

Some Features of Project Management Using Dedicated Software in the Land Surveying Works

Lecturer Eng. BADEA ANA-CORNELIA, PhD
Faculty of Geodesy
Technical University of Civil Engineering
122-124, Lacul Tei Blvd., District 2, Bucharest
ROMANIA

badeacadastru@yahoo.com <http://www.geodezie.utcb.ro/>

Associate Professor Eng. BADEA GHEORGHE, PhD
Faculty of Geodesy
Technical University of Civil Engineering
122-124, Lacul Tei Blvd., District 2, Bucharest
ROMANIA

badeacadastru@gmail.com <http://www.geodezie.utcb.ro/>

Lecturer Eng. DIDULESCU CAIUS, PhD
Faculty of Geodesy
Technical University of Civil Engineering
122-124, Lacul Tei Blvd., District 2, Bucharest
ROMANIA

caiusdidulescu@gmail.com <http://www.geodezie.utcb.ro/>

Lecturer Eng. BĂDESCU GABRIEL, PhD
Faculty of Mineral Resources and Environment
62A V.Babes Street, Baia Mare
ROMANIA

gabrielbadescu@yahoo.com

Lecturer Eng. SAVU ADRIAN, PhD
Faculty of Geodesy
Technical University of Civil Engineering
122-124, Lacul Tei Blvd., District 2, Bucharest
ROMANIA

adisavu2002@gmail.com <http://www.geodezie.utcb.ro/>

Abstract: - In this article we pointed out the main features to be taken into account in land surveying projects. These specific items are found especially in the area of risk management, which must be taken into account and properly quantified. Therefore, to carry out the project of land measurement is not enough to have specialized knowledge, but must be treated as a series of knowledge in terms of project management. It approached the topic from the perspective of project management knowledge that need to have any engineer in land surveying which is working as project manager in a company that performs surveying activities. He must know and properly manage human resources and materials at its disposal, thus obtaining maximum efficiency in the work done with minimum resources, in the shortest time.

Key-Words: - project management software, land surveying, risk management, project plan

1 Introduction

A project may be designed on different levels, covering the problems of different sizes. First it is important to begin to detail the concepts related to project management.

Despite the extremely large variety of programs and projects there are some general characteristics that we find, regardless of geographical or temporal dimensions and sizes without budgets or teams to have any significance.

The project represents an amount of activities that lead to achieving a common goal and requires a significant consumption of resources (human, financial, material, equipment, documentary information and time). Implementation of a project requires a baseline and a final project now, so a lasting achievement.

Project management consists of planning, organizing and managing (control) tasks and resources aimed at achieving a particular objective, conditions of the existence of constraints on time, resources and costs.

From a conceptual point of view there is a clear and necessary distinction between the notions of project and the institution - the project is a process, and the body is a structure. Ignoring the existence of this distinction may have consequences on the design and the implementation of the project.

For example, if a company that operates land measurements, this distinction is important because, in general, more projects are in progress, and human and material resources must be allocated properly. In this case, the general manager must have the ability to work simultaneously on the allocation of resources in all projects to exploit them more judiciously.

Project management requires the existence own structure, at least from an organizational perspective if not institutional. In this respect, the project definition is applicable to the institution, with a notable exception: the duration. By definition, the project has a predetermined time, when the company has an indefinite duration. On the other hand, the success of the company is monitored and evaluated throughout the duration operation, while assessing the project's success after its completion.

For example, a company may engage in surveying an entire project structure, but does not mean that the company is identified with the project.

After completion of the project company will continue to exist as an organization. In terms of resources and budgets, we must not forget that the budget is company project budget.

Therefore, we must take into account the triple constraint. (Fig. 1)



Fig. 1 – The Triple Constraint

The triple constraint is composed by:

- Increased Scope = increased time + increased cost
- Tight Time = increased costs + reduced scope
- Tight Budget = increased time + reduced scope.

2 Key Areas of Project Management

It should be noted key areas of project management in order to get to the actual design implementation.

They are:

- SCOPE MANAGEMENT – Ensuring all the appropriate work within the project scope is completed and only the work within scope is being conducted
- TIME MANAGEMENT – Schedule Management
- COST MANAGEMENT – How costs are controlled and incurred costs are paid
- QUALITY MANAGEMENT – Quality Assurance Plan – How quality control is measured and satisfied
- HUMAN RESOURCE MANAGEMENT – Development of the project team, reporting structure, resource capacity
- COMMUNICATIONS MANAGEMENT – How project communications will be handled to ensure all project stakeholders are informed
- RISK MANAGEMENT – Risk Management plan to have all project stakeholders in agreement on how project risks will be handled (aversion, mitigation or assumption)
- PROCUREMENT MANAGEMENT – Procurement process, contract processes
- INTEGRATION MANAGEMENT – Integration of all areas of project management to develop a cohesive project plan

3 The Project Plan Structure

The structure consists of project plan:

- Introduction.
- Project organisation
- Risk analysis
- Hardware and software resource requirements
- Work breakdown
- Project schedule
- Monitoring and reporting mechanisms

3.1 Activity Organization

Activities in a project should be organised to produce tangible outputs for management to judge progress.

