The Next Generation
Theater Geospatial Database
U.S. Army Pacific & U.S. Army Europe Geospatial Enterprise Solution

Presented By

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The Art of War

The art of war, then, is governed by five constant factors, to be taken into account in one’s deliberations, when seeking to determine the conditions obtaining in the field. These are: (1) The Moral Law; (2) Heaven; (3) Earth; (4) The Commander; (5) Method and discipline.

Earth comprises distances, great and small; danger and security; open ground and narrow passes; the chances of life and death.

Sun Tzu, 500 BC
Objectives

• What & Why of TGD
• Data Model
• Hardware / Software Architecture
• Enterprise Component (JIVA-V)
• Future Enhancements
What is the TGD

The TGD is an enterprise solution focused on providing critical vector data in support of commanders, analysts, planners and systems. The TGD will greatly improve geospatial data collection, analysis, management and dissemination via the SIPRNET.

The TGD consists of:
- Standard data model implemented on the Army’s Digital Topographic Support System (DTSS)
- Standard tools for creating and managing terrain analysis data (i.e., ESRI ArcGIS, ArcSDE, PLTS; ERDAS Imagine)
- Standard metadata scheme to enhance data discovery
- Geospatial data visualization and dissemination capability on the SIPRNet (JIVA-V, GLIDE, DGINet)
- New “Information-based” business processes
As the U.S. Pacific Command's (PACOM) Executive Agent for all Pacific Theater terrain analysis and geospatial information, U.S. Army, Pacific has established a Pacific Theater Geospatial Database (TGD). A collaborative, three year, on-going effort with U.S. Army, Europe, define(ESRI), and with support from the Topographic Engineer Center (TEC), the TGD provides a unique geospatial data production, retrieval, and storage capability at a fidelity not currently offered by any other Department of Defense system or agency.

The TGD addresses critical Homeland Security intelligence analysis requirements by consolidating and disseminating extensive Pacific Theater, unique, digital, geospatial information and products.

In addition, the TGD allows intelligence analysts, planners, and operators to integrate, seemingly disparate data to aid in pattern recognition, modeling, and visualization of the battle space.
Value added imagery products

TGD provides archive space

Decrease Duplication of effort

Co-producer with the 29th through 5th P&C

Capability to retrieve and browse products
TGD Problem Set

• There is no standardized theater geospatial database available to support geospatial and intelligence analysis during the IPB and EBA process.

• There is no effective method for sharing geospatial data with the National Geospatial-Intelligence Agency (NGA).

• Geospatial operations are “product-based” and therefore data are created, managed and disseminated in an ad hoc approach which varies from theater to theater. It’s like building cars one car at a time…

• Standard NGA datasets are incomplete and do not meet data-centric operational requirements.
What & Why of TGD

• Poor quality, no existing geospatial data
  cumbersome data format
• Lack of enterprise solution
• Rapid response in a changing world
• Reduction in man power
• Reduction in available resources
• Lack of standards (database, tools, TTPs)
The TGD is a fusion of geospatial technologies, hardware, software, information, and processes. The brain of a geospatial system is the database model. The TGD is based on a scaled down version of the National Geospatial Intelligence Agency (NGA) Feature Attribution Coding Catalog (FACC) data model standard and NGA’s Geospatial Intelligence Feature Database (GIFD).
Geospatial Database Growth
IOC April 2004 to March 2006

- Strategic: 6 GB - 7.5 GB
- Global: 2.6 GB - 2.7 GB
- Tactical: 120 MEG - 7.04 GB
- Urban: 40 MEG - 305 MEG
USARPAC TGD Data to NGA GIFD
TGD 3 Data model

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- **EBD** - Check FACC for attributes "agriculture" "fertilizer plant" AND "Nursery & Farm Supplies". Add attribute BFC116 "Factory". Need to look at BDB for attributes in dBankNAICS specifying type of bank. Consider adding "meeting place" as a BDB attribute - EBD (SeeAndMeetFACC1. Add attribute "Restaurant" BFC057. Add attribute "University or College" BFC080, "Dormitory" BFC151, "Library" BFC125. Add attributes to BFC list for "Meeting Place" and "Filling Station". Need attribute for "Gas Station" BFC054. Need to add BFC codes for "executive office", "Ministerial Office", "Human and Social Service Office", "Correctional institution" from dGovernmentNAICS. Need to add attributes "Market" BFC051 & "Shopping Center" BFC022. Need to add attributes "Commercial Building" BFC133 & some attribute for Newspaper & Broadcasting Building - see dMediaNAICS. Need to add "Nursing Facility" BFC109. Check Crop Production Farm ALD15. BDB - add subclass "backup power or generator" ALD15.
Abuja Nigeria Topographic Line Maps

Abuja Nigeria Topographic Line Maps (TLM), TLM 1:50,000 scale maps produced in February 2006 by the USAEUR Theater Geospatial Database (TGD). These maps were generated from commercial satellite imagery source acquired from fall 2004 to spring 2005. Large PDF files are in GeoPDF format (coverage maps with coordinates). Please direct any questions or comments to the Program Manager, TGD - reference project 95-37-002 Abuja Nigeria TGD.

