

A GIS PROJECT MANAGEMENT TEMPLATE

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SUMMARY

Nowadays, both the services of the technological development and the successful results of the Geographical Information System (GIS) applications orient clients, institutions and organizations to establish their geographic information systems and manage their inventory with these systems. GIS has been introduced in early 80's. It is developing and spreading increasingly. GIS technology differs from information systems in general by its structure and contents. GIS related projects need to be planned and managed efficiently from the formation phase to the implementation phase, in order to be successful with given time and resources.

With a GIS project,

- Quick access to the information of institution
- Performing query processes on this information and creating the required reports and statistical data
- Serving these results via different media systems through the institution on a multi-user environment
- Serving specific information via internet to the citizens

are aimed for the investigation, planning, implementation, and decision making divisions.

To achieve these goals, both bidder and contractor should perform a properly organized GIS management.

The feasibility study of the GIS project should be performed in order to determine the possible application phases and personal and material resources. Furthermore, time and cost estimation is very important in order to determine the budget of the project. On the contrary, GIS projects could be tendered with very limited budgets and takes the institutions away from their targets.

The properly performed project definitions will not only help institutions prepare realistic proposals but also, help them trace the project application phases easily. In addition, the estimation of the project management by the contractor would be more realistic. According to this, many GIS projects are tendered as consulting projects. The institutions are prepared to the tender according to the feasibility study, which is performed by the consulting company. The development and the implementation of the project should be tracked after the tender.

This presentation has been prepared in order to assist both in the project phases (formation/feasibility study, development, application) and preparation of "GIS project management template" which is required to manage the project for institutions. In addition, this presentation is thought to be a helpful document for assistance to the institutions that need GIS implementation, GIS consulting and contracting companies.

Some logical names like The Institution, GIS theme have been used in presentation. The Institution is used for bidder/administration/department/agency. GIS theme is used for the theme like Forest/Agriculture/Cadastre/Transportation in Geographic Information System.

A GIS project should be composed of the following topics at minimum:

- Introduction of the project
- Objective of the project
- Scope of the project
- Tasks of the project
- Resources of the project
- Time schedule

Some short explanations are provided below.

1 INTRODUCTION (sample)

The Institution is planning to build an integrated information system in order to access accurate and up-to-date data which is used in the activities of research, planning, management, control, and application units from the related resources.

For attaining these goals, the Institution will use the investments that have been made until today and will build an GIS theme Information System.

2 OBJECTIVE OF THE PROJECT (sample)

The Institution is planning to establish an Information System on a geographic base, to organize the data and information produced and used by the organization. This system is intended to serve the public by using Geographic Information Systems for providing communication, data sharing, and technological integration. The system should be designed to make improved and informed GIS theme decisions and perform GIS theme management services in the most efficient, fast and consistent way by using the resources of the Institution efficiently and economically.

The overall objectives for the project are to:

- Simplify Institution's business processes and increase the productivity of users by improvement and implementing functional practices
- Consider the users in determining the designing and implementing of the GIS theme
- Use the latest technology to allow users better access to the information and improved communication for decision-making.
- Develop products that can be easily utilized and distributed to a wide range of users.
- Improve standards and operations of automated data storage in order to ensure the accuracy, reliability, and currency of the data.
- Up-grade the skills of staff of The Institution through training and use of new technology.
- Create an organization that can manage and support the GIS theme environment.
- Display all kinds of information (inventory, personnel, equipment, project investments, budget, etc.) on maps.
- Improve the capability of the Institution to respond emergencies.
- Create a user-friendly information system decision-support system for the Institution which is accessible to all managers within the organization.

3 SCOPE OF THE PROJECT

In this part, the scope of project should be defined as follows

- The scale or boundary of project: The project can be implement to an institution, part of an institution, a wide area of organizations, inter organizations or country wide.
- Data quantity and quality: Data quantity means the number of sheets to be digitized, the photos or images to be compiled, the text documents to be collected. Data quality

means the type and structure of data like vector, raster, text, topological, or simple structured.

- Definition of the system usage (architecture): Single user or multi user, web based usage
- Summary of Software, Hardware and Network requirements.
- Summarize the service requirements
 - Software development
 - Data acquisition
 - Training

4 PROJECT MANAGEMENT (sample)

Project management is the process of planning, organizing, and managing **tasks** and **resources** to accomplish a defined objective, usually within constraints on time, resources, or cost.

A project plan can be simple, for example, a list of tasks and their start and finish dates written on a notepad. Or it can be complex, for example, thousands of tasks and resources and a project budget of millions of dollars.

While building a project plan, a project management tool can be used for calculating and creating a working schedule, based on information about the tasks to be done, the people who work on them, the equipment and supplies used to accomplish them, and the costs involved.

