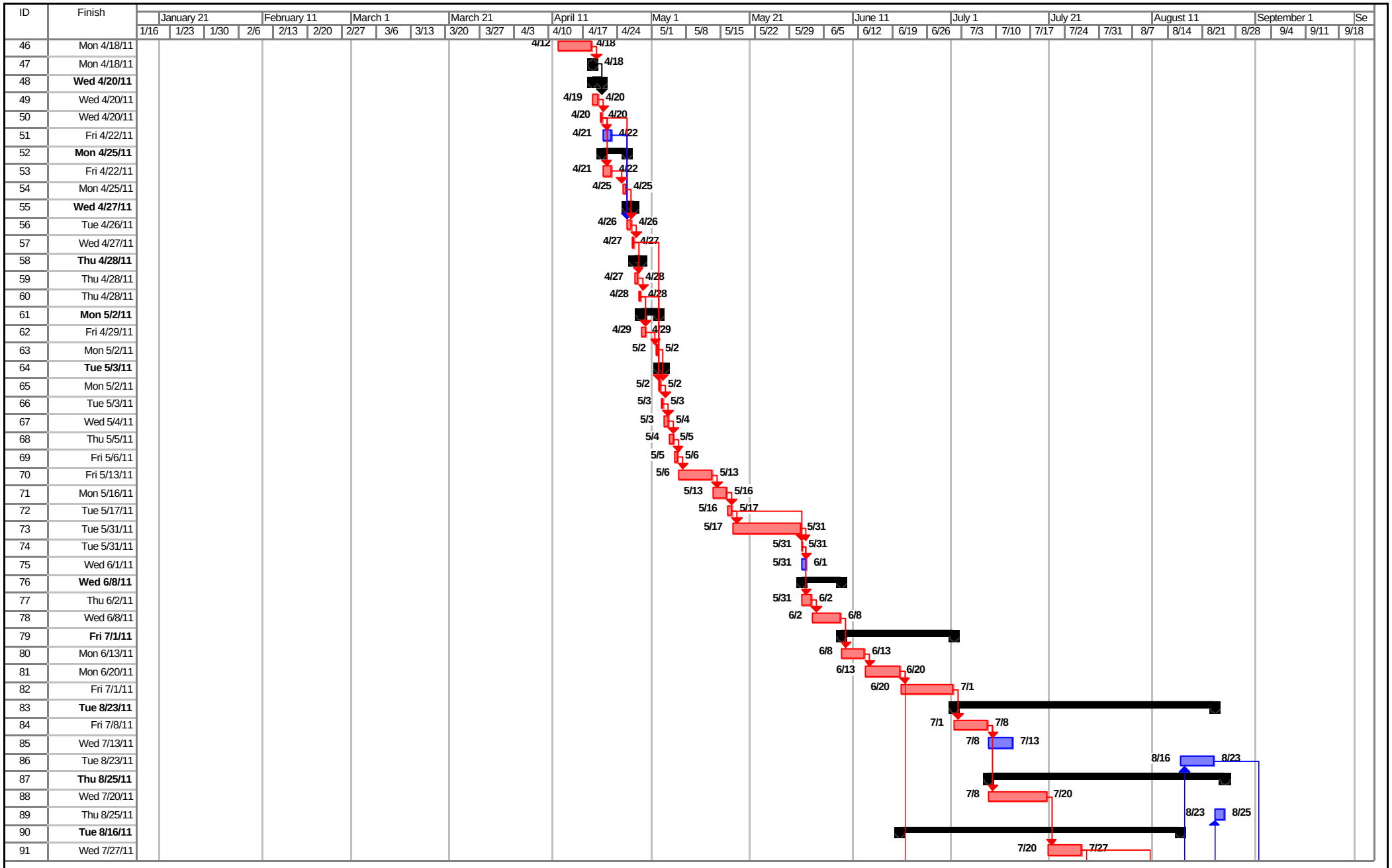
External Tasks
Deadline
Progress
Rolled Up Task
Rolled Up Progress
Project Summary



Project: MANDACHE building moderniz
Date: Tue 3/29/11

Task
Critical Task
Progress
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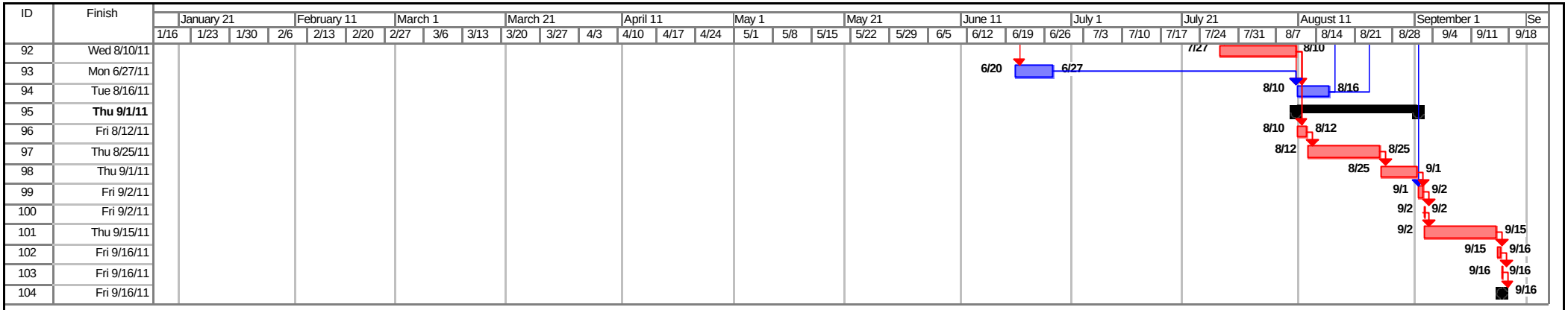
Split
External Tasks
Project Summary
Group By Summary
Deadline



Project: MANDACHE building moderniz
Date: Tue 3/29/11

Task	Milestone	Rolled Up Critical Task	Split	Group By Summary
Critical Task	Summary	Rolled Up Milestone	External Tasks	Deadline
Progress	Rolled Up Task	Rolled Up Progress	Project Summary	

Budget Report as of Tue 3/29/11
MANDACHE building modernization.mpp

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
0	**Mandache building modernization**	**$0.00**	**Prorated**	**$177,371.00**	**$0.00**	**$177,371.00**	**$0.00**	**$177,371.00**
104	Pay money for work	$0.00	Prorated	$90,000.00	$0.00	$90,000.00	$0.00	$90,000.00
76	**Repair the roof**	**$0.00**	**Prorated**	**$75,000.00**	**$0.00**	**$75,000.00**	**$0.00**	**$75,000.00**
77	Scraping the old roof	$0.00	Prorated	$75,000.00	$0.00	$75,000.00	$0.00	$75,000.00
73	Solve possible appeal	$0.00	Prorated	$2,500.00	$0.00	$2,500.00	$0.00	$2,500.00
7	**Investment analysis**	**$0.00**	**Prorated**	**$1,765.00**	**$0.00**	**$1,765.00**	**$0.00**	**$1,765.00**
1	**Mission analysis**	**$0.00**	**Prorated**	**$1,557.13**	**$0.00**	**$1,557.13**	**$0.00**	**$1,557.13**
70	Evaluate applications (offerts)	$0.00	Prorated	$1,250.00	$0.00	$1,250.00	$0.00	$1,250.00
12	**Final Investment Decision**	**$0.00**	**Prorated**	**$882.50**	**$0.00**	**$882.50**	**$0.00**	**$882.50**
8	**Initial Investment Decision**	**$0.00**	**Prorated**	**$812.50**	**$0.00**	**$812.50**	**$0.00**	**$812.50**
26	**Develop and field project for Municipa**	**$0.00**	**Prorated**	**$798.50**	**$0.00**	**$798.50**	**$0.00**	**$798.50**
33	**Keep in touch with superior echelon a**	**$0.00**	**Prorated**	**$725.00**	**$0.00**	**$725.00**	**$0.00**	**$725.00**
27	Develop project for Municipality Hall	$0.00	Prorated	$711.00	$0.00	$711.00	$0.00	$711.00
42	**Obtain necessary funds for project**	**$0.00**	**Prorated**	**$675.00**	**$0.00**	**$675.00**	**$0.00**	**$675.00**
15	Documentation	$0.00	Prorated	$545.00	$0.00	$545.00	$0.00	$545.00
2	Identify Projected Demand for Services	$0.00	Prorated	$491.25	$0.00	$491.25	$0.00	$491.25
34	Keep in touch with superior echelon	$0.00	Prorated	$375.00	$0.00	$375.00	$0.00	$375.00
45	Keep in touch with P.P.B.E.S. from superi	$0.00	Prorated	$375.00	$0.00	$375.00	$0.00	$375.00
35	Keep in touch with local authorities	$0.00	Prorated	$350.00	$0.00	$350.00	$0.00	$350.00
3	Identify Technological Opportunities	$0.00	Prorated	$348.75	$0.00	$348.75	$0.00	$348.75
4	Identify Projected Supply of Services	$0.00	Prorated	$336.50	$0.00	$336.50	$0.00	$336.50
18	**Develop and field Report of necessity**	**$0.00**	**Prorated**	**$312.50**	**$0.00**	**$312.50**	**$0.00**	**$312.50**
10	Analysis	$0.00	Prorated	$285.00	$0.00	$285.00	$0.00	$285.00
36	**Obtain all approvals from the superio**	**$0.00**	**Prorated**	**$285.00**	**$0.00**	**$285.00**	**$0.00**	**$285.00**

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
11	Documentation	$0.00	Prorated	$272.50	$0.00	$272.50	$0.00	$272.50
52	**Develop and field the Specification**	**$0.00**	**Prorated**	**$267.50**	**$0.00**	**$267.50**	**$0.00**	**$267.50**
5	Mission Needs Analysis and Assessment	$0.00	Prorated	$260.63	$0.00	$260.63	$0.00	$260.63
9	Planning	$0.00	Prorated	$255.00	$0.00	$255.00	$0.00	$255.00
40	Obtain the approval from the Municipality	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
71	Develop and field Report procedure	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
19	Detail Background note for repair and mod	$0.00	Prorated	$225.00	$0.00	$225.00	$0.00	$225.00
53	Develop the Specification	$0.00	Prorated	$217.50	$0.00	$217.50	$0.00	$217.50
99	Make initial reception	$0.00	Prorated	$215.50	$0.00	$215.50	$0.00	$215.50
14	Analysis	$0.00	Prorated	$210.00	$0.00	$210.00	$0.00	$210.00
69	Open applications (offerts)	$0.00	Prorated	$200.00	$0.00	$200.00	$0.00	$200.00
102	Make final reception	$0.00	Prorated	$196.13	$0.00	$196.13	$0.00	$196.13
46	Get a new budget that contain sufficient f	$0.00	Prorated	$187.50	$0.00	$187.50	$0.00	$187.50
13	Planning	$0.00	Prorated	$127.50	$0.00	$127.50	$0.00	$127.50
6	Initial Requirements Definition	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
29	Obtain the environmental permit	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
30	Obtain the electricity permit	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
31	Obtain the notice of the water-channel	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
22	**Develop and field Investment sheet**	**$0.00**	**Prorated**	**$100.00**	**$0.00**	**$100.00**	**$0.00**	**$100.00**
28	Field project for Municipality Hall	$0.00	Prorated	$87.50	$0.00	$87.50	$0.00	$87.50
55	**Develop and field the Grade estimatio**	**$0.00**	**Prorated**	**$87.50**	**$0.00**	**$87.50**	**$0.00**	**$87.50**
58	**Develop and field the Note evidence r**	**$0.00**	**Prorated**	**$87.50**	**$0.00**	**$87.50**	**$0.00**	**$87.50**
61	**Develop and field the Note evidence r**	**$0.00**	**Prorated**	**$87.50**	**$0.00**	**$87.50**	**$0.00**	**$87.50**
48	**Develop and field Report of necessity**	**$0.00**	**Prorated**	**$81.25**	**$0.00**	**$81.25**	**$0.00**	**$81.25**

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
23	Develop Investment sheet	$0.00	Prorated	$75.00	$0.00	$75.00	$0.00	$75.00
43	Develop a Background note to get money	$0.00	Prorated	$75.00	$0.00	$75.00	$0.00	$75.00
51	Introduce the service in the Annual Procu	$0.00	Prorated	$75.00	$0.00	$75.00	$0.00	$75.00
16	Rebaseline Decision	$0.00	Prorated	$70.00	$0.00	$70.00	$0.00	$70.00
56	Develop the Grade estimation for establis	$0.00	Prorated	$67.50	$0.00	$67.50	$0.00	$67.50
59	Develop the Note evidence regarding to c	$0.00	Prorated	$67.50	$0.00	$67.50	$0.00	$67.50
62	Develop the Note evidence regarding to e	$0.00	Prorated	$67.50	$0.00	$67.50	$0.00	$67.50
67	Publish Call for papers in Public Acquisitio	$0.00	Prorated	$67.50	$0.00	$67.50	$0.00	$67.50
68	Submitting applications (offerts)	$0.00	Prorated	$67.50	$0.00	$67.50	$0.00	$67.50
72	Communicate the result of procedure	$0.00	Prorated	$67.50	$0.00	$67.50	$0.00	$67.50
75	Make acquisition file	$0.00	Prorated	$67.50	$0.00	$67.50	$0.00	$67.50
49	Develop Report of necessity for acquisiti	$0.00	Prorated	$56.25	$0.00	$56.25	$0.00	$56.25
64	**Develop and field the Tender documer**	**$0.00**	**Prorated**	**$53.75**	**$0.00**	**$53.75**	**$0.00**	**$53.75**
103	Sign the final reception forms	$0.00	Prorated	$52.50	$0.00	$52.50	$0.00	$52.50
21	Field Report of necessity for repair and m	$0.00	Prorated	$50.00	$0.00	$50.00	$0.00	$50.00
54	Field the Specification	$0.00	Prorated	$50.00	$0.00	$50.00	$0.00	$50.00
100	Sign the initial reception forms	$0.00	Prorated	$42.50	$0.00	$42.50	$0.00	$42.50
20	Develop Report of necessity for repair an	$0.00	Prorated	$37.50	$0.00	$37.50	$0.00	$37.50
44	Field and send a Background note to get	$0.00	Prorated	$37.50	$0.00	$37.50	$0.00	$37.50
32	Develop and field request for Municipality	$0.00	Prorated	$35.00	$0.00	$35.00	$0.00	$35.00
39	Send Project for Municipality Hall	$0.00	Prorated	$35.00	$0.00	$35.00	$0.00	$35.00
65	Develop the Tender documentation	$0.00	Prorated	$33.75	$0.00	$33.75	$0.00	$33.75
24	Field Investment sheet	$0.00	Prorated	$25.00	$0.00	$25.00	$0.00	$25.00
50	Field Report of necessity for acquisition	$0.00	Prorated	$25.00	$0.00	$25.00	$0.00	$25.00

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
74	Sign the contract with the winner company	$0.00	Prorated	$22.50	$0.00	$22.50	$0.00	$22.50
57	Field the Grade estimation for establishing	$0.00	Prorated	$20.00	$0.00	$20.00	$0.00	$20.00
60	Field the Note evidence regarding to choc	$0.00	Prorated	$20.00	$0.00	$20.00	$0.00	$20.00
63	Field the Note evidence regarding to esta	$0.00	Prorated	$20.00	$0.00	$20.00	$0.00	$20.00
66	Field the Tender documentation	$0.00	Prorated	$20.00	$0.00	$20.00	$0.00	$20.00
25	Send Report of necessity and Investmen	$0.00	Prorated	$18.75	$0.00	$18.75	$0.00	$18.75
17	Final decision	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
37	Obtain all approvals from the superior ecl	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
38	Obtain all approvals from the local author	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
41	Municipality Hall response	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
47	Getting the funds	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
78	Install new roof	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
79	**Achieve new space repartitioning**	**$0.00**	**Prorated**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
80	Dismantling the old plumbing and electrica	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
81	Demolish interior walls (less of the resista	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
82	Frame interior walls	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
83	**Plumbing**	**$0.00**	**Prorated**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
84	Install water lines	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
85	Setting sanitary	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
86	Setting heating instalation	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
87	**Electrical**	**$0.00**	**Prorated**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
88	Install wiring	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
89	Install outlets/switches	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
90	**Interior**	**$0.00**	**Prorated**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
91	Install drywall on the ceilling and walls	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
92	Carryng out carpentry work	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
93	Install carpets	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
94	Install painting	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
95	**Exterior**	**$0.00**	**Prorated**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
96	Repairing façade	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
97	Isolating facade	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
98	Painting façade	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
101	Remediy any problems	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
		$0.00		**$177,371.01**	**$0.00**	**$177,371.01**	**$0.00**	**$177,371.01**

Researches about Modelling, Simulation of Operation and Optimization of a.c-a.c. Switch Mode Electronic Conversion Systems

Lecturer Ecaterina Liliana MIRON, PhD

Project name:

Researches about Modelling, Simulation of Operation and Optimization of c.a.-c.a. Switch Mode Electronic Conversion Systems

Project sponsor:

National Council of University Scientific Research (CNCSIS)

I. BUSINESS CASE

Current situation

The conversion of electrical energy from one to another form (alternating current – direct current, direct current –direct current, direct current – alternating current and alternating current – alternating current) had a new stage of development with the large usage of switch mode conversion electronic equipments. The switch mode power converters permitted the construction of power sources with high energetic parameters, which are reliable, light and small and in according to international regulation for the electrical energy quality.

In ac-ac switch mode converters, the conversion of energy is realized with the next modality of semiconductor devices command

1. Phase control
2. On-Off control
3. PWM technique (chopper)

The circuits with phase control and on-off control utilize the triacs and SCRs. These are studied and utilized on the large area. About the circuits with transistors (PWM) it can't say the same things, even if these have some advantage in accord of efficiency and power factor. The disadvantages of the PWM schemes are the problems of correct and sure command of their semiconductor devices.

The reduction of power consumption is one of the actual priorities. The international basic tendency is to optimize and to update the supply techniques for the protection of the ambient and to develop the alternative power supply too. In this respect, some papers at the national and international level are presented:

- Multilevel converters with high energetic parameters", author Dan Floricău, Review of Science Politic and Scientometry - Special number, 2005 - ISSN- 1582-1218;
- BUCK-BOOST PWM converters controlled by two independent switches, author Dorin Cismasiu, Proceedings of the National Conference with International participation Electrotechnics Applied in Industrial ECO-Reconstruction, Sibiu, 2005.
- „Single-phase PWM AC/AC Semiconductor Transformer Topologies and Applications", authors: Zbigniew Fedyczak, Ryszard Strzelecki, Grzegorz Benysek, 2001;
- „Modeling and Analysis of Static Var Compensator Based on Three Phase PWM Cuk AC-AC Converter", authors: Nam-Sup Choi, Yulong Li, 2005;
- „D-UPFC as a Voltage Regulator in the Distribution System", authors: Kyungsoo Lee, Kenichiro Yamaguchi, Hirotaka Koizumi, Kosuke Kurokawa, RENEWABLE ENERGY 2006 Proceedings;
- „Modelling and Analysis of STATCOM Based Voltage Regulator for Self-Excited Induction Generator with Unbalanced Loads", authors: Bhim Singh, S. S. Murthy, Sushma Gupta, TENCON 2003;

Solutions

The proposed study of optimization and modeling of ac-ac switch mode power supply with transistors (PWM) wants to be a chapter of the international research for development of the ac-ac conversion circuits with implication for energetic parameters.

Because in most of activity areas, the existing equipments ask power supplies with an ac-ac conversion section, the study proposes to develop a facile design method of switch mode

power supply and a selection method of ac-ac converters structural circuits in function of the asked application.

In context of the area development where the ac-ac energy conversion is made in too steps: ac-dc and dc-ac, the study removes the stage of transition on dc step with keeping the all consequence:

1. The necessity to realize a method of calculus of electrical quantities values from converter circuits, in transient state and steady state too.
2. The necessity to develop the performing models (the element of novelty of study) which can be use in simulation of ac-ac switch mode converters operation using dedicated programs: PSpice, MatLAB

The development of informatics systems has a major influence concerning all activities area, including the control of electrical and electronically equipments. In that way, the control and command of actual switch mode converters is implemented in a performance manner using microprocessor based systems. The subject of proposed study has in view the analyze and the implementation of the control and assistant command in ac-ac switch mode electronic converters.

The project novelty

Resides in the development of virtual models for the ac-ac (switch mode) conversion schemes with transistors, with PWM and APWM command. Another novelty is the development of control and assists command programs of the ac-ac (switch mode) conversion schemes with transistors.

Project feasibility

The scientific demarche projected is framed in the zone areas of boundary domains, having as important stages in his scroll:

1.The modeling and the operation simulation of the AC-AC (switch mode) converters with transistors;

2.The control and the assisted command of the AC-AC (switch mode) converters with transistors;

3.The optimization of the performances of the AC-AC (switch mode) converters with transistors.

The discussion of the project feasibility must take into account the novelty degree of the research study from conceptual point of view, which consists in virtual model realization of ac-ac switch mode converters. The solution of this objective, the mathematical modelling of

function stages of the ac-ac (switch mode) converters with transistors, is a realistic solution drives to the results gated closer to one real.

II. PROJECT SCOPE MANAGEMENT

II.1. Project goal

The project visas the elaboration of a mathematical model of c.a.-c.a. switch mode converters operation, respective a virtual model for their physical structure, able to achieve same functions as the classical models.

The finality of the project drives to the implementation of an automatic adjusting method of the power transfer at optimal parameters through computer assisted command.

II.2. Project objectives

For the goal defined above, we identified the following objectives:

1. The elaboration of mathematical models of the ac-ac (switch mode) conversion schemes with transistors, with PWM command.
2. The elaboration of mathematical models of the ac-ac (switch mode) conversion schemes with transistors, with APWM command.
3. The development of virtual models for the ac-ac (switch mode) conversion schemes with transistors, with PWM command.
4. The development of virtual models for the ac-ac (switch mode) conversion schemes with transistors, with APWM command.
5. The verification of the models of ac-ac (switch mode) conversion schemes with transistors.
6. The development of control and assist command programs of the ac-ac (switch mode) conversion schemes with transistors.
7. The performances optimization of the ac-ac (switch mode) conversion schemes with transistors.

The team members have studies and achievements in switch mode power area with encouraging results, as examples, the doctoral thesis and some papers:

Thesis: Contributions in ac Voltage Regulators Study and Designing Using in Temperature Control Systems, author Ecaterina-Liliana Miron

Papers:

About MathCAD Modeling of Buck PWM AC Regulators, authors: Miron L, Miron M, C.G. Constantinescu 8th International Conference on Applied and Theoretical Electricity ICATE 2006

Why these objectives?

The reason can be the one which results from the necessity of comparative analyse of both types of commands (PWM, APWM) with taking into account the energetic parameters from the conversion scheme output. The first type of command is found in specialized literature with preponderance to dc-dc switch conversion schemes and there are references in ac-ac switch conversions schemes. The second type, APWM, is found in few papers and researches. As a result of proposed analyze it want to find some modalities to implement this command. Finality of the research theme is the one to optimize and to facilitate the design activity. This signifies existence of another reason for the mentioned objectives.

II.3. Project activities and sub-activities corresponding to objectives

(Name of the obiective)		Associated activities
1.	The elaboration of mathematical models of the ac-ac conversion schemes with transistors, with PWM command	1.The elaboration of mathematical models of the different ac-ac conversion schemes with transistors, with PWM command 2.The elaboration of the programs for assisted simulation of ac-ac converters with transistors and PWM command 3.The comparing of the simulating and experimental results 4.The correcting and the improvement of the mathematical models and simulating programs of the ac-ac converters with transistors and PWM command.
2.	The elaboration of mathematical models of the ac-ac conversion schemes with transistors, with APWM command	1.The elaboration of mathematical models of the different ac-ac conversion schemes with transistors, with APWM command 2. The elaboration of the programs for assisted simulation of ac-ac converters with transistors and PWM command 3. The comparing of the simulating and experimental results 4. The correcting and the improvement of the mathematical models and simulating programs of the ac-ac converters with transistors and APWM command.
3.	The development of virtual models for the ac-ac conversion schemes with transistors, with PWM command.	1. The determination of the power transfer mathematic model of the function of the ac-ac converters with transistors and PWM command. 2. The verification of the power transfer approximation with montage help. 3. The development of virtual models for the ac-ac conversion schemes with transistors, with PWM command
4.	The development of virtual models for the ac-ac conversion schemes with	1. The determination of the power transfer mathematic model of the function of the ac-ac converters with transistors and APWM command. 2. The verification of the power transfer approximation with montage help.

(Name of the obiective)		Associated activities
	transistors, with APWM command.	3. The development of virtual models for the ac-ac conversion schemes with transistors, with APWM command
5.	The verification of the models of ac-ac conversion schemes with transistors.	1. The simulation of the function of the ac-ac conversion schemes with transistors and PWM command. 2. The simulation of the function of the ac-ac conversion schemes with transistors and APWM command 3. The comparing of the simulating and experimental results
6.	The development of control and assist command programs of the ac-ac (switch) conversion schemes with transistors.	1. The algorithm development of power transfer control in ac-ac converters with transistor and with PWM and APWM command 2. The development of the implementing program for the power transfer control algorithm in ac-ac converters with transistors and the PWM and APWM command
		3. The development of control and assist command programs of the ac-ac (switch) conversion schemes with transistors
7.	The development of the optimum of the performances of the ac-ac (switch) conversion schemes with transistors.	1. The comparative analyze of the energetic performances of the different ac-ac (switch) conversion schemes with transistors 2. The direction for the performances development and efficient use of ac-ac (switch) conversion schemes with transistors

Table 1. Project activities and sub-activities

III. HUMAN RESOURCES MANAGEMENT

The project initiating team is envisaged to consist of the following individuals: specialist in mathematics, simulation, PSpice, power transfer and programming in the different programs. The human resources necessary during each phase of the project, as well as the corresponding costs are presented in the Microsoft Project sheet annexed to the hereby paper, *appendix 2*.

IV. PROJECT COST MANAGEMENT

The total amount of money needed for this project is: 92360 dollars.

The total amount is justified by the elimination of the linear variation of the project. The linear variation was eliminated for the shorten of the project, although the costs grow by increasing team of each activities and sub activities.

The costs incurred by the hereby project are detailed in the Human Resources Costs Sheet annexed to the present project, *appendix 3*.

V. PROJECT QUALITY MANAGEMENT

Next, the deliverables and quality indicators are presented in connection to each activity:

Deliverables	Quality and review	Associated activities
1. mathematical models of the different ac-ac conversion schemes with transistors, with PWM command	Quality of human resources specialist in: mathematics (MathCAD), simulation (PSpice), The comparison of the waveforms of the simulating and experimental results shows a match between results by applying the methodology to be found in appendix 1	1.1.1 1.1.2
2. programs for assisted simulation of ac-ac converters with transistors and PWM command		1.1.3 quality 1.5.1
3. mathematical models of the different ac-ac conversion schemes with transistors, with APWM command	Quality of human resources specialist in: mathematics (MathCAD), simulation (PSpice), The comparison of the waveforms of the simulating and experimental results shows a match between results by applying the methodology to be found in appendix 1	1.2.1 1.2.2
4. programs for assisted simulation of ac-ac converters with transistors and APWM command		1.2.3 quality 1.5.2
5. mathematical model for power transfer of the function of the ac-ac converters with transistors and PWM	Quality of human resources specialist in: mathematics (MathCAD), programming (PSpice) Verification of the power transfer approximation with montage help	1.3.1 1.3.3
6. virtual models for the ac-ac conversion schemes with transistors, with PWM		1.3.2 quality
7. mathematical model for power transfer of the function of the ac-ac converters with transistors and APWM	Quality of human resources specialist in: mathematics (MathCAD), programming (PSpice) Verification of the power transfer approximation with montage help	1.4.1 1.4.3
8. virtual models for the ac-ac conversion schemes with transistors, with APWM		1.4.2 quality
9. control and assist command programs of the ac-ac (switch) conversion schemes with transistor	Quality of human resources who have experience in computer programming Quality of human resources who have experience in analog digital conversion	1.6.2 1.6.3 1.7.1 quality

Table 2. Project deliverables and quality indicators on each (sub)activity

VI. RISK MANAGEMENT PLAN

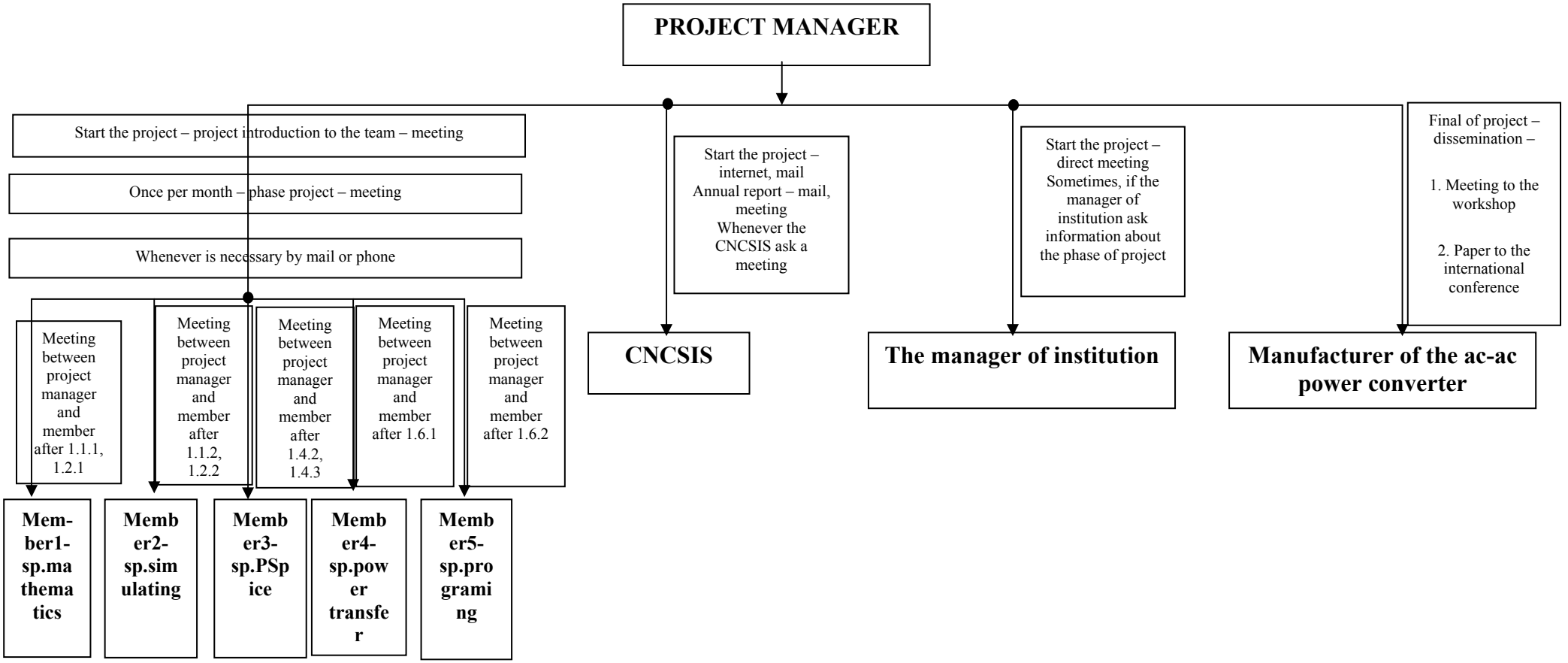
For the smooth running of the project, we have identified some of the risks that may hamper

Risk name	Risk description	Risk level	Risk approach
Lack of resources	fortuity work incapacity of the human resource involved in a certain activity of the project	Low	Research of the another member for the team who has the same specializing
Lack of material resources	the unavailability of physical processes analysis due to the existing software	Low	An IT specialist is included in the team and another may be consulted
Conflict within project team	Communication problems among team members	Low	Organize briefings and brainstorming sessions to enhance exchange of ideas (vertical and horizontal communication)
Management support	Management team do not support research process	Low	Regularly inform management team on research progress and impact
Project management experience	Project manager has little experience with similar projects and is new to project management	High	Foster communication and empowerment inside the project team to secure collective support

Table 3. Project risks – name, description, level, approach

VII. COMMUNICATION PLAN

For the purpose of successful project implementation, various communication lines and methods have been suggested, as the following diagram shows:



APPENDIX 1

Methodology of the research

The essential step of the ac-ac conversion study is constituted by the method determining of the conversion circuit power transfer to the load. This is the first point of the solution algorithm of the proposed objectives that are presented at the beginning. During the study will be utilized three research methods: quantitative, qualitative and experimental, which are combined for the final object to realize a simplification for the designing method of the ac-ac switch mode conversion circuits.

To realize the proposed objectives is necessary to treat like a first point, through a quantitative research, the PWM and APWM command methods. The study will continue with the solution of the equation systems that characterize the ac-ac switch mode converters circuits function, which for there are very difficult solution on mathematical way.

There are defined the next circuit quantities:

α: the turn on angle of the K_1 switch;

β: the turn on angle of the K_2 switch;

$i_{L\alpha\beta}$: the inductor current during $\alpha\beta$ period;

I_α: $i_{L\alpha\beta}$ initial value;

$u_{c\alpha\beta}$: the capacitor voltage during $\alpha\beta$ period;

U_α: $u_{c\alpha\beta}$ initial value;

$i_{L\beta\alpha}$: the inductor current during $\beta\alpha$ period;

I_β: $i_{L\beta\alpha}$ initial value;

$u_{c\beta\alpha}$: the capacitor voltage during $\beta\alpha$ period;

U_β: $u_{c\beta\alpha}$ initial value;

φ: phase angle

γ: duty factor

The determination of quantities expressions is the first step of the power transfer calculus. The next step is to study the circuit transient and steady state, step that completes the first objective solution. The research in this stage becomes the one quantitative; there are obtained the based quantities expressions. With these expressions will store data for a database that is necessary for the next sequences of the project algorithm. The research becomes quantitative too because it is realized for the each type of command, respectively for each type of ac-ac converter structure.

