

PROJECT EXECUTION AND MANAGEMENT IN DIGITAL ENVIRONMENT

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1. Introduction

The range of Surveying and mapping tools is expanding rapidly as a result of technological development in the field of computing, visualization, telecommunication, database, navigation and point positioning systems, satellite technology and image processing.. These new integrated tools and techniques are either replacing or complementing established technologies in project execution and management in digital environment. Their actual and potential capacity for serving the user community is revolutionizing traditional disciplines.

Surveying and mapping organisations as well as all tiers of Government need qualified personnel to manage transition from existing to new and integrated technologies to meet growing demand for geoinformation, As federal, State and Local Government are increasing calling on the private sector to take up delivery of services, it is imperative that information needed to support those activities must be identified where it exists and be made widely available in a known consistent manner.

The basis of business is information. Successful organizations are the ones that most efficiently manage information. Data must be stored, organized and accessed quickly with minimum effort. Much, if not all the data involved is spatial in nature and geographic information system is the very technology to handle such data. The social demand for geographic information products such as up --to – date map is growing rapidly. This is caused by pressure of Urbanization, Resource exploitation and management, the development of agriculture, protection of the environment, the need for security and political stability. At the same time planning and decision making process have become more and more complex and increasingly decentralized. This requires more, faster, accurate and specific geographical information. The essence of GIS is to build a powerful decision – support - system which will increase the ability of decision makers at all level to analyse data widely and take vital decisions to guarantee efficient resource allocation, promote domestic prosperity and ensure sustainable development.

2. Hardware and Software Requirement for Project Execution and Management

Significant advancement have taken place in the development of computer hardware and software for different applications. This will have an impact in the way data is collected and the speed at which it is processed. It is advisable to consider the following points when considering the hardware and software requirement for project execution and management.

- Provide an overview of the current GIS structure and organisation e.g one might include the number of users, Geographic dispersion of GIS services, Application

equipment, software, security network infrastructure, network management helpdesk and network service level.

- Ability to carry out wide range of applications in field of mapping, such as remote sensing, cartographic and complete digital mapping tasks.
- User friendly and flexible in use

2. 1. Hardware and Software for Ground Surveys

i. Global Positioning System: There are different types of GPS hardware and associated software in the market. In this passage we will examine some very common ones.

- **TOPCON HiPer (Integrated GPS):** This is a high performance static GPS RTK surveying system fully integrated. The Antenna, the receiver and rechargeable batteries are neatly packed inside the rugged, compact housing. Some special features include
 - 40 universal channels that can each track all signals of either L1 or L2 GPS frequencies
 - Multipart mitigation and coop tracking making the best low signal strength recognition
 - Streamlined RTK operation with integrated rover radio card

- **Trimble 5700 – Real-Time GPS Monitoring System:**

This system has the following components

- Condor's 3D Tracker software
- Trimble's 5700 CORS receiver
- Zephyr Geodetic GPS Antenna

This system can also be used to monitor civil structures and landforms that have the potential to move, for example dams, bridges, oil platforms, power facilities, volcanoes and landslides.

- **ProMark 2 from Thales Navigation, USA:**

This GPS with kinematic capabilities and on-board maps has

- 2 Promark 2 receivers
- 2 survey-grade antenna w/ cables
- 2 field brackets
- 2 carry cases
- 1 copy of Astech Solutions L1 software
- 1 download cradle

The static survey performance accuracies are

- Horizontal: 0.005m + 1 ppm
- Vertical: 0.010m + 2 ppm
- Azimuth: < 1 arcsecond

The Real-Time Performance with WAAS accuracies are

- Horizontal: < 3m (10 ft) w/Astech ProAntenna
5m (16.5ft) w/internal antenna

- **Thales Navigation's 6500 GPS Series:**
This system is mostly for control surveys and it uses a real-time dual frequency 6502 SK/MK. It also has integrated radio and LRK™ technology which guarantees maximum availability of 3D centimetric accuracy.
- **SOKKIA Radian GPS System:**
This is a comprehensive high accurate GPS consisting of
- **GARMIN 111 Plus Hand Held GPS receiver:** With Atlantic Internal database
Lanyard, Vectro mount and quick reference guide
- **SOKKIA GSR 260 L1/L2 High – Accuracy GPS System**
This GPS system has the following key properties
 - Front panel LCD display with easy interface keypad
 - Millimeter accuracies for the most demanding survey projects
 - RTK and post – processed capable for flexibility
 - Compatible with a range of data collection packages.

ii. Total Stations: Another important hardware required for projection execution in project execution in digital environment is the total station. This is particularly useful in ground survey projects. There are a number of features to consider when purchasing a total station. These include

- Accuracy of angular and distance measurement and robustness for field handling
- A good control panel and an indicator for measuring the height of instrument
- Range of dual axis compensation
- Maximum range with reflectors and without reflectors
- Measuring time
- Data storage capacity
- Etc.

