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.
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.

IPB: Intelligence Preparation of the Battlefield
EBA: Engineering Battlefield Assessment
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
TGD 3 Data model

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Enterprise TGD

AGED => Army Geospatial Enterprise Database
TGD => Theater Geospatial Database
TAGD => Tactical Area Geospatial Database

Diagram showing relationships between AGED, TGD, TAGD, DIA, DGInet, M.PACOM, M.EUCOM, PACOM, TAGD, EUCOM, DIA, and MCIA.

ArcGIS 9.2
Replication XML

US Army, Pacific and US Army, Europe
USAREUR TGD Web Site

TGD Digital Data

TGD Finished Products

Request Information

Organizational Information

Links & Downloads

New Products

Overview Maps of Syria
[Posted: 3/3/2006]

Overview Maps of Tajikistan
[Posted: 3/3/2006]

Overview Map of the United Arab Emirates
[Posted: 3/3/2006]

Overview Maps of Yemen
[Posted: 3/3/2006]

Overview Maps of Kuwait
[Posted: 3/3/2006]
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 and coverable maps with coordinates). Please direct any questions or comments to the Program Manager, TGD - reference project A5-37-055 Abuja Nigeria TGD.

Adobe Acrobat Reader is required to view Adobe Acrobat (.pdf) files. Some files have been georeferenced. To take advantage of this functionality the MAPI/PDF plug-in 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”

The “Front Door” of the TGD - NIPRNET

https://geopac.hi.pac.army.mil/
TGD at work

- New Bridge
- Updated Buildings
- Updated Vegetation
- New Road
Production Workflow

- Receive Request
- Validate Request
- Data Mining

TGD SDE

Original Product Data

Priority Relevancy
New Production

Yes

No

Customer

Dissemination

DIGI Net
SIPRNET FPT
NIPRNET FTP
INTRANET

New Product

Product Updates

Data Contributors:
CSIL NGA
USGS 1TOPO (ADF) NAVTEC TPIO-TDTEC GEOBASE NGA
MARFORPAC

Commodity Data

Internal / External or Commodity data
- Product / Data currency

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

DIGI Net
SIPRNET FPT
NIPRNET FTP
INTRANET

PD #2003-053
05GUAMED1

PD# is on product for
tracking and retrieval
TGD Data (Data Model)
VMAP Various Scales
Commodity Data

Data Models

Global
1:5M-1:1M

Strategic
1:500K-1:250K

Tactical
1:100K-1:50

Urban
25k-7.5K

TGD SDE

Data Load

Mapping Tables

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

TGD Data (Data Model)
VMAP Various Scales
Commodity Data

Data Models

Global
1:5M-1:1M

Strategic
1:500K-1:250K

Tactical
1:100K-1:50

Urban
25k-7.5K
USARPAC TGD Network

TGD Network Architecture
v3.0
TGD Software

Data Production

--ArcGIS
ArcSDE
ArcCatalog

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

Data Management

--Data Master
Sky Media
GBS

--ArcGIS Imagine
Imagine
SOCET SET

Data Acquisition

--Data Master
Sky Media
GBS

Data/Product Visualization and Dissemination

--JIVA-V
DGINet
Geo Products
Geo RFI

--UNCLASSIFIED--
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 (DGI Net): 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?

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

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

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

**DGInet Clients**
- Internet Explorer
- DGInet Explorer

**Data Consumers**
- Non-GIS Developer/User Clients
  - Custom web Application
- GIS Developer/User Clients
  - GIS WS
  - Other ArcIMS Services

**Standard Products**
- NGA
- Commercial
- Other

**Geospatial WS**
- Vector/Raster
- Ops/Intel

**Text WS**
- Intel Reports

**Data Producers**
- Standard Products
  - NGA
  - Commercial
  - Other

**Data Consumers**
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**DGInet Clients**
- Internet Explorer
- DGInet Explorer

**Data Production**
- Geospatial WS
  - Vector/Raster
  - Ops/Intel
- Text WS
  - Intel Reports
DGInet Operational SIPRNET Nodes

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

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

**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
Disconnected Editing

TGD forms
Initial “map” baseline

Checkout mission dataset

Check-outs To individual ArcPad devices

Check-Out

Check-In

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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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TGD DGInet (SIPRnet):
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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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--UNCLASSIFIED--
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