An example of calculus is made for the buck converter with PWM command.

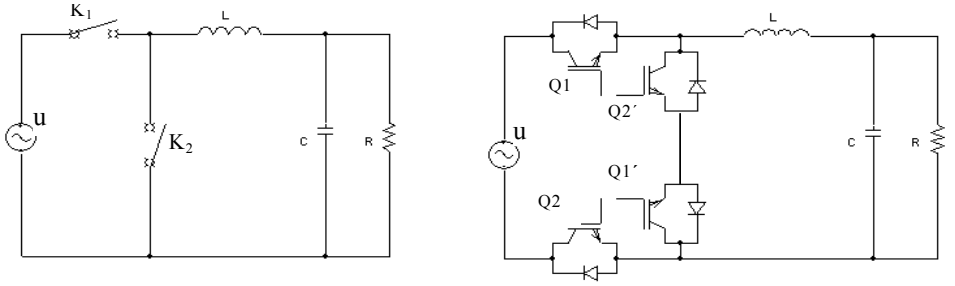


Fig.1. AC-AC Buck converter.

a) K_1 is turn off, K_2 is turn on, $\omega t \in [\alpha, \beta]$

$$\begin{cases} L\dfrac{di_L}{dt} + ri_L(t) + u_c(t) = u(t) \\ C\dfrac{du_C}{dt} = i_C(t) \\ \dfrac{u_C(t)}{R} = i_R(t) \\ i_C(t) + i_R(t) = i_L(t) \end{cases} \quad (1)$$

The initial conditions are:

$$\begin{cases} i_L(\omega t = \alpha) = I_\alpha \\ u_C(\omega t = \alpha) = U_{C\alpha} \end{cases} \quad (2)$$

The system is solved by Laplace method. In case of sinusoidal input voltage using Laplace transformation the system becomes:

$$\begin{cases} sLI_L(s) - LI_\alpha + rI_L(s) + U_C(s) = U(s) \\ sCU_C(s) - CU_{C\alpha} = I_C(s) \\ RI_R(s) = U_C(s) \\ I_C(s) + I_R(s) = I_L(s) \end{cases} \quad (3)$$

$$U(s) = U_m \frac{s \cdot \sin\alpha + \omega \cdot \cos\alpha}{s^2 + \omega^2}$$

b) K_1 is turn on, K_2 is turn off, $\omega t \in [\beta, \alpha]$

$$\begin{cases} L\dfrac{di_L}{dt} + ri_L + u_c = 0 \\ C\dfrac{du_C}{dt} = i_C \\ \dfrac{u_C}{R} = i_R \\ i_C + i_R = i_L \end{cases} \quad (4)$$

The initial conditions are:

$$\begin{cases} i_L(\omega t = \beta) = I_\beta \\ u_C(\omega t = \beta) = U_{C\beta} \end{cases} \quad (5)$$

The figure 2 waveforms and the matrix with minimum and maximum values of the currents I_α and I_β are obtained by MathCAD functions after the systems (1) and (4) solving.

During the K_1 turn on period and K_2 turn off period the quantities have the next expressions:

- the $i_{L\alpha\beta}$ current

$$iL\alpha\beta(t, r, L, C, \phi, \alpha, I\alpha, U\alpha, S) := Re\left[\sum_{k=0}^{last(S)} \frac{\Delta IL\alpha\beta\left(r, L, C, \phi, \alpha, I\alpha, U\alpha, S_k\right)}{\Delta 1\alpha\beta\left(r, L, C, \phi, S_k\right)} \cdot e^{S_k \cdot \left(t - \frac{\alpha}{\omega}\right)}\right]$$

- the $i_{R\alpha\beta}$ current

$$iR\alpha\beta(t, r, L, C, \phi, \alpha, I\alpha, U\alpha, S) := Re\left[\sum_{k=0}^{last(S)} \frac{\Delta IR\alpha\beta\left(r, L, C, \phi, \alpha, I\alpha, U\alpha, S_k\right)}{\Delta 1\alpha\beta\left(r, L, C, \phi, S_k\right)} \cdot e^{S_k \cdot \left(t - \frac{\alpha}{\omega}\right)}\right]$$

- the $i_{C\alpha\beta}$ current

$$iC\alpha\beta(t, r, L, C, \phi, \alpha, I\alpha, U\alpha, S) := Re\left[\sum_{k=0}^{last(S)} \frac{\Delta IC\alpha\beta\left(r, L, C, \phi, \alpha, I\alpha, U\alpha, S_k\right)}{\Delta 1\alpha\beta\left(r, L, C, \phi, S_k\right)} \cdot e^{S_k \cdot \left(t - \frac{\alpha}{\omega}\right)}\right]$$

- the $u_{C\alpha\beta}$ voltage

$$uC\alpha\beta(t,r,L,C,\phi,\alpha,I\alpha,U\alpha,S) := Re\left[\sum_{k=0}^{last(S)} \frac{\Delta UC\alpha\beta(r,L,C,\phi,\alpha,I\alpha,U\alpha,S_k)}{\Delta 1\alpha\beta(r,L,C,\phi,S_k)} \cdot e^{S_k\cdot\left(t-\frac{\alpha}{\omega}\right)}\right]$$

During the K_2 turn on period and K_1 turn off period the quantities have the next expressions:

- the $i_{L\beta\alpha}$ current

$$iL\beta\alpha(t,r,L,C,\phi,\beta,I\beta,U\beta,S) := Re\left[\sum_{k=0}^{last(S)} \frac{\Delta IL\beta\alpha(r,L,C,\phi,\beta,I\beta,U\beta,S_k)}{\Delta 1\beta\alpha(r,L,C,\phi,S_k)} \cdot e^{S_k\cdot\left(t-\frac{\beta}{\omega}\right)}\right]$$

- the $i_{R\beta\alpha}$ current

$$iR\beta\alpha(t,r,L,C,\phi,\beta,I\beta,U\beta,S) := Re\left[\sum_{k=0}^{last(S)} \frac{\Delta IR\beta\alpha(r,L,C,\phi,\beta,I\beta,U\beta,S_k)}{\Delta 1\beta\alpha(r,L,C,\phi,S_k)} \cdot e^{S_k\cdot\left(t-\frac{\beta}{\omega}\right)}\right]$$

- the $i_{C\beta\alpha}$ current

$$iC\beta\alpha(t,r,L,C,\phi,\beta,I\beta,U\beta,S) := Re\left[\sum_{k=0}^{last(S)} \frac{\Delta IC\beta\alpha(r,L,C,\phi,\beta,I\beta,U\beta,S_k)}{\Delta 1\beta\alpha(r,L,C,\phi,S_k)} \cdot e^{S_k\cdot\left(t-\frac{\beta}{\omega}\right)}\right]$$

- the $u_{C\beta\alpha}$ voltage

$$uC\beta\alpha(t,r,L,C,\phi,\beta,I\beta,U\beta,S) := Re\left[\sum_{k=0}^{last(S)} \frac{\Delta UC\beta\alpha(r,L,C,\phi,\beta,I\beta,U\beta,S_k)}{\Delta 1\beta\alpha(r,L,C,\phi,S_k)} \cdot e^{S_k\cdot\left(t-\frac{\beta}{\omega}\right)}\right]$$

The figure 2 waveforms are realized for steady state with the next condition:

$$i(\omega t = \alpha) = i(\omega t = \alpha + 2\cdot\pi) = I_\alpha \qquad (6)$$

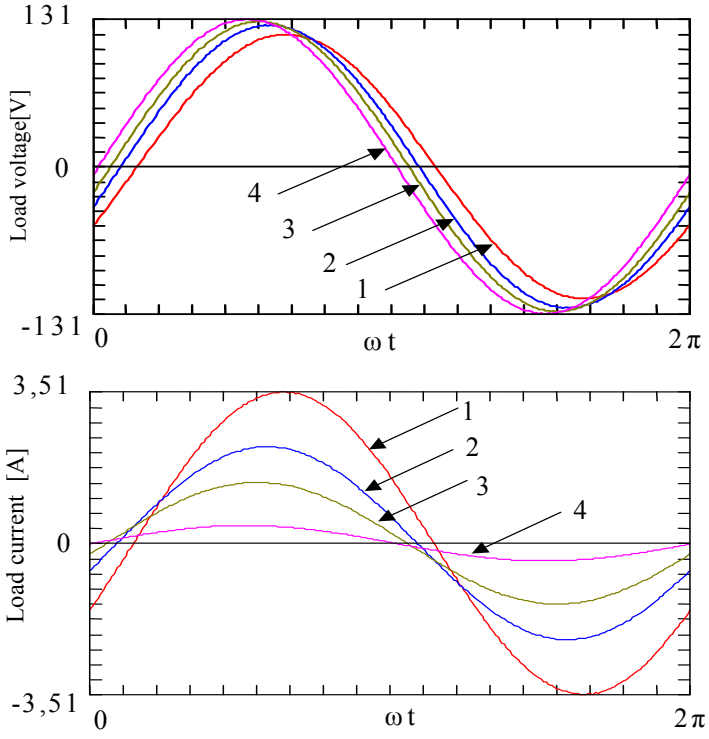


Fig.2. Load voltage and load current variations of ac-ac Buck converter in steady state:

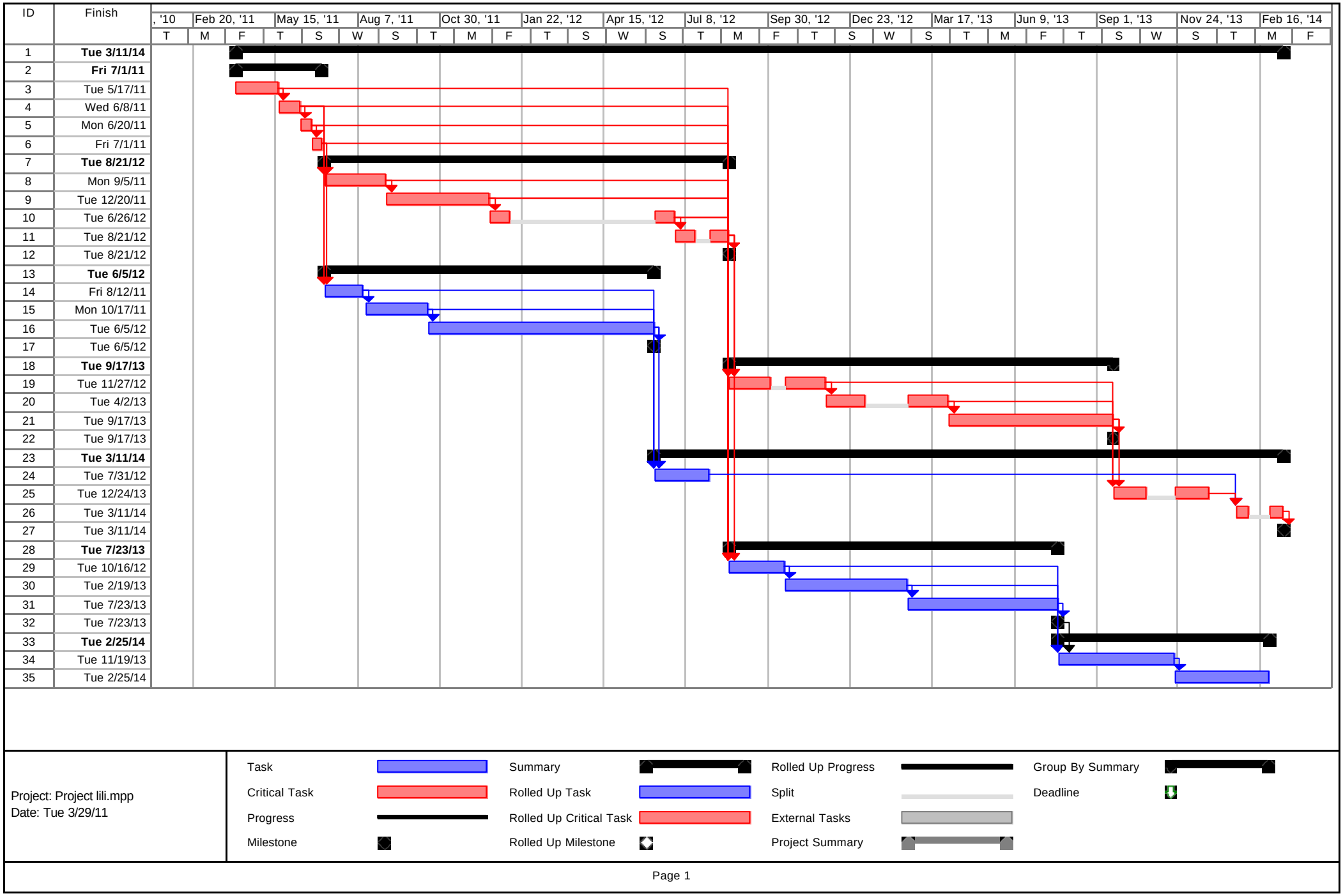
duty factor: $\gamma = 0{,}4$; load angle: 1) $\varphi = 6^o$; 2) $\varphi = 10^o$; 3) $\varphi = 16^o$; 4) $\varphi = 40^o$.

The database is obtained with the help of relations from (1) to (6) and contains: the duty factors; the load angles; the volt amp power on resistor; the active power on resistor; the reactive power on resistor; the deforming power on resistor; the volt amp power on capacitor; the active power on capacitor; the reactive power on capacitor; the deforming power on capacitor; the volt amp power on inductor; the active power on inductor; the reactive power on inductor; the deforming power on inductor.
This database is completed with the waveforms, which are collected with the help of an oscilloscope with memory. These forms represent different quantities of converter circuit.
The next step of the algorithm, the one that resolve the point 3 and 4 of the proposed study, are a qualitative research. This means that it verifies the calculus precision from the earlier steps. Determination of the approximation method of power transfer to load becomes the essential element necessary to realize the virtual model. Now there is necessary to verify the energetic balance with the obtained values from the earlier steps. It must specify that the verification stage can be covered thanks to existence of the experimental montage that is realized by a part of research team before the proposing of this study.
The first objective, the elaboration of the mathematical model for expression of the circuit operation, for each scheme of ac-ac converters, will be realized by the all members of the research team. This objective is formed by the accumulation stage of the knowledges and values. With their experience in energetic conversion area, the director of project, Miron Mihai, Constantinescu Cristian and Pana Gheorghe will realize the stage of interpretation and development of solution for circuits modeling.
The virtual model realization, the area innovation element will be made with the database which is obtained in anterior stages and which is verified in the experimental research stage. The director of project, Miron Mihai, Constantinescu Cristian and Pana Gheorghe will execute the objective because they have experience in PSpice simulation area too.
Gherman Laurian, Ursoiu Carmen and the other members of team will involve finding an optimal solution for the turn on / turn off control of switching elements from ac-ac converters. This means to realize a procedure to automatic regulation of the ac-ac converter output power depending by the load and duty factor. This continues with the development of the soft that will resolve the optimal control of switching elements to obtain high energetic parameters.
In order of development the next soft will use:

- MathCAD, MathLAB necessary for the values calculus and determination of the expressions of circuit characteristic quantities
- SP107E in experimental research stage, for the visualization of the waveforms.
- PSpice (ORCAD), LabVIEW in function simulation and ac-ac swintching converter modeling.

The characterization of the proposed theme as a fundamental research, becomes evidently because of existing feedback through the objectives solvent. The research starts with the study of the processes and phenomena which be held at ac-ac switching mode converters function, continues with the development of a new conceptual model for the ac-ac switching mode converters and finishes with the realization of the automatic and assisted regulation system for the ac-ac switching mode converters. All of these are made to obtain high energetic parameters.
It is clear that the proposed research subject can’t exist without a part of experimental research necessary to verify the theoretical results and the proposed solutions. The experimental research consists in development of the existing montage and development of new montage.

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1	**1 RESEARCHES ABOUT MODELING, SIMULATION OF OPERATION AND OPTIMIZATION OF C.A.-C.A. SWITCH MODE ELECTRONIC CONVERSION SYSTEMS**	**767 days**	**Mon 4/4/11**	**Tue 3/11/14**		
2	**1.1 The elaboration of mathematical models of the ac-ac conversion schemes with transistors, with PWM command**	**65 days**	**Mon 4/4/11**	**Fri 7/1/11**		
3	1.1.1 The elaboration of mathematical models of the different ac-ac conversion schemes with transistors, with PWM command	32 days	Mon 4/4/11	Tue 5/17/11		Mathematics,Simulating
4	1.1.2 The elaboration of the programs for assisted simulation of ac-ac converters with transistors and PWM command	16 days	Wed 5/18/11	Wed 6/8/11	3	Simulating ,Manager
5	1.1.3 The comparing of the simulating and experimental results	8 days	Thu 6/9/11	Mon 6/20/11	4	Simulating ,Manager,Transfer
6	1.1.4 The correcting and the improvement of the mathematical models and simulating programs of the ac-ac converters with transistors and PWM command.	9 days	Tue 6/21/11	Fri 7/1/11	5	Mathematics,Simulating
7	**1.2 The elaboration of mathematical models of the ac-ac conversion schemes with transistors, with APWM command**	**297 days**	**Mon 7/4/11**	**Tue 8/21/12**		
8	1.2.1 The elaboration of mathematical models of the different ac-ac conversion schemes with transistors, with APWM command	46 days	Mon 7/4/11	Mon 9/5/11	4,5,6	Mathematics,Simulating
9	1.2.2 The elaboration of the programs for assisted simulation of ac-ac converters with transistors and PWM command	76 days	Tue 9/6/11	Tue 12/20/11	8	Simulating ,Manager
10	1.2.3 The comparing of the simulating and experimental results	30 days	Wed 12/21/11	Tue 6/26/12	9	Simulating ,Manager,Transfer
11	1.2.4 The correcting and the improvement of the mathematical models and simulating programs of the ac-ac converters with transistors and APWM command.	30 days	Wed 6/27/12	Tue 8/21/12	10	Mathematics,Simulating
12	1.2.5 milestone	0 days	Tue 8/21/12	Tue 8/21/12	11	
13	**1.3 The development of virtual models for the ac-ac conversion schemes with transistors, with PWM command.**	**242 days**	**Mon 7/4/11**	**Tue 6/5/12**		
14	1.3.1 The determination of the power transfer mathematic model of the function of the ac-ac converters with transistors and PWM command.	30 days	Mon 7/4/11	Fri 8/12/11	4,5,6	Transfer,Manager
15	1.3.2 The verification of the power transfer approximation with montage help.	46 days	Mon 8/15/11	Mon 10/17/11	14	Simulating ,Transfer
16	1.3.3 The development of virtual models for the ac-ac conversion schemes with transistors, with PWM command	166 days	Tue 10/18/11	Tue 6/5/12	15	Pspice,Simulating
17	1.3.4 milestone	0 days	Tue 6/5/12	Tue 6/5/12	16	
18	**1.4 The development of virtual models for the ac-ac conversion schemes with transistors, with APWM command.**	**280 days**	**Wed 8/22/12**	**Tue 9/17/13**		
19	1.4.1 The determination of the power transfer mathematic model of the function of the ac-ac converters with transistors and APWM command.	60 days	Wed 8/22/12	Tue 11/27/12	9,10,11	Transfer,Manager,Mathematics
20	1.4.2 The verification of the power transfer approximation with montage help.	60 days	Wed 11/28/12	Tue 4/2/13	19	Simulating ,Transfer
21	1.4.3 The development of virtual models for the ac-ac conversion schemes with transistors, with APWM command	120 days	Wed 4/3/13	Tue 9/17/13	20	Pspice,Simulating
22	1.4.4 milestone	0 days	Tue 9/17/13	Tue 9/17/13	21	
23	**1.5 The verification of the models of ac-ac conversion schemes with transistors.**	**460 days**	**Wed 6/6/12**	**Tue 3/11/14**		
24	1.5.1 The simulation of the function of the ac-ac conversion schemes with transistors and PWM command.	40 days	Wed 6/6/12	Tue 7/31/12	14,15,16	Simulating ,Pspice
25	1.5.2 The simulation of the function of the ac-ac conversion schemes with transistors and APWM command.	50 days	Wed 9/18/13	Tue 12/24/13	19,20,21	Simulating ,Pspice
26	1.5.3 The comparing of the simulating and experimental results	20 days	Wed 1/22/14	Tue 3/11/14	24,25	Manager,Transfer,Simulating
27	1.5.4 milestone	0 days	Tue 3/11/14	Tue 3/11/14	26	
28	**1.6 The development of control and assist command programs of the ac-ac (switch) conversion schemes with transistors.**	**240 days**	**Wed 8/22/12**	**Tue 7/23/13**		
29	1.6.1 The algorithm development of power transfer control in ac-ac converters with transistor and with PWM and APWM command	40 days	Wed 8/22/12	Tue 10/16/12	8,9,10,11,3,4,5,6	Transfer,Mathematics
30	1.6.2 The development of the implementing program for the power transfer control algorithm in ac-ac converters with transistors and the PWM and APWM command	90 days	Wed 10/17/12	Tue 2/19/13	29	Programming,Mathematics,Transfer
31	1.6.3 The development of control and assist command programs of the ac-ac (switch) conversion schemes with transistors	110 days	Wed 2/20/13	Tue 7/23/13	30	Programming,Mathematics,Transfer
32	1.6.4 milestone	0 days	Tue 7/23/13	Tue 7/23/13	31	
33	**1.7 The development of the optimum of the performances of the ac-ac (switch) conversion schemes with transistors.**	**155 days**	**Wed 7/24/13**	**Tue 2/25/14**		
34	1.7.1 The comparative analyze of the energetic performances of the different ac-ac (switch) conversion schemes with transistors	85 days	Wed 7/24/13	Tue 11/19/13	29,30,32	Manager,Simulating ,Transfer
35	1.7.2 The direction for the performances development and efficient use of ac-ac (switch) conversion schemes with transistors	70 days	Wed 11/20/13	Tue 2/25/14	34	Manager,Simulating ,Transfer



Project: Project lili.mpp
Date: Tue 3/29/11

Task	Summary	Rolled Up Progress	Group By Summary
Critical Task	Rolled Up Task	Split	Deadline
Progress	Rolled Up Critical Task	External Tasks	
Milestone	Rolled Up Milestone	Project Summary	

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ID	Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar
1	Manager	Work		M		100%	$5.00/hr	$0.00/hr	$0.00	Prorated	Standard
2	Mathematics	Work		M		100%	$5.00/hr	$0.00/hr	$0.00	Prorated	Standard
3	Simulating	Work		S		100%	$5.00/hr	$0.00/hr	$0.00	Prorated	Standard
4	Pspice	Work		P		100%	$10.00/hr	$0.00/hr	$0.00	Prorated	Standard
5	Transfer	Work		T		100%	$5.00/hr	$0.00/hr	$0.00	Prorated	Standard
6	Programming	Work		P		100%	$4.00/hr	$0.00/hr	$0.00	Prorated	Standard
7	acquisition manager	Work		a		100%	$8,600.00/yr	$0.00/hr	$0.00	Prorated	Standard
8	16	Work		1		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard
9	26	Work		2		100%	$0.00/hr	$0.00/hr	$0.00	Prorated	Standard

Budget Report as of Tue 3/29/11
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ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
1	**RESEARCHES ABOUT MODELING, SIM**	**$0.00**	**Prorated**	**$92,360.00**	**$0.00**	**$92,360.00**	**$0.00**	**$92,360.00**
18	**The development of virtual models for**	**$0.00**	**Prorated**	**$20,400.00**	**$0.00**	**$20,400.00**	**$0.00**	**$20,400.00**
13	**The development of virtual models for**	**$0.00**	**Prorated**	**$19,200.00**	**$0.00**	**$19,200.00**	**$0.00**	**$19,200.00**
28	**The development of control and assist**	**$0.00**	**Prorated**	**$18,880.00**	**$0.00**	**$18,880.00**	**$0.00**	**$18,880.00**
16	The development of virtual models for the	$0.00	Prorated	$14,400.00	$0.00	$14,400.00	$0.00	$14,400.00
21	The development of virtual models for the	$0.00	Prorated	$14,400.00	$0.00	$14,400.00	$0.00	$14,400.00
33	**The development of the optimum of th**	**$0.00**	**Prorated**	**$10,800.00**	**$0.00**	**$10,800.00**	**$0.00**	**$10,800.00**
7	**The elaboration of mathematical mode**	**$0.00**	**Prorated**	**$10,360.00**	**$0.00**	**$10,360.00**	**$0.00**	**$10,360.00**
31	The development of control and assist cc	$0.00	Prorated	$8,960.00	$0.00	$8,960.00	$0.00	$8,960.00
23	**The verification of the models of ac-ac**	**$0.00**	**Prorated**	**$7,200.00**	**$0.00**	**$7,200.00**	**$0.00**	**$7,200.00**
30	The development of the implementing prc	$0.00	Prorated	$6,720.00	$0.00	$6,720.00	$0.00	$6,720.00
2	**The elaboration of mathematical mode**	**$0.00**	**Prorated**	**$5,520.00**	**$0.00**	**$5,520.00**	**$0.00**	**$5,520.00**
34	The comparative analyze of the energetic	$0.00	Prorated	$5,400.00	$0.00	$5,400.00	$0.00	$5,400.00
35	The direction for the performances devel	$0.00	Prorated	$5,400.00	$0.00	$5,400.00	$0.00	$5,400.00
8	The elaboration of mathematical models	$0.00	Prorated	$3,680.00	$0.00	$3,680.00	$0.00	$3,680.00
9	The elaboration of the programs for assis	$0.00	Prorated	$3,680.00	$0.00	$3,680.00	$0.00	$3,680.00
19	The determination of the power transfer r	$0.00	Prorated	$3,600.00	$0.00	$3,600.00	$0.00	$3,600.00
29	The algorithm development of power tran	$0.00	Prorated	$3,200.00	$0.00	$3,200.00	$0.00	$3,200.00
24	The simulation of the function of the ac-a	$0.00	Prorated	$3,000.00	$0.00	$3,000.00	$0.00	$3,000.00
25	The simulation of the function of the ac-a	$0.00	Prorated	$3,000.00	$0.00	$3,000.00	$0.00	$3,000.00
3	The elaboration of mathematical models	$0.00	Prorated	$2,560.00	$0.00	$2,560.00	$0.00	$2,560.00
14	The determination of the power transfer r	$0.00	Prorated	$2,400.00	$0.00	$2,400.00	$0.00	$2,400.00
15	The verification of the power transfer app	$0.00	Prorated	$2,400.00	$0.00	$2,400.00	$0.00	$2,400.00
20	The verification of the power transfer app	$0.00	Prorated	$2,400.00	$0.00	$2,400.00	$0.00	$2,400.00

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
10	The comparing of the simulating and expe	$0.00	Prorated	$1,800.00	$0.00	$1,800.00	$0.00	$1,800.00
4	The elaboration of the programs for assis	$0.00	Prorated	$1,280.00	$0.00	$1,280.00	$0.00	$1,280.00
11	The correcting and the improvement of th	$0.00	Prorated	$1,200.00	$0.00	$1,200.00	$0.00	$1,200.00
26	The comparing of the simulating and expe	$0.00	Prorated	$1,200.00	$0.00	$1,200.00	$0.00	$1,200.00
5	The comparing of the simulating and expe	$0.00	Prorated	$960.00	$0.00	$960.00	$0.00	$960.00
6	The correcting and the improvement of th	$0.00	Prorated	$720.00	$0.00	$720.00	$0.00	$720.00
12	milestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
17	milestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
22	milestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
27	milestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
32	milestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
		$0.00		**$92,360.00**	**$0.00**	**$92,360.00**	**$0.00**	**$92,360.00**

Improving the efficiency of IT system in Supply Directorate in order to carry out the future demands of Supply Directorate

LTC Mohd'A. ALOMOUSH

Business case

The IT System in Supply Directorate the operating system, the database, the equipment and the network are outdated. As a result of this, an upgrading of the IT system is necessary. The following reasons underline this necessity:

1.Equipment.

Since the equipment is too old (e.g. Server is Avion Data General, Dummy Terminals (Sedco, D217)) it is very difficult to find spare parts either on the local market or outside country. Therefore, these spare parts are assumed to be exported from abroad (USA). However, the supply of such parts outside Jordan is quite rare. Hence the prices are high (Dummy Terminal about 800$, CPU about 2000$) and the time needed for purchasing and obtaining them is too long (at least two months). As a result, the costs incurred by spare parts acquisition are too high compared to the benefits. In an optimistic prediction these equipment will not be functioned more than one year.

2.The Database.

It is an old version (oracle 7.3) as compared to the database that already used in IT Directorate (oracle 10g). The compatibility of the databases will facilitate and improve the maintenance of these databases. As a result of compatibility we can train one team to do maintenance for all databases.

Consequently, no domestic company provides technical support and the Original company is located outside the country also will not provides technical support because this (database oracle 7) is out of date; so if serious a problem happened (control file corrupted, data file damaged) which means that our data is in a critical situation because the original company will not responsible to find any solution.

3.Operating System.

It is an old version (Sco Unix) and there is no technical support from any domestic company and the Original company which is outside the country because this operating system is out of date so the original company which produced this type is not responsible to find ay solution for you if a critical problem happened (one of booting files damaged). This means that our system is critical situation because of the relation with database (one system file damaged in working day so we cannot see our data until we solve this problem)

4.Programs.

It is an old version (Developer 2000) that we have not any technical support from any local company and the Original company. This means that we will face a problem in fixing errors and modifying the application related to the customer demands.

5.Experts.

Because the application programs and database are old version we have few persons (four persons; two of them will get retired within two years) who still close to these application because no one at this time wants to learn how to deal with this programs; because there are not available at the schedule of training companies and also no one wants to learn old software. Thus, not only is the number of experts a small one, but costs of hiring consultants are high (200$/h).

Recommendation

We should be a ware to the problem that we will face in accordance to the expectation of the IT system in Supply Directorate because of the old of database, applications, operating system, equipments and a rare of experts so we are obliged to upgrade the database, developments tool(developer 10g),conversion data, and application, and changing the equipments. So the suggested procedure to fix this problem will be

through upgrading the Database from version 7 to version 10g and application from developer 2000 to developer 10g. Replaced the OS from Sco Unix To Redhat Linux. The upgrading for software related to Database and application, installing Os and modifying the network will be done by IT Directorate. Purchasing the equipment will be from the budget of Supply Directorate and the amount of money that we will need is approximately (32700$).

4. Project scope management

4.1. Project goal

The project goal is to improve the efficiency of IT system in Supply Directorate in order to carry out the future demands of Supply Directorate.

4.2. Project objectives

For the goal defined above, we identified the following objectives:

1. Installing operating system, (Redhat linux), Upgrading database from oracle 7 to oracle 10 g and the application from oracle developer 2000 to developer 10g to improve the efficiency of the IT System in Supply Directorate.
2. Converting the application from oracle developer 2000 to developer 10g to improve the efficiency of the IT System in Supply Directorate.

3. Purchasing the equipment for the IT SYSTEM in Supply Directorate.

4. Modifying the network in Supply Directorate to absorb the new system.

5. Purchasing, licenses (Oracle database, developer 10 and Redhat linux) for Supply Directorate to establish the new IT system.

4.3. Project activities and sub-activities corresponding to objectives

O1. Installing operating system, (Redhat linux),Upgrading database from oracle 7 to oracle 10 g and the application from oracle developer 2000 to developer 10g to improve the efficiency of the IT System in Supply Directorate.

1.1.Training workshop to show the installing of operating system (Redhat linux),oracle database 10g and developer 10g to the database administrators in IT directorate.

1.2. Installing process of operating system (Redhat linux), oracle database (10 g) and developer10g on servers in Supply Directorate.

O2. Converting the application from oracle developer 2000 to developer 10g to improve the efficiency of the IT System in Supply Directorate.

2.1 Training workshop to explain the procedure of the conversion process for the applications from developer 2000 to developer 10g.
2.2 Converting process for applications from developer 200 to developer 10g in Supply Directorate.
2.3 Converting process for Data from 7 bit to 8 bit in Supply Directorate.

2.3. Testing process for IT System in Supply Directorate.

O3. Purchasing the equipment for the IT SYSTEM in Supply Directorate.

3.1 Sending requests by Procurement Directorate to the companies of the equipments list that will used to accomplish the IT System in the supply Directorate (Server,workstations, printers, switches, cables,….) in order to send there offers..
3.2 Receiving companies offers by Procurement Directorate to the equipment of Supply Directorate.
3.3Anylizing offers by Procurement Directorate and send approval to the company that has the best offer.
3.3 Receiving equipment by Procurement Directorate from the company that her offer is accepted to provide the equipment to Supply Directorate.

O4. Modifying the network in Supply Directorate to absorb the new system.

4.1 Modifying network infra structure to be ready to establish a network for the new system in Supply Directorate.

4.2 Installing equipment in Supply Directorate.

O5 Purchasing, licenses (Oracle database,developer 10 and redhat linux) for Supply Directorate to establish the new IT system.

5.1 Sending requests by IT Directorate to the companies in order to buy licensees to implemented in Supply Directorate.

5.2 Receiving companies offers by IT Directorate for the licensees to be implemented in Supply Directorate.

5.3Anylizing offers by IT Directorate and send approval to the company that has the best offer.