There are so many total stations in the market. One should be able to select instruments that will guarantee successful execution of different mapping projects. We will list here some popular stations from where one can select.

- a) **Leica Geosystems:** Lieca Geosystems has a number of total stations. The Prominent ones are
TPS 1100, TPS 700, TPS 1000/2000 series
- b) **Nikon:** Nikon systems include **DTM 801, NPL 821, DTM 502, DTM 352/332 NPL 352/332**
- c) **PENTAX :** **R –323,333, R 315, R 326**
- d) **SOKKIA:** **SET 1030R3, SET2030R3, 3030R3.** These series were introduced this year and are the most modern.
- e) **TOPCON GTS223, GTS-225, GTS-226, GTS-229,** introduced into the market

in September, 2000

f) **TRIMBLE 3600DR, 5600IR, 5600DR**, all introduced into the market in 2001.

Most of the Total Stations have advanced onboard capabilities with Standard Survey Software for different applications

2. 2. GIS Hardware and Software Requirement

- i) **Hardware Requirement:** Project execution in digital environment will require the availability of standard GIS Hardware. These include Digitizer, such Calcomp Digitizer, Scanners and digital plotters. Well configured Computer Unit – Stand – Alone or Network System (See MCPD Study manual Part II)
- ii) **Software Requirement:** There are many GIS and DIP software in the market. It is vital to have good software that will facilitate execution and management of projects. These may include ArcView GIS, ArcInfo, Autocard 15.1, ER Mapper, IDRIS, DBASE IV (See MCPD Study Manual Part II)

3. Personnel Requirement

The availability of well trained and experienced manpower is very crucial in any organization in this digital era. For example development and implementation of a successful GIS project will require specialists with broad experience and knowledge in digital data acquisition, processing and management as well as good knowledge of hardware and software systems. Therefore to meet this requirement, training and retraining programme will be needed. The training should be focused on different levels of personnel

- Policy makers may require short intensive training in the fundamental aspect of Digital mapping techniques.
- Professional staff should from time to time undergo retraining to broadening their Outlook and keep in touch with current trends.

4. Digital Approach to Project Execution

Before embarking on such projects, one needs to have very good knowledge of the projects and what it entails. The following questions should be considered

- i) What is the extent of the project ?
- ii) What are possible methods of successfully handling the projects?
- iii) What is the required accuracy ?
- iv) What are the hardware and software requirements
- v) What are the sources of primary and secondary data-sets
- vi) Are there trained personnel to execute the projects ?
- vii) What are the sources of funding ?
- viii) What will the final product to the client look like ?
- ix) Etc

A review of the above questions and more will enable the analyst plan for the project, acquire the required hardware and software and subsequently execute the project

successfully

5. Project Documentation and Management

One technique for determining whether an investment is worthwhile is cost-benefit analysis. This may be described as a quantitative analysis of the output (i.e the benefits) with the input (costs) of a particular course of action. It is a general economic tool for organizing and assisting in evaluation of information required in decision making process. The following issues must be considered for an effective project management:

- Indication of the clients objective
- Development and preparation of the brief
- Preparation of an option/feasibility study
- Execute a risk analysis exercise
- Establish and manage integrated information system
- Select the appropriate procurement strategy
- Device the pr-contract control systems and execute a value analysis exercise
- Coordinate planning permission and other statutory consents
- Conduct tenders evaluation and select contractors
- Establish the post contract time, cost and quality control and management systems
- Carry out cost analysis

Conclusion

Digital technology makes possible a wide range of opportunities in the capture, handling and presentation of geo-information. Project execution in this modern era requires ability to handle digital data capture processing and management. The knowledge of Geographic Information Systems is sine qua non in project management, because it provides the ability to analyse the organizational workflow, recognize and define the new information products needed in an organization.

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