In the specific works of land measurements are relatively easy to define these elements as part of a practice field, where the main operations are known. Milestones are the end-point of a process activity. Deliverables are project results delivered to customers.

The waterfall process allows for the straightforward definition of progress milestones.

3.2 Project Management Tools

Gantt Chart is a popular type of bar chart that illustrates a project schedule. (Fig.2)

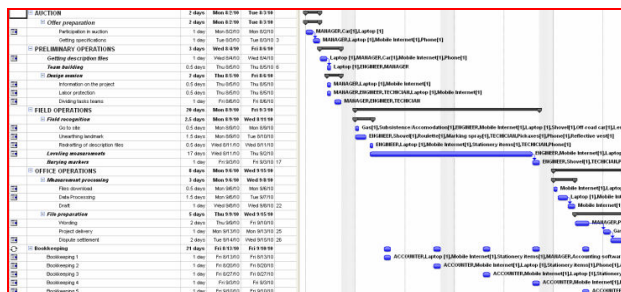


Fig. 2 – The Gantt Chart

Project scheduling

- Split project into tasks (Fig. 3) and estimate time and resources required to complete each task. For example, we have the phase of auction, preliminary operations, field operations, office operations, bookkeeping.
- Organize tasks concurrently to make optimal use of workforce.
- Minimize task dependencies to avoid delays caused by one task waiting for another to complete. In our specific projects, a problem is the interdependence between field work and office work that takes place afterwards. More advantageous is to divide the activities into several phases, so that a deployment phase of its

office work can be done concurrently with phase 2 of the field work, etc.. (Fig. 4)

- Dependent on project managers intuition and experience.

Principal scheduling problems

- Estimating the difficulty of problems and hence the cost of developing a solution is hard.
- Productivity is not proportional to the number of people working on a task.
- Adding people to a late project makes it later because of communication overheads.
- The unexpected always happens. Always allow contingency in planning.

ID	Task Name	Duration	Start	Finish	Precedence
1	AUCTION	2 days	Mon 8/2/10	Tue 8/3/10	
2	Offer preparation	2 days	Mon 8/2/10	Tue 8/3/10	
3	Participation in auction	1 day	Mon 8/2/10	Mon 8/2/10	
4	Getting specifications	1 day	Tue 8/3/10	Tue 8/3/10	3
5	PRELIMINARY OPERATIONS	3 days	Wed 8/4/10	Fri 8/6/10	
6	Getting description files	1 day	Wed 8/4/10	Wed 8/4/10	
7	Team building	0.5 days	Thu 8/5/10	Thu 8/5/10	6
8	Design session	2 days	Thu 8/5/10	Fri 8/6/10	
9	Information on the project	0.5 days	Thu 8/5/10	Thu 8/5/10	
10	Labor protection	0.5 days	Thu 8/5/10	Thu 8/5/10	
11	Dividing tasks teams	1 day	Fri 8/6/10	Fri 8/6/10	
12	FIELD OPERATIONS	20 days	Mon 8/9/10	Fri 9/3/10	
13	Field recognition	2.5 days	Mon 8/9/10	Wed 8/11/10	
14	Go to site	0.5 days	Mon 8/9/10	Mon 8/9/10	
15	Unearthing landmark	1.5 days	Mon 8/9/10	Tue 8/10/10	
16	Redefining of description files	0.5 days	Wed 8/11/10	Wed 8/11/10	
17	Leveling measurements	17 days	Wed 8/11/10	Thu 9/2/10	
18	Burying markers	1 day	Fri 9/3/10	Fri 9/3/10	17
19	OFFICE OPERATIONS	8 days	Mon 9/6/10	Wed 9/15/10	
20	Measurement processing	3 days	Mon 9/6/10	Wed 9/8/10	
21	Files download	0.5 days	Mon 9/6/10	Mon 9/6/10	
22	Data Processing	1.5 days	Mon 9/6/10	Tue 9/7/10	
23	Draft	1 day	Wed 9/8/10	Wed 9/8/10	22
24	File preparation	5 days	Thu 9/9/10	Wed 9/15/10	
25	Wording	2 days	Thu 9/9/10	Fri 9/10/10	
26	Project delivery	1 day	Mon 9/13/10	Mon 9/13/10	25
27	Dispute settlement	2 days	Mon 9/13/10	Wed 9/15/10	26
28	Bookkeeping	21 days	Fri 8/13/10	Fri 9/10/10	
29	Bookkeeping 1	1 day	Fri 8/13/10	Fri 8/13/10	
30	Bookkeeping 2	1 day	Fri 8/20/10	Fri 8/20/10	
31	Bookkeeping 3	1 day	Fri 8/27/10	Fri 8/27/10	
32	Bookkeeping 4	1 day	Fri 9/3/10	Fri 9/3/10	
33	Bookkeeping 5	1 day	Fri 9/10/10	Fri 9/10/10	