5.3 Receiving licenses by IT Directorate from the company that her offer is accepted to be installed in Supply Directorate.

5. Project Time Management

The start date and the end date of each activity and sub-activity are presented in the Gantt chart annexed to the hereby project.

6. Human Resources Management

The human resources necessary during each phase of the project, as well as the corresponding costs are presented in the Microsoft Project sheet annexed to the hereby paper.

7. Project Cost Management

Next, the costs are presented in connection to each to recourse. As it becomes obvious from the first to fourth no costs are allocated because the resources are already in place within the Jordan Armed Forces (The human resource as well as the services including Transportation, Food, Drinks**).**

Seq.No	Resource	Name	cost	Source
1	Human	DBA team leader|(1) Development team leader(1) Technical team leader(1) Development team(3) DBA team (2) Technical team (3)	zero	Jordan Armed forces
2	Equipment	Server(1) Workstation(5) Printer(1) Switch(1)	zero	IT Directorate
3	Services	Transportation Food Drinks	zero	Jordan Army
4	Material	Stationary	zero	
5	Services	DBA training	1200$	Project Budget
6	Services	Programmers Training	1500$	Project Budget

8. Project Quality Management

Next, the deliverables and quality indicators are presented in connection to each activity:

Deliverables

Type	Name	Activity Code	Quality Measurements	Responsibility
Equipment	**Servers, workstations, switches, cables, UBS**	**6, 6.1, 6.2, 7, 7.1, 7.2, 8, 8.1, 8.2**	**Equipments subject to JORDAN ARMED FORCES standard**	**Procurement Directorate**
Software	**Licenses of Database 10g, Developer 10g, Operating system (Redhat Linux)**	**12, 12.1, 12.2, 12.3, 12.4, 12.5**	**Oracle Licenses(database 10g,devloper2000) Redhat License**	**IT Directorate**
	Programs		**IT directorate Standard**	**IT Directorate**
Documents	**End user Guide Database Building, applications (forms, reports)**	**13, 13.1, 13.2, 13.2.1, 13.2.2, 13.2.3**	**IT directorate Standard**	**IT Directorate**
Network	**Network Sketch**		**IT directorate Standard**	**IT Directorate**

Table 1. Project deliverables and quality indicators

9. Risk Management Plan

For the smooth running of the project, we have identified some of the risks that may hamper the activities to various degrees:

Risk name	Risk description	Risk level	Risk approach
Supply equipment	-equipment which was received violated the standard of	low	Change the equipments and the company should pay penalties because of

Risk name	Risk description	Risk level	Risk approach
	Jordan Army -delivery delayed due to problems of transport of out side		delay. Change the company and the first company should pay penalties. Pay penalties because of delay.
The Lake of programmers experience in such a project.	Specific errors appeared during conversion process	Low	Hire an expert for specific hours.

Table 2. Project risks – name, description, level, approach

10. Communication plan matrix

For the purpose of successful project implementation, various communication lines and methods have been suggested, as the following table shows:

Target audience	Persons to convey the message	When the message is conveyed	Format the message	Message content	Delivered by
IT Directorate	Chief of IT Directorate	Pre initiating the project before one month from starting the project.	Report	1. The necessity of developing the it system in supply directorate. 2. The resources for the project. 3. The cost of the project. 4. The duration time to finish the project. 5. The plan to perform the project	Project manager
		Initiating phase	Report after the meeting with project team leaders	Related to the meeting with team leaders of the project.	Project manager
		Planning phase	On the third week of the project	Plan steps to perform the project	Project manager
		Executing phase	Monthly Report	1. Tasks which were performed 2. Difficulties if they exist.	Project manager
		Closing phase	Report after handover the project	1. Tasks which are completed according to the plan. 2. The delay if it happened. 3. Handover process.	Project manager

Target audience	**Persons to convey the message**	**When the message is conveyed**	**Format the message**	**Message content**	**Delivered by**
Procurement Directorate	Bids department	In initiating the project	Email on the first day of the project	List of equipment that we need for the project	Project manager
IT Directorate	Project Manager	Executing phase	Email when receiving the equipment of the company	To receive the equipment	Bids department
IT Directorate	Development Team leader DBA Team leader Technical Team leader	Pre initiating the project	Meeting (before one month from starting the project.)	1. The necessity of developing the it system in supply directorate. 2. The plan to perform the project. 3. The duration time to finish the project. 4. Suggestions	Project manager
	Development Team leader DBA Team leader	initiating phase	Meeting on (the second day of the project)	1. Purpose of training. 2. Context of training. 3. Ways of contact through training.	Project manager

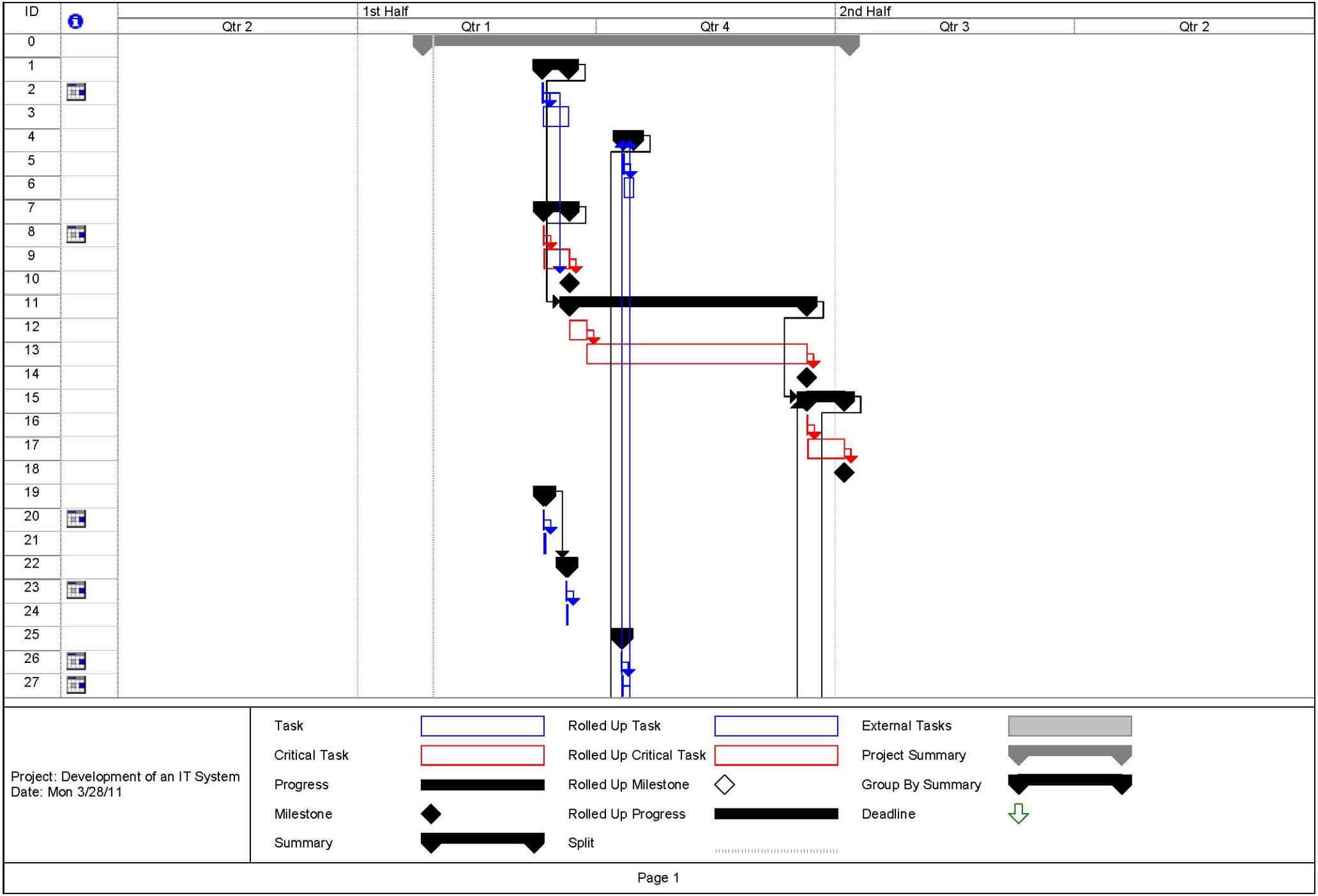
Target audience	Persons to convey the message	When the message is conveyed	Format the message	Message content	Delivered by
	Development Team leader DBA Team leader Technical Team leader	Planning phase	presentations (on the second week)	How to perform the duties related the duration of time	Development Team leader DBA Team leader Technical Team leader
		executing phase	Report at the end of every week	1. Tasks that have already been performed 2. Delay if it exists and the reasons. 3. Difficulties.	Development Team leader DBA Team leader
		Controlling phase	Monthly report	1. Tasks that have already been performed 2. Delay if it exists and the reasons.	Technical Team leader
		Closing phase	Report (after handover the system)	1. Performing tasks in accordance with the plan project. 2. Finalize documentations of the system. 3. Handover process	
	Development			1. Materials level	Development

Target audience	Persons to convey the message	When the message is conveyed	Format the message	Message content	Delivered by
	Team leader DBA Team leader	executing phase	Report after finishing the training	2. Notes related the training(if it sufficient to go on the project)	Team leader DBA Team leader
Supply Directorate	Chief of Supply Directorate	Pre initiating the project	Report (before one month from starting the project)	1. The necessity of developing the It system in supply directorate. 2. The benefits of the modifying the system 3. The duration time to finish the project.	Project manager
		Closing phase	Report (After handover the system)	1. Tasks which were performed. 2. The improvement and efficiency of the IT system. What was accomplished.	Project manager
Supply Directorate	End Users of Supply Directorate	Closing project	Presentation (After finishing the conversion process and installing equipment and software)	1.Equipment (usage) 2.programs(job process)	Programmers

Table 3. Project communications plan matrix

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
0	**Development of an IT System in Supply Directorate**	**349 days**	**Thu 3/17/11**	**Tue 7/17/12**		
1	**1 Training process to DBA**	**22 days**	**Mon 8/1/11**	**Tue 8/30/11**		
2	1.1 identifying the persons	1 day	Mon 8/1/11	Mon 8/1/11		project manager
3	1.2 Starting training	21 days	Tue 8/2/11	Tue 8/30/11	2	training company1
4	**2 Installing OS and Database and applications**	**8 days**	**Tue 11/1/11**	**Sun 11/13/11**	**27,42**	
5	2.1 receiving sofware CDs	1 day	Tue 11/1/11	Wed 11/2/11		dba team leader
6	2.2 starting installing process	7 days	Wed 11/2/11	Sun 11/13/11	5	dba team leader
7	**3 programmers training**	**22 days**	**Tue 8/2/11**	**Wed 8/31/11**		
8	3.1 identifying the persons	1 day	Tue 8/2/11	Tue 8/2/11		project manager
9	3.2 Starting training	21 days	Wed 8/3/11	Wed 8/31/11	8	training company2
10	4 finished training	0 days	Wed 8/31/11	Wed 8/31/11	2,9	
11	**5 conversion process**	**194 days**	**Thu 9/1/11**	**Tue 5/29/12**	**1,7**	
12	5.1 prparing temporary equipments for programming	14 days	Thu 9/1/11	Tue 9/20/11		Dba
13	5.2 executing conversion process	180 days	Wed 9/21/11	Tue 5/29/12	12	Dba,prgrammer
14	6 finishing conversion process	0 days	Tue 5/29/12	Tue 5/29/12	13	
15	**7 testing process**	**31 days**	**Wed 5/30/12**	**Wed 7/11/12**	**11,33**	
16	7.1 identify pesrons from supply direcorate	1 day	Wed 5/30/12	Wed 5/30/12		chief of supply section
17	7.2 start testing process	30 days	Thu 5/31/12	Wed 7/11/12	16	end users in supply directorate
18	8 finishishing testing process	0 days	Wed 7/11/12	Wed 7/11/12	17	
19	**9 Procuremen requests**	**3 days**	**Tue 8/2/11**	**Thu 8/4/11**		
20	9.1 prparing equipment requirments	1 day	Tue 8/2/11	Tue 8/2/11		Bid section
21	9.2 sending requests to companies	2 days	Wed 8/3/11	Thu 8/4/11	20	Bid section
22	**10 receiving offers**	**2 days**	**Sun 8/28/11**	**Mon 8/29/11**	**19**	
23	10.1 anylyzing offers	1 day	Sun 8/28/11	Sun 8/28/11		Bid section
24	10.2 sending approval to companies	1 day	Mon 8/29/11	Mon 8/29/11	23	Bid section
25	**11 receiving equipment**	**2.5 days**	**Sun 10/30/11**	**Tue 11/1/11**		
26	11.1 checkiing characterstics of equipment realted to the offers	1 day	Sun 10/30/11	Sun 10/30/11		Bid section
27	11.2 hadover equipment to Supply directorate	1.5 days	Mon 10/31/11	Tue 11/1/11	26	Bid section,hardware company
28	12 complete handover process	0 days	Tue 11/1/11	Tue 11/1/11	27	27
29	**13 installing equipments in Supply direcorate**	**3 days**	**Thu 11/3/11**	**Mon 11/7/11**		
30	13.1 identifying persons	1 day	Thu 11/3/11	Thu 11/3/11	28	team leader of technical
31	13.2 start installing process	2 days	Sun 11/6/11	Mon 11/7/11	30	Technical
32	14 complete inatalltion of equipment	0 days	Thu 3/17/11	Thu 3/17/11		31
33	**15 Modifing network**	**2 days**	**Sun 11/13/11**	**Tue 11/15/11**	**29,4**	
34	15.1 iidentiying persons	1 day	Sun 11/13/11	Mon 11/14/11		team leader of technical
35	15.2 start modifying process	1 day	Mon 11/14/11	Tue 11/15/11	34	Technical
36	16 completing network	0 days	Thu 3/17/11	Thu 3/17/11		34
37	**17 obtaing licensees**	**4.5 days**	**Mon 10/17/11**	**Sun 10/23/11**		
38	17.1 sending request to companyies	1 day	Mon 10/17/11	Mon 10/17/11		maintenous section in IT Direcorate
39	17.2 receiving offers	1 day	Tue 10/18/11	Tue 10/18/11	38	maintenous section in IT Direcorate
40	17.3 anylizing offers	1 day	Wed 10/19/11	Wed 10/19/11	39	maintenous section in IT Direcorate

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
41	17.4 sending approval to companies	1 day	Thu 10/20/11	Thu 10/20/11	40	maintenous section in IT Direcorate
42	17.5 receiving licences	0.5 days	Sun 10/23/11	Sun 10/23/11	41	maintenous section in IT Direcorate,software company
43	18 licences compleated	0 days	Sun 10/23/11	Sun 10/23/11	42	
44	**19 handovering project**	**4 days**	**Thu 7/12/12**	**Tue 7/17/12**	**15**	
45	19.1 identify persons	1 day	Thu 7/12/12	Thu 7/12/12		dba team leader,team leader of technical
46	**19.2 start handovering process**	**3 days**	**Sun 7/15/12**	**Tue 7/17/12**	**45**	
47	19.2.1 equipments	1 day	Sun 7/15/12	Sun 7/15/12		Technical
48	19.2.2 software and applications	1 day	Mon 7/16/12	Mon 7/16/12	47	prgrammer
49	19.2.3 system documents	1 day	Tue 7/17/12	Tue 7/17/12	48	prgrammer,Technical
50	19.3 hanovering the system	0 days	Tue 7/17/12	Tue 7/17/12	47,48,49	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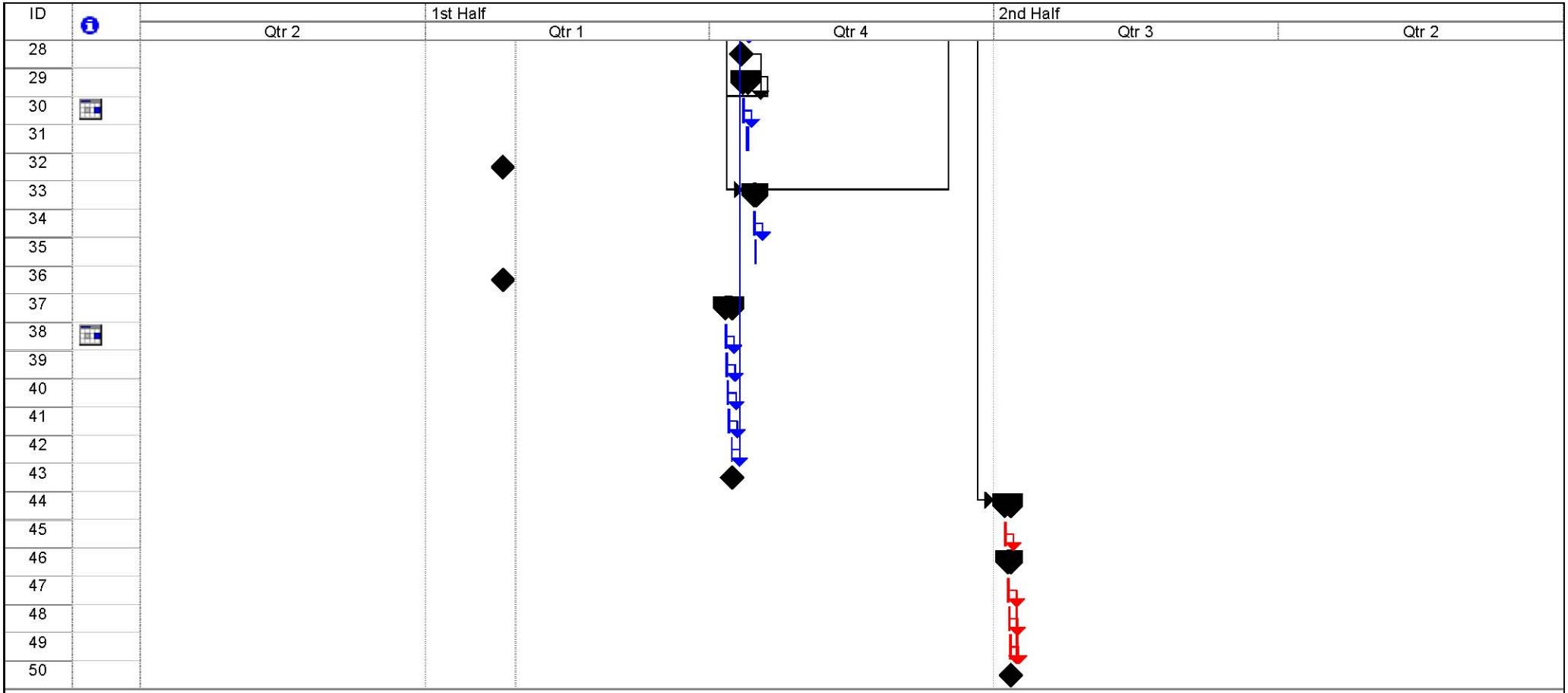
Project: Development of an IT System
Date: Mon 3/28/11
Task
Critical Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Critical Task
Rolled Up Milestone
Rolled Up Progress
Split
External Tasks
Project Summary
Group By Summary
Deadline



Project: Development of an IT System
Date: Mon 3/28/11

Task		Rolled Up Task		External Tasks	
Critical Task		Rolled Up Critical Task		Project Summary	
Progress		Rolled Up Milestone		Group By Summary	
Milestone		Rolled Up Progress		Deadline	
Summary		Split			

Budget Report as of Mon 3/28/11
Development of an IT System in Supply Directorate

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
27	hadover equipment to Supply directorate	0.00 $	Prorated	20,000.00 $	0.00 $	20,000.00 $	0.00 $	20,000.00 $
42	receiving licences	0.00 $	Prorated	10,000.00 $	0.00 $	10,000.00 $	0.00 $	10,000.00 $
9	Starting training	0.00 $	Prorated	1,500.00 $	0.00 $	1,500.00 $	0.00 $	1,500.00 $
3	Starting training	0.00 $	Prorated	1,200.00 $	0.00 $	1,200.00 $	0.00 $	1,200.00 $
2	identifying the persons	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
5	receiving sofware CDs	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
6	starting installing process	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
8	identifying the persons	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
10	finished training	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
12	prparing temporary equipments for progra	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
13	executing conversion process	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
14	finishing conversion process	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
16	identify pesrons from supply direcorate	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
17	start testing process	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
18	finishishing testing process	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
20	prparing equipment requirments	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
21	sending requests to companies	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
23	anylyzing offers	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
24	sending approval to companies	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
26	checkiing characterstics of equipment re	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
28	complete handover process	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
30	identifying persons	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
31	start installing process	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
32	complete inatalltion of equipment	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
34	iidentiying persons	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
35	start modifying process	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
36	completing network	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
38	sending request to companyies	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
39	receiving offers	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
40	anylizing offers	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
41	sending approval to companies	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
43	licences compleated	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
45	identify persons	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
47	equipments	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
48	software and applications	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
49	system documents	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
50	hanovering the system	0.00 $	Prorated	0.00 $	0.00 $	0.00 $	0.00 $	0.00 $
		0.00 $		**32,700.00 $**	**0.00 $**	**32,700.00 $**	**0.00 $**	**32,700.00 $**

Ware House-Automation Equipment

Lt. Florin SPÂRLU

1. Business Case for Ware House-Automation Equipment

1.1. Executive Summary

Analysis of the ABC Company's needs to decrease the cost of production issued this project as a result of ABC Company demands.

The solution for the demand of the ABC Company we recommend purchasing FLORAL software, an office-automation product that will save E 103,468 costs over one year for ABC Company.

A production of bricks direct proportional with the demands of the sales points and the purchasing of the right amount of prime materials for the production will eliminate the cost of the four additional ware houses.

By the beginning of July 2011 the office automation product will run on ABC Company and also in all of the ABC Company sales points.

FLORAL kit will cost 15,362 €; paid once

- it will be design in accordance with the requirements:
- it will implement ware house -automation equipment on the factory unit and also on the sales points.
- the package includes also the personnel training.

The return on investment (ROI) over one year is 112%. The payback period is 1.6 month.

1.2. Business Opportunity

ABC Company has an opportunity to save 8622 E/monthly, annually 103,468 E.(according to appendix 5.a.-)

This opportunity allows ABC Company to grow efficiently by:

- lowering the cost of materials

- lowering the cost of administration

a. Benefits

IT EASY will provide all the capabilities and benefits of ABC Company's current ware house -automation update of the needs of sales points and the needs of ABC Company's prime materials.

IT EASY will solve two sensitive problems that requires on increasing the price of materials.

- The cost of depositing the materials
- The labor to centralized the needs

Administrative assistants at ABC Company spend on average two hours/day, updating the currents needs, distributing and keeping day count of the materials remain in the factory. By automatically updating the currents needs, distributing and keeping day count of the materials ABC Company's save an estimated 480 hours per year in labor costs.

Elimination of Errors

ABC Company's current office-automation up date will prevent users from accidentally making mistakes on counting the quantity of the materials need, the needs to be sold and the amount of the materials remained in the factory.

Administrative assistants spend 0, 5 hours daily per correcting each problem.

By eliminating these errors, ABC Company's will save an estimated 120 hours per year in labor costs.

1.3. Costs

IT EASY purchase price: 15,362 €

Estimated life cycle: ten years.

Installation fee: included in the purchase price.

Annual maintenance contract: 540 €

1.4. Financial Analysis

	Actually costs			
Domain	ware house	transportation	administration	sistem
No.	1000	45	22	0
Cost/year	12,000 €	20,736 €	119,328 €	0
Total costs/year	152,064 €			

	Future costs			
Domain	ware house	transportation	administration	sistem
Cost/ONCE	0	0	0	15,362 €
Cost/year			32,544 €	690 €
Total costs/year	48,596 €			
Saved money	**103,468 €**			

Return on investment (ROI): 144**%**

Payback period: **1.6 month**

2. Scope statement

2.1. Goal

By the end of June 2011 FLORAL software will be fully operational on ABC Company and also in all of the ABC Company sales points.

2.2. Projects objectives

1. IT EASY will deliver the FLORAL software no later than 25th May 2011 according to the specific requirements.

2. Implementation of office automation product on ABC Company and also in all of the ABC Company sales points will be done no later than 3rd of June 2011.

3. No later than 4th July 2011, 22 employees of ABC Company will operate with FLORAL software in according to the specifications of the product.

2.3. Projects deliverables

1. Soft package computing costumer accounts
2. Soft package updating the data base automatically
3. Soft package computing ABC Company's needs of bricks for each sales point
4. Soft package computing ABC Company’s needs of prime materials for production

2.4. Projects requirements

1. a. bills and pro forma invoice should be A4 in sheet;

1. b. bills and pro forma invoice should have ABC Company’s badge;

1. c date accurate

2. a. data base should contain real time information requiring quantity of sale, time, date, and numbers of transactions

2. b. the up date of the data base should be made via internet

2. c. the reports of data base should right access be seen only by the administrator of the ABC Company

3. a. program should report quantity, types of the bricks remained on every sales point and in the ABC Company ware house in every moment

4. a. program should report day to day need of quantity of prime materials for the factory production

2.5. Project Boundaries

1.IT EASY will develop, implement the package and also will train the employees in the same budget.

2. IT EASY will demand extra pay for annual maintenance.

3. IT EASY will demand extra pay for future training

2.6. Product Acceptance Criteria

1. After the final phased the implemented system will offer the completed reports on time.

2. Production, sales, and purchasing on ABC Companies will be able to be made based on the specific report on the right time.

2.7. Project Constraints

1. All 22 employees that should be train should be available at the precise time.

2. Every delay on finishing the project caused by ABC Company should be paid by the ABC Company.

3. All the employees that will go to be trained by IT EASY will sign a confidentiality agreement

2.8. Project Assumptions

1. If some delays occur caused by the ABC Company, IT EASY will not response by the modifications of the price of the materials.

2. If the employees will not attend the courses IT EASY will receive the same amount of money.

2.9. Project organization

- The list of stakeholders is as the one describe in appendix 1.a.
- The organizational integration of the project management is clearly defined in the project.
- Clear functions, competence and responsibility were established.

2.10. Defined risks

The project has the following potential risks:

- Project fit to customer organization;
- Project fit to provider organization;
- Customer perception;
- Work flow;
- Political influences;
- Convenient date;
- Use of attractive tehnology;
- Organization stability;
- Organization roles and responsibilities;
- Projects objectives;
- User involment;
- User experience;
- User acceptance;
- User training needs;
- User justification;
- Project size;
- Costs controls;
- Requirements stability;
- Testability;
- Design difficulty;
- Implementation dificulty;
- System dependencies;
- Alternatives analysis;
- Quality assurance aproach;
- Early Identification of defects;

- Defect tracking;
- Physical facilities;
- Tools availability;
- Disaster recovery
- Design complexity;
- Support personel;
- Vendor support .

2.11. Schedule milestones

- Tue 3/29/11 Product milestone
- Tue 4/5/11 Design milestone
- Thu 5/5/11 Final product milestone
- Tue 5/17/11 1st verification milestone
- Fri 6/3/11 2nd verification milestone
- Fri 6/3/11 3rd Verification milestone

2.12. Cost estimates

- The budget estimated for this project was made in according with the actual prices and was evaluated at the amount of 15362 euro.
- In this amount of money are included the equipment and also the training of the personnel.

2.13. Project specifications

The details of the package kit will be written in:

- the maintenance handbook
- functionality system book
- implementation SOP

3. Resources management

Resource pool description is described in the 4th Appendix;

WBS is describing in Grant Chart (3rd Appendix).

4. Time management plan

Gantt chart included in the Appendix 2nd Appendix.

5. Cost management plan

a. The package kit of the project was established in accordance with the numbers of the personnel that need to be trained and the numbers of sales point.

	ONCE COST FOR THE AUTOMATICALLY SISTEM							
Location / Equipment	Numbers of sales points in Brasov	Numbers of sales points in Arad	Num-bers of sales in Bucures ti	Numbers of sales points in Sibiu	Numbers of sales points in Vatra Dornei	Total point of sales	Cost of equipme nt / EURO	Total cost of equipment / EURO
	2	**3**	**4**	**3**	**6**	**18**		
Package soft	2	3	4	3	6	18	59	1062
Scans	2	3	4	3	6	18	404	7272
Laptops	2	3	4	3	6	18	342	6156
Bars code printers	2						366	732
Price applicator s	20						7	140
TOTAL COST								**15362**
	Annual costs							
Maintena nce	2	3	4	3	6	18	30	540
Internet connectio n taxes	2	3	4	3	6	18	8.33	149.9 4
TOTAL COST								**689.94**

b. The changes that will occur in the ABC Company will increase or decrease the price of the package in accordance with the number of personnel and the numbers of sales point.

The change will be allowed to be in a range of maximum of 15 %.

If the decrease will be more than 15 % during the project the cost for the package kit will be at the level of less 15%.

If the increase will be more than 15% during the project the package kit will be only for the limit of 15%.

6. Quality management plan

Output/deliverable name	Soft package computing costumer accounts
Deliverable description	1. Planned actions to produce the activity output 131;132;134;135;136;137; 2. Deliverable description 2.1. purpose of the deliverable – it will create the accounts for customer 2.2. what is composed of - programs to add, modify, and erase accounts 2.3. where information about it is obtained from – sales operation 2.4. the required appearance - bills and pro forma invoice should be A4 in sheet - bills and pro forma invoice should have ABC Company's badge 2.5. The level of quality required 2.5.1. Quality criteria - date accurate - easy to work with it 2.5.2. Quality method: - simulation exercise will be perform 2.6. The skills required to develop and test it (i.e. identifying the individuals/groups who need to be involved) - Web Developer Team; Consulting Team from ABC Company
Date of assessment/review	- After the design phase is finish Mon 5/23/11
Who manages deliverable quality	Web Developer Team
Who controls quality	Project manager Consulting Team from ABC Company
Who accepts the deliverable	ABC Company
////////////////////////////////// ///	//
Output/deliverable name	Soft package updating the data base automatically
Deliverable description	1. Planned actions to produce the activity output 113;1411;1412;142;1421;1422;1423;1424;1425;143;1431; 1432;1433;1434 2. Deliverable description 2.1. purpose of the deliverable – it will maintain on real time the precise need of the quantity of materials, and bricks sold 2.2. what is composed of - program to update the data base 2.3. where information about it is obtained from –140 2.4. the required appearance - data base should contain real time information requiring quantity of sale, time, date, and numbers of transactions - the up date of the data base should be made via internet - the reports of data base should right access be seen only by the administrator of the ABC Company

Output/deliverable name	**Soft package computing costumer accounts**
	2.5. The level of quality required 2.5.1. Quality criteria: - date accurate - easy to work with it - automation of update the quantity of materials remain 2.5.2. Quality method: - simulation exercise will be perform 2.6. The skills required to develop and test it (i.e. identifying the individuals/groups who need to be involved) - WEB DEVELOPER TEAM; *IT Team*; *Project manager; Consulting Team from ABC Company*
Date of assessment/review	- 1. After the design phase is finish Mon 5/23/11 - 2. After the development phase is finish Wed 5/25/11 - 3.Qualification test Tue 5/17/11
Who manages deliverable quality	*IT Team*
Who controls quality	Project manager Consulting Team from ABC Company
Who accepts the deliverable	ABC Company
////////////////////////////////// ///	//
Output/deliverable name	Soft package will compute ABC Company's needs of bricks for each sales point
Deliverable description	1. Planned actions to produce the activity output 113;1411;1412;142;1421;1422;1423;1424;1425;143;1431; 1432;1433;1434 2. Deliverable description 2.1. purpose of the deliverable – maintain the need direct proportional between the relation of customer and production 2.2. what is composed of - program to report the information 2.3. where information about it is obtained from – from day to day operations 2.4. the required appearance - program should report quantity, types of the bricks remained on every sales point and in the ABC Company ware house in every moment 2.5. The level of quality required 2.5.1. Quality criteria- date accurate - easy to work with it - automation of update the quantity of materials remain 2.5.2. Quality method: - simulation exercise 2.6. The skills required to develop and test it (i.e. identifying the individuals/groups who need to be involved) - IT Team; Project manager; Consulting Team from ABC Company

Output/deliverable name	Soft package computing costumer accounts
Date of assessment/review	- 1. After the development phase is finish Wed 5/25/11 - 2. After implementation phase is finish Fri 6/3/11 - 3. Qualification test is perform Tue 5/17/11
Who manages deliverable quality	Web Developer Team
Who controls quality	Project manager Consulting Team from ABC Company
Who accepts the deliverable	ABC Company
////////////////////////////////// ////	//
Output/deliverable name	Soft package will compute ABC Company's needs of prime materials for production
Deliverable description	1. Planned actions to produce the activity output 131;132;134;135;136;137;1434 2. Deliverable description 2.1. purpose of the deliverable – maintain the need direct proportional between the relation of customer and production 2.2. what is composed of - program to update the data base 2.3. where information about it is obtained from – day to day operations 2.4. the required appearance - program should report day to day need of quantity of prime materials for the factory production 2.5. The level of quality required 2.5.1. Quality criteria - date accurate - easy to work with it - automation of update the quantity of materials remain 2.5.2. Quality method: - simulation exercise will be perform 2.6. The skills required to develop and test it (i.e. identifying the individuals/groups who need to be involved) - WEB DEVELOPER TEAM; *IT Team*; *Project manager; Consulting Team from ABC Company*
Date of assessment/review	- 1. After the design phase is finish Mon 5/23/11 - 2. After the development phase is finish Wed 5/25/11 - 3. Qualification test Tue 5/17/11
Who manages deliverable quality	IT Team
Who controls quality	Project manager Consulting Team from ABC Company
Who accepts the deliverable	ABC Company

7. Communications management plan

a. In accordance with Appendices 1.a., Communication management plan

8. Risk management plan

b. In accordance with Appendices 1.b., Risk management plan

Appendix 1.a.

