



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

BattleView Overview

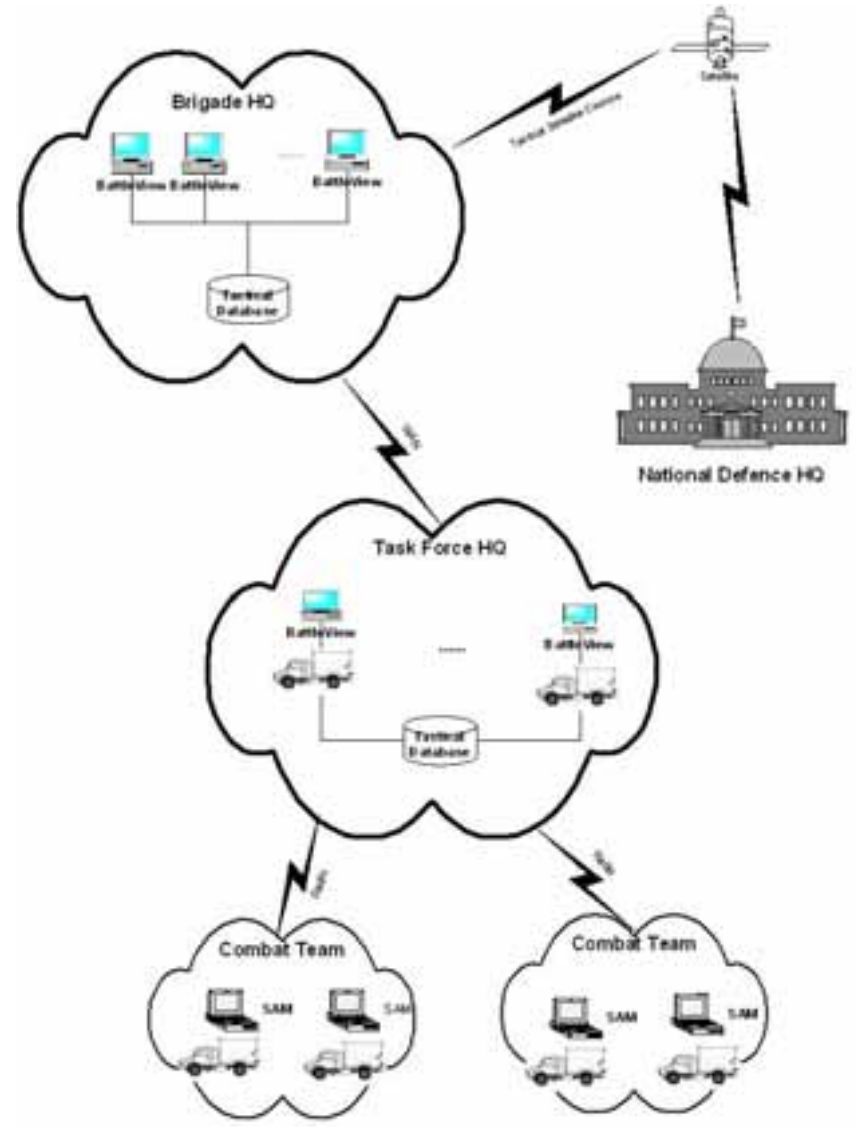
- Canadian Army's command and control (C2) application
- Deployed in army headquarters unit and above
- Part of Land Command Support System (LCSS)





