Enterprise GeoSpatial Data and Decision Information for Defense

Risk Management
Disaster Recovery
Security
Networks and Business

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What’s This All About?

GIS ENTERPRISE

- Document Imaging
- Geographic Database
- Digital Imagery
- Decision Making
Contents: Enterprise GIS

- Understanding
- Components
- Applications
- Case Studies
- Summary
Today GIS is used to show a map and layer information to allow visualization of the physical relationship of objects for operational decision making.

Tomorrow GIS will be used to monitor "real time" operations and the ability to forecast future business impacts for proactive decision making.
UNDERSTANDING Enterprise GIS

- ASSOCIATES Digital Data with Coordinate Network
- LAYERS Multiple Type and Sources of Data
- FORMS a Composite View
- Provides VISUAL Analysis in Real Time
- Allows Evaluation of WHAT-IF Scenarios
- MITIGATES Risk and MINIMIZES Disruption/Impact by Achieving Maximum Theatre Efficiency/Effectiveness — through Preparation & Emergency Response Capability
Views of Enterprise GIS
Enterprise GIS
Integrates All Types of Data...

Geography is a “key.”

Vehicle locations
Weather information
Roads/Infrastructure
Land use/Land cover
Raster imagery
Environment
Basemaps

Forming collections of data to create information and knowledge ...
Services Oriented Architecture (SOA)

Provides a Framework for Integrating GIS and Enterprise Systems

Net Services & Messaging

- Roads
- Critical Infrastructure
- Buildings
- Business Applications
- Police
- Defense/Intel

... Open, Flexible and Standards Based
Enterprise GIS Components

- **GIS Web Clients**
  - Smart Phone
  - Pocket PCs
  - Tablets

- **GIS Desktops**
  - Open GIS Network
    - TCP/IP, HTTP, XML
  - Open DBs
    - Info
    - Editing
    - Viewing
    - Reading

- **GIS Servers**
  - GIS Developer Tools
    - Programs
    - Map Objects
  - SQL Server
  - + DBs

- **Location-Based Services/Mobile/Wireless**
  - .NET Web Services
  - Internet
Global Enterprise GIS
Enterprise GIS APPLICATIONS

- Risk Management
- Disaster Recovery
- Security
- Networks and Business
RISK MANAGEMENT

Executive Decision Making

“Real Time”

Composite Global and Specific Data AND Dissimilar-Integrated Databases

Data and Databases
- Consistency
- Maintenance
- Consolidation
- Ergonomic Presentation

Enterprise GIS Application

Continuous Information Flow
DISASTER RECOVERY

1st Part of DOING
- Operations
- Plans
- Emergency Situations

E-GIS

Models
- Events/Circumstances
- In REAL TIME with Timely Data

Visualizes
- Event Impact
- Contingency Plan Response

Enterprise GIS Application
SECURITY

Enterprise GIS Application

Supports:
- Risk Assessments
- Planning/Response Options
- Preparedness
- Response/Recovery

Prepares
- Data and Information Analysis for Confronting
  - Individual and Corporate/Agency Threats

Results in
- Balance
  - of User Convenience and Organizational Security
NETWORKS and BUSINESS

Automated Presentation
• Analytical Tools for Network Architecture and Business Process

Expands
• Decision-Making Perspectives

Provides
• Cross-Functional Unity of Process Technology and Continuous Operations

Enterprise GIS Application
Enterprise GIS CASE STUDIES

1. FORCEnet

2. Enterprise GIS in the Deep Sea
FORCEnet

"FORCEnet is the operational construct and architectural framework for Naval Warfare in the Information Age which integrates WARRIORS, sensors, networks, command and control, platforms and weapons into a networked, distributed combat force, scalable across the spectrum of conflict from seabed to space and sea to land".*

*CNO's Strategic Study Group - XXI definition from 22 July 02 CNO Briefing

FORCEnet was introduced as part of the Naval Transformation Roadmap, called Sea Power 21
GIS’s role in FORCEnet

- GIS desktop software provides 3D real time visualization for the COP (Common Operating Picture) so “everyone” has the same picture.