Stakeholders list

No.	Category	Stakehoders	Needs / Requirements	POWER			INTEREST		
				LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
1	Internal	ABC Company	reduce cost, increase sales		X				X
		Employees	performing the trainig	X					X
2	Connected	Sales point	instalation of system	x				X	
		Suppliers	receive the precise needs	X				X	
		PM	time and quality			X			X
		HR team	good feedback		X			X	
		IT team	good feedback		X			X	
		Web developer team	good feedback		X			X	
3	External	Local administration	taxe pay			X	X		
		Local IT shops	provide equipment	X			X		
		Local Internet providers	taxe pay		X		X		

Appendix 1.b.

Comunication management plan

NO.	Category	Stakeholders	Target audience				Persons to convey the message				When the message is conveyed				Format of a message				Message content			
			Software Development Life Cycle	Sistem implementation	Training	Closing activity	Software Development Life Cycle	Sistem implementation	Training	Closing activity	Software Development Life Cycle	Sistem implementation	Training	Closing activity	Software Development Life Cycle	Sistem implementation	Training	Closing activity	Software Development Life Cycle	Sistem implementation	Training	Closing activity
1	Internal	ABC Company	x				head of ABC consult team				Wed 3/30/11				open letter				common resources demanded to be share locations to store and prepare the training			
		Employees			x	x			HR team leader	project manager			Mon 6/13/11	Wed 7/6/11			oral presentation	oral presentation			succes rate; incidents; solutions	handed the diploma speech
2	Connected	Sales point		x	x			IT Team	HR team leader			Fri 5/27/11	Mon 6/13/11			notice letter	oral presentation, practice			time of starting to implement the soft	brief of the sistem, practice with the sistem	
		Suppliers		x				suppliers leader				Fri 5/27/11				mail				notify the supplier leader about the new sistem, sending one example demand		
		PM	x	x	x	x	all team	IT Team	HR team		Wed 3/30/11	Fri 5/27/11	Mon 6/13/11		oral presentation	oral presentation	oral presentation		verify if the teams have understood the project	brief of problems, issues solutions	brief of problems, isues solutions	
		HR team	x	x	x	x	head of ABC consult team	IT Team leader	HR team leader	HR team leader	Thu 6/2/11	Mon 6/6/11	Mon 6/6/11	Mon 6/13/11	oral notice	write presentation	oral presentation	mail	up date the IT team about features of project miles stone ;warning the employess that will gone pe train	update the SOP	notify the employees about the schedule of training	notify the team to perform the diploma, and organize the closing day
		IT team	x	x	x	x	HR team leader	IT Team leader	IT team leader	IT team leader	Mon 5/30/11	Fri 5/27/11	Mon 6/13/11	Mon 6/13/11	write presentation	write presentation	oral presentation, practice	mail	up date the IT team about features of project miles stone	notify about test qualification	perform clases	notify the team about the closing day
		Web developer team	x	x	x	x	web developer team leader	web developer team leader	IT team leader	Web developer team leader	Mon 5/30/11	Fri 6/3/11	Mon 6/13/11	Mon 6/13/11	write presentation	write presentation	oral presentation, practice	mail	up date the web developer team about features of project miles stone	notify about the design to erect the SOP	perform clases	notify the team about the closing day
3	External	Local administration	x				head of ABC consult team				Wed 3/30/11				legal notice				pay legal taxe			
		Local IT shops	x				head of IT team				Thu 5/26/11				legal notice				purchasing the equipment			
		Local Internet providers	x				head of ABC consult team				Wed 3/30/11				legal notice				pay the taxe for internet			

Risk management plan

No.	Risk name	Risk description	Risk level	Risk approach
Mission and Goals				
1	Project fit to customer organization	Does not support or relate to customer goal	Low	At each miles stone implicate ABC consult leader team
2	Project fit to provider organization	Does not support or relate to provider goal	High	Try to find alternative for the providers
3	Customer perception	Customer expects this organization to provide the bricks on time	Medium	List of customer needs will be done earlier enough to provide the precise quantity and quality on time
4	Work flow	Significantly changes	High	For the beginig phase of production ABC consult team will evaluate twicelly on week the work flow to be in accordance with the issued SOP
Decision Drivers				
5	Political influences	No particular politically-driven choices being made	Low	No political aspects will be develop
6	Convenient date	Date is being partially driven by need to purchaising the equipment on time and to develop for emplyees a high level of handle the software system	Low	Purchasing date for the equipment was made on the beginig of the project; The employees will have practice clases
7	Use of attractive tehnology	Reject to the new tehnology that is bring into the organization	Medium	Explain clases of the need of the system will be perform
Organization management				
8	Organization stability	Little or no change in the management structure	Low	Rotate the members of organization on the function
9	Organization roles and responsibilities	Individuals throughtout the organization understand their own roles and responsibilities and those of others	Low	Monthly discussons with the members of organizations
10	Projects objectives	Verifiable project, objectives, reasonable requirements	Low	Rewiev scope statement
Users				
11	User involment	Not involved in the trainig process	Medium	Use of intereactive presentations and offer soft drinks during the breaks
12	User experience	Users have no previous experience with similar projects	High	Lack of experience will by bypas by practice
13	User acceptance	Users accept most of concepts and details of system;	Medium	
13	User training needs	User training needs consider	Low	
14	User justification	User justification complet	Low	mandatory to gratuaded
Project characteristics				
15	Project size	Medium, moderate complexity, decomposable	Medium	
16	Costs controls	well established	Low	
Product content				
17	Requirements stability	Some change expected against approved set	Medium	At each miles stone implicate ABC consult leader team
18	Testability	Parts of product to test	Medium	All the test that will be perform will be recorded and analyzed
19	Design difficulty	Well defined interfaces	Low	
20	Implementation dificulty	Content is reasonable for the teams	Low	
21	System dependencies	clear defined dependencies	Low	
Development process				
22	Alternatives analysis	Analysis of alternatives	Low	Alternative analysis perform in the define the product
23	Quality assurance aproach	Procedures establish, but not well folled	Medium	Implement SOP
24	Early Identification of defects	Team expects to find all defects with testing	High	Record all the incidents that appeared
25	Defect tracking	Defect tracking process in place	Medium	Establish Qualification Test
Development environment				
26	Physical facilities	Comon facilities	Medium	list of comon facilities will be establish from the planing phase
27	Tools availability	Lack of electrical devices	Low	rewiev at the beginig of the project the nedeed devices
28	Disaster recovery	Data security, back up of system	High	All people involved in the project will sign an confidentional paper; A back up will be perform after each phase and a general back will be made after the project will be finish
Maintenance and support				
29	Design complexity	Easily maintained	Low	issue maintenance handbooks
30	Support personel	Sufficient numbers	Low	Establish the precise numbers of employees nedeed to be train
31	Vendor support	Complete support at reseanoble price	Medium	Establish at the beginig with ABC consulting leader team about the total cost

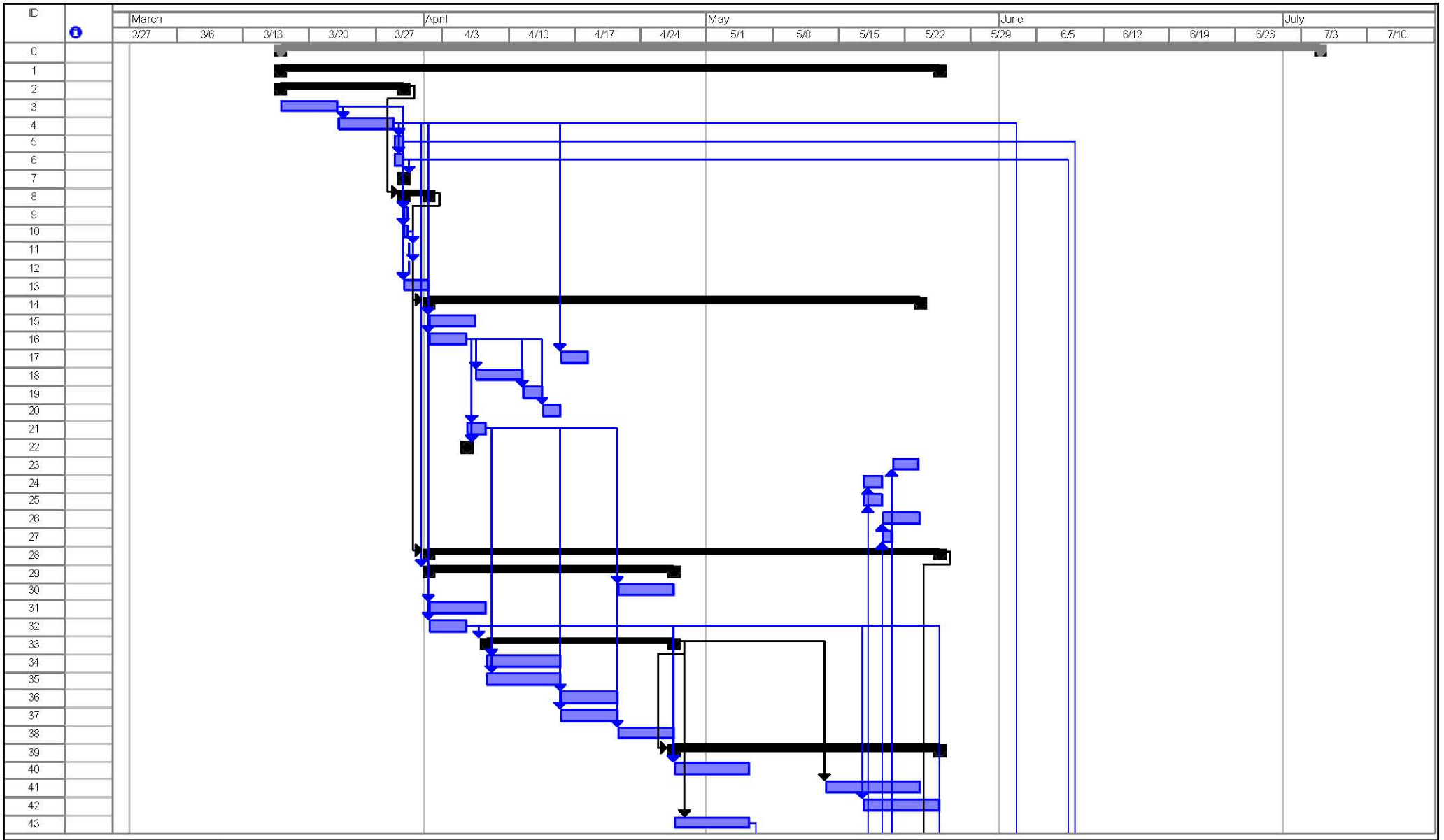
ID	Task Name	Duration	Start	Finish	Predece	Resource Names
0	**FLORAL SOFTWARE**	**78 days**	**Thu 3/17/11**	**Mon 7/4/11**		
1	**1 Software Development Life Cycle**	**49.8 days**	**Thu 3/17/11**	**Wed 5/25/11**		
2	**1.1 Analyze**	**9 days**	**Thu 3/17/11**	**Tue 3/29/11**		
3	1.1.1 Define the final product	4 days	Thu 3/17/11	Tue 3/22/11		HR TEAM[50%],IT TEAM[50%],ABC COMPANY CONSULT TEAM[50%],PROJECT MANAGER[50%],WEB DEVELOPEI
4	1.1.2 Features of the program	4 days	Wed 3/23/11	Mon 3/28/11	3	ABC COMPANY CONSULT TEAM[50%],PROJECT MANAGER[50%],HR TEAM[50%],IT TEAM[50%],WEB DEVELOPE
5	1.1.3 List of the software components	1 day	Tue 3/29/11	Tue 3/29/11	4	ABC COMPANY CONSULT TEAM[50%],PROJECT MANAGER[50%],HR TEAM[50%],IT TEAM[50%],WEB DEVELOPE
6	1.1.4 List of the hardware components	1 day	Tue 3/29/11	Tue 3/29/11	4	ABC COMPANY CONSULT TEAM[50%],PROJECT MANAGER[50%],HR TEAM[50%],IT TEAM[50%],WEB DEVELOPE
7	1.1.5 product milestone	0 days	Tue 3/29/11	Tue 3/29/11	6	
8	**1.2 Resources analyze demanded to be share**	**2.8 days**	**Wed 3/30/11**	**Fri 4/1/11**	**2**	
9	1.2.1 Identify the locations to train	0.2 days	Wed 3/30/11	Wed 3/30/11	3	IT TEAM[50%]
10	1.2.2 Designated locations to implement	0.04 days	Wed 3/30/11	Wed 3/30/11	3	IT TEAM[50%]
11	1.2.3 Identify Internet conection	0.1 days	Wed 3/30/11	Wed 3/30/11	10	IT TEAM[50%]
12	1.2.4 Identify electrical plugs	0.2 days	Wed 3/30/11	Wed 3/30/11	10	IT TEAM[50%]
13	1.2.5 Identify depositing locations	2.8 days	Wed 3/30/11	Fri 4/1/11	3	IT TEAM[50%],ABC COMPANY CONSULT TEAM[50%]
14	**1.3 Design**	**36 days**	**Fri 4/1/11**	**Mon 5/23/11**	**8**	
15	1.3.1 Create interface of the programs	3 days	Fri 4/1/11	Wed 4/6/11	4	WEB DEVELOPER TEAM
16	1.3.2 Create the format of the accounts forms	2 days	Fri 4/1/11	Tue 4/5/11	4	WEB DEVELOPER TEAM
17	1.3.3 Create the format of the report forms	1 day	Fri 4/15/11	Mon 4/18/11	4	WEB DEVELOPER TEAM
18	1.3.4 Create the specifications for adding the accounts	3 days	Wed 4/6/11	Mon 4/11/11	16	WEB DEVELOPER TEAM
19	1.3.5 Create the specifications for modifying the accounts	2 days	Mon 4/11/11	Wed 4/13/11	16	WEB DEVELOPER TEAM
20	1.3.6 Create the specifications for erease the accounts	2 days	Wed 4/13/11	Fri 4/15/11	16	WEB DEVELOPER TEAM
21	1.3.7 Create the specifications for counting the accounts	2 days	Tue 4/5/11	Thu 4/7/11	16	WEB DEVELOPER TEAM
22	1.3.8 designmilestone	0 days	Tue 4/5/11	Tue 4/5/11	16	
23	1.3.9 Write the help manual system	0.67 days	Fri 5/20/11	Mon 5/23/11	50	HR TEAM,WEB DEVELOPER TEAM[50%]
24	1.3.10 Write the maintenance handbook	2 days	Tue 5/17/11	Thu 5/19/11	50	WEB DEVELOPER TEAM,HR TEAM
25	1.3.11 Write the functionality system book	2 days	Tue 5/17/11	Thu 5/19/11	50	WEB DEVELOPER TEAM[50%],HR TEAM
26	1.3.12 Write the implementation SOP	2 days	Thu 5/19/11	Mon 5/23/11	50	WEB DEVELOPER TEAM[50%],HR TEAM
27	1.3.13 Write the graduade diploma	1 day	Thu 5/19/11	Fri 5/20/11	50	HR TEAM
28	**1.4 Development**	**38 days**	**Fri 4/1/11**	**Wed 5/25/11**	**8**	
29	**1.4.1 Develop the basic components of the programs**	**18 days**	**Fri 4/1/11**	**Wed 4/27/11**	**4**	
30	1.4.1.1 Develop the combination of front-end client-side	4 days	Thu 4/21/11	Wed 4/27/11	21	IT TEAM
31	1.4.1.2 Develop the front-end loads and back-end	4 days	Fri 4/1/11	Thu 4/7/11	4	IT TEAM
32	1.4.1.3 Standard of intercom communication	2 days	Fri 4/1/11	Tue 4/5/11	4	IT TEAM
33	**1.4.2 Develop the client interface**	**14 days**	**Thu 4/7/11**	**Wed 4/27/11**	**32**	
34	1.4.2.1 Develop the soft to log on	6 days	Thu 4/7/11	Fri 4/15/11	21	WEB DEVELOPER TEAM,IT TEAM
35	1.4.2.2 Develop the soft to process the scan of the code bar	6 days	Thu 4/7/11	Fri 4/15/11	21	IT TEAM
36	1.4.2.3 Develop the soft to compress the code bars picture	4 days	Fri 4/15/11	Thu 4/21/11	21	IT TEAM
37	1.4.2.4 Develop the soft to transmit the compressed picture	4 days	Fri 4/15/11	Thu 4/21/11	21	IT TEAM
38	1.4.2.5 Develop the soft to receive the result if the image wa	4 days	Thu 4/21/11	Wed 4/27/11	21	IT TEAM
39	**1.4.3 Develop the server applications**	**20 days**	**Wed 4/27/11**	**Wed 5/25/11**	**33**	
40	1.4.3.1 Develop the soft for password demand	6 days	Wed 4/27/11	Thu 5/5/11	32	WEB DEVELOPER TEAM,IT TEAM
41	1.4.3.2 Develop the soft to received the compressed picture	6 days	Fri 5/13/11	Mon 5/23/11	33	IT TEAM
42	1.4.3.3 Develop the soft to decompressed and convert the pi	6 days	Tue 5/17/11	Wed 5/25/11	32	IT TEAM
43	1.4.3.4 Develop the soft to update the data base	6 days	Wed 4/27/11	Thu 5/5/11	33	IT TEAM
44	1.4.3.5 finalproductmilestone	0 days	Thu 5/5/11	Thu 5/5/11	43	
45	**1.4.4 Qualification Test**	**8 days**	**Thu 5/5/11**	**Tue 5/17/11**	**43**	
46	1.4.4.1 Run system validation tests	4 days	Mon 5/9/11	Fri 5/13/11	44	WEB DEVELOPER TEAM,IT TEAM,PROJECT MANAGER

ID	Task Name	Duration	Start	Finish	Predece	Resource Names
47	1.4.4.2 Run validation data system specifications as required	2 days	Thu 5/5/11	Mon 5/9/11	43	IT TEAM[200%],WEB DEVELOPER TEAM[200%],ABC COMPANY CONSULT TEAM,PROJECT MANAGER
48	1.4.4.3 Save the testing results in specific document	2 days	Mon 5/9/11	Wed 5/11/11	47	IT TEAM
49	1.4.4.4 Create the standard operate procedure in order to insta	2 days	Wed 5/11/11	Fri 5/13/11	48	IT TEAM
50	1.4.4.5 Create the standard operate procedure in order to fix	2 days	Fri 5/13/11	Tue 5/17/11	49	IT TEAM
51	1.4.4.6 1stverificationmilestone	0 days	Tue 5/17/11	Tue 5/17/11	50	
52	**2 SISTEM IMPLEMENTATION**	**6.8 days**	**Wed 5/25/11**	**Fri 6/3/11**	**28**	
53	**2.1 Assure the equipment**	**0.4 days**	**Wed 5/25/11**	**Thu 5/26/11**	**28**	
54	2.1.1 Purchasing the Laptops	0.01 days	Wed 5/25/11	Wed 5/25/11	51	ABC COMPANY CONSULT TEAM
55	2.1.2 Purchasing the Bars code printers	0.1 days	Wed 5/25/11	Wed 5/25/11	32	ABC COMPANY CONSULT TEAM
56	2.1.3 Purchasing the Price aplicators	0.1 days	Wed 5/25/11	Wed 5/25/11	32	PURCHASING MAN [50%],PROJECT MANAGER
57	2.1.4 Purchasing the Scans	0.2 days	Wed 5/25/11	Wed 5/25/11	32	PURCHASING MAN [50%]
58	2.1.5 Transportation of the equipment to the ABC Company	0.2 days	Thu 5/26/11	Thu 5/26/11	57	PURCHASING MAN [50%]
59	**2.2 Perform the implementation procedure**	**6.4 days**	**Thu 5/26/11**	**Fri 6/3/11**	**53**	
60	2.2.1 Recording events that occur during installation	0.4 days	Thu 5/26/11	Thu 5/26/11	57	IT TEAM
61	2.2.2 Internet connection	0.4 days	Thu 5/26/11	Thu 5/26/11	50	IT TEAM
62	2.2.3 Software installations	2 days	Thu 5/26/11	Mon 5/30/11	61	IT TEAM,WEB DEVELOPER TEAM,ABC COMPANY CONSULT TEAM,PROJECT MANAGER
63	2.2.4 Establish solution to remedy the defects	2 days	Mon 5/30/11	Wed 6/1/11	62	IT TEAM,HR TEAM
64	2.2.5 Update the defects	1 day	Wed 6/1/11	Thu 6/2/11	63	IT TEAM,HR TEAM
65	2.2.6 Run system qualifications test	1 day	Thu 6/2/11	Fri 6/3/11	64	IT TEAM,HR TEAM
66	2.2.7 2ndverificationmilestone	0 days	Fri 6/3/11	Fri 6/3/11	65	
67	**3 TRAINING THE EMPLOYEES**	**21 days**	**Fri 6/3/11**	**Mon 7/4/11**	**4**	
68	**3.1 Performing the classes**	**16 days**	**Fri 6/10/11**	**Mon 7/4/11**	**82**	
69	3.1.1 Performing a generally presentation of the system	2 days	Wed 6/22/11	Fri 6/24/11	50	HR TEAM
70	3.1.2 Performin the need for system lesson	2 days	Wed 6/22/11	Fri 6/24/11	50	HR TEAM
71	3.1.3 Performing data entry lesson	2 days	Fri 6/24/11	Tue 6/28/11	50	HR TEAM,WEB DEVELOPER TEAM,IT TEAM
72	3.1.4 Performing installation standard operate procedure lesson	4 days	Fri 6/10/11	Thu 6/16/11	50	HR TEAM,IT TEAM
73	3.1.5 Performing fixing standard operate procedure lesson	4 days	Thu 6/16/11	Wed 6/22/11	50	HR TEAM,IT TEAM
74	3.1.6 Performing devices presentation lesson	2 days	Fri 6/24/11	Tue 6/28/11	50	HR TEAM,IT TEAM
75	3.1.7 Performing the generally presentation of the accounts, repor	1 day	Thu 6/30/11	Fri 7/1/11	50	HR TEAM,IT TEAM
76	3.1.8 Performing the practice with the install product lessons	2 days	Tue 6/28/11	Thu 6/30/11	50	HR TEAM,IT TEAM
77	3.1.9 Performing the practice with the bars code printers lessons	4 days	Thu 6/16/11	Wed 6/22/11	50	HR TEAM
78	3.1.10 Performing the practice with the price applicators	2 days	Tue 6/28/11	Thu 6/30/11	50	HR TEAM
79	3.1.11 Performing the practice with the reports lessons	2 days	Thu 6/30/11	Mon 7/4/11	50	HR TEAM,WEB DEVELOPER TEAM
80	3.1.12 Performing the practice with the accounts, reports lessons	2 days	Fri 6/10/11	Tue 6/14/11	50	HR TEAM,WEB DEVELOPER TEAM
81	3.1.13 Performing evaluating session of the system record the in	2 days	Tue 6/14/11	Thu 6/16/11	80	HR TEAM,IT TEAM
82	**3.2 Preparing the classroom location**	**1.6 days**	**Thu 6/9/11**	**Fri 6/10/11**	**86**	
83	3.2.1 Provide material support	1.6 days	Thu 6/9/11	Fri 6/10/11	5	HR TEAM[50%]
84	3.2.2 Transportation of the materials support to the classroom	0.8 days	Thu 6/9/11	Thu 6/9/11	57	HR TEAM[50%]
85	3.2.3 Install of the support material	1.6 days	Thu 6/9/11	Fri 6/10/11	62	HR TEAM[50%]
86	**3.3 Planning the training schedule**	**3.4 days**	**Fri 6/3/11**	**Wed 6/8/11**	**59**	
87	3.3.1 Develop the generally presentation of the system class	0.4 days	Fri 6/3/11	Fri 6/3/11	65	HR TEAM
88	3.3.2 Develop the need for system class	0.4 days	Fri 6/3/11	Fri 6/3/11	65	HR TEAM
89	3.3.3 Develop data entry class	0.4 days	Mon 6/6/11	Mon 6/6/11	88	HR TEAM,WEB DEVELOPER TEAM[50%]
90	3.3.4 Develop installation standard operate procedure class	0.4 days	Wed 6/8/11	Wed 6/8/11	88	HR TEAM
91	3.3.5 Develop fixing standard operate procedure class	0.4 days	Wed 6/8/11	Wed 6/8/11	88	HR TEAM
92	3.3.6 Develop devices presentation class	0.4 days	Wed 6/8/11	Wed 6/8/11	88	HR TEAM
93	3.3.7 Develop generally presentation of the accounts, reports clas	0.4 days	Mon 6/6/11	Mon 6/6/11	88	HR TEAM

ID	Task Name	Duration	Start	Finish	Predece	Resource Names
94	3.3.8 Develop practice with the install product class	0.4 days	Mon 6/6/11	Mon 6/6/11	93	HR TEAM
95	3.3.9 Develop practice with the bars code printers class	0.4 days	Tue 6/7/11	Wed 6/8/11	93	HR TEAM,IT TEAM
96	3.3.10 Develop practice with the price applicators class	0.4 days	Tue 6/7/11	Wed 6/8/11	93	HR TEAM
97	3.3.11 Develop practice with the reports class	0.4 days	Wed 6/8/11	Wed 6/8/11	93	HR TEAM
98	3.3.12 Develop practice with the accounts, reports class	0.4 days	Mon 6/6/11	Mon 6/6/11	93	HR TEAM,WEB DEVELOPER TEAM
99	3.3.13 Develop evaluating session of the entire system	2 days	Mon 6/6/11	Wed 6/8/11	98	HR TEAM[200%],WEB DEVELOPER TEAM,ABC COMPANY CONSULT TEAM,PROJECT MANAGER
100	3.3.14 3dferificationmilestone	0 days	Fri 6/3/11	Fri 6/3/11		
101	**4 Closing activity**	**18 days**	**Thu 6/9/11**	**Mon 7/4/11**	**86**	
102	**4.1 Provide the material support**	**1.4 days**	**Thu 6/9/11**	**Fri 6/10/11**	**6**	
103	4.1.1 Organized the locations for the closing day	0.2 days	Thu 6/9/11	Thu 6/9/11	99	HR TEAM[50%]
104	4.1.2 Purchasing food	0.2 days	Fri 6/10/11	Fri 6/10/11	99	HR TEAM[50%]
105	4.1.3 Provide entertainment music	0.2 days	Fri 6/10/11	Fri 6/10/11	99	HR TEAM[50%]
106	4.1.4 Provide the graduated diploma	0.2 days	Fri 6/10/11	Fri 6/10/11	99	HR TEAM[50%]
107	4.1.5 Provide video recording and photos	0.2 days	Thu 6/9/11	Thu 6/9/11	99	HR TEAM[50%]
108	4.1.6 Create the closing speech	0.8 days	Thu 6/9/11	Thu 6/9/11	107	HR TEAM[50%]
109	**4.2 Performing the activity**	**0.4 days**	**Mon 7/4/11**	**Mon 7/4/11**	**67**	
110	4.2.1 Performing the speech	0.05 days	Mon 7/4/11	Mon 7/4/11	108	ABC COMPANY CONSULT TEAM
111	4.2.2 Handed the diploma	0.05 days	Mon 7/4/11	Mon 7/4/11	108	ABC COMPANY CONSULT TEAM
112	4.2.3 Drinking a glass of wine	0.4 days	Mon 7/4/11	Mon 7/4/11	108	HR TEAM[50%]

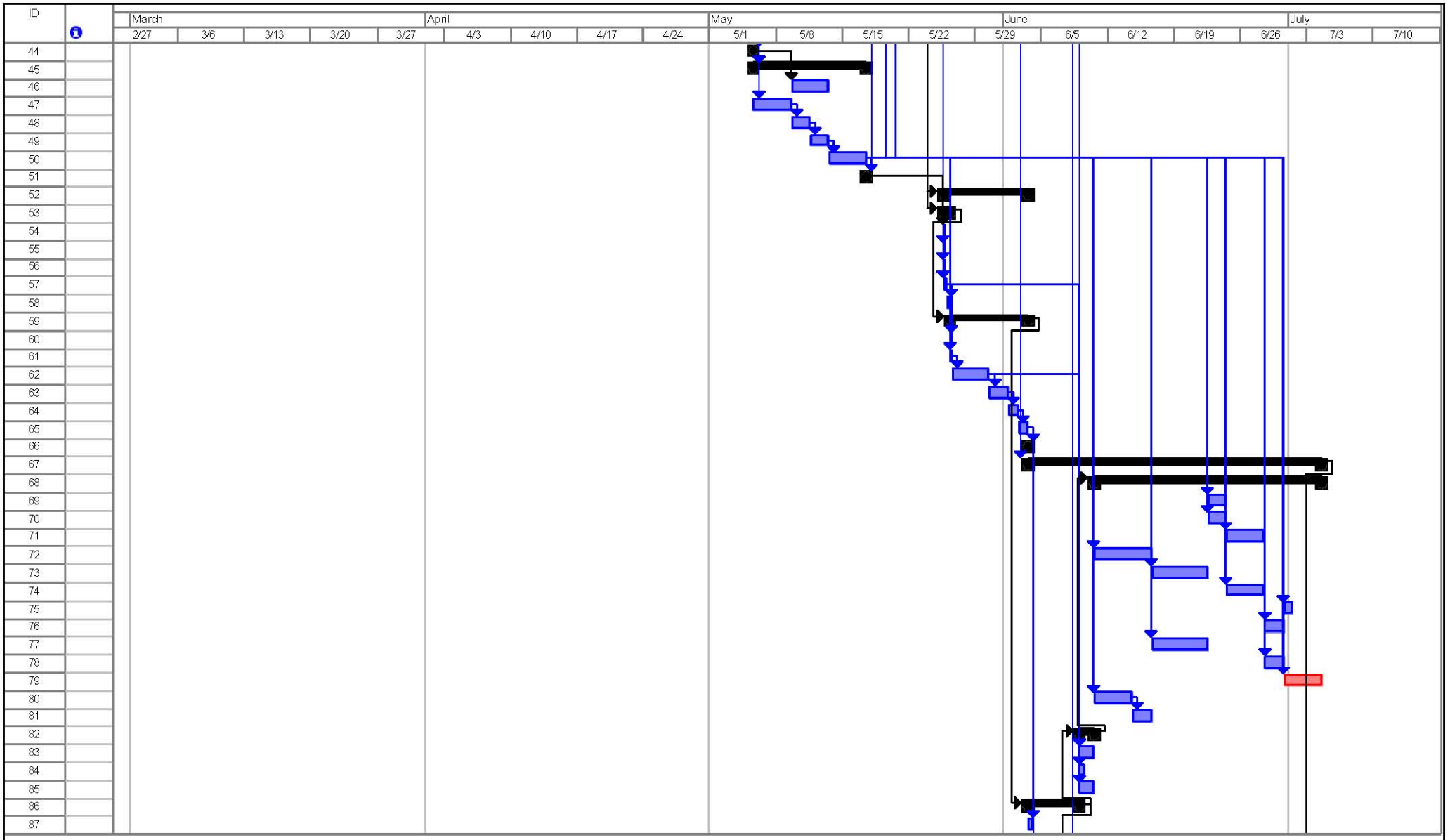
FLORAL SOFTWARE

ID	Resource Name	Type	Material	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	Code
1	PROJECT MANAGER	Work		P		100%	$2,500.00/mon	$60.00/hr	$0.00	Prorated	Standard	
2	IT TEAM	Work		I		200%	$600.00/mon	$4.00/hr	$0.00	Prorated	Standard	
3	HR TEAM	Work		H		200%	$600.00/mon	$4.00/hr	$0.00	Prorated	Standard	
4	WEB DEVELOPER TEAM	Work		W		200%	$600.00/mon	$4.00/hr	$0.00	Prorated	Standard	
5	ABC COMPANY CONSULT TEAM	Work		A		200%	$0.00/mon	$0.00/hr	$0.00	Prorated	Standard	
6	PURCHASING MAN	Work		P		100%	$15,362.00/yr	$0.00/hr	$0.00	Start	Standard	