[Meta Data]

Adobe Acrobat Reader is required to view Adobe Acrobat (.pdf) files. Some files have been geo-referenced. To take advantage of this functionality the MMFP-PDF plugin for Adobe Acrobat Reader will also need to be installed. If these programs are not installed on your computer, you can download them from the Links & Downloads page.
From Concept to Reality
“Standing-up the TGD”

https://geopac.hi.pac.army.mil/

The “Front Door” of the TGD - NIPRNET
Production Workflow

Receive Request

Validate Request

TGD SDE

New Product

Product Updates

Dissemination

Customer

Yes

No

Priority Relevancy
New Production

Value Added

Mapping Tables

Internal / External or Commodity data
- Product / Data currency

Commodity Data

External or Commodity data

PD# is on product for tracking and retrieval

Internal

New Data – Populates TGD
Product Updates systematically
Updates SDE DB, Map Comp

DIGI Net SIPRNET FPT NIPRNET FTP INTRANET

CSIL USGS NAVTEC TEC NGA 1TOPO (ADF) TPIO-TD GEOBASE USAREUR MARFORPAC
Global Strategic Tactical
• 1:5M-1:1M
• 1:500K-1:250K
• 1:100K-1:50

Urban
• 25k-7.5K

TGD Data (Data Model)
VMAP Various Scales
Commodity Data

Data Models

TGD SDE

Mapping Tables

Data Load

Commodity Data

• CSIL
• USGS
• NAVTEC
• HOST Information
• GEOBASE
• NGAUSAREUR
• MARFORPAC
• TEC
• TPIO-TD
• 1TOPO (ADF)
• NGA
TGD Software

Data Acquisition
- Data Master
- Sky Media
- GBS

Data Production
- ArcGIS
- Imagine
- SOCET SET

Production Line Tool Set (PLTS)
Job Tracking Extension (JTX)
CTIS Tactical Decision Aid Software

Data Management
- ArcSDE
- SQL Server
- ArcCatalog

Data/Product Visualization and Dissemination
- JIVA-V
- DGInet
- Geo Products
- Geo RFI
Enterprise Component

- Joint Intelligence Virtual Architecture – Visualization (JIVA-V): Provides capability to quickly and easily find, display, overlay and fuse geospatial data from multiple sources.

- Distributed Geospatial Intelligence Network (DGINet): Provides analysts the capability to rapidly locate and display data residing locally or at remote sites worldwide.

- Geographically Linked Information Dissemination Environment (GLIDE): Provides the capability to quickly locate, display and download geospatial products from anywhere on the network.
What Is JIVA-V/DGInet?

**DGInet Data Management**
- Data Prep tool
- Metadata Card
- Admin Tools
- DGInet Database

**DGInet Web Services**
- DGInet Web Services
- DGInet External Services

**Data Producers**
- Standard Products
  - NGA
  - Commercial
  - Other
- Data Production
  - Geospatial WS
    - Vector/Raster
    - Ops/Intel
  - Text WS
    - Intel Reports

**Data Consumers**
- DGInet Clients
  - Internet Explorer
  - DGInet Explorer
- Text WS
  - Intel Reports
  - CGI/XML ICD
- Non-GIS Developer/User Clients
  - Custom web Application
- GIS Developer/User Clients
  - GIS WS
  - Other ArcIMS Services

**Data Consumers**
- JPEG/PNG
- Standard SDE Call
DGInet Operational SIPRNET Nodes

SIPRNET1 Active
- USPACOM
- JFIC
- MCIA (GLIDE)
- NGIC (Prototype)

SIPRNET2 Active
- USARUR
- USARPAC
- NAVO
- DTRA
- NGA*

SIPRNET Planned
- DIAC
- NGIC (Operational)
- 1st MEF
- 2nd MEF
- 3rd MEF
- USTRANSCOM
- JIOC (AIA)
From Concept to Reality
“Standing-up the TGD”

The “Front Door” of the TGD - SIPRNET

--UNCLASSIFIED--
Disconnected Editing

TGD forms
Initial “map” baseline

Checkouts
To individual ArcPad devices

Check-Out mission dataset

Check-In Data to TGD

Check-Out

Check-In

Check-Out

Check-In

Check-Out

Check-In
U.S. Army Transformation
5th EN DET (P&C) to 5th GPC

- 5th EN DET, 11 Mil 1DA Civ, 5 contractors
- 5th GPC, Oct 2007 27 Mil ? DA Civ, ? contractors

- 60th EN DET
- 60th GPC, Spring 2007
Future Enhancements

• TGD 3
  – Raster Geospatial Database
  – Glide features (Zip and Ship)

• TGD 4
  • Improved database performance
  • Automatic Feature extraction
  • Automatic Map generation
  • Automatic Feature change notification
Points of Contact

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http://tgd.60engdet.hqusareur.army.smil.mil/jiva/start.html

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TGD DGInet (SIPRNET): http://128.80.136.007/jiva/start.html
SIPRNET: http://128.80.136.192
NIPRNET: https://geopac.hi.pac.army.mil/

TEC

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Glossary

- LINCS – Long-range Information Networked Communications Services
- TGD – Theater Geospatial Database
- Jiva-V - Joint Intelligence Virtual Architecture – Visualization
- DGINet - Distributed Geospatial Intelligence Network
- GLIDE - Geographically Linked Information Dissemination Environment
- DTSS - Digital Topographic Support System
- NGA - National Geospatial-Intelligence Agency
- IPB - Intelligence Preparation of the Battlefield
- EBA - Engineering Battlefield Assessment
Attribution

The following people took part in the ongoing development and implementation of the TGD:

• USAREUR – Todd M. Minnich, Ron Bijeau, Kristin A. Fishburn

• USARPAC – Dr. Eugene Bingue, MAJ Curtis Edson, CW3 Loren Small, Ryan Kakazu

• ESRI – Jim Ciarrocca, John Grammer, Jack Miller

• USATEC – Dennise Hovanec, Mark Hainsey

• DIA – Terry Busch
Questions

"A map says to you, Read me carefully, follow me closely, doubt me not, I am the earth in the palm of your hand"

_Beryl Markham -- aviator and author_