Microsoft Project is a powerful, flexible project management tool that can be used to control simple or complex projects. It helps scheduling and tracking of all activities. In this presentation, the MS Project has been used for generating a GIS management template.

4.1 MAJOR FACTORS OF A PROJECT

There are three main factors that shape every project;

- **Time:** The time to complete the project reflected in a project schedule.
- **Money:** The project budget, based on the cost of the resources: the people, equipment, and materials required to perform the tasks.
- **Scope:** The goals and tasks of the project and the work required to complete them

This trio of time, money, and scope is the project triangle. Changes in one of these elements affects the other two.

4.2 TASKS OF THE PROJECT

Task an activity that has a beginning and an end. The completion of a task is important for the completion of the project. Projects are made up of tasks.

Tasks are composed of phases, steps and sub-steps in turn in order.

In this sample template project composed of three phases.

- System development phase
- System realization phase
- System generalization phase.

4.2.1 First Phase - System Development

In this phase, the GIS activities in the region, the uses and users of the related information, existing organizational structures, functions and tasks, data resources, data structures, data processing, data storage (archive), data presentation, data update, revival of the system, related problems, bottlenecks and solution proposals should be evaluated within the framework of Geographic Information Systems.

This phase should be composed of steps and sub-steps as follows:

4.2.1.1 Project Planning

- Review of project documents
- Preparation of Project Organization
- Preparation of detailed project plan
- Preparation of Quality Plan
- Preparation of Configuration Management Plan
- Preparation of Training Plan
- Preparation of Risk Management Plan
- Preparation of Integration and Test Plan

4.2.1.2 System Analysis

- Beginning of Analysis
- Surveying general flow of the system
- Surveying of the data structure
- Preparation of the Problem/Requirement List
- Reviewing the system survey results together with user
- Preparation of the logical data flow
- Determination of follow up, control and safety (data security) requirements
- Combining user requirements
- Preparation of the data flow
- Preparation of required data structure
- Preparation of entity life history
- Preparation of Process Drafts
- Reviewing of the determined requirements together with the user

4.2.1.3 System Design

System design will follow the system analysis step. Data Design and Process Design steps will be followed in the GIS project.

4.2.1.3.1 Data Design

- Normalization
- Geographical data structure design
- Composite logical data structure design
- Preparation of Digital Geographical Information Standards
- Verification of Logical Data Design

4.2.1.3.2 Process Design

- Preparation of Geographical Data Base Questioning Process Drafts
- Preparation of geographical data base updating transaction drafts
- Preparation of the geographic analysis transaction drafts
- Preparation of Displaying Transaction Drafts
- Control of logical data model
- Preparation of drafts programs
- Geographical data base physical design
- Control of physical draft
- Preparation of the system plan

4.2.1.4 Training

- Project Management
- System Management
- System User
- Software Developer
- Base GIS Software Training

4.2.1.5 Reporting of First Phase Studies

In System Analysis step, organizational structure of the agency should be investigated in order to expose the existing work and data flows in detail. A “Problems and Requirements List” should be prepared by determining the problems in these flows.

In System Design step, data design, data production work schedule, process design and application software development work schedule should be exposed. Query, analysis, report and display process designs should be determined according to the “requirements /problems list” that has been prepared in System Analysis step.

4.2.2 Second Phase - System Realization for Pilot Area

Data should be produced properly according to the data base design and data production work schedule that has been exposed in System development process. Parallel to this process, application software should be developed according to process design and application software development work schedule.

This phase should be composed of the following:

4.2.2.1 Acquisition of Equipment for Pilot Area

- Hardware Acquisition for Pilot Area
- LAN/WAN Acquisition
- Software Acquisition

4.2.2.2 Data Acquisition for Pilot Area

- Data Acquisition
- Quality Control

4.2.2.3 Software Development

- Geodatabase
- GIS Functions
- Process Automation
- MIS (Personnel and Material Inventory, Financial)
- Project Monitoring

4.2.2.4 System Testing

- Functional Test
- Application Test
- Communication Test
- Preparation of the Users Manuals

4.2.2.5 Training

- Database Management Training
- System Application Training

4.2.2.6 Reporting

- Implementation Report

4.2.3 Third Phase - System Generalization for Whole Area

The system which has been designed to meet all the requirements, the software which has been developed and tested in a pilot area should be generalized to whole project area.

This phase should be composed of as follow;

- Software Acquisition for Whole Project
- Hardware Acquisition for Whole Project
- Data Acquisition for the Whole Area
- Training
- System Implementation for the Whole Area

4.3 RESOURCES OF A GIS PROJECT

Resources are the people, equipment and material used to complete tasks in a project.

