BattleView: Integrating ArcGIS Into Canadian Army’s Command And Control Application

Thales Canada, System Division
Canadian Army’s command and control (C2) application

Deployed in army headquarters unit and above

Part of Land Command Support System (LCSS)
Canadian Army’s C2 system

- Communication infrastructure: voice and data, satellite, tactical network and radio
- Sensors: such as GPS,
- C2 capabilities: operation monitoring, directing, and planning
  - Situation awareness
  - Battle management
  - Battle planning
  - Intelligence
  - Information exchange
  - Others, such as meteorological, NBC
LCSS Deployment
BattleView System Design Objectives

• Map centric
  ■ New COTS GIS: ESRI ArcGIS 9
  ■ New symbology: MIL-2525B
  ■ Shield GIS complexity from users

• Integration
  ■ Merging separate C2 applications
  ■ Providing a plug-in framework
  ■ Integrating new and legacy components

• Development and deployment
  ■ Migration to .NET/C#
  ■ Major data model change
  ■ Multi-site, multi-vendor development
Architecture

• Client server
  - Thick client application
  - User experience and survivability

• Integration approach
  - C2 functional services: such as battle planning, management of organization and unit, etc
  - Data: common operational database
  - Business process: coordination of functional services
  - Presentation: common tactical display

• Integration infrastructure
  - Service interaction through messaging
GIS: A key infrastructure

- Embedded GIS architecture: ArcGIS Engine
- Symbolization engine: ESRI MOLE
- Tactical data: operational database, Tactical PGDB
- Background maps: Map PGDB
• Multiple views of the tactical data
  ■ Map view
  ■ List view

• Re-use and extension of ESRI tools
  ■ Map navigation controls
  ■ Sketch tools
  ■ Spatial analysis tools
  ■ Provides intuitive, map-based “look and feel”
Geodata Presentation: Logical Layers

Logical layers

- Overlay:
  - Grouping of tactical objects
  - Symbolized tactical data
Geodata Presentation: Logical Layers

Logical layers

- Background maps:
  - Scanned maps
  - Georeferenced images
  - Georeferenced satellite images
  - Terrain data
  - Vector data
Geodata Presentation: Physical Layers

Tactical data

- MOLE layers
- fallback feature layers

- Map data
  - raster catalog layers
  - vector layers
  - graphics layers

- The BattleView GIS framework carries out the mapping
Management of Tactical Objects

- Management of tactical objects through GUI or map
- Map and GUI interaction
- Support tactical grouping
- Both list view and map view provide access
• Tactical geodata data
  ■ Tactical data: operational database, following NATO C2IEDM
  ■ Symbolization: local Tactical PGDB
  ■ Data model translation
  ■ Change synchronization

• Background maps
  ■ Locally managed in Map PGDB
  ■ Raster catalog for NGA standard products
  ■ Raster dataset for other types
  ■ VPF
Tactical Feature Creation & Editing

- Feature shape determined by tactical data types
- Explicit business rules and rule engine
- Custom geometry types
- Custom sketch tool
Visual que during feature creation and editing
Symbolization

- Military symbology MIL-STD-2525B
- Symbol identification generation
- Data model transformation
- Employing MOLE to render symbols
- Extension to military symbology standard
Geographic Analysis

• Terrain analysis
  ■ Digital Terrain Elevation Data (DTED)
  ■ Line of sight
    ● Point-to-point
    ● Point-to-line
    ● Point-to-sector
  ■ Elevation profile

• Other tools: measurement, angle, elevation
Terrain Analysis Tools

PERIMETER

Point to Point Intervisibility

Point to Area Intervisibility

AREA

Point to Line Intervisibility
Elevation Profile
Cartographic Extensions

- BattleView Grid Engine
- MOLE cartography extensions
Development and Deployment Environment

• Windows XP Pro
• .NET2.0/C#
• XML
• ESRI ArcGIS Engine 9.2
• MOLE, Military Analyst
• MS SQL Server 2005
Thank you.

Questions?