

GEOSPATIAL SUPPORT FOR JOINT FORCES INSTALLATION MANAGEMENT

Gerry Galloway

ABSTRACT

This paper will explore geospatial information and service opportunities created by shifting from single to joint service installation management. Current initiatives, such as Strategic Sourcing, 2005 Base Realignment and Closure (BRAC), and improved Installation and Warfighter efficiency, are intended to privatize non-core activities, increase joint services activity and co-location, and eliminate excess physical capacity. 2005 BRAC will increase the emphasis on GIS through the widespread development of Installation Visualization Tool (IVT) data layers. Combined with Common Installation Picture (CIP) development through the USAF Strategic GeoBase program, most DOD installations will have basic geospatial data. The development of data, however, does not necessarily improve the efficiency of installation management or result in government cost savings. This paper presumes that the growing opportunities for GIS within the installation management arena are going to be found in the integration of geospatial technologies and data into the existing information infrastructure and business processes required to support efficient installation management.

21st Century Installations Will Be Different

The next decade will see significant transformation of the nation's military forces as the Department of Defense (DOD) and the services work to develop organizations suited to meet the changing world environment of the 21st Century. While this transformation will be seen more rapidly in the organization and weapons systems of the military forces, it will also carry over to the structure of the installations that they occupy in the United States and overseas. Installations will transform in parallel with the forces with a goal of freeing combat commanders from the burden of managing facilities and passing this task to organizations that are specifically tailored to carry out installation management. This will improve the business efficiency of a major cost sector in the DOD – facility sustainment. The effective use of geospatial information and the integration of that information into the installation command and control structure will be a critical component of this move to 21st Century installations and their efficient management. To carry out his installation transformation, the Office of the Secretary of Defense (OSD) and the services have already launched several initiatives that will assist in the effort. This paper explores the opportunities for insertion of geospatial technologies and organizations into the transitioning management of these future installations.

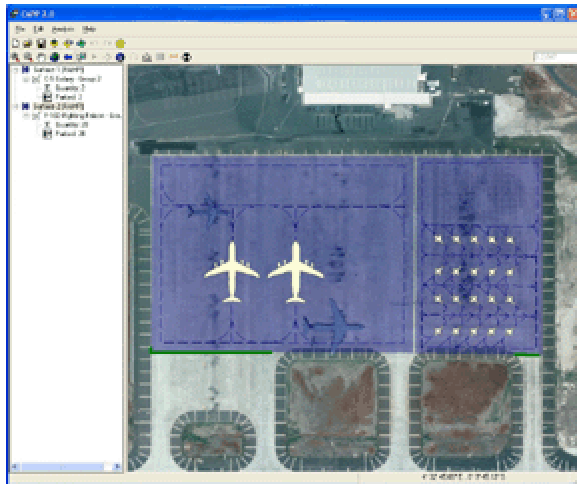
Military Installations as Businesses

Over \$19 billion in the defense budget in Fiscal Year 2004 was initially focused on facility sustainment, environmental restoration and improvement, and new construction in support of military installations worldwide. (Reprogramming to support operations in Iraq and Afghanistan dramatically reduced that number as the fiscal year progressed). Military installations provide work areas for nearly 1.4 million personnel and include, for the active forces, their 'living' spaces and all of the support needed to properly feed, house, and support the logistical, and morale and welfare needs of these forces and, in most case, their families. It is big business and is treated as such within DOD.

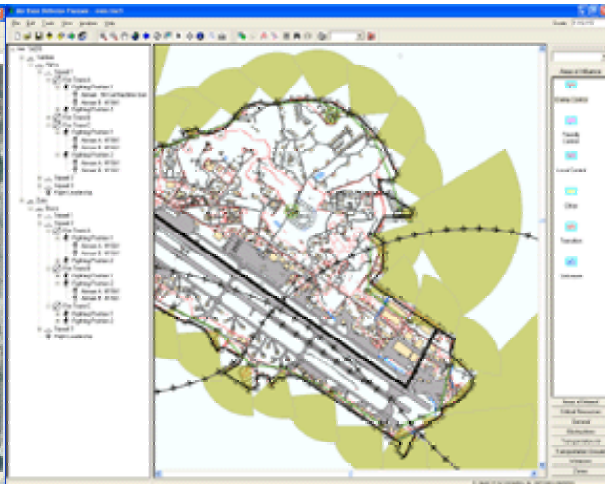
While management of these installations has always been important, until recently, installation management was treated as an adjunct to the conduct of mission operations and those responsible for operating combat organizations were also responsible for the installation operations. Fiscal lines ran from the national headquarters of the services to major commands to subordinate elements within the commands to the installations. Funds allocated to the installation were somewhat fungible and dollars originally allocated for facilities could be reprogrammed when needed elsewhere to support mission operations (tank gunnery, flight hours, etc). Over the past two years the Army and the Navy have moved to detach responsibility for base operations from mission commanders and establish a separate chain of command for installation operations. In 2002, the Army established the Installation Management Agency (IMA) and the Navy, in 2003, established the position of Commander, Naval Installations (CNI). Funds that started in Washington marked for base operations will remain in the base operations chain and will not be diverted. Efforts also are underway to professionalize the field of installation management through centralized programs that support the development of personnel and management systems focused on improving the efficiency of installation operations. (The Navy has recently issued an RFP seeking support for development of the first level of an enterprise architecture for installations.) The Air Force continues to deal with installations through its major commands but provides commonality of approach through centralized control of technical fields in support of installations, e.g. facility engineering.