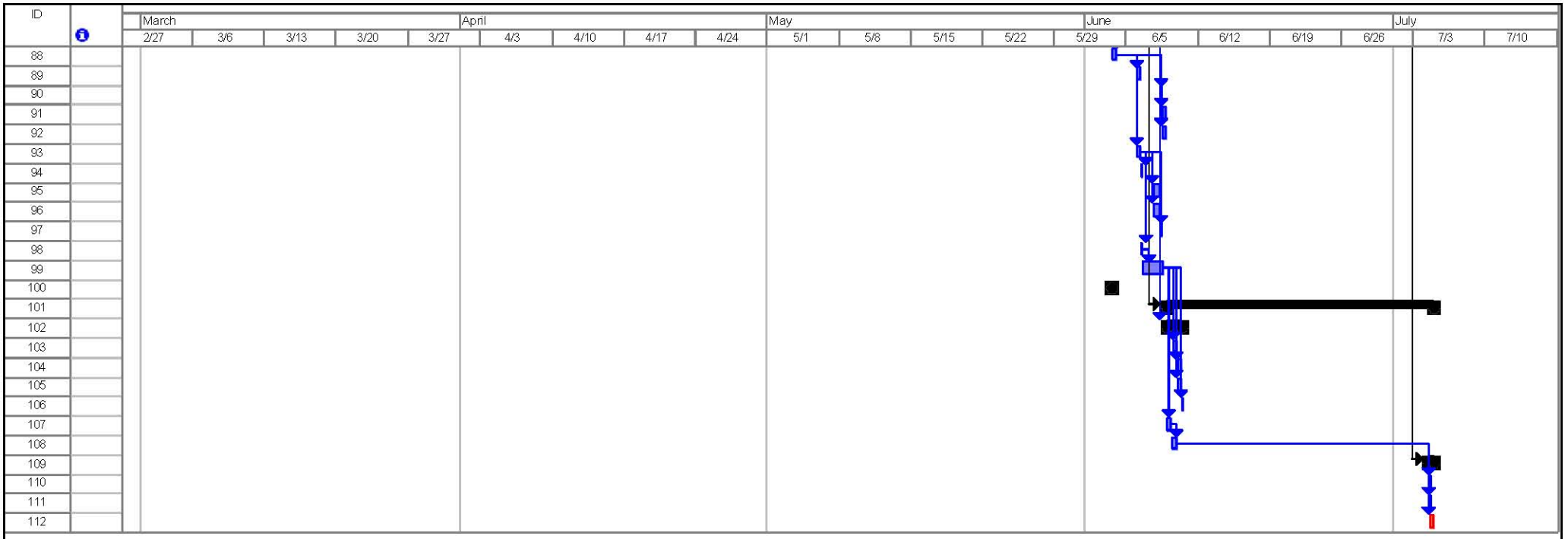
Project: FLORAL SOFTWARE
Date: Tue 3/29/11

Task	Summary	Rolled Up Progress	Group By Summary
Critical Task	Rolled Up Task	Split	Deadline
Progress	Rolled Up Critical Task	External Tasks	
Milestone	Rolled Up Milestone	Project Summary	



Project: FLORAL SOFTWARE
Date: Tue 3/29/11

Task	Summary	Rolled Up Progress	Group By Summary
Critical Task	Rolled Up Task	Split	Deadline
Progress	Rolled Up Critical Task	External Tasks	
Milestone	Rolled Up Milestone	Project Summary	



Project: FLORAL SOFTWARE
Date: Tue 3/29/11

Task	Summary	Rolled Up Progress	Group By Summary
Critical Task	Rolled Up Task	Split	Deadline
Progress	Rolled Up Critical Task	External Tasks	
Milestone	Rolled Up Milestone	Project Summary	

Budget Report as of Tue 3/29/11
FLORAL SOFTWARE

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
0	FLORAL SOFTWARE	$0.00	Prorated	$7,440.12	$0.00	$7,440.12	$0.00	$7,440.12
1	Software Development Life Cycle	$0.00	Prorated	$5,165.10	$0.00	$5,165.10	$0.00	$5,165.10
28	Development	$0.00	Prorated	$3,260.00	$0.00	$3,260.00	$0.00	$3,260.00
67	TRAINING THE EMPLOYEES	$0.00	Prorated	$1,712.00	$0.00	$1,712.00	$0.00	$1,712.00
68	Performing the classes	$0.00	Prorated	$1,275.00	$0.00	$1,275.00	$0.00	$1,275.00
45	Qualification Test	$0.00	Prorated	$1,160.00	$0.00	$1,160.00	$0.00	$1,160.00
2	Analyze	$0.00	Prorated	$1,075.00	$0.00	$1,075.00	$0.00	$1,075.00
33	Develop the client interface	$0.00	Prorated	$900.00	$0.00	$900.00	$0.00	$900.00
39	Develop the server applications	$0.00	Prorated	$900.00	$0.00	$900.00	$0.00	$900.00
14	Design	$0.00	Prorated	$780.00	$0.00	$780.00	$0.00	$780.00
52	SISTEM IMPLEMENTATION	$0.00	Prorated	$530.02	$0.00	$530.02	$0.00	$530.02
59	Perform the implementation procedure	$0.00	Prorated	$509.00	$0.00	$509.00	$0.00	$509.00
46	Run system validation tests	$0.00	Prorated	$490.00	$0.00	$490.00	$0.00	$490.00
47	Run validation data system specifications as requ	$0.00	Prorated	$490.00	$0.00	$490.00	$0.00	$490.00
3	Define the final product	$0.00	Prorated	$430.00	$0.00	$430.00	$0.00	$430.00
4	Features of the program	$0.00	Prorated	$430.00	$0.00	$430.00	$0.00	$430.00
86	Planning the training schedule	$0.00	Prorated	$377.00	$0.00	$377.00	$0.00	$377.00
34	Develop the soft to log on	$0.00	Prorated	$360.00	$0.00	$360.00	$0.00	$360.00
40	Develop the soft for password demand	$0.00	Prorated	$360.00	$0.00	$360.00	$0.00	$360.00
29	Develop the basic components of the progr	$0.00	Prorated	$300.00	$0.00	$300.00	$0.00	$300.00
62	Software installations	$0.00	Prorated	$245.00	$0.00	$245.00	$0.00	$245.00
99	Develop evaluating session of the entire system	$0.00	Prorated	$215.00	$0.00	$215.00	$0.00	$215.00
35	Develop the soft to process the scan of the code	$0.00	Prorated	$180.00	$0.00	$180.00	$0.00	$180.00
41	Develop the soft to received the compressed pict	$0.00	Prorated	$180.00	$0.00	$180.00	$0.00	$180.00
42	Develop the soft to decompressed and convert th	$0.00	Prorated	$180.00	$0.00	$180.00	$0.00	$180.00
43	Develop the soft to update the data base	$0.00	Prorated	$180.00	$0.00	$180.00	$0.00	$180.00

Budget Report as of Tue 3/29/11
FLORAL SOFTWARE

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
72	Performing installation standard operate procec	$0.00	Prorated	$180.00	$0.00	$180.00	$0.00	$180.00
73	Performing fixing standard operate procedure les	$0.00	Prorated	$180.00	$0.00	$180.00	$0.00	$180.00
30	Develop the combination of front-end client-side	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
31	Develop the front-end loads and back-end	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
36	Develop the soft to compress the code bars pictu	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
37	Develop the soft to transmit the compressed pictu	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
38	Develop the soft to receive the result if the image	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
63	Establish solution to remedy the defects	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
71	Performing data entry lesson	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
77	Performing the practice with the bars code printe	$0.00	Prorated	$120.00	$0.00	$120.00	$0.00	$120.00
5	List of the software components	$0.00	Prorated	$107.50	$0.00	$107.50	$0.00	$107.50
6	List of the hardware components	$0.00	Prorated	$107.50	$0.00	$107.50	$0.00	$107.50
15	Create interface of the programs	$0.00	Prorated	$90.00	$0.00	$90.00	$0.00	$90.00
18	Create the specifications for adding the accounts	$0.00	Prorated	$90.00	$0.00	$90.00	$0.00	$90.00
24	Write the maintenance handbook	$0.00	Prorated	$90.00	$0.00	$90.00	$0.00	$90.00
25	Write the functionality system book	$0.00	Prorated	$90.00	$0.00	$90.00	$0.00	$90.00
26	Write the implementation SOP	$0.00	Prorated	$90.00	$0.00	$90.00	$0.00	$90.00
74	Performing devices presentation lesson	$0.00	Prorated	$90.00	$0.00	$90.00	$0.00	$90.00
76	Performing the practice with the install product le	$0.00	Prorated	$90.00	$0.00	$90.00	$0.00	$90.00
79	Performing the practice with the reports lessons	$0.00	Prorated	$90.00	$0.00	$90.00	$0.00	$90.00
80	Performing the practice with the accounts, report	$0.00	Prorated	$90.00	$0.00	$90.00	$0.00	$90.00
81	Performing evaluating session of the system reo	$0.00	Prorated	$90.00	$0.00	$90.00	$0.00	$90.00
16	Create the format of the accounts forms	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
19	Create the specifications for modifying the accou	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
20	Create the specifications for erease the accounts	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
21	Create the specifications for counting the accour	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00

Budget Report as of Tue 3/29/11
FLORAL SOFTWARE

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
32	Standard of intercom communication	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
48	Save the testing results in specific document	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
49	Create the standard operate procedure in order t	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
50	Create the standard operate procedure in order t	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
64	Update the defects	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
65	Run system qualifications test	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
69	Performing a generally presentation of the systen	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
70	Performin the need for system lesson	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
78	Performing the practice with the price applicators	$0.00	Prorated	$60.00	$0.00	$60.00	$0.00	$60.00
82	**Preparing the classroom location**	**$0.00**	**Prorated**	**$60.00**	**$0.00**	**$60.00**	**$0.00**	**$60.00**
8	**Resources analyze demanded to be share**	**$0.00**	**Prorated**	**$50.10**	**$0.00**	**$50.10**	**$0.00**	**$50.10**
75	Performing the generally presentation of the acc	$0.00	Prorated	$45.00	$0.00	$45.00	$0.00	$45.00
13	Identify depositing locations	$0.00	Prorated	$42.00	$0.00	$42.00	$0.00	$42.00
101	**Closing activity**	**$0.00**	**Prorated**	**$33.00**	**$0.00**	**$33.00**	**$0.00**	**$33.00**
23	Write the help manual system	$0.00	Prorated	$30.00	$0.00	$30.00	$0.00	$30.00
17	Create the format of the report forms	$0.00	Prorated	$30.00	$0.00	$30.00	$0.00	$30.00
27	Write the graduade diploma	$0.00	Prorated	$30.00	$0.00	$30.00	$0.00	$30.00
102	**Provide the material support**	**$0.00**	**Prorated**	**$27.00**	**$0.00**	**$27.00**	**$0.00**	**$27.00**
83	Provide material support	$0.00	Prorated	$24.00	$0.00	$24.00	$0.00	$24.00
85	Install of the support material	$0.00	Prorated	$24.00	$0.00	$24.00	$0.00	$24.00
53	**Assure the equipment**	**$0.00**	**Prorated**	**$21.02**	**$0.00**	**$21.02**	**$0.00**	**$21.02**
89	Develop data entry class	$0.00	Prorated	$18.00	$0.00	$18.00	$0.00	$18.00
95	Develop practice with the bars code printers clas	$0.00	Prorated	$18.00	$0.00	$18.00	$0.00	$18.00
98	Develop practice with the accounts, reports class	$0.00	Prorated	$18.00	$0.00	$18.00	$0.00	$18.00
60	Recording events that occur during installation	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
61	Internet connection	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00

Budget Report as of Tue 3/29/11
FLORAL SOFTWARE

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
84	Transportation of the materials support to the cla	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
87	Develop the generally presentation of the system	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
88	Develop the need for system class	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
90	Develop installation standard operate procedure	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
91	Develop fixing standard operate procedure class	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
92	Develop devices presentation class	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
93	Develop generally presentation of the accounts, r	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
94	Develop practice with the install product class	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
96	Develop practice with the price applicators class	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
97	Develop practice with the reports class	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
108	Create the closing speech	$0.00	Prorated	$12.00	$0.00	$12.00	$0.00	$12.00
56	Purchasing the Price aplicators	$0.00	Prorated	$9.20	$0.00	$9.20	$0.00	$9.20
109	**Performing the activity**	**$0.00**	**Prorated**	**$6.00**	**$0.00**	**$6.00**	**$0.00**	**$6.00**
112	Drinking a glass of wine	$0.00	Prorated	$6.00	$0.00	$6.00	$0.00	$6.00
57	Purchasing the Scans	$0.00	Prorated	$5.91	$0.00	$5.91	$0.00	$5.91
58	Transportation of the equipment to the ABC Comp	$0.00	Prorated	$5.91	$0.00	$5.91	$0.00	$5.91
9	Identify the locations to train	$0.00	Prorated	$3.00	$0.00	$3.00	$0.00	$3.00
12	Identify electrical plugs	$0.00	Prorated	$3.00	$0.00	$3.00	$0.00	$3.00
103	Organized the locations for the closing day	$0.00	Prorated	$3.00	$0.00	$3.00	$0.00	$3.00
104	Purchasing food	$0.00	Prorated	$3.00	$0.00	$3.00	$0.00	$3.00
105	Provide entertainment music	$0.00	Prorated	$3.00	$0.00	$3.00	$0.00	$3.00
106	Provide the graduated diploma	$0.00	Prorated	$3.00	$0.00	$3.00	$0.00	$3.00
107	Provide video recording and photos	$0.00	Prorated	$3.00	$0.00	$3.00	$0.00	$3.00
11	Identify Internet conection	$0.00	Prorated	$1.50	$0.00	$1.50	$0.00	$1.50
10	Designated locations to implement	$0.00	Prorated	$0.60	$0.00	$0.60	$0.00	$0.60
7	product milestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00

Budget Report as of Tue 3/29/11
FLORAL SOFTWARE

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
22	designmilestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
44	finalproductmilestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
51	1stverificationmilestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
54	Purchasing the Laptops	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
55	Purchasing the Bars code printers	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
66	2ndverificationmilestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
100	3dferificationmilestone	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
110	Performing the speech	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
111	Handed the diploma	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
		$0.00		**$7,440.12**	**$0.00**	**$7,440.12**	**$0.00**	**$7,440.12**

Appendix 5.a.

	Actually costs			
Domain	ware house	transportation	administration	sistem
No.	1000	45	22	0
Cost/year	12.000 €	20.736 €	119.328 €	0
Total costs/year	152.064 €			

	Future costs			
Domain	ware house	transportation	administration	sistem
Cost/ONCE	0	0	0	15.362 €
Cost/year			32.544 €	690 €
Total costs/year	48.596 €			

Save money	**103.468 €**

Appendix 5.b.

Minimal actual cost for warehouse

location of ware house	stupini	ghimbav	bod	cristian
total surface/mp	200	350	150	300
utilities/mp/E	1	1	1	1
cost	200	350	150	300
total cost / month	**1.000 €**			
total cost / year	**12.000,00 €**			

Appendix 5.c.

Minimal actual cost for transportation

location of ware house	stupini	ghimbav	bod	cristian
distance brasov ….. and return /km	5	10	15	15
no. vehicule	1	1	1	1
maintenance cost / month	50	100	150	150
fuel cost /E/month	142	284	426	426
total cost / month	**192**	**384**	**576**	**576**
total cost / year	**20.736,00 €**			

Appendix 5.d.

Minimal actual cost for personnel income

Personnel	Stupini	Ghimbav	Bod	Cristian	Brasov
administration	1	1	1	1	2
manipulation	2	2	2	2	4
drivers	1	1	1	1	
Total	**22**				
medium salary /E / month	452	452	452	452	452
total cost / month	1808	1808	1808	1808	2712
total cost / year	**119.328 €**				

Appendix 5.e.

Future cost for personnel income

Personnel	Stupini	Ghimbav	Bod	Cristian	Brasov
administration	o	o	o	o	2
manipulation	o	o	o	o	4
drivers	o	o	o	o	
Total	**6**				
medium salary /E / month	452	452	452	452	452
total cost / month	0	0	0	0	2712
total cost / year	**32.544 €**				

Appendix 5.f.

Future cost for implementation of the automatically sistem

	ONCE COST FOR THE AUTOMATICALLY SISTEM							
Location / Equipment	Numbers of sale points in Brasov	Numbers of sale points in Arad	Numbers of sale points in Bucuresti	Numbers of sale points in Sibiu	Numbers of sale points in Vatra Dornei	Total points of sale	Cost of equipment / EURO	Total cost of equipment / EURO
	2	**3**	**4**	**3**	**6**	**18**		
Package soft	2	3	4	3	6	18	59	1062
Scans	2	3	4	3	6	18	404	7272
Laptops	2	3	4	3	6	18	342	6156
Bars code printers	2						366	732
Price aplicators	20						7	140
TOTAL COST								15362
	Annual costs							
Maintenance	2	3	4	3	6	18	30	540
Internet connection taxes	2	3	4	3	6	18	8,33	149,94
TOTAL COST								689,94

WHAT MAKES AN EFFECTIVE PROJECT MANAGER?

An extensive study on the importance of human resource management principles in securing project management success

Lecturer PhD Ecaterina Livia TĂTAR

Introduction

When approaching various fields and branches of management, one may notice that the science and art of management never ceases to display overlapping dimensions, thus emphasizing its interdisciplinary nature. In fact, we can speak about a somewhat antagonistic tendency: on the one hand, hype-specialization in a particular area of management theory and practice is regarded as a means to achieve better knowledge and understanding of the processes. On the other hand, the ever growing complexity of management processes calls for an interdisciplinary approach, for it is difficult to draw clear-cut boundaries in what may be, and usually is, a complex endeavor, entailing a wide range of skills and/or experiences. Moreover, such an approach could be considered to be an oversimplification that disregards the breadth and depth of managerial roles and areas of responsibility.

Consequently, the hereby study attempts to examine the complex nature of project management, with an emphasis on the project manager's duties. Also, attention will be paid to the soft skills he/she must display in order to increase the project's success rate, as I consider that non-measurable or unquantifiable skills governing a manager's activity can really make the difference between failure and success.

At the same time, the present study will present the human resource management principles that pertain to the project manager's specific attributes, in order to examine the extent to which they can and must contribute to facilitating project progress, while valuing what I consider to be a modern organization's most valuable asset: its people.

CHAPTER I

Overview of human resource management principles

The following section of the study attempts to critically analyze some of the human resource management roles and responsibilities as they are reflected in the specialized literature. However, by no means do I intend to transform this chapter into a manual of human resource management, but rather capture the main attributes and duties that a human resource manager should display in his/her daily activity.

In the light of the above, I would like to start by mentioning an article which, in my opinion, succeeds in presenting useful snapshots of the core of human resource management. Thus, in her article entitled "*The Supervisor and Human Resource Management*", Lesley Myland (1995) adopts an objective view of what duties a manager should or should not do in order to effectively perform their tasks, regardless of the hierarchical level or position they occupy.

Mention should be made that the analysis is put into perspective by mentioning several management trends that delineate modern organizations' environment, such as: delayering, restructuring, or downsizing, all of which resulting in flatter, more agile organizations, where accountability or information flow are more flexible compared to traditional, pyramidal, and often bureaucratic organizations. Needless to say that these trends impact significantly the organization's internal processes such as decision-making or problem-solving concerning of the way, methods, and procedures used to perform them. More precisely, these activities continue to be done in the same quantitative terms, but their qualitative coordinates change significantly both in terms of efficiency, and in terms of effectiveness.

Going back to the article findings, one can notice the two-fold perspective presented by the author: the former argues that any manager or supervisor does human resources management, one way or another, more or less explicitly, regardless of what his/her job description mentions; the latter, on the other hand, suggests that human resources management duties should be let to professionals, for mid-level managers are already overburdened with more technical or tangible tasks, and consequently have neither the knowledge, nor the time and energy to perform these additional roles.

Obviously, the natural tendency of the one reading this article is to take either one of the two sides, weigh the pros and cons of each argument, and eventually decide whether they support the former or the latter. However, from the experience I have had with our course participants in the human resources management classes, I have noticed that the truth is somewhere in between, since most of the individuals expressing their opinions based on their personal experience have pointed out that they carry out at least *some* human resources management duties, to various extents, despite that their job descriptions do not stipulate anything specific in this respect.

At this early stage of my study, I would like to mention what exactly we mean by human resources management functions in the very context of this paper. Therefore, the following list is advanced, without pretending that this exhausts the whole range of roles, duties, and tasks. Instead, I will focus on those which I regard as most impactful, which leaves room for a significant degree of subjectivity and interpretation. Nonetheless, when selecting the items above, I will attempt to increase the objectivity of my choices by relying on my previous lectures, as well as on the valuable input provided by my previous students, both in formal and informal environments.

Resuming the human resources management roles, I suggest that we should focus on aspects such as: personnel recruitment, job assignment, staff appraisal, payment and reward schemes, grievance and disciplinary procedures – in no particular order. It is not the purpose of our endeavor to prioritize these aspects, since I strongly believe that one cannot do this for the simple reason that every single factor has its own critical importance upon the overall effectiveness of human resources management system applied in an organization. At one stage or another in developing and implementing personnel policies and strategies, each function is essential, and is subject to affect and being affected by the rest of the functions in a domino effect.

In the following sections of our study, I will briefly concentrate upon every function in order to ensure that their understanding is coherent and consistent across the paper.

Personnel recruitment

In my opinion, this is the step that can guarantee the organization's future success provided that the recruitment policies fall in line with the organization's business strategy. This is why theorists and practitioners as well speak about strategic human resources management (SHRM), in an effort to emphasize that managers at all levels, but particularly the ones occupying top positions, should be aware of the strategic intent of their entity, understand it, and be able to see the picture of the business environment. One of the most widely used tools to assess the organization's current state is the popular SWAT analysis, which focuses upon the internal business environment when examining its strengths and weaknesses, and then upon the external environment when exploring its opportunities and threats. It goes without saying that the SWAT analysis is but one of the instruments utilized to evaluate what an organization has good and valuable versus what the organization needs to improve and/or be careful about. Management literature also mentions the PEST analysis, which refers to the political, economic, social, and technological factors impacting regional, national, or global environment at a certain moment in time.

Regardless of the tool used to assess an organization's condition, one should keep in mind the ultimate purpose of doing it, that is, to see where it is now (moment A), where we want it to be in the future (moment B), and how we can fill in the gap between moment A and moment B. It is the top decision-makers' duty to perform this type of analysis as accurately as possible, paying attention both to the breadth and to the depth of all the aspects involved. In doing so, I strongly argue that people matters must occupy the central stage, because they can make the difference between organization's success and failure.

In more concrete terms, the manager – no matter what his/her job description stipulates – should be the one who best knows the business strategic intent, its needs in terms of people, and how they can contribute to achieving organization's mission, goals, and objectives. The question is how exactly can the management at all levels ensure that the best people are attracted to the organization? And assuming that this has been accomplished, how can the organization retain them?

To address these complex issues, one must bear in mind several collateral implications. For instance, the simple use of the term “best” to describe people is extremely ambiguous, since every single job, as well as every single organizational culture requires a specific type of employee. To make thins even more complicated, “best” has not only a qualitative connotation, but also a qualitative connotation. In other words, when recruiting staff, the human resources manager must make sure that he/she provides the institution with the right *number* of people, and at the same time, these people have the right *skills* and *education, qualification, experience*, etc.

Once these initial stage is successfully completed and the personnel are ensured both in quantitative, and in qualitative terms, induction is carried out in order to make sure that the newly hired staff understand what is expected of them, and – what is more important – they match the organizational culture and the vice versa. Unless there is a clear and ambivalent relationship between the two parties – the employee and the organization – one should not and cannot expect a long-lasting and productive coexistence of the two.

Last but certainly not least, the retention phase is of paramount importance, since the organization cannot afford to lose a valuable employee: staring from the axiom that the recruitment process is a costly one – both time-wise, and money-wise – followed by the induction phase, which is at least equally costly in itself, let alone that it may often be accompanied by additional courses or training, which again mean time and money spent, it logically follows that retaining most valuable employees is not only advisable, but even decisive in achieving organizational success.

Job assignment

One of the most difficult roles that a manager must perform is that of deciding who does what. The reason is multifaceted, for it involves displaying various and subtle skills, both measurable and unmeasurable, both tangible and intangible. Let us begin with the former ones, which may take the form of allocating a certain amount of work to a certain amount of people. Providing that the manager has a clear idea of what needs to be done, on the one hand, as well as what human resources are available to accomplish that particular amount of work, on the other hand, everything should be easy. And it is, in theory: the easy way is to do the simple math, and divide the work by the number of people, allocate the resulting tasks, set the standards and the deadline, and expect that everything will go smoothly.

Naturally, the method described above is neither realistic, nor desirable. When it comes to people, nothing is simple, for one cannot find two identical individual concerning their skills, knowledge, experience, educational backgrounds, potential, learning abilities, culture, personality traits, expectations, motivation – and the list could go on, and on, and on…

Having said that, how can a manager make sure that the task distribution is done fairly? If one applies the simplistic math-based method, more often than not the result will be a disaster not only in productive terms, but also in people relation terms. The reason is that math simply does not apply to people, for a manager's duty – and gift, if I may add – is to know every employee's real potential to do a particular task. Since people are so different when it comes to all the things listed above, so is their capacity and ability to perform professionally. In a nutshell, this is the reason why math is not applicable to task allocation.

Staff appraisal, payment and reward schemes

Notwithstanding that these roles have separate identities and impacts in the process of managing human resources management, I opted to approach them altogether, because I see them as a continuum of the same sequence, i.e., the activity of selecting the payment and reward scheme that best suits a particular individual and in accordance with his/her own individual performance.

Once again, the "hard" or measurable aspects of this managerial function are shadowed by the "soft" ones, which call for the deep and subtle knowledge and understanding of the human nature. It is often hard to decide on a particular employee's productivity or effectiveness at a certain moment in time, for a human is not a machine. A human is subject to mental or physical pitfalls, which affect labor performance. Also, various individuals are motivated by different perks, rewards, or incentives, depending on their personality, education, or culture. Some people react better or faster to positive reinforcement, whereas others react faster or better to negative reinforcement – this is the classical dilemma of "carrot and stick" motivation. Obviously, the carrot is always preferable, but reality shows that the stick is sometimes – regrettably – applied.

So how should a manager assess an employee's performance in order to ensure that he/she measures *what* needs to be measured and *how* it needs to be

measured? How does he/she know that the appraisal moment is the one that truly reflects the employee's real level of performance? How does the manager know that he/she has applied the motivating methods that best match the employee's needs and expectation? Questions such as the previous ones make managers' life so complicated, sometimes even frustrating, but also challenging and rewarding at the same time.

Grievance and disciplinary procedures

Once the matter of motivating and rewarding people has been approached, one may consider the problem half solved, at least in theory, because practically the complex and complicated nature of human beings leads to situations when people experience frustration, dissatisfaction, and even conflict. It is not the purpose of our study to deepen the theory and practice of conflict, which is one of magnitude and high importance to management theory and practice; nonetheless, I would like to point out that the concept of conflict pertains to a wide range of interpretations, depending on the "interpreter's" personal traits, education, background, culture, etc. Thus, we once again encounter the relative character of management models and theories, which hardly ever attempt, let alone succeed, in offering recipes for effective conflict solving. And this is a realistic attitude, from my point of view, due to the peculiarities of every conflict situation in terms of individuals and matters involved.

It, therefore, follows naturally that the manager's professional and personal characteristics will play a pivotal role in applying the appropriate grievance and disciplinary procedures, with an emphasis on the contingency approach which, in my opinion, should prevail managerial activities at all levels. Nevertheless, mention should be made that grievance and conflict occurrence are natural phenomena in every organization's life. Should we not encounter such manifestations, the organization's creativity, adaptability, and maturity should be questioned.

Once the inevitable and even desirable nature of conflict existence have been acknowledged, one should address the issue of conflict solving techniques and methods that are most appropriate at a particular moment in time, or most suitable to a particular group of professionals. This is due to the fact that conflict situations pertain to various approaches and solutions, according to the particularities of each context examined. Once again, insightfulness, flexibility, open-mindedness are but a few of the professional and interpersonal skills required of an individual filling in a management position, regardless of the hierarchical level one is discussing.

To conclude the brief presentation of human resources management roles and attributes one needs to fulfill when exerting various management functions across the organization, one should notice that it is hard to draw a clear-cut line between the technical and interpersonal roles a manager must carry out on a daily basis. As a consequence of the truism that organizations, or more precisely, managers rely on individuals in order to perform all the tasks an organization's complex life requires, one may argue that every management function, however technical it may be, involves the use of interpersonal skills that can be subsumed to the larger field of human resources management.

Last but not least, I strongly argue that a manager is not complete unless he/she assumes human resources management roles, given that nowadays' employees are totally different from the employees fifty years ago. Thus, they are more educated, more skilled, and more competent, simply because they have more access to education, training, and information resources. Moreover, they are more exposed to diversity and diversification, which results in their expanding the range of competencies and, consequently, expectations. In simple words, this means that they expect their employers, i.e., their superiors or supervisors, to be aware of their needs and to support them in meeting these needs. In return, they make a significant contribution to their organization's overall success, which leads to a mutually beneficial relationship between the two parties – both the employer and the employee.

CHAPTER II

Fundamental dimensions of project management

In order to accomplish the purpose of our paper as we stated it at the very beginning of our endeavor, the following sections of the paper will focus on the characteristics of project management, with an emphasis on the project manager's roles, duties, and skills. Since we started the hereby study by advancing a parallelism between the principles of human resources management, in general, and the functions of an effective project manager, in particular, we will continue our analysis by delineating the main aspects that make a project manager effective and efficient at the same time.

First, I would like to focus on the definition of a project as it is stated in management literature: “a project is a group of related tasks organized to achieve a goal […] within defined specifications, has start and end dates, has funding limits, and consumes resources in terms of money, labor, equipment, and materials” (McCollum and Banacu, 2005, p. 30). As one may easily notice, by extrapolation, the goal of the project can be regarded as an organizational objective, whereas all the other elements delineating a project can be identified as any organization’s resources and constraints.

Once the project goals and objectives have been established, the project manager is appointed, and the project commences. Theoretically at least, the project manager’s roles are known from the very beginning. In practice, however, they can vary according to the nature of the project, as well as the quantity and quality of the resources available to accomplish that particular project. In the following paragraphs of the present study, we will concentrate upon the project manager’s duties, and then the relationship between the project manager and the human resources he/she needs to manage in order to successfully complete the assigned project.

In general terms, one of the main duties which a project manager is expected to perform is to coordinate and integrate activities across numerous functional areas. In order to do this, he/she must display strong interpersonal and communicative skills, that is, leadership skills. We thus acknowledge that dealing with people is the first and most important challenge which the project manager should be able to face, for the complex nature of humans make this job difficult and sometimes confusing. In other words, he/she must act as a team leader, whose main role responsibility is to orient all team members towards the fulfillment of their individual role within the overall project. Formally, this is done on the grounds of a work breakdown structure document, which illustrates the various work packages that the project consists of. Mention should be made that this document is prone to changes, since the project beneficiary’s requirements may change during the project unfolding. It thus becomes clear that the project manager needs to adopt a flexible mindset and, more importantly, be able to instill this flexibility to the team members, so that they are prepared for capable of dealing with potential changes.

To make things even more complicated, one should bear in mind that the team structure is not fixed throughout the project: some members will stay until the end of the project, some people will leave the team, whereas some other people will join the team. This requires tremendous leadership skills in order to harmonize the variety of people leaving and joining the team, while keeping the

team focused on their common goal: project completion within the initially stated time limit and budget and at the necessary standards.

Unfortunately, as Timmins (1995) states, “organizations invest little in improving relationship skills beyond basic communications training. But as the more highly developed countries of the world increase the service component of their economies, then relationship skills will become even more crucial […]. Managing relationships with your colleagues is critical for success. Building good relationships and coalitions with your colleagues ensures you can rely on them for help when needed” (p. 23).

When using the term “colleague”, one can assume the author refers to the wider range of co-workers, whether they are peers, superiors, or subordinates, due to the development that have taken place in the organizational environment nowadays: the organization is no longer a hierarchical, pyramidal rigid structure based on the rules of the chain of command, but rather an agile, creative, adaptable entity, in which this are done because people respond to their co-workers requests out of respect and mutual support. It is, therefore, of paramount importance to develop such communication and interpersonal skills, which represent a vital component of leadership skills, which, in their turn, are a fundamental dimension of human resources management.

The dark side of the coin is that formal training in the aforementioned skills is scarce and rather inefficient, for such competencies call for some traits that are often born and rarely made. However, there is still hope in this respect once we acknowledge that building relationships starts with treating people respectfully, regardless of their position inside, as well as outside the organization. Furthermore, as middle managers, project managers must translate the project goals into meaningful front-line tasks, “facilitate, take a lead on innovation and creativity, solve problems and communicate with all from top to toe of the organization” (Timmins, 1995, p. 23). Needless to say, all these roles are human resources management duties.

Even the project manager’s selection process is a human resources management function, which entails some specific criteria regarding the roles and responsibilities which he/she must carry out. Some of the most important are listed below, and most of them bear conspicuous human resources management connotations: organize and motivate personnel, establish clear and concise delegation of authority, keep objectives pointed toward the ultimate goal, relate actions to schedule and budget, make all required decisions, act as the customer

and upper-level and functional management communications focal point, negotiate functionally for the accomplishment of the necessary work packages within time, cost, and performance, solve all conflicts, etc. On a simplistic note, a good project manager's characteristics could be summed up as follows: good, judgment, people skills, ethical, broad thinker, focused leader, skilled decision-maker, communicator (vertically, horizontally), dynamic, charismatic, etc. If one wants to elaborate on these features, one will realize that this blend of analytic and synthetic competencies is but the tip of the iceberg, in the sense that a project manager's having all these traits does not guarantee the success of his/her endeavor. The reason is the ever changing nature of businesses and business environments, which require permanently reshaping the project manager's profile due to the transformations occurred in the core processes specific to the field of project management. Let us focus on two such transformations: teleworking and e-business, and examine the way in which they have reshaped the way business is done and, implicitly, the modern project manager's profile.

Teleworking implies building and managing a team at a distance and often at numerous locations, that is "groups who now, and even more so in the future, will work full-time from home" (Morris, 1996, p. 14). On the one hand, this a working style which brings a lot of advantages such as lower overheads and personnel recruitment without facing the issue of relocation. On the other hand, this working style poses new and complicated problems to managers and supervisors, who have to continue to perform their managerial roles of directing, controlling and motivating their teams without having much contact with them. This evidently requires a new mental approach to the processes of team building and team management, based on four critical pillars (Morris, 1996):

- philosophy, which is the team's foundation and means that the team members have a clear vision of their goal, are confident to test new ideas, and regard failure as a learning opportunity without seeking scapegoats;
- interaction, which reflects the way the team works on the grounds of mutual respect, open and honest communication, in an environment that fosters creativity and participation;
- drive, which is the source of the team's energy and will to focus on achieving the best results;
- resource, which shows how the team functions, by using all individual talents and contributions to the common success.