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



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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”



view



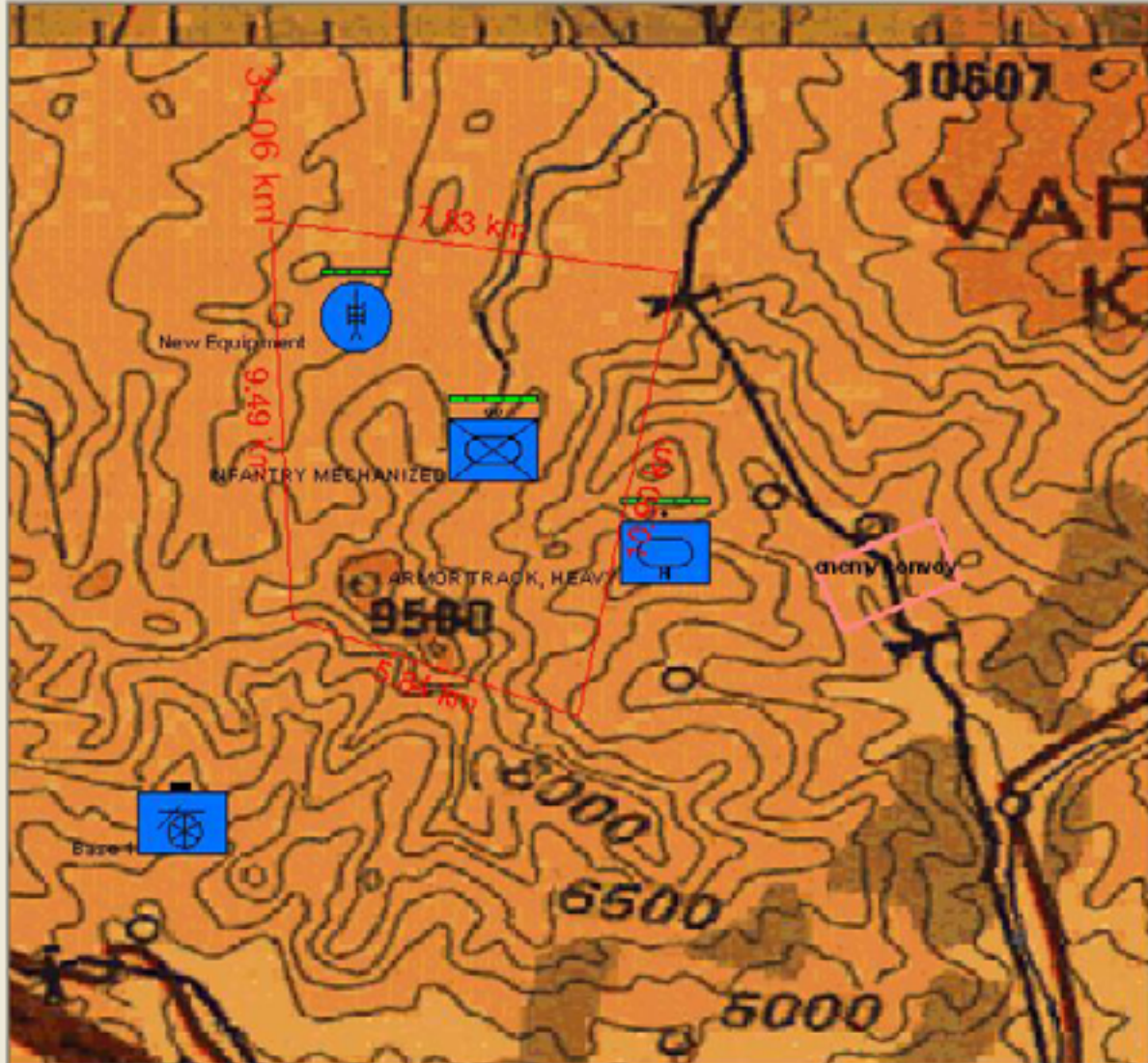
Map

Contact Reports

Visible Overlays

Current Situation

- Current Situation
- Global View
 - Battle Map
 - Biological Reports
 - Chemical Reports
 - Contact Reports
 - FR & NEU POSNS
 - Meteorological Repo
 - Nuclear Reports
 - Globally Significant
 - Int Sum
 - Local View
 - Other Canadians
 - Others