Better Tools to Support Decision Making

The increasing focus on management of installations has led to the search for tools to support effective decision making at installations and to ensure that those commanding these business elements have a solid picture of the activities taking place on the installations. Key among these have been installation GIS activities. Almost every post, base, and station has now developed some form of GIS to deal with facility planning and use. Some are primitive CADD representations of buildings—essentially facility maps. Others are far more sophisticated and offer a full range of information layers. Since 1999, the Air Force has been using the GeoBase GIS support program, which provides Air Force installations worldwide a basic structure for dealing with installation facilities and many other aspects of installation operations. Major commands using GeoBase have the authority to develop support modules to meet their specific needs and to share these, once developed, with other commands. For example, the Titan-developed Contingency Aircraft Parking Planner (CAPP) (figure 1) and Air Base Defense Planner (*Defensor Fortis*) (figure 2) modules provide tools to support air base operations. GeoBase is more than an installation operations tool and can be used for a variety of planning activities on the installation and during overseas deployment, e.g. to plan for movements overseas. Neither the Army nor the Navy has established a similar structure for their installation GIS support but both are actively working to develop such structures.



**Figure 1. Contingency Aircraft Parking Planner
(Titan Corporation)**



**Figure 2. Air Base Defense Planner
(Titan Corporation)**

Developing a Common Installation Picture

The process of using GIS in installation management is growing more complex. The goal of GeoBase is to provide those operating on a base (or overwatching the base from higher headquarters) a Common Installation Picture (CIP) of the installation that will be grounded in facilities and topographic information and also would include geospatial information pertaining to all base activities. Where appropriate, the activities of the neighboring communities and regions may also be incorporated to support homeland security and other coordinated emergency operations activities. While initially seen as an engineer's planning tool, GIS are becoming widely recognized as key decision support mechanisms for all aspects of installation operations. Medical personnel, police, attorneys, logisticians, etc, want to see some of their important data spatially enabled and available for analysis. For example, because of possible linkages, the locations of respiratory disease occurrences on an installation are of interest to the medical personnel, those who are responsible for storage of hazardous material and security personnel. All want to see the *same* information. Many others similarly see a need for their information to be spatially displayed for analysis. However, in most installations, the installation GIS is still seen as belonging to the engineer. Stovepipe information systems are present to support the different technical sectors involved in installation operations but are only loosely linked and marginally spatially enabled. As commanders of 'more efficient' installations attempt to use the variety of information available, they are recognizing the fragmented GIS structure with which they must deal and the number of claimants for geospatial information. They soon seek a more organized approach. A survey of New York City government departments indicated that most every department and agency maintains and has need for data with a spatial component, and that a common picture of these data might well reveal information previously not available.

The Changing Nature of Installations

At the same time that the armed services are focusing on improvement of installation operations, they and the OSD are examining efficiencies that could be obtained by such actions as consolidation of functions on installations, regionalization of support, base realignments and closures, and creation of joint installations where facilities are shared by active forces, National Guard, and Reserve components of all the services. At the installation level, better understanding of what facilities (and their condition) exist on an installation permits more efficient use of the space that is available, and is a first step for any base

planning. The Army and the Navy have been using procedures that permit them to lease unneeded facilities on their installations to neighboring communities or commercial organizations. In turn, the lessee provides some form of in-kind support to the installation (e.g. construction or operation of a needed facility) or payment to the government. Transformation of the force structure and the potential return of forces from overseas to the United States will require full analysis of space availability at installations, and forecasts of not only what will be needed for the current force structures, but also for force structures that involve units and weapons systems still on the drawing boards. In forming the Army IMA and the Navy CNI, regional offices were established to coordinate the activities of installations within the regions and to determine where analysis indicates efficiencies of any kind can be generated by combining regional activities such as contracting, cross-leveling of assets, etc. The increased use of National Guard and Reserve components during the Iraq War has pointed out the close links between the installation needs of the Guard and Reserve and the active force and has opened the question of how best to provide support for these units in the future.