Given these pre-requisites, it becomes clear that leadership skills play an essential role in ensuring the team's success by instilling the necessary vision

and motivation amongst the team members. Under these circumstances, the project manager's role is to enhance the team spirit, as well as to deal with potential grievances by maintaining regular contact with every team member. On the other hand, too much focus on individual needs may jeopardize the team spirit. Therefore, balance is necessary to keep between individual communication and team communication. Moreover, the project manager should not overlook his/her main duty, that is, channeling the common effort towards achieving the project goal. This can be done by developing a forum by means of which experiences can be exchanged, and feedback can be collected. The most common form of such forums is that of organizing meetings on a regular basis in order to reinforce one-to-one communication and benchmark the project team's performance against other partners' or counterparts'. Also, information dissemination is essential in securing the project's success. And all of the above roles and functions must be carried out by the project manager, whereas the weight of the human resources management principles in doing so is obvious. (In the annex, we present what the cited author names "*The distance management" health check, i.e., a list of questions that a project manager should ask in order to determine whether he/she is on the right way or, on the contrary, whether some changes should be made to ensure the project accomplishment*.)

The second source of project management challenges is the one generated by e-business, a sector that has gained tremendous amplitude and magnitude during the last decades, and is expected to grow at least at the same pace in the near future. As Porter (2002) notes, "over the past decade, a peaceful revolution driven by the explosion in IT has occurred. IT provides users greater computing power in smaller packages at lower costs, and with that computing power comes enormous capacity for change, driving process reengineering, new ways of doing business, and streamlining" (p. 177). Given and revolutionary nature of the business environment we live in, it naturally follows that it impact the very core of the managerial skills this new type of business requires. However, the fundamental features of projects remain the same, whilst the project manager's profile changes in order to counterbalance these challenges and changes. The hardship and excitement of such projects comes from the endless opportunities that IT offers, whereas the genuine benefit appears when professional are able to use these tools to improve, invent, or upgrade what we already have and apply. But however critical the role of IT in this process is, it is the people's will to learn and grow as professionals that secures project success.

When talking about people learning and growing, we actually have in mind their willingness and capacity to acquire and, most importantly, to exert the knowledge, skills, experience, and behavior imposed by the new project

environment. Considering that one can no longer regard the traditional rigid way of doing things as a viable option, we can infer that empowerment and flexible decision-making pushed down the line is one of the keys to success. As the aforementioned authors point out,

> "today's workplace demands a new kind of worker. In our global world, data is dispatched in picoseconds and gigabits and this deluge of information must be sorted, evaluated, and applied. Information literacy is a set of information and knowledge age skills that enable individuals to recognize what information is needed, when it is needed, and methods for location, evaluation, use and effective communication. It is people knowing how to use what […] the world is creating" (p. 178).

It is thus becomes clear that the roles and duties which the project manager has to do, regardless of the nature of the project and including IT projects, are fundamentally the same. What really makes the difference is *how* the project manager can contribute to the accomplishment of his/her enterprise. And the answer to the *how* question is, in our opinion, the thorough knowledge and application of human resources management in its most genuine and professional sense. To be more specific, it is the "soft" side of human resource management that offers the clue to team building, interpersonal communication, conflict solving – to name but a few aspects entailed by project management which may hamper its successful completion.

In terms of practical solutions to meet these challenges, the word of the day is "communication": honest, open communication across the project team and across the organization overall. Experience shows this is easier said than done. At the same time, experience shows this is the only way out of troubles, frustration, and pitfalls. Last but not least, it must be initiated by the project manager, and directed to the project team members. Then and only then can the team members be held accountable for their deeds, whether they are achievements or failures.

To add to the project manager's list of functions, providing the team members' with learning and growing opportunities is also the project manager's duty. Coaching, mentoring, job enrichment, or any other form of training and education that may significantly contribute to the project's overall success can and must be extensively applied in order to increase the employee's level of skills, knowledge, and expertise, which naturally impact the project's completion in an effective and efficient manner. It goes without saying that nowadays learning and training rely more and more on technology, with an

emphasis upon IT. The rapid pace of change and development in every field of business and, more generally, in every walk of life, individuals must keep up with the new situations. And this means constant learning, information, and training. Information acquiring and sharing have become constant elements of our every day life, and this can only lead to organization learning and growing.

Under the circumstances described above, it is not surprising that new professional positions have merged in order to deal with the IT challenges. We are now talking about the Chief Information Officer (CIO), who is regarded as a key executive in any modern organization, be it private or public, which is well on its way to performance. As Schubert (2004) argues, the CIO is expected "to understand and communicate important business strategies, IT organization focuses, and executive peer/partnership values relative to information technology […], to work with external customers on behalf of the company" (p. 13). Noticeably, the range of a CIO's roles and responsibilities is rather wide, and this can only illustrate the importance of placing professionals in key IT positions. This raises the following question: what profile should a CIO in particular, as well as an IT project manager by inference.

According to the same author previously cited, the ideal candidate's profile should meet the following requirements:

1. display planning skills in order to formulate adequate strategies for project completion;
2. have strong business orientation;
3. have strong analytical skills;
4. demonstrate ability to apply IT in order to solve business issues while managing costs and risks at the same time;
5. identify and assess new technological developments and evaluate their usefulness to the project;
6. show communicative skills and be able to understand the needs and expectations of internal and external customers;
7. have organizational and facilitation skills;
8. be a good listener, a team builder, and conflict mediator;
9. be able to work with people at various hierarchical levels;
10. have negotiation skills in order to secure the necessary level of buy-in by all stakeholders to ensure project successful completion.

Should one take a quick look at the far from exhaustive list above, one will easily notice the high degree of resemblance with the teleworking project manager's profile. Notwithstanding the apparently huge gap between the nature of the two field of activity, the fundamental dimensions remain the same, as they subsume to the same large branch of project management. Moreover, the relevance of human resources management principle in smoothly running this type of business is again more than conspicuous, with an emphasis on the leadership roles such as communication, motivation, vision, conflict solving, etc. Above all these, however, is the credibility issue, which is the vital pre-requisite for any managerial endeavor, including project management. More precisely, this refers to the manager doing what he/she is preaching as a key to his/her actions implementation, regardless of the organization or project scale.

The conundrum of credibility has stirred and continues to stir debates and analyses among the management theorists and leadership practitioners. For instance, Broadbent and Kitzis (2005) consider that many managers, and project managers in particular, do not know the sources of their credibility, although they are aware of the importance of having it. Could this source be knowledge, experience, or tenure? The authors' answer is as simple and clear and one can possibly imagine: it comes from achieving the results that your superiors or leaders regard as important. And the hazard of doing otherwise is also straightforward: "Even if you deliver projects on time and under budget, if they don't help your executive colleagues meet their business goals, your credibility suffers" (p. 20).

Another idea the aforementioned scholars approach is that of how management and leadership differ, in spite of the fact that the two concepts – and practices, too – are complementary. Again, people skills play a pivotal role in ensuring project success by acknowledging that a project manager lacking vision, communication, and relationship building is doomed to fail. Also, intercultural management requires special attention on behalf of the project manager, given the team structure diversity. These differences in terms of team members' personality, education, culture, and background leads in turn to significant differences in their working style and conduct, which directly influences their labor performance and eventually the project success.

Flexibility and creativity are essential ingredients for business performance when it comes to various situations that may occur while unfolding a project. Therefore, every situation should be approached differently, in accordance with

its peculiarities. There is no one perfect way to lead – it all depends on the characteristics of the situation encountered. Nevertheless, management literature suggests that three leadership styles should prevail: visionary, affiliative, and democratic. To conclude upon this short episode dedicated to leadership, one may say that effective leaders must apply a variety of styles, depending on the problem and people involved.

In the wake of the aspects examined in the previous sections of this study, one may conclude that people skills are critical in ensuring the implementation and completion of any project, regardless of its goal or purpose. Also, this conclusion falls in line with our initial study hypothesis, according to which the fundamental principles of human resources management genuinely make the difference between the success or failure of project management, due to the importance played by the interpersonal skills in any project manager's professional performance.

CHAPTER III

How do we measure project management success?

- Lessons learned from the best in the field -

The purpose of the following part of our study is to clarify what exactly we mean by a successful project with an emphasis upon the best practices in the field of project management. In doing so, I will rely on Kerzner's book *Project Management Best Practices* (2006), which presents various organization's experiences in implementing projects that led to achieving global excellence at different moments in time.

It is worth noting that project management has not always enjoyed the attention it is paid to nowadays despite having been with us for decades. The main reason one may identify is that project management, by its own very nature, requires the extensive and intensive use of human resources management principles, which is both difficult and undesirable to some managers. We refer here to empowerment, team work, delayering, delegation, communication, motivation, flexibility, creativity, etc. – all the principles that characterize modern management and are not embraced by traditional autocratic managers. And this is not an easy thing to change, for changing people's mentality is the hardest

thing to do, and it is more so when it comes to individuals who already occupy management positions and are not ready to give up on them.

Nevertheless, the economic crises that the world's economy underwent by the '90s forced people to reconsider the way they had been doing business, and consequently this resulted in the need for a change in the way they conducted business. Tough competition, the necessity to gain and retain customers, employees' emancipation, and globalization challenges dictated the adoption of new management and leadership styles, which reshaped the organizational processes dramatically. Among them, project management has gained ever growing importance, since it addresses all the main challenges posed by the new economic, social, and cultural environment, especially by placing people at the heart and core of business.

As a social and economic necessity, project management theory and practice has evolved in time, from something good or desirable for an organization to have to a way of doing business to achieve performance. Skeptics may have regarded it as another management fad, but reality has proved them wrong by at least two apparently contradictory trends: on the one hand, some organizations keep their project management strategies secret and locked, for they are the key to success and competitive advantage; on the other hand, there are organizations which share their knowledge and experience in project management hoping to enlarge useful data bases and to learn from other organizations' best practices, starting from which they can develop their own project management strategic planning.

Mention should be made that in practice project management has been with us for decades, but after World War II and until the '60s it carried some misconceptions, which included the following:

- project management applies to large projects only;
- project management is designed for government projects only;
- project managers must be engineers with advanced degrees;
- project success is measured in technical terms only.

However, the later developments in all economic sectors, as well as in management theory and practice have led to the widening and deepening of project management understanding and applying. Consequently, project management was adopted by more and more companies, mainly as a result of

technological progress, increased attention paid to the research and development area, ever growing amount of information available, etc. Naturally, as project management developed, so did the role of project managers. Instead of continuing to be an organizer and a controller, the project manager had to be more of a leader, a motivator, a facilitator, a negotiator, etc. In other words, his/her "hard", technical roles were slowly but steadily replaced or rather accompanied by the "soft" ones, dealing with people's needs and expectations. This is not surprising given the fact that employees became more and more educated and viewed as the organization's most important asset.

This is the reason why the eighth and the ninth decades of the last century witnessed a shift in the project management theory and practice, in which some of the main managerial duties changed fundamentally: decision-making pushed down the organizational hierarchy, trust in the peers' decisions, easy adaptation to an ever changing environment, both horizontal and vertical work flow, more focus on customer aspects, innovative organizational design, etc.

In a dynamic world as the one we live in today, organizations need sources of stability that can sustain their performance, reputation, and survivability in the market. And this is how and why the need for capturing best practices was born. Nevertheless, one should make sure that one has a consistent comprehension of what the term "best practices" means. As a result, we will present some of the ways in which it can be understood, as well as the way in which this understanding has evolved in time. Thus, "a best practice might be:

- something that works
- something that works well
- something that works well on a repetitive basis
- something that leads to a competitive advantage
- something that can be identified in a proposal to generate business
- something that keeps the company out of trouble and, if trouble occurs, the best practice will assist in getting the company out of trouble" (p. 12).

Considering that the list above presents best practices in a progressing manner, one may infer that best practices themselves have evolved in time, and so has project management theory and practice. Therefore, strategies have appeared to instill the new project management approach and culture in modern organizations seeking success, performance, and competitive advantage.

Consequently, the need for best practices was born, in order to provide some guidelines to gaining competitive edge by means of project management principles.

Mention should be made that best practices may reside with one's own organization, or with external ones. Among best practice sources, one may list various publications, seminars, symposia, relationships and partnerships with other professional entities, research papers, graduate theses etc.

Coming back to project success definition and measurement, primary and secondary factors are used:

- primary factors: time, cost, quality, customer's acceptance;
- secondary factors: customer's reference, commercialization, financial success, technical superiority, strategic alignment, health and safety, environmental conformity, corporate reputation, ethical conduct etc.

Provided that we have reached a common understanding concerning what best practices in project management are, one may wonder what an organization should do with its portfolio of best practices: guard it as a secret, or share it for common benefits? The answer is somewhere in between, for "some best practices are common knowledge and we would certainly share this information. But we view the transitioning risk template as proprietary knowledge not to be shared" (p. 29).

A concept closely connected to best practices is that of excellence, which is one of the most important desiderata of a competitive modern organization. Project management excellence is viewed as a continuous flow of successfully managed projects, and this implies the efficient and effective use of a project management methodology. However, although most theorists and practitioners agree on these ideas, there are still debates concerning the way in which excellence is defined. This results from the truism according to which every organization regards success differently, according to its mission, vision, goals, objectives, culture, standards etc. In spite of the wide range of perceptions, one may agree to accept the following understanding of excellence in project management: strict adherence to scheduling practices, regular senior management oversight, formal requirements change control, formal issue and track tracking, formal resource tracking, formal cost tracking. At the same time, Kerzner advances a sum of skills that a project manager should display in order to successfully complete

his/her tasks: strong communication and management skills, project management experience, strong organizational skills, ability to oversee and coordinate multiple resources and activities. Should one examine this list of skills, one will easily notice that the successful project manager's profile requires the exercise of clear human resources management duties, which falls in line with the purpose of the present study.

Nonetheless, having and applying a certain project management methodology do not guarantee the achievement of excellence; therefore, monitoring, correction and feedback collection are required. Also, the external environment factors play a crucial role in project management success, with a special attention paid to the frequent, deep, and often dramatic changes that occur and affect the flow of activities. The current business environment is sometimes described by means of the acronym VUCA – that is, volatile, uncertain, complex and ambiguous, which makes it hard to comprehend and to handle. Technological developments and changes in customers' tastes, preferences and expectation do nothing but add to the burden of managing change.

As a result, project management methodology has to change itself in order to adapt to the turmoil characterizing the organization both externally and internally. In the wake of this complex of factors, project managers themselves need to update and upgrade their knowledge and skills to be able to face these challenges: "managers on all levels should be committed to the changes and develop a vision that calls for the development of project management systems along with the rest of the organization's other business system" (p. 140).

A general trend of the last decades has been the adoption by many organizations of project management methodologies that must be aligned with the organization's strategy by placing emphasis on choosing a project based on its capacity to meet the corporate scorecard objectives, increasing labor efficiency, standardize processes to enhance data clarity to support senior management's decision-making etc.

Given the complexity of the aspects brought forward so far, the need for project managers' education, training and qualification has become more and more stringent. This can only highlight the importance of applying human resources management principles in project management as an ingredient for success. Training needs can also be traced down by benchmarking individual performance development plans against the technical maturity model for project management, and the tools used in the process covers a wide range of areas:

induction, coaching, mentoring, web-based seminars, specialized courses etc. Therefore, from the analysis above, one may easily notice that the principles of human resources management plat a pivotal role both in the project manager's training and education and in the way in which the project manager carries out his/her tasks in order to successfully complete the assigned project.

CHAPTER IV

Conclusions and recommendations concerning the use of human resources management principles in project management

Notwithstanding the fact that our study has not focused on examining the nature, characteristics and philosophy underpinning project management theory and practice, we have regarded the human resources related aspects as an essential part of project management starting from the assumption according to which people are the most important and most difficult to manage resource of any organization.

As Lock (2000) argues, "the efficient organization of a project implies the existence of a clear chain of command. It also means that every team member knows exactly what they are expected to do in order to ensure the project success. All these aspects belong to the management communication framework and are critical to the motivation of every employee" (p. 11). Starting from the idea that a motivated employee is productive and enthusiastic in performing his/her duties within the project, it naturally follows that an ill informed group, in which nobody knows exactly what they have to do and what their role is inside the project, is hard to manage, slow in achieving results, costly in operating, and a source of severe frustrations.

What the project manager really needs to do is to make sure that adequate communication channels are in place at all levels of the organization to allow for the project monitoring, feedback collection, and information sharing. However self explanatory these factors may seem, their application in practice is easier said than done, for it requires that the project manager should be an effective leader in the real sense of the word. Building and especially maintaining the team spirit is a difficult thing, which takes time and effort on the manager's side. Besides, time and effort dedicated to the team members must be accompanied by special personality traits such as responsibility and accountability, as well as special approaches to people and the development of interpersonal relationships.

For instance, a potential type of successful project manager may be the one who commands fear and expects that everything he/she says is regarded as an order and executed immediately.

On the other hand, a different type of project manager may be the one who obtains the same results by means of persuasion, that is, kindly but firmly. The essential aspect in this analysis is the ability to motivate people, regardless of the methods applied, for a real expert in the field is able to change and adapt his/her management style according to each particular situation and individual. Nevertheless, most project members are satisfied whether their project manager is capable of displaying competence, making clear decisions, giving clear and achievable instructions, delegating tasks and responsibilities, listening and offering good advice, showing confidence and enthusiasm and being a role model, thus gaining the employees' respect and support (Lock, 2000).

Other features that a successful project manager should prove have to do with receptiveness in the sense that he/she must be able to discern what is important and relevant from what is not. Most project managers should accept that most of the information which they receive is incomplete, unrealistic, inaccurate, confusing, or simply wrong. Lack of information, on the other hand, is equally frustrating. Customers' instructions or approvals, contractors' or distributors' feedback, delaying documents can all be sources of inexistent or incomplete information.

So far, we have highlighted some of the challenges posed to the project manager when dealing with people and information flows. The question we feel that we need to address now is what can be done to meet these challenges in order to make the project manager's tasks easier and to run the project smoothly. Thus, one of the solutions to overcome these obstacles is that of providing the project manager with support both by the top management and by the project team members. Lock's (2000) opinion in this respect is illustrative:

> "However experienced, competent, enthusiastic and clever the individual appointed as a project manager may be, one cannot expect him/her to work efficiently without adequate support and cooperation. These include he entire personnel's support, whether they are subordinated to the project manager or not […]. The project manager must be motivated, too, and so must be all the project members, and top managers […] can help in this respect by giving their subordinates training opportunities whenever new management systems and technique develop" (p. 33).

The project manager's main manifestation of authority comes from his/her own personality, as well as his ability to persuade and motivate people. In nowadays' organizations, where employees are educated and liberated, discipline no longer

means the use of a rigid, authoritarian management style based on fear or coercion. In the long run, it is more productive to foster an organizational climate that nurtures and sustains personal satisfaction and individual growth both for the project manager and for the project team members.

In order to ensure the organization's competitive advantage, the project manager must keep up with the latest developments in management theory and practice, which means permanent learning. This is much more than attending a two-day course on a particular topic. Instead, training and education refers to attending seminar, conferences and other similar events, which enhance a constructive exchange of ideas, opinions, experiences etc. The follow-up of this activity is the learning process inside the project team, just like in a cascade effect. If people embarked in the project clearly understand the techniques, methods and procedures involved in their tasks, as well as the reason why they are used, it is more likely that they will cooperate more efficiently, which will impact the whole endeavor positively.

Human resources management activities inside the project have a strategic and paramount importance in project management success from at least three points of view: personnel selection; career development in a constantly changing environment; knowledge management and learning. As Turner and Simister (2004) notice, "there are various staff selection methods, according to how essential and irreplaceable or, on the contrary, how peripheral and easy to find their skills are in the labor market" (p. 642). In the light of this consideration, the main procedures related to staff selection in a project oriented organization are the following: headhunting for top managers and experts; networking and using personal contacts to recruit potential candidates; staff selection by means of testing them; college recruitment. In other words, project oriented companies are more prone to informal practices, in the sense that they are more focused on finding candidates that meet their organizational culture and develop together with the organization. Also, the knowledge and skill they possess is less important than their adapting capacity to the dynamic environment of project focused organizations, particularly due to the changes occurred in customers' requirements, tastes and standards.

Outsourcing is another popular human resources management method, which ensures a high degree of numerical flexibility. This serves the organization's needs as project centered companies have temporary activities due to the limited life span of projects. The use of this approach is difficult, however, and poses obstacles to people's motivation and job satisfaction: whereas the organization's stability is ensured by a core of permanent or at least long staying employees,

the peripheral or dispensable ones are dissatisfied and therefore less productive. Considering that project based working style is mostly required in innovative and complex fields of activity, this state of things causes serious problems in terms of project quality and timeliness. As a consequence, organizations having hardships in dealing with such situations are attempting to implement culture change programs, staff training and socializing etc. in order to smoothen the transition to a volatile and unstable working environment.

Another matter worth being considered is the rapid dynamics of the way in which career development and management are regarded. Short term employment and personnel turnover are but two of the challenges posed by project orientation in many field of activity, whereas lifelong employment has gradually become a thing of the past. The old traditional image of a career was that of a path made of bricks and stones laid by the individual, each brick and stone standing for a new stage in his/her career. Nowadays, however, this image has been replaced by that of a surfer, who needs to stay firm on the wave and look for opportunities to catch the new wave. Another metaphor of a career is that of a spiraled ladder, which goes up incrementally in a fan-like development where the fan magnitude represents the knowledge and experiences gained in various organizations and learning opportunities (Lock, 2000).

Career development in project centered organizations depends, to a large extent, on the employee's initiative and willingness to learn new skills, often in a very short period of time. At the same time, the employee must assume the responsibility for managing his/her own career and to use his/her knowledge and skills to progress in career. We are thus dealing with a whole new perception of a career, which implies initiative, personal responsibility, flexibility, creativity, innovation etc.

Apart from the challenges briefly examined in the previous paragraphs, organizations are facing a motivation problem, too: whereas traditionally promotion was regarded as an effective motivating tool, this can no longer be used as such, because organizations are more and more subjected to delayering and flattening due to financial constraints. As a result, project oriented companies must find alternative compensating methods and encourage their staff to adopt a new idea of career progress, as well as the prestige and respectability once conferred by promotion to a superior hierarchical position.

Starting from the idea expressed in the previous paragraph, the concept of dual or multiple careers has emerged as a way to overcome the problems caused by

promoting technical experts to top positions implying high managerial and administrative responsibilities (Turner and Simister, 2004). In this respect, the authors mention a model of competence consisting of a triangle. Each side of this triangle represents one of the following competences, respectively: human competence, technical or professional competence, and business competence. This model underpins the original hypothesis of our study, according to which the principles of human resources management can and must be used in order to ensure project management success. Also, the aforementioned scholars underline that the inconsistent application of this triangular approach leads to organizations losing their most valuable employees due to the fact that technically skilled personnel are sometimes appointed to top management functions despite that they do not have the necessary abilities to accomplish the afferent roles.

Another trend in today's organizations is to create diverse career paths that do not follow the dual careers which place technical positions before operational positions. The fields that most conspicuously reveal this tendency are human resource management, marketing and sales. This practice contradicts the traditional one that offers a great advantage to people, that is, every employee belongs to a well defined comfort zone that provides him/her with careers opportunities matching his/her skills, background, culture, needs and expectations. At the same time, this comfort zone is the place which ensures that the staff have learning opportunities contributing to increasing their work motivation and, consequently, to increasing their productivity. The importance of learning – as a human resources management tool – to securing project management success (as well as any organizational process success) cannot be overstated. As Gardner (1995) pointed out almost two decades ago,

> "Everyone, from child to senior citizen, will become life-long learners. Traditional concepts of education and training will be challenged and subsequently changes. The principal knowledge disseminators of the 21st century will be businesses, not academic institutions, as 'earners' are forced by economic circumstances to become perpetual 'learners' " (p. 12).

We are thus crossing a fundamental transitional process, particularly in mentality, both on the employees' side and on the employers' side. We can no longer talk about long-term job security, and instead we should focus on the concept of employability, which represents an employee's capacity and ability to be employed due to his/her portfolio of skills. It is in this context that more and more theorists and practitioners draw our attentions to the knowledge-based society that the entire world has witnessed and will continue to witness in the foreseeable future. The term "knowledge" mainly refers to the knowing things and being able to out in practice this information rather than acquiring knowledge for the sake of being informed.

Placing education and training opportunities at the heart of doing business, regardless of the field of activity one is discussing, is an irrefutable piece of evidence of the importance of observing the principles of human resources management. If we remind ourselves that the purpose of the present study is to analyze the use of human resources management in order to smoothen project management processes, the role of such principles becomes even more evident. This is due to the fact that project management, perhaps more than any other business endeavor, requires fast responses, adaptability and flexibility to the quick and dramatic changes posed by the present environment worldwide, dominated by economic, social, cultural, political, military and technological revolution.

To conclude out study, I would like to quote Gardner (1995) again, who clearly states the critical role played by investing in education in the workplace – as an essential component of human resources management – in tomorrow's organizations pursuing competitive advantage in a turbulent millennium:

> "The basis for this investment is that businesses which know how to convert information into knowledge will be the most successful in the future. There is an old saying that 'knowledge is power'. The most powerful businesses of the 21st century will doubtless be those which develop their knowledge bases and the collective brainpower of their staff most effectively. In so doing, they will be assuming a new and expanded role in the education system of the future. Within a decade, more people will be 'learning' at their workplace than are attending full-time educational institutions. This will change not only our employment prospects, but our leisure activities and our life-styles" (p. 13).

This is the reason why coaching and mentoring have already become popular educational and training methods, as the aforementioned author envisaged. Since we acknowledge that these tools belong to the human resources management, the usefulness of human resources management in any business, especially in project management oriented organizations, speaks for itself. This acknowledgment shows once again the benefits of coaching and mentoring in the workplaces (Yemm, 1995). Moreover, there are organizations – in the United Kingdom, for instance – which pay particular attention to people aspects as a significant selection and retention technique. Such organizations also seek for a formal recognition of this matter by providing all the conditions for the Investment in People Award, which proves that an organization offers its employees all the motivating opportunities – including education, training, promotion, appraisal, fair treatment etc. – in order for them to perform at the necessary standards. The main benefits which such organizations enjoy are related to improving staff morale with a direct impact upon organizational performance (Collins, 1995). It is thus clear that the appropriate use of human

resources management principles can only result in ensuring organizations' well being.

Considering the project centered organizations have already become a significant part of nowadays' business stage, one may infer that the principles and approaches previously examined pertain to being applied and enforced in such organizations for they are prone to doing business in an insecure and unstable business climate. This is why such organizations depend on their people even more that other types of institutions, because their employees are hard to replace due to their valuable skills, knowledge, and personal networks. Consequently, project oriented structures rely on the effective utilization of human resources functions, with an emphasis on personnel recruitment, retention, motivation, promotion, and appraisal systems. We can thus conclude that the initial assumption of our study – that is, the importance of applying the human resources management principles in project management, including the project manager's roles and duties – has proved to be accurate and with profound implications in securing project management success.

ANNEX

The “Distance Management” Health Check

- Do you think of your group as a team?
- Do your group members consider themselves as part of a team?
- Can you define clearly your vision for the team?
- Do the team have a similar vision?
- How often and by what means do you check whether your team members feel that they have sufficient contact with you?
- How do you ensure that your team are kept up-to-date on general company matters?
- How many sub-projects are currently being led by team members?
- How many meetings are currently planned?
- What changes in team behavior resulted from your last three meetings?

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Building a house

MAJ Milos TOMASEVIC

PROJECT NAME:

Building a house

PROJECT SPONSOR:

My family

1 BUSINESS CASE

1.1 Question of choice – buy a flat or building a house

My family wants to improve housing conditions.

We rent apartment for 200 € every month. My family have fee in that amount from the Army. That amount of money is thrown away, because both Army and my family don't have benefit (only my landlord has one).

Serbian Army has a loan program for solving apartment problems.

Due to solve the problem, anyone who is interested, has to take a loan from the bank, and after signing contract Army will continue to give him fee which is increased for 10% in next 20 year.

In accordance with my monthly salary, maximum amount which I can get from the bank is about 50.000 €.

Unfortunately, we are left to our own, wether we are buying an apartment or building a house.

1.2 Buying a flat

First of all you have to find appropriate apartment, after that solve all administrative problems, and at the end sign loan contract with the bank and buy an apartment. It is the easiest way to solve the problem. But even in that way there are some gaps that should be overcome:

- You can consider only apartments in buildings that have all documentation that will undoubtedly lead to registering. Less than 30% apartments in Belgrade is registered, and choice is considerably narrowed,
- When you find the desired apartment, in order to ensure that someone else will not buy it until you get a loan, you need to place a deposit, which usually ranges from 10% to 15% of the purchase price of the property. A big problem is to give that money and that you are not sure what amount of loan you can get and if you get it at all,
- Even if you get a loan, some of the apartment sellers will not wait for the rest of the money longer than one manth,
- Whole procedure is very long and you will be at least twice a week for a few hours away from work and run around for variety confirming,
- Do not take any steps immediately before or after the parliamentary elections, falling or forming a government, the announcement of the introduction or abolition of taxes, etc. because procedure then takes at least two times longer. Such things are very often in transition country like Serbia.

After all complications there is the question, whether this will solve my problem?

I have wife and two sons, and maybe I will have more children, who know. We are living in a small apartment – it is about 50 m^2. That apartment is not big enough to satisfy all needs of my family (we need one more bedroom) currently, and situation will be worst for sure (because children are growing up and each of them will have to have theirs` own room).

Taking a maximum credit from the bank we will be able to buy apartment of the same size that we already rent, and that will not fully solve our problem.

1.3 Building a house

One of solutions to fully solve my problem, with restricted budget (50.000 €), is to build our own house in suburb which will have 100 m^2 and it will satisfy all our needs.

In the very beginning it is very hard to find a suitable plot. There are several things to check before buying:

- Check whether and what you can build on this plot,

- Check right to use the land,
- Make sure that the land is not agricultural,
- Get the complete list owner, etc.

Errors and contingent details are not uncommon. It is better to check everything personally. Have a good lawyer with experience in land transactions is a big advantage.

After that you have to do a project for the construction, obtain all licenses, find Constracor Company and start building a house.

You should to include several more things in the cost of building a house:

- Material (sand, cement, lime, bricks, roof material, carpentry, etc.),
- Shore for electricity, water, sewage, etc.,
- Salary for the constractors and transportation costs,
- Other unforeseen expenses.

After a short research on the Internet and consultation with colleagues and friends who have already built a house, I made estimation of costs:

No	**Activity**	**Estimated cost**
1.	Buying an appropriate plot	15.000 €
2.	Collection of various documentation, project preparation, various permits, shore for electricity, water, sewage etc.	5.000 €
3.	Buying a material for construction	15.000 €
4.	Salary for the constractors and transportation costs	12.000 €
5.	Other unforeseen expenses	3.000 €
TOTAL		**50.000 €**

After that we made a brief analysis about living in a flat or house:

ITEM	**HOUSE IN A SUBURB**	**FLAT IN A CITY**
Comfort of living	+	-
Cost of the maintenance	-	+
Amount of tax	-	+
Costs for heating, electricity, water	-	+
Crowd, noise, air polution, etc.	+	-
Parking place, garage, courtyard, etc	+	-

ITEM	HOUSE IN A SUBURB	FLAT IN A CITY
Proximity to schools, hospitals, supermarkets, etc.	-	+
Safety of kids and place for games	+	-
Relations whith neighbors	+	-
Opportunities for hobbies and afterwork bussines	+	-

At the end my family conclude that it is more profitable for us and we will get more benefits if build house. We will use our savings to purchase the plot and take a loan from the bank for missing funds.

Of course, there is always a challenge to test yourself and find own possibilities.

For this reason, this project will be individual, and I will be a project manager.

2 PROJECT SCOPE MANAGEMENT PLAN

2.1 Project goal

The project goal is to permanently solve my family housing problem with construction of family house in Belgrade suburb.

2.2 Project objectives

In objective process writing, I have been guided with idea: If criteria's for objectives is higher, motivation to achieve the objectives will be bigger.

A factor that played a major role in the process of writing goals was time. Main idea was that all works related to "paperwork" should be completed during the winter and construction works should be carried when weather conditions are favorable.

For the goal defined above, I identified (according folk expression: "House is built from the ground up, not from the roof.") the following **objectives:**

1. By the end of December, 2011. I will buy a suitable plot (good position, apropriate size, alowed building) in Belgrade suburb up to 15.000 €.
2. By the end of February, 2012. I will take a lone from the bank in amount of 35.000 €.

3. By the end of March, 2012. I will obtain a building permit
4. By the end of April, 2012. I will obtain technical conditions for connection to the existing infrastructure (especially for the electricity and water shores) for house building.
5. Until the beginning of May 2012. I will find a construction firm and sign a preliminary with them
6. Until the beginning of May 2012 I will buy all necessary material for starting hause building and stored them on the plot.
7. By the middle of June 2012. all constructor works in “gray” phase will be done.
8. By the middle of August 2012. works related to elctricall and water instalation, carpentry and heating will be done.
9. By the end of August, 2012. finall works will be done.

