The Use of GIS by Surveyors and Engineers in Developing Nations for Building Infrastructure

Overview

Definitions
Stakeholders
Infrastructure Development Process
- Existing Situation
- State of Technology
Infrastructure Operations
Opportunities
- SDI – Spatial Data Infrastructure

Definitions

Infrastructure – Services and facilities that support day to day economic activity.

Infrastructure includes:
- Roads
- Electricity
- Water
- Communication systems

Transportation networks
- Schools
- Hospitals
- Others

Stakeholders in Data

Geospatial Data
- SDI
- Land Ministry
- Survey
- Natural Resources
- Environmental Management
- Land Title
- Transportation
- Utilities
- NGO
- Infrastructure Managers
- Others

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Users of Geospatial Data for Infrastructure Development

- Planners
- Surveyors
- Engineers
- Contractors
- Construction Managers
- Construction Surveyors
- Infrastructure Managers

Planning

- Data Acquisition
- Data Management
- Large Scale Data Capture
  - Photogrammetry
  - Satellite Imagery
  - Cadastral Data
- Land Use – Existing
- Land Use – Planned
- Data Delivered on Paper Maps
- GIS Users

Analysis

- Planning
- Engineering Analysis
- Ad hoc Calculations
- Cost Analysis
- Risk Analysis
- Text files, maps and CAD
- PCs, Standalone Analysis Software

Survey

- Location
- Small Scale Photogrammetry
- Detailed Inventory
- Precise Information Acquisition
- Boundary/Cadastral Survey
- Text and CAD files
- Field books, Data collectors, GPS, PCs

Analysis

- Planning
- Engineering Analysis
- Ad hoc Calculations
- Cost Analysis
- Risk Analysis
- Text files, maps and CAD
- PCs, Standalone Analysis Software

Design

- Facility Design
- Drafting
- Risk Analysis
- Modeling
- Simulation
- Mitigation
- Layout
- Specifications
- Quantities
- Construction Drawings
- Text files, maps and CAD files
- PCs, add-on to CAD software

Construction

- Specifications
- Drawings
- Financial Analysis
- Change Orders
- Revisions
- Quantities
- Maps, text and CAD files
- PCs, Lasers, GPS, Machine Control
Asbuilt Process

- Drawings
- Revisions
- Quantities
- Operations Data

Maps, text and CAD files
Lasers, GPS, Machine Control, Field books, Data collectors, GPS

Operations

- Outage Analysis
- Traffic Management
- Facility Management
- Asset Management
- Regulatory Reporting
- Risk Analysis
- Emergency Management
- Customer Service
- Document Management
Maps, text and CAD files
Connection to Other Systems
GIS Users

Infrastructure Development Process - Existing

Planning | Survey | Analysis | Design | Construction | Asbuilt | Operations

GIS

Infrastructure Development Process - Revised

Design | Construction | Asbuilt | Operations | GIS
GIS
New Facilities | Planning | Survey

Benefits

- Eliminate Redundant Data
- Eliminate Cost of Data Conversions
- Reduce Risk
- Data Collected Contributes to SDI

SDI – Spatial Data Infrastructure

Planning Data
Geodetic Control
Cadastral
Collect Once
Use Many
Manage Better
Conclusions

Infrastructure Data Continuum
Minimize Errors
Improve Operations
  Better Data – Better Operational Decisions
Less Training
Less Software
Single Repository
Lower Total Cost of Ownership
SDI

Collect Once
Use Many
Manage Better