Joint Geospatial Enterprise Services - Science and Technology Program

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Abstract

Today's C4ISR systems contain very limited geospatial capabilities that are disconnected from emerging net-centric geospatial technologies and databases. Future battle command and ISR services (i.e., Future Combat System, Distributed Common Ground System--Army) require timely, relevant, accurate terrain situational awareness. A Joint Geospatial Enterprise Services (JGES) capability is required to enable a dynamic, tailorable User-Defined Operational Picture, Situational Awareness, and decision aids.

The JGES Science and Technology (S&T) program is establishing a initial net-centric geospatial architecture to enable critical development of geospatial services and provide an early transition of emerging technologies and C4ISR net-centric services; partner with industry to enhance commercial GIS technology to support complex operational needs and gaps; and collaborate with joint network architectures and C4ISR services (including emerging Army tactical C4ISR net-centric architectures).

This paper will discuss the JGES S&T Spiral 2 effort, JGES Spiral 3 and beyond experimentation, and how ESRI technology is being leveraged to meet these requirements.

Body

Introduction

Profound changes in science and technology are enabling our Soldiers with better tools to accomplish their missions, yet in the constantly evolving world of geospatial services operating within a net-centric environment, the volume of programs, platforms, and formats are endless. To better enable our Soldiers to navigate this complex environment, the U.S. Army Engineer Research and Development Center's, Topographic Engineering Center (ERDC-TEC) developed a test bed with Joint Geospatial Enterprise Services (JGES) capabilities to build a bridge between the warfighter, the command center, and at the national level of the National Geospatial-Intelligence Agency.

Mission/Overview

ERDC-TEC manages the JGES S&T program for testing, evaluation and experimentation of critical geospatial services and to make needed architecture a reality in the net-centric environment. The JGES-S&T program promotes the use of geospatial technologies to allow data management, collection, exploitation, visualization and dissemination of geospatial data/information from any available national or tactical source. It provides a dynamic, customizable common operational picture and tactical decision aids to allow

rapid analysis and situational awareness based upon the best available information across the network, especially from Soldiers on the ground.

A driving force behind the JGES-S&T program is assisting in spiraling technologies to the field more quickly. The JGES-S&T program focuses on creating geospatial net-centric services built to fit within the structure of different architectures. Therefore, the JGES-S&T concept was created to partner with other DoD agencies, federal agencies, private industries and academia to develop and influence geospatial standards, policies and procedures.

Capabilities

The initial technology focus areas for the JGES-S&T program in spiral one included: Soldier as sensor using mobile GIS technology; discovery services using metadata portal concepts; high-resolution sensor exploitation; geo-database synchronization; spatially and temporally explicit link analysis; terrain reasoning services; and 3-D terrain visualization. It leveraged commercial and government-off-the-shelf technology. Through the use of five operational vignettes, spiral one demonstrated the need of net-centric geospatial services for current and future battle command systems to many high-level military decision-makers.

Spiral two, built upon lessons learned and building blocks in spiral one, includes: integration of the Striker Brigade database stored in ArcSDE and populated through an ArcGIS Server application; custom-developed synchronization software, interest management and alerts services; hosting a Defense Geospatial Intelligence Network (DGINet) site serving TEC-generated Urban Tactical Planner, Water Resources Data Base, and terrain reasoning services; additional terrain reasoning services; use of temporal geospatial information and tracking to observe patterns; various live feeds into the user-defined operational picture; enhanced data entry, data synchronization and interest management on handhelds; and further prototyping of Force XXI Battle Command, Brigade-and-Below-like capabilities.

Spiral three will focus on the experimentation of ArcGIS 9.2 functionality in support of enterprise GIS at different echelons. Specific functionality will include synchronization, mobile application developer framework, ArcGIS Explorer, file format deployment (file-based Geodatabase, personal ArcSDE …), Image Server, Network Analyst, and Tracking Server. Spiral three will also focus on understanding the "goodness" of geospatial data, information, and knowledge in the Commander's decision making process through experimentation and evaluation.

Benefits

The JGES-S&T program will continue to evolve and provide an environment and open architecture:

- In which geospatial technologies can be integrated while supporting research and development efforts
- Identify GES gaps and focus future research efforts to address these gaps
- Supporting transition of GES technologies to Programs of Record (POR) and continuing support for POR and others on a reimbursable basis.
- To integrate, experiment, analyze, evaluate and demonstrate with various DoD research centers, industry and academia GES technologies.
- Develop, prototype and evaluate new geospatial concepts and services
- To understand the "goodness" of geospatial information and how it affects the Commander's decision making process
- Greatly improve data/information access
- Avoid costs associated with redundant databases
- Foster data reuse

Summary

The JGES S&T program was created to better enable horizontal integration while providing a test bed for research which supports our Soldiers. ERDC-TEC Director Robert Burkhardt concluded, "As the program continues to develop and mature, it will provide better solutions for the GIS needs of the commander and warfighter, further enabling every Soldier as a sensor, and empowering our Army in its missions."

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