2.3 Project activities and sub-activities corresponding to objectives

1. Buying a suitable plot

1.1. Check that the plot is covered by detailed regulation plan
1.2. Check the right to use the land
1.3. Request a copy of the plan
1.4. Check category of the land. Maybe it is agricultural land and if it is check the class
1.5. Get the complete list owner
1.6. Get certified statement of waiver of preemption by the co-user

2. Taking a lone from the bank

2.1. Gathering information from bank
2.2. Applying for credit assessment
2.3. Collection of legal documents
2.4. Loan Agreement
2.5 Realization of loan

3. Obtaining a building permit

3.1. Obtaining a location permit
3.1.1 Development of the preliminary architectural design of planned construction
3.2. Obtaining a building permit

4. Getting the technical conditions for house building

4.1 Getting the technical conditions for connection to the existing infrastructure
4.1.1 Getting the technical conditions and connection to the electric grid
4.1.2 Getting the technical conditions and connection to water distribution

grid

4.1.3 Getting the technical conditions and connection to gas distribution grid

4.1.4 Getting the technical conditions and signing contract for sewage and garbage removal

5. Finding construction firm and signing preliminary

5.1. Making a list of construction firms with best qualification and prices

5.2. Agreement with the selected firm and the signing of preliminary contract

6. Buying all necessary material for starting house building and storing materials on the plot.

6.1. Making a list of construction material companies with best conditions

6.2 Construction of stockroom for storage tools and materials

6.3 Buying material for starting house building

7. Constructor works on building till "gray" phase

7.1 Plot metering

7.2 Digging of foundation

7.3 Construction of foundation and ground plate

7.4 Setting of plate installation

7.5 Rough construction works on the ground, end with the plate above the ground

7.6 Rough construction works on the attic

7.7 House covering

7.8 Setting of carpentry

8. Works related to electrical and water installation, carpentry, façade and heating

8.1 Electrical supply installation

8.2 Water supply installation

8.3 Sewage installation

8.4 Indoor plastering

8.5. Creation and setting of interior stairs

8.6 Setting of sanitary

8.7 Setting of external facade

8.8 Setting of parquet

8.9 Painting works

8.10. Connection to gas distribution grid

8.11 Heating installation

9. Final works

9.1 Setting of cable TV

9.2 Telephone and internet connection

9.3 Cleaning and decorating of yard

9.4 Small repairs

A detailed description of all activities is shown in Appendix No 1. – Description of activities and in the Gantt chart annexed to the hereby project.

3 HUMAN RESOURCES MANAGEMENT PLAN

This project is a textbook example of a Management by objectives (MBO) strategy.

Algorithm for this project is very simple.

As can be seen in the previous section, each objective has only one activity which is divided into sub-activities.

Very little activities may take place simultaneously in two different objectives. Therefore, it is easier for project management.

Concept of leadership is focused on achieving each objective individually.

The objectives are measurable and their achievement is an indicator of the successfulness of the work. The realization of each objective is a milestone and has motivational effect.

Various individuals and groups of people would be included in different stages of this project. Assistance of an experienced lawyer is required during the purchase of plot. It would be necessary to engage an architect in order to obtain a building permit.

If plot was well chosen should not be problems at this stage of the project. If there are any problems, maybe we should give up of buying the plot. This issue will be explained in more detail in chapter Risk management.

After plot buying and solving all problems related to paperwork when you think that torture came to the end, the most difficult part of job comes. It is necessary to find a good construction firm with experienced manager (hereinafter CF manager). CF manager is one of the key figures in the further implementation of the project. Agreement and cooperation with CF manager and its employees leads to converting the project objectives in the specific individual tasks. All this will have resulted in increasing employee motivation and better assignments. CF manager must clearly explain to each worker his job, what results are expected of him and what his responsibility is. In other words, he has the task to make a team from a group of people.

During the construction it is necessary to reach agreement about the objectives and possibilities of their realization. Otherwise, pre-set objectives will only be a “dead letter on the paper”.

It is necessary to analyze the achieved results and compare them with set objectives after each activity.

4 COST MANAGEMENT PLAN

In this part of the project, following work breakdown structure, I tried to calculate the **definitive estimates** and to verify predictions from beginning of this story.

Resources are allocated as follows:

- People: Lawyer, architect, CF manager, craftsmen, laborers, carpenter, electrician, plumber, painters, heating master, ceramist and IT master
- Materials for building: (sand, cement, lime, bricks, roof material, carpentry, etc.),
- Equipment (truck, backhoe, concrete mixer, hand tools for house building, etc.)

Predicted approximately cost is verified after calculation:

- human resources cost	10.340 €
- material and equipment cost	24.893 €
- cost of the plot	15.000 €
- total project cost	50.233 €

Cost breakdown structure is shown in:

- Appendix No 2. – Human resources requirement table and
- Appendix No 3. – Materials and equipment requirement table
- Project Manager Human Resources Costs Sheet annexed to the hereby project.

5 TIME MANAGEMENT PLAN

The estimated implementation period of this project is: 31.10.2011. – 21.08.2012. or 212 days.

The start date and the end date of each activity and sub-activity are presented in:

- Attachment No 1. – Description of activities and
- The Gantt chart annexed to the hereby project.

6 QUALITY MANAGEMENT PLAN

The houses building project is specific because the deliverables are clearly visible after the attainment of each individual objective.

It is essential for all people who participate in the project to possess appropriate professional, labor and moral qualities. All people should be well trained and have appropriate certificates. It is only way to achieve an adequate quality of deliverables.

Similar principle is valid for materials and equipment. A building permit and all technical conditions for construction which are issued shall be in accordance with the JUS standard of habitation.

All materials and equipment should satisfy JUS standard of construction.

List of deliverables and people who are responsible for their quality is shown in

- Appendix No 4. – Quality management plan.

7 COMMUNICATIONS MANAGEMENT PLAN

In accordance with the goal, it is obvious that main stakeholder of this project is my family (or me as its representative). Since I am the main decision maker in this project, the largest part of communication will take place between me and the other stakeholders.

Other stakeholders have not big demand to communicate between themselves.

Format of message during communication with official institutions generally would be writing form. Communication with other stakeholders would be orally or by telephone.

The roles of other stakeholders vary depending on project phase.

Categories, type, expectations, concerns and power/interest of all stakeholders are detailed in:

- Appendix No 5. – Stakeholder communication matrix.

8 RISK MANAGEMENT PLAN

Most of risk factors are in the first phase of the project. The future of the project depends on whether the plot on which we intend to build a house has proper documentation. If documentation is not valid it is better not to buy the plot and do not expose to risk the whole project.

Certainly it is impossible to start building if there is no credit from the bank.

Certain risk factors exist in the final stage when lack of money due to budget overruns could seriously jeopardize the completion of project. In this situation we can move into the completed part of the house and finish other works later.

Risk factors are presented in: Appendix No 6. – Risk management Matrix.

Appendix No 1

Description of activities

Activity	Sub - activity	Description	Start date	End date	Responsible	Cooperate
1. objective - By the end of December, 2011. I will buy a suitable plot (good position, apropriate size, alowed building) in Belgrade suburb up to 15.000 €.						
1. Buying a suitable plot	1.1. Check that the plot is covered by detailed regulation plan	If you are buying land for the construction, the first thing to check is whether and what you can build on this land. For that information, you need to know if there is a detailed regulation or detailed urban plan for the area where the plot is. If not, you probably will not be able to legally build. To find the right information about the land, you must go to the Secretariat for Urban Planning and Construction.	31.10. 2011.	11.11. 2011.	Project manager	Seller of the plot, Municipality Secretariat for Urban Planning and Construction.
	1.2 Check the right to use the land	The seller of plat has to obtain the Solution of Article 84 (Law on Planning and Construction) from the municipality which plot belongs, as evidence of his right of use on undeveloped building land.	31.10. 2011.	11.11. 2011.	Project manager	Seller of the plot, Municipality Secretariat for Urban Planning and Construction.
	1.3 Request a copy of the plan	The seller must have a copy of the plan issued by the Institute of Geodesy. A copy of the plan contains a list of land users based on information in the Institute of Geodesy. This list has to agree with a list of users in the title.	14.11. 2011.	25.11. 2011.	Project manager	Seller of the plot, Institute of Geodesy.
	1.4 Check category of the land. Maybe it is agricultural land and if it is check the class	On the copy of the plan, I will find more useful information such as types and classes of land and real land surface. If it is agricultural land I will have to change the use of plot before I start to build.	14.11. 2011.	25.11. 2011.	Project manager	Seller of the plot, Institute of Geodesy.
	1.5 Get the complete list owner	I should also get the proprietary list from seller. This document is issued by the Second Municipal Court. The names of users on a solution based on Article 84 and the owner's name list must be the same.	28.11. 2011.	16.12. 2012.	Project manager	Seller of the plot, Second Municipal Court.
	1.6. Get certified statement of waiver of preemption by the co-user	If you buy only one part of a larger parcel, users of other parts of the plot have preferential rights in relation to you. Thus, the seller must offer to all co-users same price you agreed with the seller. If one of the co-user is interested and buy that part of the plot, the story is over. If none of the co-user is not interested, their statements to waive part of that should be in writing and certified by the court.	19.12. 2011.	29.12. 2012.	Project manager	Seller of the plot, Co-users.
2. objective - By the end of February, 2012. I will take a lone from the bank in amount of 35.000 €.						
2. Taking a lone from the bank	2.1 Gathering information from bank	Go to more banks and collect all the information. Choose a bank and best model of loan. Obtain a list of documents you need to make the next arrival to the bank.	30.12. 2011.	12.01. 2012.	Project manager	Banks
	2.2 Applying for credit assessment	Based on the submitted documentation and access to Credit Bureau report bank determines the credit worthiness and the maximum loan amount. A certificate that confirms approval of the loan shall be issued by bank (valid for 60 days).	13.01. 2012.	19.01. 2012.	Project manager	Selected Bank, Serbian Army
	2.3 Collection of legal documents	Bring a correct and complete documentation of the property to the bank for final loan approval.	20.01. 2012.	02.02. 2012.	Project manager	Selected Bank
	2.4 Loan Agreement	Signing of Loan Agreement and obtaining all documents needed for hypothec	03.02. 2012.	09.02. 2012.	Project manager	Selected Bank
	2.5 Realization of loan	Dealing certified documentation required for hypothec and transfer of funds on the account	10.02. 2012.	29.02. 2012.	Project manager	Selected Bank

Activity	Sub - activity	Description	Start date	End date	Responsible	Cooperate
3. objective - By the end of March, 2012. I will obtain a building permit						
3. Obtaining a building permit	3.1. Obtaining a location permit	The location permit is the first step in the construction procedure of a legal object. It is obtained based on a preliminary architectural design of the building project. It provides all conditions and data needed for the making of the technical documentation in conformity with valid planning documents	01.03. 2012.	14.03. 2012.	Project manager	Real estate agency, Municipality Secretariat for Urban Planning and Const.
	3.1.1 Development of the preliminary architectural design of planned construction	Architectural design consists of a text item (description, purpose and characteristics of the object, technical solutions, the method of heating etc.) and 4 graphic items: situational solution, typical elevations, facades, sections of the building, floors, roof base	01.03. 2012.	14.03. 2012.	Project manager	Real estate agency, Municipality Secretariat for Urban Planning and Const.
	3.2. Obtaining a building permit	Having obtained the location permit, it is time to prepare the complete project documentation in order to obtain the proper building permit. The project has to be done in accordance with the construction regulations contained in the location permit.	15.03. 2012.	28.03. 2012.	Project manager	Real estate agency, Municipality Secretariat for Urban Planning and Const.
4. objective - By the end of April, 2012. I will obtain technical conditions for connection to the existing infrastructure (especially for the electricity and water shores) for house building						
4. Getting the technical conditions for house building	4.1 Getting the technical conditions for connection to the existing infrastructure	To get those technical conditions, you need to submit an individual request to each public utility company that applies on the plot (connection to the electric grid, water distribution, sewage, natural gas distribution and garbage removal).	29.03. 2012.	25.04. 2012.	Project manager	Companies for public utilities
	4.1.1 Getting the technical conditions and connection to the electric grid	Submit an individual request to Electric Company	29.03. 2012.	04.04. 2012.	Project manager	Electric Company
	4.1.2 Getting the technical conditions and connection to water distribution grid	Submit an individual request to Water supply Company	05.04. 2012.	11.04. 2012.	Project manager	Water supply Company
	4.1.3 Getting the technical conditions and connection to gas distribution grid	Submit an individual request to Gas supply Company	12.04. 2012.	18.04. 2012.	Project manager	Gas supply Company
	4.1.4 Getting the technical conditions and signing contract for sewage and garbage removal	Submit an individual request to Company for public utilities	19.04. 2012.	25.04. 2012.	Project manager	Company for public utilities
5. objective - Until the beginning of May 2012. I will find a construction firm and sign a preliminary with them						
5. Finding construction firm and signing preliminary	5.1. Making a list of construction firms with best qualification and prices	Using Internet and other sources find a firm with best qualification and prices	05.04. 2012.	18.04. 2012.	Project manager	
	5.2. Agreement with the selected firm and the signing of preliminary contract	Signing of preliminary contract with selected firm manager and agreement about all activities (start of works, transport, food, tools etc.)	19.04. 2012.	02.05. 2012.	Project manager	Selested constructiom firm

Activity	Sub - activity	Description	Start date	End date	Responsible	Cooperate
6. objective - Until the beginning of May 2012 I will buy all necessary material for starting hause building and stored them on the plot.						
6. Buying all necessary material for starting hause building and storing materials on the plot.	6.1. Making a list of construction material companies with best conditions	Using Internet and other sources find construction material companies with best conditions (prices, quality, transport etc.)	29.03. 2012.	04.04. 2012.	Project manager	Construction firm manager
	6.2 Construction of stockroom for storage tools and materials	Construction of stockroom for storage tools and materials to protect against theft and weather conditions	19.04. 2012.	25.04. 2012.	Project manager	Construction firm manager, Workers
	6.3 Buying material for starting house building	Buying material for starting house building, transport and storage on the plot	26.04. 2012.	02.05. 2012.	Project manager	Construction firm manager
7. objective - By the middle of June 2012. all constructor works in “gray” phase will be done.						
7. Constructor works on building till “gray” phase	7.1 Plot metering	Plot metering and setting-up of string pickets in order to mark place of foundation digging	02.05. 2012.	02.05. 2012.	Project manager	CF manager, Workers
	7.2 Digging of foundation	Machine digging with earth loading and transport to landfill	03.05. 2012.	03.05. 2012.	Project manager	CF manager, Workers
	7.3 Construction of foundation and ground plate	Molding, reinforcement, concreting of foundation, creating a buffer from crushed gravel, concreting of ground plate, drying of ground plate	04.05. 2012.	10.05. 2012.	Project manager	CF manager, Workers
	7.4 Setting of plate installation	Setting of plate installation for water supply and sawage	11.05. 2012.	14.05. 2012.	Project manager	CF manager, Workers
	7.5 Rough construction works on the ground, end with the plate above the ground	Walls masonry, molding, reinforcement and concreting of pillars, other supporting beams and plate, drying of plate etc.	15.05. 2012.	23.05. 2012.	Project manager	CF manager, Workers
	7.6 Rough construction works on the attic	Walls masonry, molding, reinforcement and concreting of pillars, other supporting beams etc.	24.05. 2012.	30.05. 2012.	Project manager	CF manager, Workers
	7.7 House covering	Masonry of gable walls, chimneys, ventilation ducts and formwork. Making the roof structure along with covering with tile	31.05. 2012.	04.06. 2012.	Project manager	CF manager, Workers
	7.8 Setting of carpentry	Setting of windows and doors (outside and inside)	05.06. 2012.	06.06. 2012.	Project manager	CF manager, Workers
8. objective - By the middle of August 2012. works related to elctricall and water instalation, carpentry and heating will be done.						
8. Works related to elctrical and water installation, carpentry, façade and heating	8.1 Electrical supply installation	Distribution of inside electrical installation and connecting to the city's power grid	07.06. 2012.	11.06. 2012.	Project manager	CF man., Workers, Electric Company
	8.2 Water supply installation	Distribution of inside water installation, connecting to city water supply network, setting of taps, sinks etc.	12.06. 2012.	14.06. 2012.	Project manager	CF man.Workers, Water Company
	8.3 Sewage installation	Conecting to city sawage network.	15.06. 2012.	18.06. 2012.	Project manager	CF man., Workers, Public Ut. Company
	8.4 Indoor plastering	Interior walls and ceilings plastering	19.06. 2012.	22.06. 2012.	Project manager	CF manager, Workers
	8.5. Creation and setting of interior stairs	Find appropriate carpenter firm for creation and setting of interior stairs	25.06. 2012.	03.07. 2012.	Project manager	CF manager, Workers
	8.6 Setting of sanitary	Buying of sanitary with adequate quality and price and setting	04.07. 2012.	12.07. 2012.	Project manager	CF manager, Workers
	8.7.Setting of external facade	Buying adequate material for external façade and setting	13.07. 2012.	18.07. 2012.	Project manager	CF manager, Workers
	8.8 Setting of parquet	Buying and setting of parquet.	19.07. 2012.	24.07. 2012.	Project manager	CF manager, Workers
	8.9 Painting works	Interior walls and ceilings painting	25.07. 2012.	31.07. 2012.	Project manager	CF manager, Workers
	8.10. Connection to gas distribution grid	Conecting to gas distribution grid.	01.08. 2012.	02.08. 2012.	Project manager	CF man., Workers, Gas Company

Activity	Sub - activity	Description	Start date	End date	Responsible	Cooperate
	8.11 Heating installation	Buing equipment and materials and setting of heating instalation	03.08. 2012.	07.08. 2012.	Project manager	CF manager, Workers

Activity	Sub - activity	Description	Start date	End date	Responsible	Cooperate
9. objective - By the end of August 2012. finall works will be done						
9. Final works	9.1 Setting of cable TV	Distribution of cable TV instalation inside house and connecting on cable TV network	08.08. 2012.	08.08. 2012.	Project manager	Firm for telephone, cable TV and internet connection
	9.2 Telephone and internet connection	Distribution of telephone instalation inside house and connecting on network	09.08. 2012.	09.08. 2012.	Project manager	
	9.3 Cleaning and decorating of yard	Finall works related to yard cleaning and decorating	10.08. 2012.	16.08. 2012.	Project manager	CF manager, Workers
	9.4 Small repairs	Small repairs in warranty period	17.08. 2012.	21.08. 2012.	Project manager	CF manager, Workers
		Total time for House Building Project is 212 days.	31.10. 2011.	21.08. 2012.		

Appendix No 2

Human resources requirement table

		specialist			craftsman			laborer				necessary	duration/
Activity	Sub - activity	Hrs	€	cost	Hrs	€	cost	Hrs	€	cost	total cost €	manpower	days
1. Buying a suitable plot	Engagement of Real estate agency in collecting valid documentation and solving possible problems	* Real estate agency lawyer service price is constant										1 lawyer	
	total			250			0			0	250		
2. Taking a lone from the bank	There is no need to engage human resources (I am not counting my spent time in project finall cost)												
	total			0			0			0	0		
3. Obtaining a building permit	Engagement of Real estate agency in collecting valid documentation and solving possible problems	* Real estate agency architect service price is constant										1 architect	
	total			250			0			0	250		
4. Getting the technical conditions for house building	4.1 Getting the technical conditions for connection to the existing electric, water, gas and sawage infrastructure.	* Estimated cost of various taxes and fees during application											
	total			2000			0			0	2.000		
5. Finding construction firm and signing preliminary	There is no need to engage human resources (I am not counting my spent time in project finall cost)	* Construction firm manager service price is constant										1 CF manager	
	total			1000			0			0	1.000		
6. Buying all necessary material for starting hause building and storing materials on the plot.	6.2 Construction of stockroom for storage tools and materials				24	3,00	72	24	2,5	60	132	1 craftsman 1 laborer	3
	6.3 Buying material for starting house building				24	3,00	72	48	2,5	120	192	1 craftsman 2 laborer	3
	total			0			144			180	324		

		specialist			craftsman			laborer				necessary	duration/
Activity	Sub - activity	Hrs	€	cost	Hrs	€	cost	Hrs	€	cost	total cost €	manpower	days
7. Constructor works on building till “gray” phase	7.1 Plot metering				8	3,00	24	8	2,5	20	44	1 craftsman 1 laborer	1
	7.2 Digging of foundation				8	3,00	24	16	2,5	40	64	1 craftsman 2 laborer	1
	7.3 Construction of foundation and ground plate				80	3,00	240	120	2,5	300	540	2 craftsman 3 laborer	5
	7.4 Setting of plate installation				16	3,00	48	16	2,5	40	88	1 craftsman 1 laborer	2
	7.5 Rough construction works on the ground, end with the plate above the ground				112	3,00	336	168	2,5	420	756	2 craftsman 3 laborer	7
	7.6 Rough construction works on the attic				80	3,00	240	120	2,5	300	540	2 craftsman 3 laborer	5
	7.7 House covering				48	3,00	144	72	2,5	180	324	2 craftsman 3 laborer	3
	7.8 Setting of carpentry				16	3,00	48	16	2,5	40	88	1 craftsman 1 laborer	2
	total			0			1.104			1.340	2.444		
8. Works related to elctrical and water installation, carpentry, façade and heating	8.1 Electrical suply installation	*Documents and fees		500	24	3,00	72	24	2,5	60	632	1 electrician 1 laborer	3
	8.2 Water suply installation	*Documents and fees		200	24	3,00	72	24	2,5	60	332	1 plumber 1 laborer	3
	8.3 Sawage installation				16	3,00	48	16	2,5	40	88	1 plumber 1 laborer	2
	8.4 Indoor plastering				64	3,00	192	96	2,5	240	432	2 craftsman 3 laborer	4
	8.5. Creation and setting of interior stairs	56	5,00	280				56	2,5	140	420	1 carpenter 1 laborer	7
	8.6 Setting of sanitary	56	5,00	280				56	2,5	140	420	1 ceramist 1 laborer	7
	8.7.Setting of external facade				64	3,00	192	96	2,5	240	432	2 craftsman 3 laborer	4
	8.8 Setting of parquet				64	3,00	192	64	2,5	160	352	2 craftsman 2 laborer	4
	8.9 Painting works	80	4,00	320							320	1 painter	5
	8.10. Connection to gas distribution grid	16	5,00	80							80	1 heating master	2
	8.11 Heating installation	24	5,00	120	24	3,00	72	24	2,5	60	252	1 he.master 1 craftsman 1 laborer	3
	total			1780			840			1.140	3.760		

		specialist			craftsman			laborer				necessary manpower	duration/ days
Activity	Sub - activity	Hrs	€	cost	Hrs	€	cost	Hrs	€	cost	total cost €		
9. Finall works	9.1 Setting of cable TV	8	5,00	40							40	1 IT master	1
	9.2 Telephone and internet connection	8	5,00	40							40	1 IT master	1
	9.3 Cleaning and decorating of yard							40	2,5	100	100	1 IT laborer	5
	9.4 Small repairs				24	3,00	72	24	2,5	60	132	1 craftsman 1 laborer	3
	total			80			72			160	312		
											human resources total cost	**10.340**	

Appendix No 3

Materials and equipment requirement table

Activity	Sub - activity	materials				equipment				materials & equipment total
		Description	com	cost €	total €	Description	Hrs	cost €	total €	
1. Buying a suitable plot	Using own car in implementation of task	Petrol, oil, etc			100	Car amortization			30	130
	total				100				30	130
2. Taking a lone from the bank	Using own car in implementation of task	Petrol, oil, etc			100	Car amortization			30	130
	total				100				30	130
3. Obtaining a building permit	Using own car in implementation of task	Petrol, oil, etc			100	Car amortization			30	130
	total				100				30	130
4. Getting the technical conditions for house building	Using own car in implementation of task	Petrol, oil, etc			100	Car amortization			30	130
	total				100				30	130
5. Finding construction firm and signing preliminary	No cost in implementation of task									
	total				0				0	0
6. Buying all necessary material for starting hause building and storing materials on the plot.	6.2 Construction of stockroom for storage tools and materials	different materials	3	100,00	300	truck	2	20	40	340
		total			300				40	340
	6.3 Buying material for starting house building	blocks	3.000	0,35	1.050	truck	2	20	40	
		gravel & sand	50	15,00	750	truck	2	20	40	
		cement	100	4,00	400	truck	2	20	40	
		iron	1.500	0,60	900	truck	2	20	40	
		fill blocks	2.200	0,20	440	truck	2	20	40	
		timber	10	400,00	4.000	truck	2	20	40	
		tile	1.600	0,25	400	truck	2	20	40	
		total			7.940				280	8.220
	total									8.560

Activity	Sub - activity	materials				equipment				materials & equipment total
		Description	com	cost €	total €	Description	Hrs	cost €	total €	
7. Constructor works on building till “gray” phase	7.2 Digging of foundation					backhoe	8	40	320	320
	7.3 Construction of foundation and ground plate	nails, wire, etc.			100	concrete mixer		200	200	300
						hand tools for building		200	200	200
	7.4 Setting of plate installation	pipes and diff. materials			100					100
	7.5 Rough construction works on the ground, end with the plate above the ground	lime, bitumen, isolation material, etc.			100	truck	2	20	40	140
	7.6 Rough construction works on the attic	lime, bitumen, isolation mat.			100					100
	7.7 House covering	gutters, isolation mat.			500					500
	7.8 Setting of carpentry	doors and windows	20	50,00	1.000	truck	2	20	40	1.040
	total				1.900				800	2.700
8. Works related to elctrical and water installation, carpentry, façade and heating	8.1 Electrical suply installation	wires, plugs fuses, etc			2.000	truck	2	20	40	2.040
	8.2 Water suply installation	pipes and diff. materials			1.000	truck	2	20	40	1.040
	8.3 Sawage installation	pipes and diff. materials			400	truck	2	20	40	440
	8.4 Indoor plastering	send, lime, etc	20	20,00	400	truck	2	20	40	440
	8.5. Creation and setting of interior stairs	timber, color, nailc, etc			250	truck	2	20	40	290
	8.6 Setting of sanitary	shower, sinks, tiles,boiler, etc.			1.500	truck	2	20	40	1.540
	8.7.Setting of external facade	Isolation mat., glue, paints,etc			1.500	truck	2	20	40	1.540
	8.8 Setting of parquet	Parquet, glue, isolation, etc.			1.500	truck	2	20	40	1.540
	8.9 Painting works	Painting materials			300	truck	2	20	40	340
	8.10. Connection to gas distribution grid	pipes, gauges, etc			300					300
	8.11 Heating installation	radiators, pipes, cauldron			1.000	truck	2	20	40	1.040
	total				10.150				400	10.550

Activity	Sub - activity	materials				equipment				materials & equipment total
		Description	com	cost €	total €	Description	Hrs	cost €	total €	
9. Finall works	9.1 Setting of cable TV	cables, plugs, etc			50					50
	9.2 Telephone and internet connection	cables, plugs, routers, etc			50					50
	9.3 Cleaning and decorating of yard	Materials for decoration			100					100
	9.4 Small repairs	different materials			100					100
	total				300				0	300
									materials and equipment	22.630
									materials burden 10%	2.263
									materials and equipment total	**24.893**

Appendix No 4

Quality management plan

Activity	List of Deliverables	Responsibility and control of quality			Required quality of human resources and materials & equipment	
		Who	When	How	Required skills for Human resources	Quality criteria for materials & equipment
1. Buying a suitable plot	Suitable plot with all necessary documentation for building	Project Manager is responsible for all required quality criteria of plot and documentation	All the while until the attainment of objective	Checking validity of all necessary documentation in municipal services using services of real estate agency	Real estate agency should be with experience and to provide corresponding price for services	Plot has to be apropriate size, on good position, has access to road, conditions for connecting on all shores (water, electricity etc.) and has all necessary documentation for building
2. Taking a lone from the bank	Loan in amount of 35.000 €	Project Manager, Bank manager	All the while until the attainment of objective	Monitoring of progress after completion of subactivities	People involved in administrative tasks should be experts in order to finished job as soon as possible	Loan should be secured at National Housing Corporation, with lowest possible interest rate
3. Obtaining a building permit	A building permit	Project Manager, Real estate agency manager	All the while until the attainment of objective	Monitoring of progress after completion of subactivities	Real estate agency should be with experience and to provide corresponding price for services	A building permit should be in accordance with the JUS standard of habitation
4. Getting the technical conditions for house building	Technical conditions for house building	Project Manager, Municipal Inspection Service	All the while until the attainment of objective	Monitoring of progress after completion of subactivities	People involved in administrative tasks should be experts in order to finished job as soon as possible	All technical conditions for construction which are issued shall be in accordance with the JUS standard of habitation
5. Finding construction firm and signing preliminary	Preliminary is signed with construction firm. Construction firm manager is familiar with the project	Project Manager, Municipal Inspection Service	All the while until the attainment of objective	Monitoring of progress after completion of subactivities	Construction firm manager should be good manager with experience, have appropriate certificates, knows the quality of workers etc.	Firm must be registered in the commercial register and have appropriate certificates
6. Buying all necessary material for starting hause building and storing materials on the plot.	Stockroom is constructed. Building material is stored on the plot	Project Manager, Construction firm manager, Municipal Inspection Service	All the while until the attainment of objective	Monitoring works on construction site in order to improve works, optimal deployment of people	All workers who perform work must be trained and have appropriate certificates. Interpersonal relationships between workers have to be on high level.	All materials and equipment should satisfy the following items according to JUS standard of construction: 1. mechanical resistance and stability 2. protection in case of fire 3. hygiene, health and environment 4. safety use, 5. protection from noise, 6. economical use of energy and heat keeping
7. Constructor works on building till “gray” phase	House is ''unuder the roof''	Project Manager, Construction firm manager, Municipal Inspection Service	All the while until the attainment of objective			

Activity	List of Deliverables	Responsibility and control of quality			Required quality of human resources and materials & equipment	
		Who	When	How	Required skills for Human resources	Quality criteria for materials & equipment
8. Works related to elctrical and water installation, carpentry, façade and heating	Most works on the house is finished	Project Manager, Construction firm manager, Municipal Inspection Service	All the while until the attainment of objective	Monitoring works on construction site in order to improve works, optimal deployment of people	All workers who perform work must be trained and have appropriate certificates. Interpersonal relationships between workers have to be on high level.	All materials and equipment should satisfy the following items according to JUS standard of construction: 1. mechanical resistance and stability 2. protection in case of fire 3. hygiene, health and environment 4. safety use, 5. protection from noise, 6. economical use of energy and heat keeping
9. Finall works	The house is vacant	Project Manager, Construction firm manager, Municipal Inspection Service	All the while until the attainment of objective			

Appendix No 5

Stakeholder communication matrix

Activity	List of stakeholders	Category	Expectations/ concerns	Power/ Interest	Type	Project phase	Person (s) to convey the message	Format of a message	Message content	Time
1. Buying a suitable plot	Project manager	I	CQS / h	H / H	D	A				
	Seller of the plot	I	CS / h	H / H	D, E	E	John Doe	verbal, phone	arrangement	as needed
	Co - users of the plot	C	CS / h	L / H	I	E	John Smith	verbal, phone	arrangement	as needed
	Real estate agency	I	CS / h	L / H	P, E	E, C	Ana Person, manager	verbal, phone	arrangement	as needed
	Municipal services	C	C / I	L / L	N	E, C	Mira Ilic, staff	official letter, phone	request	as needed
	Local community	E	C / I	L / L	N	A	Pasa Ilic, staff	official letter, phone	request	as needed
2. Taking a lone from the bank	Project manager	I	CQS / h	L / H	D	A				
	Bank	I	CQS / h	H / H	D, E	E, C	Bank manager	official letter, phone	request	as needed
	Serbian Army	I	CS / I	L / L	N	E, C	Army PCs	official letter	request	as needed
	Government	C	CS / I	H / L	N	A	Pera Ilic, staff	official letter	request	as needed
3. Obtaining a building permit	Project manager	I	S / h	L / H	D	A				
	Real estate agency	C	S / h	L / H	P, E	E, C	Ana Person, manager	verbal, phone	arrangement	as needed
	Architectural office	I	S / h	L / H	P, E	E, C	Ana Person, manager	verbal, phone	arrangement	as needed
	Municipal services	C	S / I	H / L	I	E, C	Mira Ilic, staff	official letter, phone	request	as needed
	Local community	E	S / I	H / L	N	E	Pasa Ilic, staff	official letter, phone	request	as needed
4. Getting the technical conditions for house building	Project manager	I	S / h	L / H	D	A				
	Real estate agency	C	S / h	L / H	P, E	E, C	Ana Person, manager	verbal, phone	arrangement	as needed
	Public Companies for shores (electrisity, water, sawage, gas)	I	S / I	H / L	I	E, C	Staff	official letter, phone	request	as needed
	Local community	E	S / I	H / L	I	A	Pasa Ilic, staff	official letter	request	as needed
	Project manager	I	CQS / h	H / H	D	A				