BRAC and Base Consolidation

The Secretary of Defense's guidance for conduct of the 2005 Base Realignment and Closure (BRAC 2005) review established eight criteria to be used in recommending installations for closure. Five of the eight have strong geospatial components (Land, facilities and airspace; expansion capabilities; local community impacts; local community infrastructure, and; environmental impacts.) The Secretary of Defense also directed analysis of common, business-oriented support functions found in all the services in order to develop closure and realignment guidelines addressing these areas. He designated seven areas or activities for joint, cross-service analysis:

- a. Education and Training
- b. Headquarters and Support
- c. Industrial
- d. Intelligence
- e. Medical
- f. Supply and Storage, and
- g. Technical.

These recommendations could lead to establishment of joint-use facilities in each of the above areas.

Some have indicated that BRAC 2005 and concurrent OSD guidance could eventually lead to consolidation of or joint operation of military facilities in areas where there are numerous separate activities. These range from consolidation of contiguous facilities such as Pope Air Force Base, NC and Fort Bragg, NC, to joint control over the numerous military facilities in such areas as Tidewater Virginia. Actions resulting from BRAC can be expected to place a major burden on the services and installations to deal rapidly with the recommendations of the BRAC Commission and to develop well-substantiated, GIS-based plans in response.

Needs, Challenges, and Opportunities

Much of what has been described for operations of 21st Century installations is underway today. More will be happening in the near future and even more over the next decade. How far this new thrust will be taken is unknown, but even in its present form, the presence of this new approach identifies needs, opportunities, and challenges for those in the geospatial community.

There is a clear need for a focus at every level of command in the services and OSD on development of a Geospatial “game plan.” At the installation level, the use of GIS will grow and the challenge is to prevent this growth from occurring within narrowly focused stovepipes as opposed to being integrated into an installation-wide common *operational* picture (COP). This COP/CIP could be an integrated view of linked stovepipe systems with only the view integrated, not the actual system architecture. The future is in business based analysis software (with an open architecture), fusion engines, and delivery mechanisms (e.g. XML). Because of the magnitude of current geospatial activity, there is already a need for integration and enablement at the installation level.

In intermediate/regional headquarters, the geospatial programs and activities also need to be coordinated and integrated. Finally, at the national level (either service or DOD level) there needs to be geospatial planning to produce structures that not only provide for the needs of the services but also link the military to the activities of federal, state and local agencies involved in geospatial activity such as Geospatial One Stop and the National Spatial Data Infrastructure. But these needs for effective planning represent only the tip of the iceberg. Geospatial information systems must be linked to effective decision support systems so that geospatial information is presented to installation commanders in a manner that will both improve efficiency and support modern business operations. Geospatial systems must be integrated into a mesh of service and DOD communications networks and support systems, and the information systems of the nearby civilian communities and of the states in which the installations operate.

Key challenges will include:

- Developing, at every level, geospatial enterprise architectures that mesh and are part of information enterprise architectures. As a start, OSD in the preparation for BRAC 2005 required all services to submit, for essentially all military installations, seven GIS layers of information (Commercial Geo-referenced Satellite Imagery, Installation Boundary, Noise Contours (65+ Db), Accident Potential Zones, Explosive Safety Arcs, Floodplains, Wetlands) in a defined format. These submissions will be used by BRAC analysts in an Installation Visualization Tool (IVT) that is designed to permit analysts to compare critical information about these installations, and to provide a baseline for future analysis of other information that may be gathered. OSD is also considering promulgation of a Defense Installation Spatial Data Infrastructure (DISDI) to provide guidance across the services for geospatial information development. The Director, Business Transformation, in the office of the Deputy Under Secretary of Defense for Installations and Environment (I&E) has indicated that he will:
 - Staff a DISDI Office effective in July 2004
 - Recommend that his office be responsible for enterprise coordination of geospatial information capabilities for all DOD installations
 - Incorporate his geospatial investment oversight within the I&E Domain Governance Board scope
 - Revise FY 2005/2006 programming language to reflect ‘IVT’ being extended to the more comprehensive ‘Defense Installation Spatial Data Infrastructure’
 - Build a programming strategy to sustain DISDI capabilities beyond ‘06
 - Direct the DISDI Office to conduct a thorough Analysis of Alternatives (AoA) across the Services I&E geospatial information resources to define the optimal DISDI architecture for I&E, DOD, and national needs
 - Brief a preferred FY 2005 DISDI investment plan based on the AoA solution
- Developing the management infrastructure to deal with this rapidly increasing use of GIS at installations and at higher levels. Geospatial program management services will be increasingly needed at every installation and higher headquarters and establishment of Geospatial Information Officer (GIO) positions should be considered for every staff and installation. The recent

announcements of GIO positions in the Department of Homeland Security, the Environmental Protection Agency, and the US Geological Survey indicate high-level recognition of this need. Movement in this direction will require those currently running the GIS programs, typically public works and engineer personnel, to morph into some new structure yet to be determined.