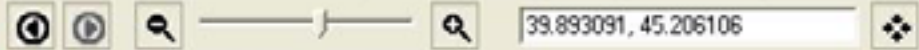
- Overlay Name
- Battle Map
- Contact Reports
- FR & NEU POSNS
- Globally Significant.<default>

- Entity Name
- Airfield1
- ARMOR TRACK, HEAVY
- Base 1
- enemy convoy
- INFANTRY MECHANIZED
- New Equipment

39.93, 45.13

1.176813

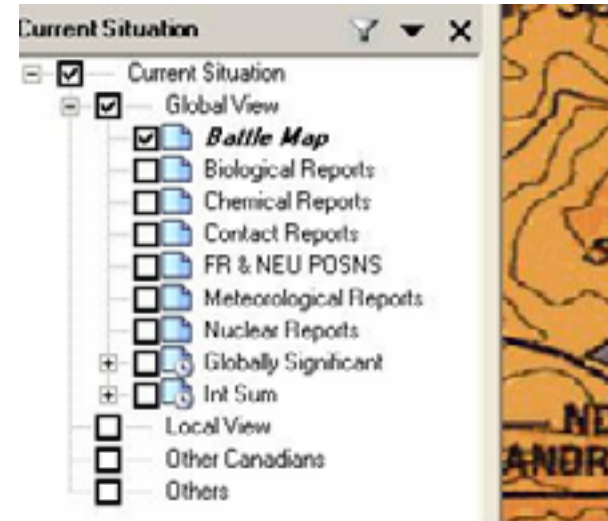
39.893091, 45.206106



Geodata Presentation: Logical Layers

Logical layers

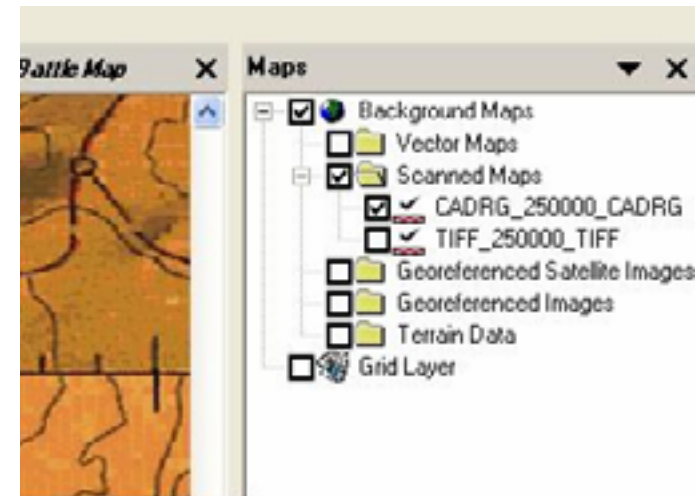
- Overlay:
 - Grouping of tactical objects
 - Symbolized tactical data





Logical layers

- Background maps:
 - Scanned maps
 - Georeferenced images
 - Georeferenced satellite images
 - Terrain data
 - Vector data