4.3.1 Personnel (Staff)

- Project Manager
- Quality Coordinator
- Software Team Leader
- Application Team Leader
- Data Acquisition team Leader
- Education Team Leader
- IT Expert
- System Analyst
- Database Expert
- GIS Expert
- Software Developer
- Data Operator
- Local Consultant
- Foreign Consultant
- Instructor
- Support Engineer

4.3.2 Hardware

- Server
- Jukebox
- CD RW
- Network equipment
- Computer
- Printer
- A0 Scanner
- A1 Digitizer

- A0 Plotter(color)

4.3.3 Software

- Software ArcSDE
- Software ArcEditor (1st licence)
- Software ArcEditor (2-10th licence)
- Software ArcEditor (11-20th licence)
- Software ArcEditor (21-50th licence)
- Software ArcView (1st licence)
- Software ArcView (2-10th licence)
- Software ArcView (11-20th licence)
- Software ArcView (21-50th licence)
- Software ArcView (51th+ licence)
- Software SpatialAnalyst (1st licence)
- SoftwareSpatialAnalyst (2-10th licence)
- Software SpatialAnalyst (11-20th licence)
- Software SpatialAnalyst (21-50th licence)
- Software 3D Analyst (1st licence)
- Software 3D Analyst (2-10th licence)
- Software 3D Analyst (11-20th licence)
- Software 3D Analyst (21-50th licence)
- Software GeoStatistical Analyst (1st licence)
- Software GeoStatistical Analyst (2-10st licence)
- Software GeoStatistical Analyst (11-20st licence)
- Software GeoStatistical Analyst (21-50st licence)
- Software ArcIMS
- Software ArcGIS Universty Lab Kit

4.3.4 Services

- Data Integration (per sheet)
- Data Acquisition (per sheet)
- Project Management Training
- System Management Training
- User Training
- Software Development Training
- Database Management Training
- System Application Training

5 A GIS PROJECT TEMPLATE

A sample Microsoft Project Document has been prepared.

- All GIS project tasks are defined and some explanations are given specially for system analysis and design studies in order to clarify “Who” does “What” and “How” in each step.
- Resources are defined in resource sheets.
- All resources are assigned to each task
- Duration time is estimated for each step.
- Standart rate cost for workers and cost per use for material are estimated

Some sample screen copies from MS project document are provided below:

Microsoft Project - GIS project Template

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Task List Summary: \$2,658,870

WBS	Task Name	Cost	Duration	Resource Names
1	1 GIS Project	\$2,658,870	348 days?	
2	1.1 First Phase (System Development)	\$655,425	198 days?	
3	1.1.1 Project Planning	\$14,100	12 days?	
4	1.1.1.1 Review of project documents	\$1,350	1 day?	Project Manager;Data Acquisition team Leader;Software Team Leader;Applicatio
5	1.1.1.2 Preparation of Project Organization	\$1,350	1 day?	Project Manager;Data Acquisition team Leader;Software Team Leader;Applicatio
6	1.1.1.3 Preparation of detailed project plan	\$2,700	2 days	Project Manager;Data Acquisition team Leader;Software Team Leader;Applicatio
7	1.1.1.4 Preparation of Quality Plan	\$1,200	2 days	Project Manager;Quality Coordinator
8	1.1.1.5 Preparation of Configuration Managemen	\$3,100	2 days	Project Manager;Data Acquisition team Leader;Software Team Leader;Applicatio
9	1.1.1.6 Preparation of Training Plan	\$700	1 day?	Project Manager;Education Team Leader
10	1.1.1.7 Preparation of Risk Management Plan	\$600	1 day?	Project Manager;Quality Coordinator
11	1.1.1.8 Preparation of Entegration and Test Plan	\$3,100	2 days	Project Manager;Data Acquisition team Leader;Software Team Leader;Applicatio
12	1.1.2 System Analysis	\$253,725	90 days	
13	1.1.2.1 Beginning of Analysis	\$25,600	8 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
14	1.1.2.2 general flow of the system	\$80,000	25 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
15	1.1.2.3 of the data structure	\$80,000	25 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
16	1.1.2.4 h of the Problem/Requirement	\$3,200	1 day	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
17	1.1.2.5 the system survey results to	\$4,300	2 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
18	1.1.2.6 Preparation of the logical data flow	\$4,300	2 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
19	1.1.2.7 Determination of follow up, control and	\$4,850	2 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
20	1.1.2.8 Combining user requirments	\$2,025	2 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
21	1.1.2.9 Preparation of the data flow	\$12,900	6 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
22	1.1.2.10 Preparation of reqired data structure	\$12,900	6 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
23	1.1.2.11 Preparation of entity life history	\$6,450	3 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
24	1.1.2.12 Preparation of Process Drafts	\$6,450	3 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
25	1.1.2.13 Reviewing of the determined requireme	\$10,750	5 days	Project Manager;System Anayst[4];Software Developer[2];Software Team Lea
26	1.1.3 System Design	\$311,100	98 days	
27	1.1.3.1 Data Design	\$144,500	65 days	
28	1.1.3.1.1 Normalization	\$25,500	15 days	Project Manager[0.5];Software Team Leader[0.5];Database Expert;Software Dev
29	1.1.3.1.2 Geographical data structure design	\$51,000	30 days	Project Manager[0.5];Software Team Leader[0.5];Database Expert;Software Dev
30	1.1.3.1.3 Conceptual logical data structure de	\$68,000	30 days	Project Manager[0.5];Software Team Leader[0.5];Database Expert;Software Dev