- Integrating numerous current and developing software tools into installation and staff decision support structures. Considerable effort has been placed on bringing some level of compatibility among data being acquired for use on military installations and into conversion of less used data formats into more common formats. Numerous commercial and government agencies have or are developing GIS software to address specific installation needs. The Army's *Fort Future* R&D effort has already pioneered a number of programs developed to deal with the needs of these rapidly evolving installation structures but will require efforts to integrate them into the specific architectures of the installations where they may be used - not an insignificant task.
- Ensuring that installation-focused GIS can support the deployment of installation forces overseas and tie to systems developed for combat theater use. Installations are, in fact, the launch platforms for US forces to move overseas. Installation support software systems must have the same touch and feel as those being used by the deploying forces.
- Maximizing the efficiency of data acquisition by tying the military geospatial data acquisition activities to federal, state, and local agencies' efforts, and sharing meta-data and portals to permit rapid access to the most up-to-date data, wherever it might be found.
- Defining the business scenarios for leveraging GIS and infusing the technology to meet specific business needs. This requires the services to take a hard look at how installations are managed, decomposing the business process and seeing where GIS provides value.

The Train is Leaving the Station

Use of GIS in support of military installations is nothing new; however, the use to this point in time has been, for the most part, fragmented and at a very basic level. Events within the DOD structure are changing the picture and portend a unique opportunity for the value of GIS to be recognized and resources devoted to dealing with the future use of GIS on military installations. For this to be accomplished, industry must work hand in glove with its clients to ensure that GIS moves from being a 'sometimes considered' resource to a key component of military installation decision support systems. This will require industry to:

- Assist clients in making effective business and tactical cases for expanded and integrated use of GIS by military commanders in the conduct of installation management activities. Rapid Scenario based business cases are the key. Look at a business processes, decompose and then identify leverage or insertion points. Most importantly, prove that the new business process (with GIS) brings about process improvement and/or better results.
- Convince key leaders in Washington of the need to adequately resource installation GIS activity, and of the consequences of failing to do so, and
- Work together to share "lessons-learned" in this leap forward in the use of GIS in installation support.

The train is slowly moving but is picking up speed. Now is the time to get on board!

Acknowledgments

I appreciate the assistance of Jeremy Williams, Danielle Brazile, and Brian Branagan in the preparation of this paper and Joe Staton and Joe Oder for their support of the efforts to better understand the subject. While they all provided invaluable contributions, I alone am responsible for the views contained in the paper.

References

Cullis, Brian COL, Chair, OSD IVT Working Group. 2004. "Transitioning Installation Visualization Tool (IVT) to Defense Installation Spatial Data Infrastructure (DISDI)." Presentation, 26 April 2004.

U.S. Department of Defense, The Under Secretary Of Defense, Technology And Logistics. 2003. Memorandum, Subject: Transformation Through Base Realignment and Closure (BRAC 2005) Policy Memorandum One - - Policy, Responsibilities, and Procedures. Washington. April 16, 2003

U.S. Department of Defense, Office of the Secretary. 2004a. Department of Defense Selection Criteria for Closing and Realigning Military Installations Inside the United States. Federal Register / Vol. 69, No. 29 / Thursday, February 12, 2004

U.S. Department of Defense, The Under Secretary Of Defense, Technology And Logistics. 2004b. Statement of Mr. Raymond F. Dubois, Deputy Under Secretary Of Defense (Installations And Environment) Before The Subcommittee On Military Construction of the House Appropriations Committee. February 12, 2004

U.S. Department of Defense. 2004c. Defense Budget Materials. *FY 2004 Budget*.
<http://www.dod.mil/comptroller/defbudget/fy2004/#>

U.S. Department of Defense. 2004d. Key Activity Indicators
http://www.dod.mil/comptroller/defbudget/fy2004/budget_justification/pdfs/operation/Overview_Book/45_Key_Activities.pdf

Author Information

Gerald E. Galloway, Jr.
Vice President, Enterprise Engineering Group
Titan Corporation
11955 Freedom Drive
Reston, VA 20190
Phone: 703-434.4329
Fax: 703-434-4350
Gerry.Galloway@titan.com