Analyzing the Operational Environment

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Geospatial Enterprise for the Military
Demonstration
David Mitchell
How do you get there?

1. Build the foundation
2. Understand the environment
3. Describe the environment’s effects
Step 1: Building the foundation
Matthew Funk
Roadblock: The full horror... your data

- Lots of data
  - files, hard drives, CD/DVD, thumb drives, ...
- Many different sources, simple to complex
- A big bucket of stuff
  - What is authoritative?
- Can’t find things easily
  - Is there metadata?
- Are there any gaps?
  - How do you know without a structure?

‘The Scream’, Edvard Munch, 1893
The Operations Server

- Portal for ArcGIS
- ArcGIS for Server
- ArcGIS GeoEvents Server
- Stores the foundation data in Operational Environment schema

Photo: author
Operational Environment

- Structure in Operations Server to support foundation
- Topographic
  - Feature data in geodatabase
- Ancillary
  - Non-TDS feature data in Ancillary geodatabase
- Elevation & Imagery
  - mosaic datasets shared as image services
- Open ended structure
  - Template integration into operational environment
How we did it

• Built folders & geodatabases

• Commercial Imagery & DTED
  - NASA, Digital Globe, USGS, MDA Federal, …
  - Mosaic Datasets, published as image services

• Open Street Map
  - Lots of cleanup, attributing, etc.

• Digitize buildings (and a few walls)
  - Map with feature templates
How you should do it

- Download Operational Environment sample schema
- Topographic:
  1. TDS data directly from NGA
  2. Use Esri Defense Mapping to convert
  3. Edit and directly modify it or digitize from imagery
- Imagery & Elevation:
  - Mosaic Datasets
  - Publish as image services
Basemaps

- Topographic, Imagery hybrid, Canvas, Scanned Maps
- Created from foundation data
- Using map document as a template
  - Symbology already set
  - Multiple scale levels
- Published as map service
- Shared on portal’s basemap gallery
- Used directly in ArcMap, Explorer, Portal viewer, etc.
Demonstration: Building the foundation

Matthew Funk
Step 2: Understanding the Environment

Matthew Funk
Roadblock: software the same for all users

- Not structured for military/defense user
- No time to train, no time to teach
- Doing tedious, repeatable tasks, tediously and repeatedly
Environment information products

Artillery Slope Tint

Obstacles and LOC

Climate Brief

Weather Effects

Suitable HLZs
How did we do it

- Map documents with symbology, def queries, popups to produce services or map packages

- Geoprocessing models and scripts to synthesize new products

- Feature templates for new feature creation

- Mobile apps, Runtime apps to run out-of-the-box
Military Aspects of Terrain

- Terrain analysis processes as maps and tools
- Use Operational Environment sources
- Results published, used as inputs to planning
Military Aspects of Terrain

- Lines of Communication and Obstacle
- Suitability overlays
- Key Terrain, Defensible Terrain and Engagement Areas
- Modified Combined Obstacle Overlay
Demonstration: Military Aspects of Terrain
Matt Funk
Military Aspects of Weather

- Climate briefing maps
- Weather analysis for intelligence and operations
- Use weather station data
- Import current and forecasted data
- Understand weather’s impact on operation types
- Supports automation of tools
Military Aspects of Weather

- Maps, tools and workflows
- Operational impacts of weather to be visualised, interpreted and distributed swiftly and efficiently.
- Climate Brief Map
  - Sample climate maps of Afghanistan and North Korea
  - focus on aspects that are most relevant to operations
- Weather Effects Map
  - effects of “current” conditions and forecast weather on operational activities.
  - Time layers play back condition changes
Military Aspects of Weather

- **Data Import Tools**
  - NetCDF Import tool
  - METAR Import tool

- **Data Handling Tools**
  - calculate the impact of weather on operational activities
  - configured using a user-managed table
  - current conditions (as received from weather stations)
  - forecasts (as extracted from global forecast models)
Climate Brief
Meteological stations and forecast
Demonstration: Military Aspects of Weather

Tim Burley
Step 3: Effects of the Environment

David Mitchell
Roadblock: So what does it mean?

- Decisions during planning and monitoring ops involve many factors
- How to bring them together?
- Using info products to support decisions
Demonstration: Building the MCOO

David Mitchell
Demonstration: Weather Impacts on Operations

Tim Burley
Conclusion

What:
- Your data
- Operations Server and Operational Environment
- Military Aspects of Terrain
- Military Aspects of Weather

How:
1. Built the foundation
2. Understand the environment
3. Describe the environment’s effects
Analyzing the Operational Environment

Thank you!

Please fill out evaluations (we need to feel loved!!)

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Coming Up:
• Intelligence Analysis @ 10:15 am
• Military Planning and Operations @ 1:30 pm
• Using Imagery for Intelligence Analysis @ 3:15 pm