Tactical data

- MOLE layers
- fallback feature layers

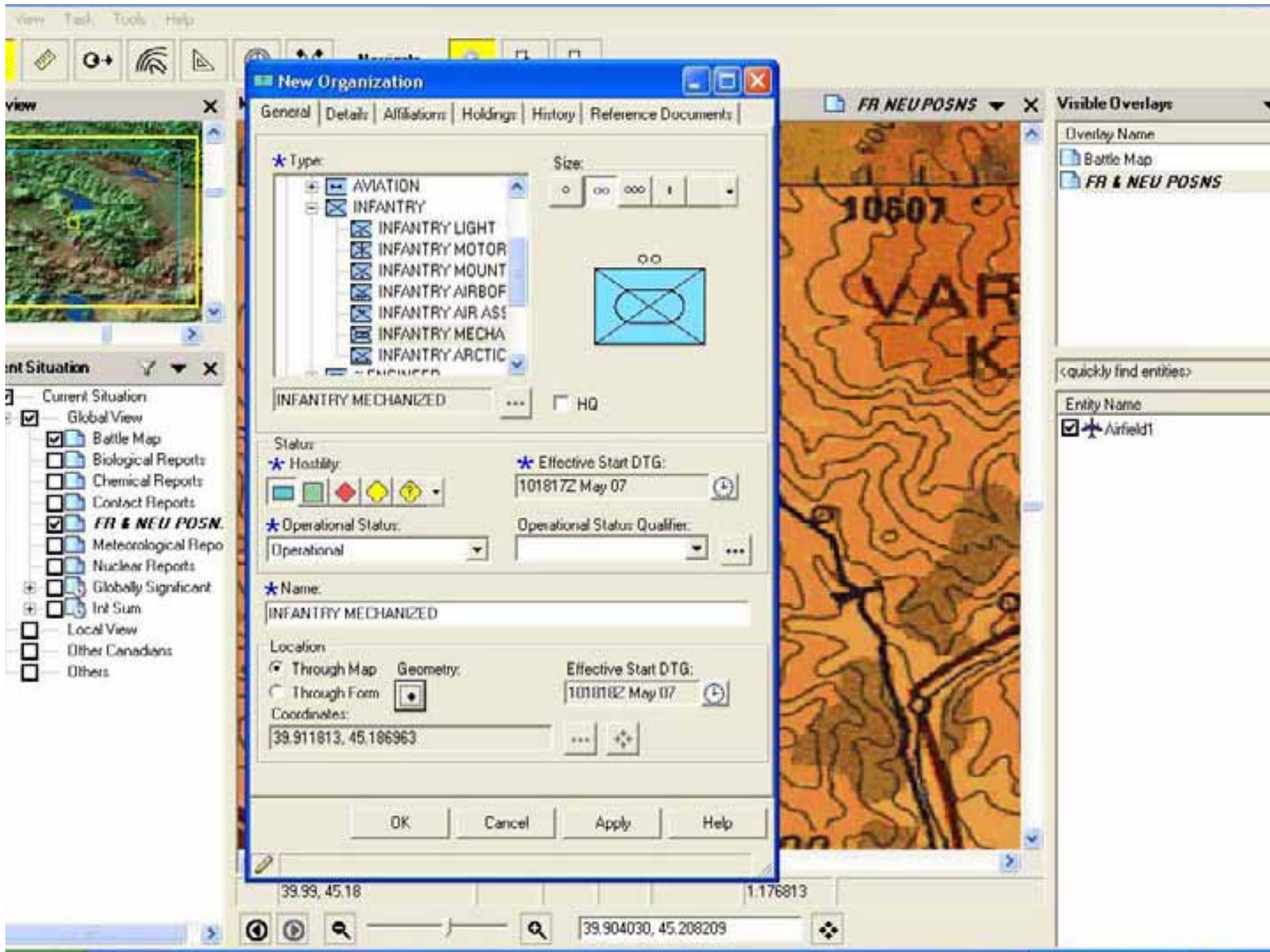
• Map data

- 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

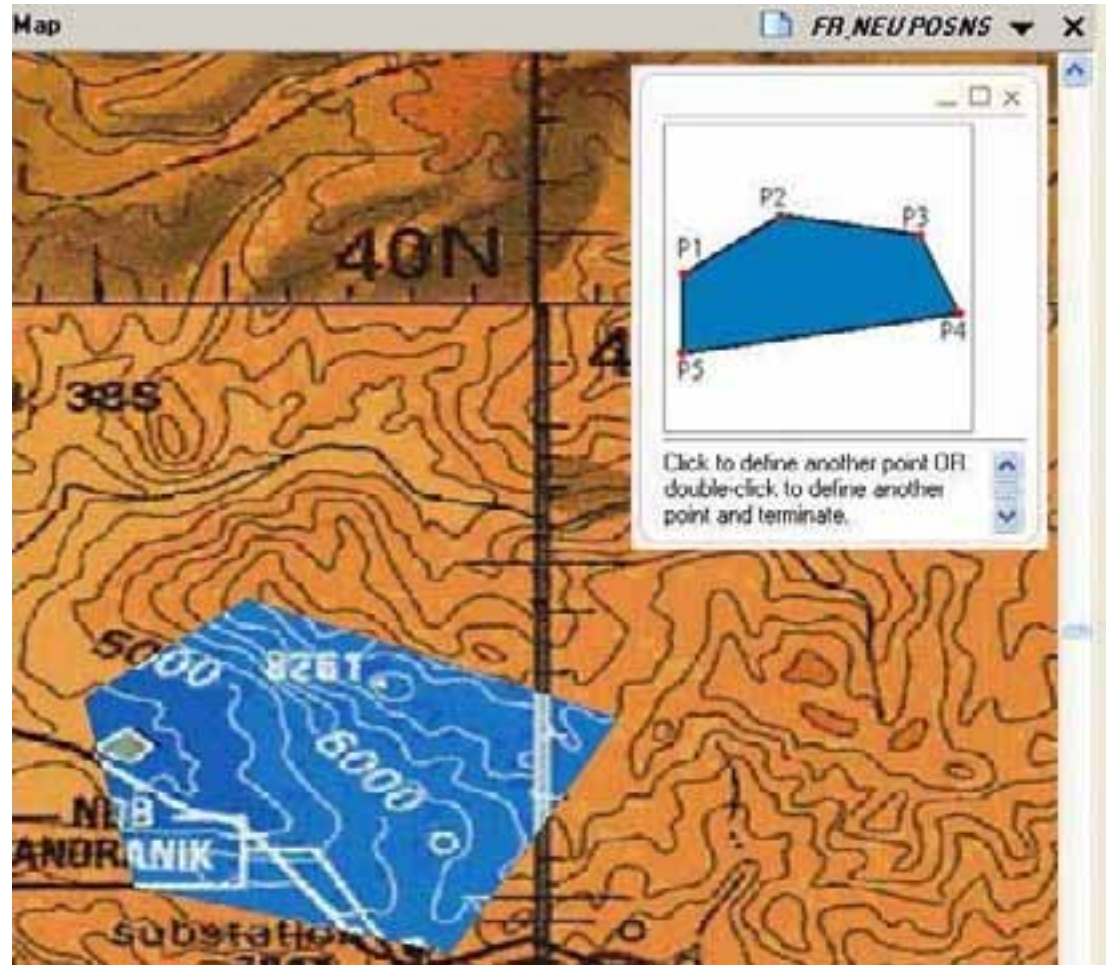