Activity	List of stakeholders	Category	Expectations/ concerns	Power/ Interest	Type	Project phase	Person (s) to convey the message	Format of a message	Message content	Time
5. Finding construction firm and signing preliminary	Construction firm manager	I	CS / h	H / H	P, E	E, C	Mosa Pijade	verbal, phone	arrangement, problems, status, needs etc.	daily
	Construction firm workers	C	CS / h	L / H	P	E, C	Workers	verbal, phone	problems, needs, etc	as needed
6. Buying all necessary material for starting hause building and storing materials on the plot.	Project manager	I	CQS / h	H / H	D	A				
	Construction firm manager	C	CS / h	L / L	P, E	E, C	Mosa Pijade	verbal, phone	arrangement, problems, status, needs etc.	daily
	Construction firm workers	E	CS / h	L / L	P	E, C	Workers	verbal, phone	problems, needs, etc	as needed
	Construction material companies	I	CQS / h	H / H	P	E	Pera Soc, manager	verbal, phone	arrangement	when buy
	Plot neighbours	E	S / I	L / L	N	A	Djoka, Mika, Pera	verbal, phone	arrangement	as needed
7. Constructor works on building till “gray” phase	Project manager	I	CQS / h	H / H	D	A				
	Construction firm manager	I	CS / h	H / H	P, E	E, C	Mosa Pijade	verbal, phone	arrangement, problems, status,	daily
	Construction firm workers	I	CS / h	H / L	P	E, C	Workers	verbal, phone	problems, needs, etc	as needed
	Plot neighbours	E	S / I	L / L	N	A	Djoka, Mika, Pera	verbal, phone	arrangement	as needed
8. Works related to elctrical and water installation, carpentry, façade and heating	Project manager	I	CQS / h	H / H	D	A				
	Construction firm manager	I	CS / h	H / H	P, E	E, C	Mosa Pijade	verbal, phone	arrangement, problems, status, needs etc.	daily
	Construction firm workers	I	CS / h	H / L	P	E, C	Workers	verbal, phone	problems, needs, etc	as needed
	Public Companies for shores (electrisity, water, sawage, gas)	C	S / I	H / L	I	E, C	Staff	official letter, phone	requests	as needed
	Plot neighbours	C	S / I	L / L	N	A	Djoka, Mika, Pera	verbal, phone	arrangement	as needed
	Project manager	I	CQS / h	H / H	D	A				

Activity	List of stakeholders	Category	Expectations/ concerns	Power/ Interest	Type	Project phase	Person (s) to convey the message	Format of a message	Message content	Time
9. Finall works	Construction firm manager	I	CS / h	H / H	P, E	CL	Mosa Pijade	verbal, phone	arrangement, problems, status, needs etc.	daily
	Construction firm workers	I	CS / h	H / L	P	CL	Workers	verbal, phone	problems, needs, etc	as needed
	Firm for telephone, cable TV and internet connection	I	CS / h	H / L	P	CL	Jesa Fric, manager	official letter, phone	request	as needed
	Plot neighbours	C	S / l	L / L	N	CL	Djoka, Mika, Pera	verbal, phone	arrangement	as needed

LEGEND

Stakeholder category	I = Internal C = Connected E = External
Stakeholder expectation	C -Cost Q - Quality S -Schedule
Stakeholder concern	h - high m - medium l - low
Power/ interest	H - High L - Low
Stakeholder type	P - Performer I - Influencer D - Decision maker E - Expert N - Nonessential
Project phase	P - Planning E - Execution C - Controlling CL - Closing O - Operating A - Equally in all phases

Appendix No 6

Risk management matrix

Activity	Risk factor	Description of impact	Severity of Impact B	Likelihood of Occurrence A	Rating score AxB	Risk response
1. Buying a suitable plot	It is not possible to find appropriate plot	Inability of finding appropriate plot within the prescribed time and money makes activity very difficult	5	3	15	Increase efforts to find appropriate plot
	Building on the plot is not possible	If it is not possible to build probably it is agricultural land. Changing the use of plot will increase price of building	5	3	15	Increase efforts to find appropriate plot. Avoid buying or decrease price of plot
	Problems with vehicular access to plot	Infrastructure problems makes building activities very difficult and causes delays	4	3	12	Avoid buying or decrease price of plot. After possible buing increase efforts to solve problems
	Problems with shores to networks					
	Seller of the plot does not accept the offered price	Purchase of plot is impossible If there is no agreement about the price	5	3	15	Negotiate and try to reduce price of plot. Give up of shopping if negotiations fail
	Problems with co - users of the plot	Possible problems with co - users of the plot may linger building	3	3	9	Preferably solve problems with co- users before buying
	Problems with municipal services	Possible problems with municipal services may linger building	3	3	9	Preferably solve problems with municipal services before buying or right after
	Problems with Local community and neighbours	Possible problems with Local community and neighbours may linger building	3	3	9	Preferably solve problems with Local community and neighbours before buying or right after
2. Taking a lone from the bank	Credit unworthiness and insufficient loan amount	Start of building is impossible in case of credit unworthiness or insufficient loan amount	5	2	10	Try again to get a valid documentation in order to restart the process
	Loan approval documentation is not collected on time	Cause delay of final loan approval	4	2	8	Increase efforts to collect documentation
	Delay of final loan approval	Cause delay of start building	4	2	8	Increase efforts to solve problems with bank
	Disapproval of loan	Start of building is impossible in case of disapproval of loan	5	1	5	Try again to get a loan.
3. Obtaining a building permit	Inability to obtain a building permit	Start of building is impossible in case of Inability to obtain a building permit	5	2	10	Try again to get a valid documentation in order to restart the process
	Delays in building permit obtaining	Cause delay of start building	4	2	8	Increase efforts to solve problems with municipal services

Activity	Risk factor	Description of impact	Severity of Impact B	Likelihood of Occurrence A	Rating score AxB	Risk response
4. Getting the technical conditions for house building	Inability to obtain some of permits for shores	Inability to obtain some of permits for shores (especially shores for electric and water grid) can slow works	3	2	6	In this part of the project risk is reduced if coditions of the first activities are satisfied
	Problems with companies which are in charge for shores to networks	Possible problems may cause start building delay.	3	2	6	Increase efforts to solve problems with companies
	Delays in permit obtaining for shores	Delays in permit obtaining for shores may cause start building delay.	3	2	6	Increase efforts to collect valid documentation and solve problems with companies
5. Finding construction firm and signing preliminary	It is not possible to find appropriate construction firm	Inability to find appropriate construction firm within the prescribed time and money may cause start building delay.	3	2	6	Increase efforts to find appropriate construction firm
	Construction firm does not satisfy conditions	If construction firm does not satisfy conditions (price, quality) budget can be overrun or quality of hause will be unsatisfactory	3	2	6	Find another construction firm
6. Buying all necessary material for starting hause building and storing materials on the plot.	Construction material does not satisfy conditions	If construction materials does not satisfy conditions (price, quality) budget can be overrun or quality of hause will be unsatisfactory	3	2	6	Find another construction material firm
7. Constructor works on building till “gray” phase	Bad weather conditions	Bad weather conditions may cause delay of works	2	3	6	Orientation on works which are not time effected
	Problems with construction firm manager and workers	Problems with construction firm manager can affect delay of works and bad interpersonal relationships	3	3	9	Improve interpersonal relationships
	Possible problems with municipal services, Local community and neighbours	Possible problems may cause delay of works	2	3	6	Increase efforts to solve problems
8. Works related to elctrical and water installation, carpentry, façade and heating	Problems with construction firm manager and workers	Problems with construction firm manager can affect delay of works and bad interpersonal relationships	3	3	9	Improve interpersonal relationships
	Problems with companies which are in charge for shores, Local community and neighbours	Possible problems may cause delay of works	2	3	6	Increase efforts to solve problems
	Lack of money due to budget overruns	Lack of money due to budget overruns in this phase of project could seriously jeopardize the completion of project	5	3	15	Take care of expenditure of money. Rig floor and move up, finish later other works

Activity	Risk factor	Description of impact	Severity of Impact B	Likelihood of Occurrence A	Rating score AxB	Risk response
9. Finall works	Problems with telephone and cable TV companies	Possible problems have no effect on project	1	1	1	Move up, solve problems later
	Lack of money due to budget overruns	Lack of money due to budget overruns in this phase have minor effect on project	2	3	6	Take care of expenditure of money. Move up, finish later other works

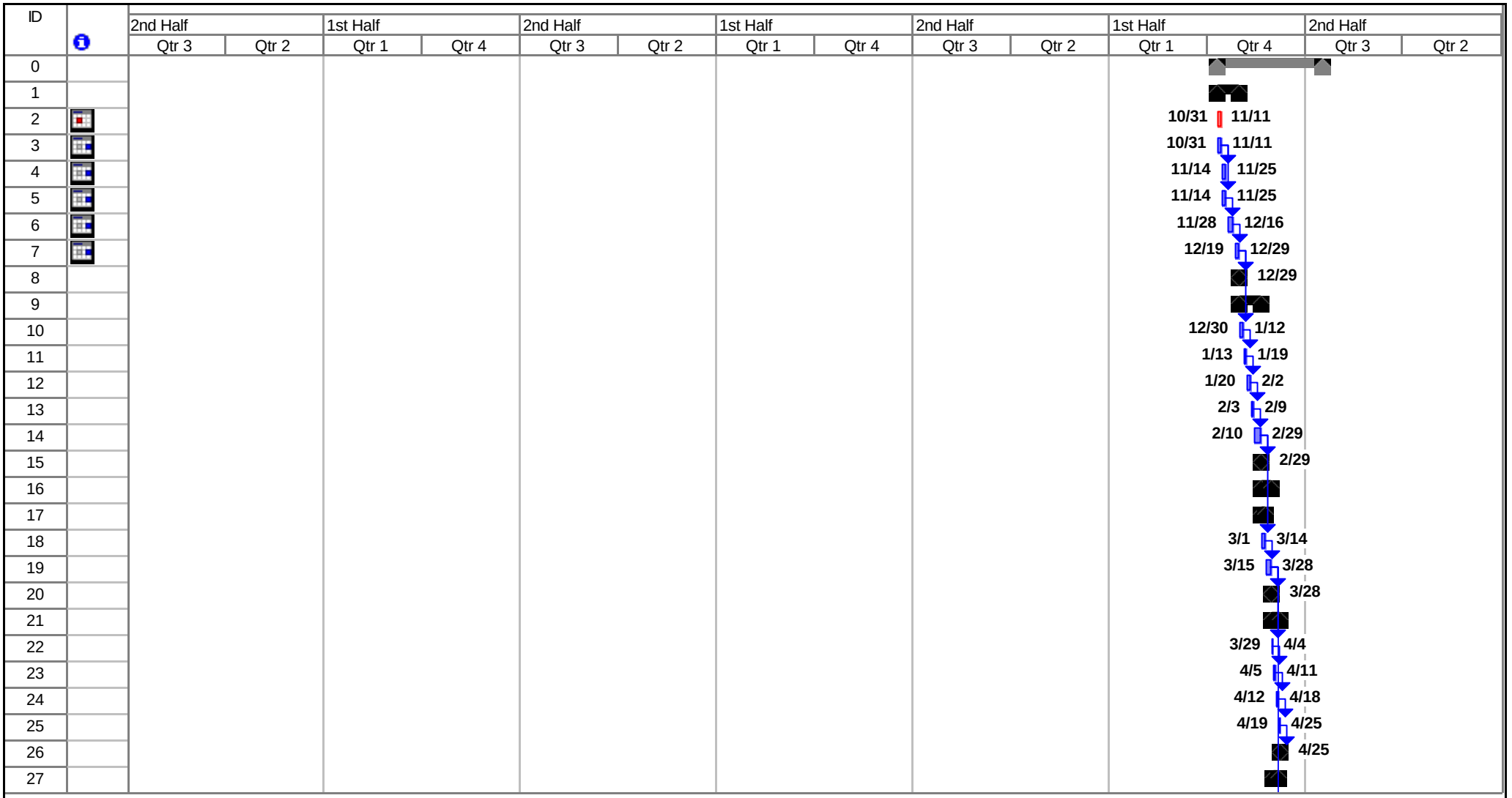
LEGEND

Likelihood of Occurrence (A)	Severity of Impact (B)
1- Very unlikely (hasn't occurred before)	1 - Insignificant (have no effect)
2 - Slight (rarely occurs)	2 - Minor (little effect)
3 - Feasible (possible, but not common)	3 - Significant (may pose a problem)
4 - Likely (has before, will again)	4 - Major (Will pose a problem)
5 - Very Likely (occurs frequently)	5 - Critical (Immediate action required)

1 to 8	Low risk
9	Medium risk
10 to 12	High risk
15 to 25	Very high risk
10	"line of tolerance"

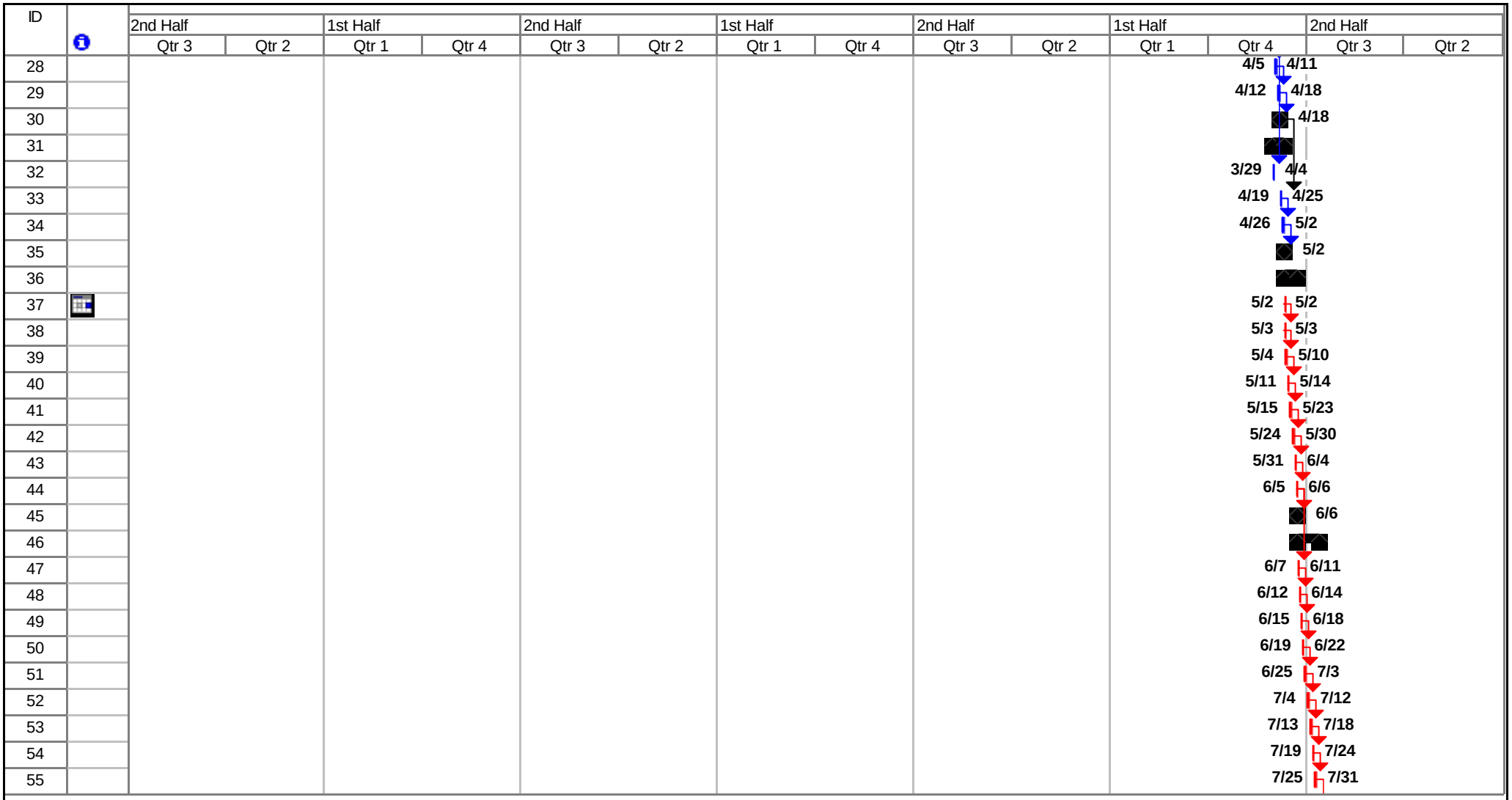
ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
0	**Building Family Hause**	**212 days**	**Mon 10/31/11**	**Tue 8/21/12**		
1	**1 Buying a suitable plot**	**44 days**	**Mon 10/31/11**	**Thu 12/29/11**		
2	1.1 Check regulation plan	10 days	Mon 10/31/11	Fri 11/11/11		project manager
3	1.2 Check right to use the land	10 days	Mon 10/31/11	Fri 11/11/11		lawyer
4	1.3 Request a copy of the plan	10 days	Mon 11/14/11	Fri 11/25/11	3	project manager
5	1.4 Check category of the land	10 days	Mon 11/14/11	Fri 11/25/11	3	lawyer
6	1.5 Get the complete list owner	15 days	Mon 11/28/11	Fri 12/16/11	5	architect
7	1.6 Get statement of the co-user	9 days	Mon 12/19/11	Thu 12/29/11	6	lawyer
8	1.7 Land is registered on my name	0 days	Thu 12/29/11	Thu 12/29/11	7	
9	**2 Taking a lone from the bank**	**44 days**	**Fri 12/30/11**	**Wed 2/29/12**		
10	2.1 Gathering information from bank	10 days	Fri 12/30/11	Thu 1/12/12	7	project manager
11	2.2 Applying for credit assessment	5 days	Fri 1/13/12	Thu 1/19/12	10	lawyer
12	2.3 Collection of legal documents	10 days	Fri 1/20/12	Thu 2/2/12	11	project manager
13	2.4 Loan Agreement	5 days	Fri 2/3/12	Thu 2/9/12	12	lawyer
14	2.5 Realization of loan	14 days	Fri 2/10/12	Wed 2/29/12	13	project manager
15	2.6 Money is on my account	0 days	Wed 2/29/12	Wed 2/29/12	14	
16	**3 Obtaining a building permit**	**20 days**	**Thu 3/1/12**	**Wed 3/28/12**		
17	**3.1 Obtain a location permit**	**10 days**	**Thu 3/1/12**	**Wed 3/14/12**		
18	3.1.1 Development of the design	10 days	Thu 3/1/12	Wed 3/14/12	14	architect
19	3.2 Obtaining a building permit	10 days	Thu 3/15/12	Wed 3/28/12	18	project manager
20	3.3 Building permit obtained	0 days	Wed 3/28/12	Wed 3/28/12	19	
21	**4 Getting the technical conditions**	**20 days**	**Thu 3/29/12**	**Wed 4/25/12**		
22	4.1 Conditions for electric	5 days	Thu 3/29/12	Wed 4/4/12	19	lawyer
23	4.2 Conditions for water	5 days	Thu 4/5/12	Wed 4/11/12	22	lawyer
24	4.3 Conditions for gas	5 days	Thu 4/12/12	Wed 4/18/12	23	lawyer
25	4.4 Conditions for garbage	5 days	Thu 4/19/12	Wed 4/25/12	24	lawyer
26	4.5 Technical requirements met	0 days	Wed 4/25/12	Wed 4/25/12	25	
27	**5 Finding construction firm**	**10 days**	**Thu 4/5/12**	**Wed 4/18/12**		
28	5.1 Making a list of construction firms	5 days	Thu 4/5/12	Wed 4/11/12	19	project manager
29	5.2 Signing of preliminary contract	5 days	Thu 4/12/12	Wed 4/18/12	28	CF manager
30	5.3 Preliminary contract signed	0 days	Wed 4/18/12	Wed 4/18/12	29	
31	**6 Buying and storing materials on the plot**	**25 days**	**Thu 3/29/12**	**Wed 5/2/12**		
32	6.1 Making a list of companies	5 days	Thu 3/29/12	Wed 4/4/12	19	project manager
33	6.2 Construction of stockroom	5 days	Thu 4/19/12	Wed 4/25/12	30	craftsman,laborer
34	6.3 Buying material	5 days	Thu 4/26/12	Wed 5/2/12	33	craftsman,laborer[200%]
35	6.4 Material is stored	0 days	Wed 5/2/12	Wed 5/2/12	34	CF manager
36	**7 Constructor works on building till “gray” phase**	**26 days**	**Wed 5/2/12**	**Wed 6/6/12**		
37	7.1 Plot metering	1 day	Wed 5/2/12	Wed 5/2/12		craftsman,laborer
38	7.2 Digging of foundation	1 day	Thu 5/3/12	Thu 5/3/12	37	laborer[200%],craftsman,construction machine operator
39	7.3 Construction of foundation and ground plate	5 days	Fri 5/4/12	Thu 5/10/12	38	craftsman[200%],laborer[300%]
40	7.4 Setting of plate installation	2 days	Fri 5/11/12	Mon 5/14/12	39	craftsman,laborer
41	7.5 Rough construction works on the ground, end with the plate above the grou	7 days	Tue 5/15/12	Wed 5/23/12	40	craftsman[200%],laborer[300%]

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
42	7.6 Rough construction works on the attic	5 days	Thu 5/24/12	Wed 5/30/12	41	craftsman[200%],laborer[300%]
43	7.7 House covering	3 days	Thu 5/31/12	Mon 6/4/12	42	craftsman[200%],laborer[300%]
44	7.8 Setting of carpentry	2 days	Tue 6/5/12	Wed 6/6/12	43	craftsman,laborer
45	7.9 house is "under the roof"	0 days	Wed 6/6/12	Wed 6/6/12	44	CF manager
46	**8 Works related to elctricall and water instalation, carpentry, heating etc.**	**44 days**	**Thu 6/7/12**	**Tue 8/7/12**		
47	8.1 Electrical suply installation	3 days	Thu 6/7/12	Mon 6/11/12	44	electrician,laborer
48	8.2 Water suply installation	3 days	Tue 6/12/12	Thu 6/14/12	47	plumber,laborer
49	8.3 Sawage installation	2 days	Fri 6/15/12	Mon 6/18/12	48	plumber,laborer
50	8.4 Indoor plastering	4 days	Tue 6/19/12	Fri 6/22/12	49	craftsman[200%],laborer[300%]
51	8.5 Creation and setting of interior stairs	7 days	Mon 6/25/12	Tue 7/3/12	50	carpenter,laborer
52	8.6 Setting of sanitary	7 days	Wed 7/4/12	Thu 7/12/12	51	ceramist,laborer
53	8.7 Setting of external façade	4 days	Fri 7/13/12	Wed 7/18/12	52	craftsman[200%],laborer[300%]
54	8.8 Setting of parquet	4 days	Thu 7/19/12	Tue 7/24/12	53	craftsman[200%],laborer[200%]
55	8.9 Painting works	5 days	Wed 7/25/12	Tue 7/31/12	54	painter[200%]
56	8.10 Connection to gas distribution grid	2 days	Wed 8/1/12	Thu 8/2/12	55	heating master
57	8.11 Heating installation	3 days	Fri 8/3/12	Tue 8/7/12	56	heating master,craftsman,laborer
58	8.12 Most works on the house is finished	0 days	Tue 8/7/12	Tue 8/7/12	57	CF manager
59	**9 Finall works**	**10 days**	**Wed 8/8/12**	**Tue 8/21/12**		
60	9.1 Setting of cable TV	1 day	Wed 8/8/12	Wed 8/8/12	57	IT master
61	9.2 Telephone and internet connection	1 day	Thu 8/9/12	Thu 8/9/12	60	IT master
62	9.3 Cleaning and decorating of yard	5 days	Fri 8/10/12	Thu 8/16/12	61	laborer
63	9.4 Small repairs	3 days	Fri 8/17/12	Tue 8/21/12	62	craftsman,laborer
64	9.5 The house is vacant	0 days	Tue 8/21/12	Tue 8/21/12	63	CF manager



Project: Building Family Hause
Date: Tue 3/29/11

Task	Rolled Up Task	External Tasks
Critical Task	Rolled Up Critical Task	Project Summary
Progress	Rolled Up Milestone	Group By Summary
Milestone	Rolled Up Progress	Deadline
Summary	Split	



Project: Building Family Hause
Date: Tue 3/29/11

Task		Rolled Up Task		External Tasks	
Critical Task		Rolled Up Critical Task		Project Summary	
Progress		Rolled Up Milestone		Group By Summary	
Milestone		Rolled Up Progress		Deadline	
Summary		Split			

ID		2nd Half		1st Half		2nd Half		1st Half		2nd Half		1st Half		2nd Half	
		Qtr 3	Qtr 2	Qtr 1	Qtr 4	Qtr 3	Qtr 2	Qtr 1	Qtr 4	Qtr 3	Qtr 2	Qtr 1	Qtr 4	Qtr 3	Qtr 2
56														8/1 8/2	
57														8/3 8/7	
58														8/7	
59															
60														8/8 8/8	
61														8/9 8/9	
62														8/10 8/16	
63														8/17 8/21	
64														8/21	

Project: Building Family Hause
Date: Tue 3/29/11

Task		Rolled Up Task		External Tasks	
Critical Task		Rolled Up Critical Task		Project Summary	
Progress		Rolled Up Milestone		Group By Summary	
Milestone		Rolled Up Progress		Deadline	
Summary		Split			

Building Family Hause

ID	Resource Name	Type	Material Label	Initials	Group	Max. Units	Std. Rate	Ovt. Rate	Cost/Use	Accrue At	Base Calendar	Code
1	project manager	Work		P		100%	$0.00/hr	$0.00/hr	$1.00	Start	Standard	
2	lawyer	Work		L		100%	$0.00/hr	$0.00/hr	$250.00	Start	Standard	
3	architect	Work		a		100%	$0.00/hr	$0.00/hr	$250.00	Prorated	Standard	
4	CF manager	Work		CFm		100%	$0.00/hr	$0.00/hr	$1,000.00	Prorated	Standard	
5	craftsman	Work		c		200%	$3.00/hr	$0.00/hr	$0.00	Prorated	Standard	
6	laborer	Work		l		300%	$2.50/hr	$0.00/hr	$0.00	Prorated	Standard	
7	electrician	Work		e		100%	$3.00/hr	$0.00/hr	$0.00	Prorated	Standard	
8	plumber	Work		pl		100%	$3.00/hr	$0.00/hr	$0.00	Prorated	Standard	
9	carpenter	Work		cp		100%	$5.00/hr	$0.00/hr	$0.00	Prorated	Standard	
10	ceramist	Work		cm		100%	$5.00/hr	$0.00/hr	$0.00	Prorated	Standard	
11	painter	Work		pa		200%	$4.00/hr	$0.00/hr	$0.00	Prorated	Standard	
12	construction machine operator	Work		cmo		100%	$40.00/hr	$0.00/hr	$0.00	Prorated	Standard	
13	heating master	Work		hm		100%	$5.00/hr	$0.00/hr	$0.00	Prorated	Standard	
14	driver	Work		d		100%	$3.00/hr	$0.00/hr	$0.00	Prorated	Standard	
15	IT master	Work		IT		100%	$5.00/hr	$0.00/hr	$0.00	Prorated	Standard	
16	Construction firm	Work		CF		100%	$0.00/hr	$0.00/hr	$24,893.00	Start	Standard	

Budget Report as of Tue 3/29/11
Building Family Hause

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
0	**Building Family Hause**	**$0.00**	**Prorated**	**$14,300.67**	**$0.00**	**$14,300.67**	**$0.00**	**$14,300.67**
46	**Works related to elctricall and water instalati**	**$0.00**	**Prorated**	**$4,060.00**	**$0.00**	**$4,060.00**	**$0.00**	**$4,060.00**
36	**Constructor works on building till "gray" phi**	**$0.00**	**Prorated**	**$3,730.67**	**$0.00**	**$3,730.67**	**$0.00**	**$3,730.67**
31	**Buying and storing materials on the plot**	**$0.00**	**Prorated**	**$1,441.00**	**$0.00**	**$1,441.00**	**$0.00**	**$1,441.00**
59	**Finall works**	**$0.00**	**Prorated**	**$1,312.00**	**$0.00**	**$1,312.00**	**$0.00**	**$1,312.00**
1	**Buying a suitable plot**	**$0.00**	**Prorated**	**$1,002.00**	**$0.00**	**$1,002.00**	**$0.00**	**$1,002.00**
27	**Finding construction firm**	**$0.00**	**Prorated**	**$1,001.00**	**$0.00**	**$1,001.00**	**$0.00**	**$1,001.00**
21	**Getting the technical conditions**	**$0.00**	**Prorated**	**$1,000.00**	**$0.00**	**$1,000.00**	**$0.00**	**$1,000.00**
29	Signing of preliminary contract	$0.00	Prorated	$1,000.00	$0.00	$1,000.00	$0.00	$1,000.00
35	Material is stored	$0.00	Prorated	$1,000.00	$0.00	$1,000.00	$0.00	$1,000.00
45	house is "under the roof"	$0.00	Prorated	$1,000.00	$0.00	$1,000.00	$0.00	$1,000.00
58	Most works on the house is finished	$0.00	Prorated	$1,000.00	$0.00	$1,000.00	$0.00	$1,000.00
64	The house is vacant	$0.00	Prorated	$1,000.00	$0.00	$1,000.00	$0.00	$1,000.00
41	Rough construction works on the ground, end with	$0.00	Prorated	$756.00	$0.00	$756.00	$0.00	$756.00
39	Construction of foundation and ground plate	$0.00	Prorated	$540.00	$0.00	$540.00	$0.00	$540.00
42	Rough construction works on the attic	$0.00	Prorated	$540.00	$0.00	$540.00	$0.00	$540.00
9	**Taking a lone from the bank**	**$0.00**	**Prorated**	**$503.00**	**$0.00**	**$503.00**	**$0.00**	**$503.00**
50	Indoor plastering	$0.00	Prorated	$432.00	$0.00	$432.00	$0.00	$432.00
53	Setting of external façade	$0.00	Prorated	$432.00	$0.00	$432.00	$0.00	$432.00
51	Creation and setting of interior stairs	$0.00	Prorated	$420.00	$0.00	$420.00	$0.00	$420.00
52	Setting of sanitary	$0.00	Prorated	$420.00	$0.00	$420.00	$0.00	$420.00
54	Setting of parquet	$0.00	Prorated	$352.00	$0.00	$352.00	$0.00	$352.00
38	Digging of foundation	$0.00	Prorated	$350.67	$0.00	$350.67	$0.00	$350.67
43	House covering	$0.00	Prorated	$324.00	$0.00	$324.00	$0.00	$324.00
55	Painting works	$0.00	Prorated	$320.00	$0.00	$320.00	$0.00	$320.00
57	Heating installation	$0.00	Prorated	$252.00	$0.00	$252.00	$0.00	$252.00

Budget Report as of Tue 3/29/11
Building Family Hause

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
16	**Obtaining a building permit**	**$0.00**	**Prorated**	**$251.00**	**$0.00**	**$251.00**	**$0.00**	**$251.00**
3	Check right to use the land	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
5	Check category of the land	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
6	Get the complete list owner	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
7	Get statement of the co-user	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
11	Applying for credit assessment	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
13	Loan Agreement	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
17	**Obtain a location permit**	**$0.00**	**Prorated**	**$250.00**	**$0.00**	**$250.00**	**$0.00**	**$250.00**
18	Development of the design	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
22	Conditions for electric	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
23	Conditions for water	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
24	Conditions for gas	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
25	Conditions for garbage	$0.00	Prorated	$250.00	$0.00	$250.00	$0.00	$250.00
33	Construction of stockroom	$0.00	Prorated	$220.00	$0.00	$220.00	$0.00	$220.00
34	Buying material	$0.00	Prorated	$220.00	$0.00	$220.00	$0.00	$220.00
47	Electrical suply installation	$0.00	Prorated	$132.00	$0.00	$132.00	$0.00	$132.00
48	Water suply installation	$0.00	Prorated	$132.00	$0.00	$132.00	$0.00	$132.00
63	Small repairs	$0.00	Prorated	$132.00	$0.00	$132.00	$0.00	$132.00
62	Cleaning and decorating of yard	$0.00	Prorated	$100.00	$0.00	$100.00	$0.00	$100.00
40	Setting of plate installation	$0.00	Prorated	$88.00	$0.00	$88.00	$0.00	$88.00
44	Setting of carpentry	$0.00	Prorated	$88.00	$0.00	$88.00	$0.00	$88.00
49	Sawage installation	$0.00	Prorated	$88.00	$0.00	$88.00	$0.00	$88.00
56	Connection to gas distribution grid	$0.00	Prorated	$80.00	$0.00	$80.00	$0.00	$80.00
37	Plot metering	$0.00	Prorated	$44.00	$0.00	$44.00	$0.00	$44.00
60	Setting of cable TV	$0.00	Prorated	$40.00	$0.00	$40.00	$0.00	$40.00
61	Telephone and internet connection	$0.00	Prorated	$40.00	$0.00	$40.00	$0.00	$40.00

Budget Report as of Tue 3/29/11
Building Family Hause

ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
2	Check regulation plan	$0.00	Prorated	$1.00	$0.00	$1.00	$0.00	$1.00
4	Request a copy of the plan	$0.00	Prorated	$1.00	$0.00	$1.00	$0.00	$1.00
10	Gathering information from bank	$0.00	Prorated	$1.00	$0.00	$1.00	$0.00	$1.00
12	Collection of legal documents	$0.00	Prorated	$1.00	$0.00	$1.00	$0.00	$1.00
14	Realization of loan	$0.00	Prorated	$1.00	$0.00	$1.00	$0.00	$1.00
19	Obtaining a building permit	$0.00	Prorated	$1.00	$0.00	$1.00	$0.00	$1.00
28	Making a list of construction firms	$0.00	Prorated	$1.00	$0.00	$1.00	$0.00	$1.00
32	Making a list of companies	$0.00	Prorated	$1.00	$0.00	$1.00	$0.00	$1.00
8	Land is registered on my name	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
15	Money is on my account	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
20	Building permit obtained	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
26	Technical requirements met	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
30	Preliminary contract signed	$0.00	Prorated	$0.00	$0.00	$0.00	$0.00	$0.00
		$0.00		**$14,300.67**	**$0.00**	**$14,300.67**	**$0.00**	**$14,300.67**