Fig. 3 – Task durations and dependencies

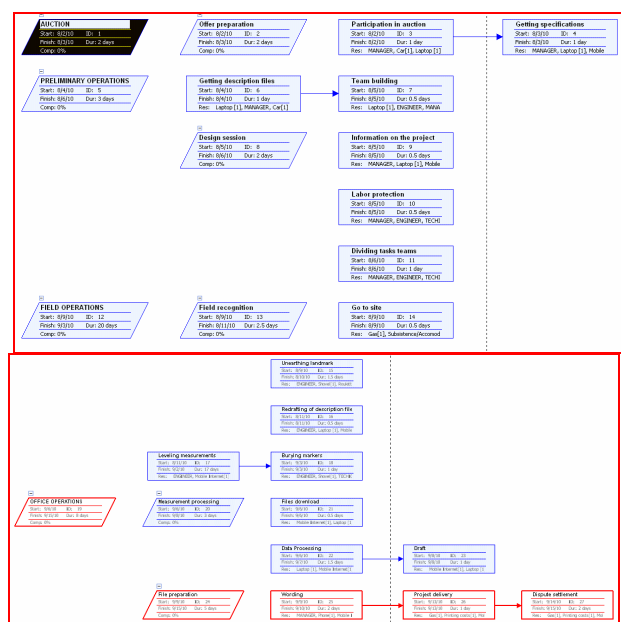


Fig. 4 – Network diagram

4 Risk management in land surveying projects

Risk management is concerned with identifying risks and drawing up plans to minimise their effect on a project. A risk is a probability that some adverse circumstance will occur. Project risks affect schedule or resources and the quality of the work. Business risks affect the organisation and the organisation team who are working in the project. For this reason, is necessary and very suggestive a cash-flow graphic (Fig. 5) and a To do list (Fig. 6.) in the land surveying project

	02/19	06/19	07/19	08/19	09/19	06/19	07/19	08/19	09/19	10/19
AUCTION										
Other preparation										
Participation in auction	40,378.00 lei									
Getting specifications	638.00 lei									
PRELIMINARY OPERATIONS										
Getting description files	40,030.00 lei									
Team building	350.00 lei									
Design session										
Information on the project	413.00 lei									
Labor protection	500.00 lei									
Dividing tasks teams	540.00 lei									
FIELD OPERATIONS										
Field recognition										
Go to site		82,330.00 lei								
Unclearing landmark		780.00 lei								
Redrawing of description files		650.00 lei								
Leveling measurement		9,420.00 lei	3,117.85 lei	3,117.85 lei	2,494.12 lei					
Burying markers					610.00 lei					
OFFICE OPERATIONS										
Measurement processing										
File download								15,510.00 lei		
Data Processing								3,150.00 lei		
Digit								630.00 lei		
File preparation										
Wording								770.00 lei		
Project delivery										41,490.00 lei
Dispute settlement										41,730.00 lei
Bookkeeping										
Bookkeeping 1		2,815.00 lei								
Bookkeeping 2			2,545.00 lei							
Bookkeeping 3				2,545.00 lei						
Bookkeeping 4					2,545.00 lei					
Bookkeeping 5						2,545.00 lei				
Total	83,490.00 lei	95,005.00 lei	5,992.85 lei	5,992.85 lei	5,540.12 lei	22,895.00 lei		22,895.00 lei		83,220.00 lei

Fig. 5 – Cash flow graphic

ID	📅	Task Name
Week of August 2		
3	📅	Participation in auction
4	📅	Getting specifications
6	📅	Getting description files
7	📅	Team building
9	📅	Information on the project
10	📅	Labor protection
11	📅	Dividing tasks teams

Fig. 6 – To do list

The risk management process implies:

- Risk identification - Identify project and business risks; (Table 1)
- Risk analysis - Assess the likelihood and consequences of these risks;
- Risk planning - Draw up plans to avoid or minimise the effects of the risk;
- Risk monitoring - Monitor the risks throughout the project;