Tactical Feature Creation & Editing



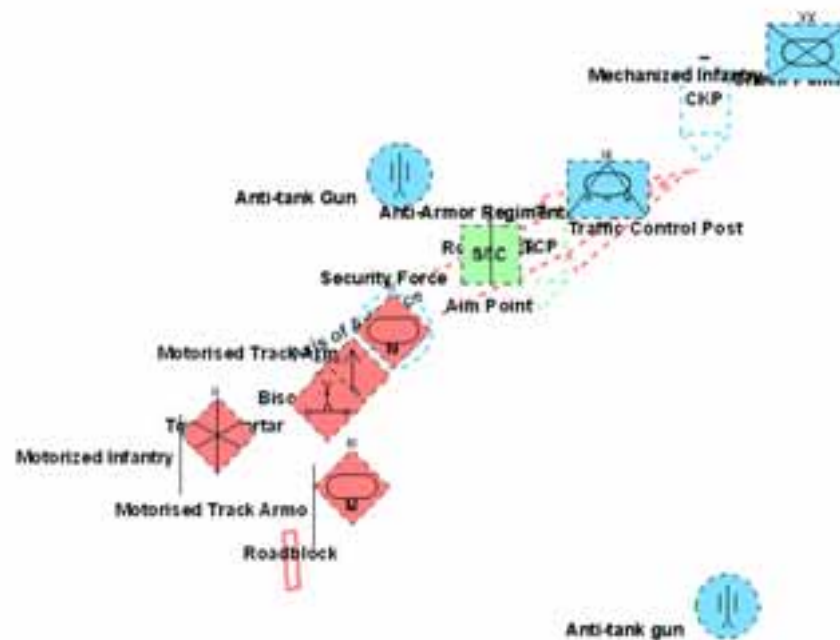
- Feature shape determined by tactical data types
- Explicit business rules and rule engine
- Custom geometry types
- Custom sketch tool