Case Study 1

Joint Operating Picture powered by Enterprise GIS

Field Teams and their charts/PDA

Aircraft Carrier CIC room

Command Post
Enterprise GIS Role in FORCEnet

Provides the technical infrastructure/framework for distributing “real-time” command and control data; people interface, computer to computer, sensor to computer, etc.
ENTERPRISE GIS FORCENET
USN - USAF C4ISR INTEGRATION

Case Study 1
Enterprise GIS in the Deep Sea

- This case study outlines a true event in which Enterprise GIS provided critical “real time” support for a deep sea search-and-recovery mission
Situation

- GIS became a critical component of a search-and-recovery mission in the deep sea, 3 miles down, at the H2O seafloor observatory site in October 2003
Case Study 2

Graphic of H2O Site

Research at the H2O Observatory sponsored by the U. S. National Science Foundation
Operational Situation

- While being lowered to the bottom of the ocean, the junction box broke loose
GIS Solution #1

- **Dive** ROV Jason II and visualize the track with GIS
- Add up to **60M swath** to indicate **sonar range**
- **Drive** Jason II for 100% swath coverage of the search area
From previous dives at H2O, we already had entered positions of known targets (e.g. fixed instruments on the seafloor) into a GIS.

During the search-and-recovery mission, we manually entered the ROV’s LBL position into a data table every 5 minutes and updated a 30- to 50-m buffer around the trackline.
GIS Solution Results #1

Composite visual of swaths and various bottom targets at H2O site
GIS Solution Results #2

- “real time” visual and sonar sensor coverage was readily available for “real time” search decisions
- The junction box was found
Case Study 2

Positive Results from Implementation of GIS in Real Time for Deep Sea #1

- Ability to visualize Jason II’s track, adding sensor’s coverage; critical for “real time” decision making
  - Prevented redundancy and overlap during the search
  - Allowed for adjustments in driving the vehicle to prevent gaps in search pattern
  - Allowed for timely search decisions and saved time
Case Study 2

Added Value of Enterprise GIS for Deep Sea #2

- Collaboration between the Scientific and Jason II Operational teams
- Integration of data sets from 1998 to 2003 for the H2O research site
- Collaboration between geologists and biologists, utilizing multi-disciplinary data
Impacts of Deep Sea Case Study

- For the GIS operational community, this solution appears simple and basic, however, for the scientists, this was a “huge” experience of the value of GIS and real time examples of how Enterprise GIS can help them in their work.

- The result and impact of this understanding:
  - GIS continuance for supporting the H2O site
  - multiple funding submissions into NSF for “GIS” projects for 2005 and beyond
  - expansion of GIS usage into multi-year, international research sites as the foundation framework for data distribution and usage
  - Buy-in and support of GIS by Scientists
Deep Sea Case Study
Summary and Future Insight

“We anticipate that GIS will become a very important and commonly-used tool on research cruises in the future. Quickly integrating and displaying data for navigation, bathymetry, images and observations of the seafloor will be critical for efficient use of ship-time at deep-sea observatories planned by the international oceanographic community.”

Dr. Stace Beaulieu, Research Specialist, Woods Hole Oceanographic Institution
Enterprise GIS (GeoSpatial Information Systems) technology is about associating data with a coordinate system in order to layer multiple types and sources of data, and form a composite view for decision making. The ability to layer data for visual analysis is very insightful and represents a new “overall-enterprise” capability for business and military operations. This analysis allows evaluation of complete defense operations, and also forecasts, or “tests,” what-if scenarios critical for immediate executive actions. The business impact is the ability to plan and prepare for events and uncertainties. The defense result is the risk mitigation and/or managing of disruptions to minimize impact, and achieve maximum efficiency and effectiveness in any defense theatre.

In summary, Enterprise GeoSpatial Data and Decision Information Systems for Defense technology provide a common and collaborative “thinking” and “actual” framework for business and military operations to prepare, plan and provide, and react to the continuous, day-to-day, operational situations, in our increasingly uncertain world.
SUMMARY: Enterprise GIS

It IS the Future
We ALL will be involved, day-to-day
Some of us are already the Power Curve

Thank you and Regards
Comments? Questions?