Notes: 'At this step, the user's establishment will be studied, information obtained so far will be compiled, system boundaries and areas that need special research will be determined.'

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Microsoft Project - GIS project Template

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All Resources

	Resource Name	standard Rate	Cost Per Use	Group
1	Project Manager	\$400/day	\$0	staff
2	Quality Coordinator	\$200/day	\$0	staff
3	Software Team Leader	\$350/day	\$0	staff
4	Application Team Leader	\$300/day	\$0	staff
5	Data Acquisition team Leader	\$300/day	\$0	staff
6	Education Team Leader	\$300/day	\$0	staff
7	IT Expert	\$300/day	\$0	staff
8	System Analyst	\$250/day	\$0	staff
9	Database Expert	\$350/day	\$0	staff
10	GIS Expert	\$250/day	\$0	staff
11	Software Developer	\$300/day	\$0	staff
12	Data Operator	\$150/day	\$0	staff
13	Local Consultant	\$250/day	\$0	staff
14	Foreign Consultant	\$500/day	\$0	staff
15	Instructor	\$250/day	\$0	staff
16	Support Engineer	\$250/day	\$0	staff
17	Server	\$0/hr	\$15,000	Hardware
18	jukebox	\$0/hr	\$20,000	Hardware
19	CD RW	\$0/hr	\$1,200	Hardware
20	network equipment	\$0/hr	\$3,000	Hardware
21	Computer	\$0/hr	\$2,000	Hardware
22	printer	\$0/hr	\$1,200	Hardware
23	A0 Scanner	\$0/hr	\$20,000	Hardware
24	A1 Digitizer	\$0/hr	\$3,500	Hardware
25	A0 Plotter(color)	\$0/hr	\$10,000	Hardware
26	Project Management	\$0/hr	\$10,000	Training
27	System Management	\$0/hr	\$10,000	Training
28	User	\$0/hr	\$10,000	Training
29	Software Development	\$0/hr	\$10,000	Training
30	Database Management Trainin	\$0/hr	\$10,000	Training

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Microsoft Project - GIS project Template

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All Resources

	Resource Name	Detail
	Process Automation	Work
	MIS (Personnel and Material Inventory, Financial)	Work
	Project Monitoring	Work
	Functional Test	Work
	Application Test	Work
	Communication Test	Work
	Implementation Report	Work
2	Quality Coordinator	Work
	Preparation of Quality Plan	Work
	Preparation of Configuration Management Plan	Work
	Preparation of Risk Management Plan	Work
	Preparation of Integration and Test Plan	Work
	Reporting for First Phase	Work
	Implementation Report	Work
3	Software Team Leader	Work
	Review of project documents	Work
	Preparation of Project Organization	Work
	Preparation of detailed project plan	Work
	Preparation of Configuration Management Plan	Work
	Preparation of Integration and Test Plan	Work
	Beginning of Analysis	Work
	Surveying general flow of the system	Work
	Surveying of the data structure	Work
	Preparation of the Problem/Requirement List	Work
	Reviewing the system survey results together with user	Work
	Preparation of the logical data flow	Work
	Determination of follow up, control and safety (data security) requirements	Work
	Combining user requirements	Work
	Preparation of the data flow	Work
	Preparation of project data structure	Work

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6 CONCLUSION

Three basic factors (time, resource cost and scope (task)) play an important role in project management system. Not only the determination of time and budget, but also determination of the phases in detail are required, in order to be successful in project management. In addition, appropriate time estimation for these processes and the suitable assignment of the resources which is going to be used in the project phases should be considered.

Application phases (tasks) of a GIS project are estimated in details with this presentation, application phases are explained and possible sources are not only estimated but also assigned in each step. In order to perform a cost analysis, approximate cost values are used to implement the budget of the project.

This template is evaluated as it could be used in not only for planning and preparing proposal phases of a GIS project, but also in project management phases. The task and resource parameters are estimated as they could possibly be constant in general. On the contrary, duration and resource cost parameters are estimated as they could be variable.