Tactical Feature Creation & Editing

Visual que during feature creation and editing

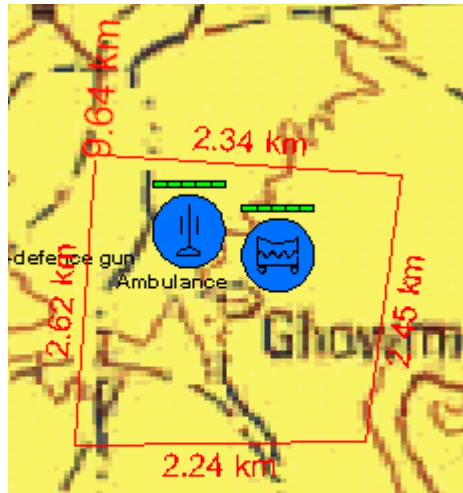


- Military symbology MIL-STD-2525B
- Symbol identification generation
- Data model transformation
- Employing MOLE to render symbols
- Extension to military symbology standard

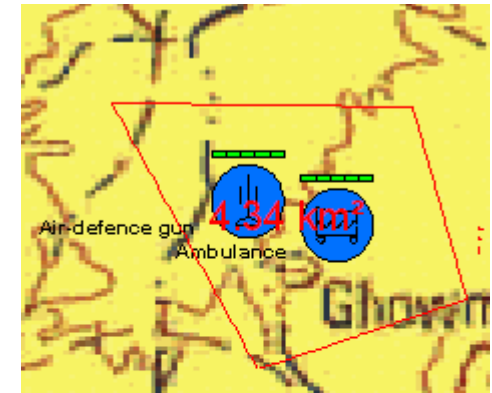




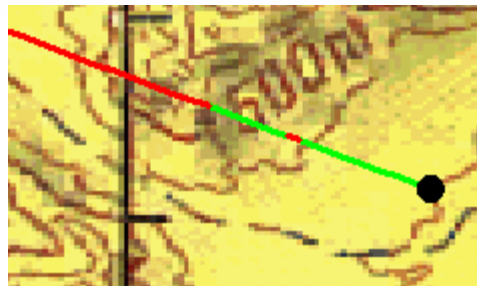
- Terrain analysis
 - Digital Terrain Elevation Data (DTED)
 - Line of sight
 - Point-to-point
 - Point-to-line
 - Point-to-sector
 - Elevation profile
- Other tools: measurement, angle, elevation