Table 1 – Possible risks

Risk	Affects	Description
Staff turnover	Project	Experienced staff will leave the project before it is finished. In land surveying projects, this situation often happens due to the large volume of land works.
Management change	Project	There will be a change of organisational management with different priorities.
Hardware unavailability	Project	Hardware that is essential for the office works will not be delivered on schedule.
Requirements change	Project and entire work	There will be a larger number of changes to the requirements of the beneficiary than anticipated.
Specification delays	Project and entire work	Specifications of specific work are not available on schedule
Size underestimate	Project and entire work	The size of the field work extent has been underestimated. This happens often as the situation on the ground is usually different than what was estimated, requiring a higher volume of work.
Surveying instruments under-performance	Product	Surveying instruments which support the project do not perform as anticipated

Risk analysis implies (Table 2):

- Assess probability and seriousness of each risk.
- Probability may be very low, low, moderate, high or very high.
- Risk effects might be catastrophic, serious, tolerable or insignificant.

Risk monitoring implies:

- To assess each identified risks regularly to decide whether or not it is becoming less or more probable.
- Also assess whether the effects of the risk have changed.
- Each key risk should be discussed at management progress meetings.

Risk monitoring leads to risk indicators which are preseted in Table 3.

Table 2 – Risk analysis

<i>Risk</i>	<i>Probability</i>	<i>Class of effetcs</i>
Organisational financial problems force reductions in the project budget.	Low	Major
It is impossible to recruit staff with the skills required for the project.	High	Major
Key staff are ill at critical times in the project.	Moderate	Serious
The weather is bad and does not allow topographic surveys	Moderate	Serious
Changes to requirements that require major design rework are proposed. The beneficiary changes the requirements of the project type (especially in the civil	Moderate	Serious

engineering projects)

The organisation is restructured so that different management are responsible for the project.

High Serious

Table 3 – Risk indicators

Risk type	Potential indicators
Technology	Late delivery of hardware or support software, many reported technology problems, including surveying instruments and old software resources.
Human resources	Low staff morale, poor relationships amongst team member, job availability
Organisational	Lack of action by senior management
Tools	Demands for higher-powered workstations and for high technology of surveying instruments
Requirements	Many requirements change requests, customer complaints
Estimation	Failure to meet agreed schedule, failure to clear reported defects

5 Conclusions

To be a successful project, the strategy - implementation gap of a project consists in:

- Direction: Must have a clear, simple summary of where we want to go.
- Communication: All activities have been communicated in a compelling manner.
- Sponsorship: Must be someone at the right level who is committed to making the strategy real.
- Actions :There are identified clear vertical and horizontal and projects with regular milestones.

- Accountability: Establishing absolutely clear who is accountable for each component of the plan.
- Resources: Redeploying adequate resources to ensure the actions are able to be implemented.
- Incentives: Creating the desired behaviours we need (without unintended side effects).
- Measurement: Having the mechanisms in place to collect evidence about implementation progress.
- Engagement: Having clear processes for regularly engaging those who need to implement the plan.
- Feedback: Having adequate mechanisms for checking we are still on track, or need to adapt our plans.

The project management team has to be integrated into the risk management. A regular reporting about the risk situation is essential like:

- Preparation of the risk report
- Marking of special risks
- Risk concentration
- Risks which are endangering the existence
- Missing of risks which are endangering the existence
- Categorizing of risks
- Description of risks
- Quantification of risks
- Meaning from the view of the enterprise
- Presentation of interdependences of risks
- Changes against forgoing year
- Total risk evaluation

References:

- [1] Badea, A., Badea G., The importance of the project management in GIS, *Buletin științific al Universității de Nord din Baia Mare*, Seria D, volumul XXIII, Editura Universității de Nord Baia Mare, 2009, pp.151-155;
- [2] Kennie, T., Strategic Practice Management: How Strategic is Your Plan?, Shaping the Change, *XXIII FIG Congress*, Munich, Germany, October 8-13, 2006;
- [3] Lessel, W., *Managementul proiectelor*, Ed. ALL, București, 2007
- [4] Mathur, A., Introduction to Project Management, <http://www.scribd.com/doc/48553851/introduction-to-project-management>
- [5] Mathur, A., Risky Business, *Essentials of Risk Management*

www.projectperfect.com.au/downloads/.../risk-management-presentation.ppt

- [6] Sommerville, I, *Project management*, Software Engineering, 7th edition. Chapter 5, 2004
- [7] ***, Commission 10, Forum on Project Management, *FIG Working Week*, Hong Kong SAR, China, 13-17 May 2007;