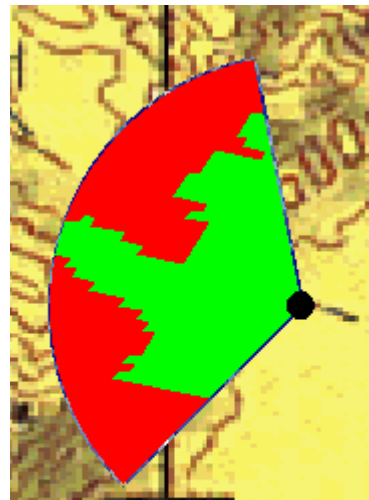
PERIMETER



AREA



Point to Point
Intervisibility

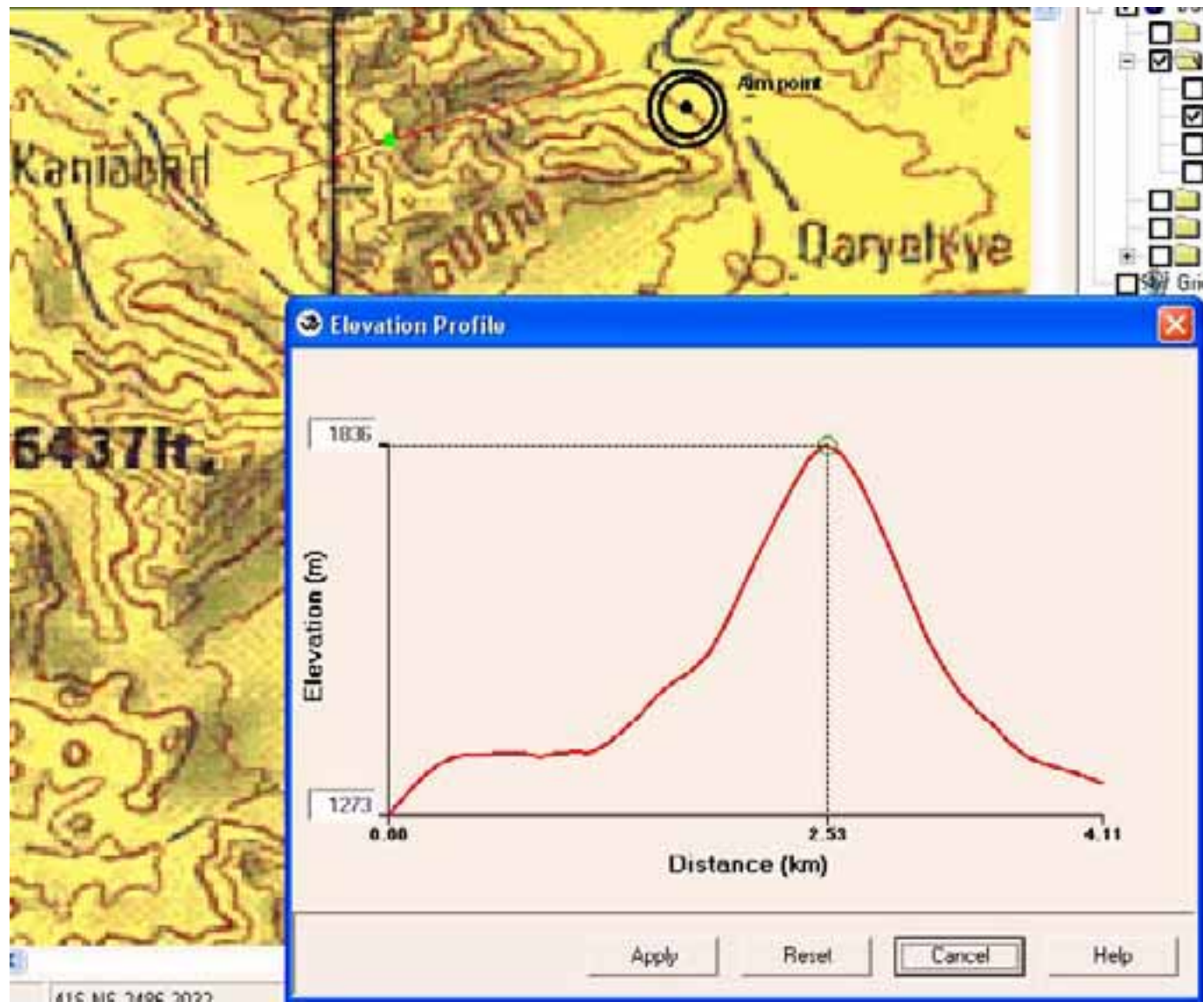


Point to Area
Intervisibility



Point to Line
Intervisibility

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- 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?