

AKTiveSA

Supporting Civil-Military Information Integration
in Military Operations Other than War



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<http://sa.aktivespace.org/>

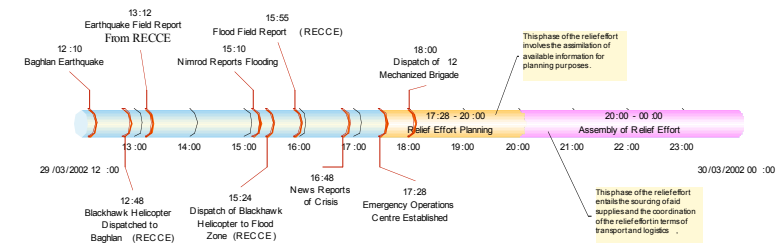
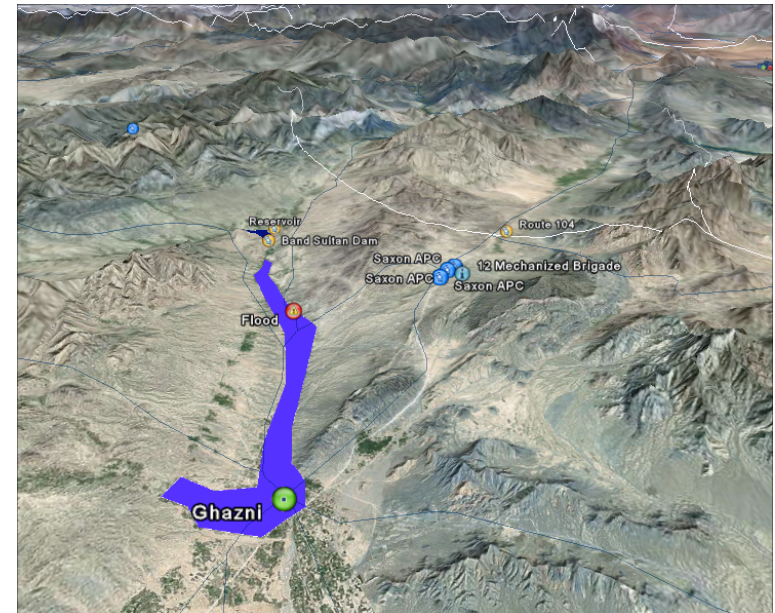
Overview

- Part of DIF DTC initiative
- Allied to the AKT initiative
 - exploitation of AKT technologies
- Enhance situation awareness in MOOTW (humanitarian relief) operations
- Combine semantic technologies with advanced visualization capabilities
 - user interface is key element of situation awareness
 - user interaction may be key part of problem solving competence – ‘epistemic action’



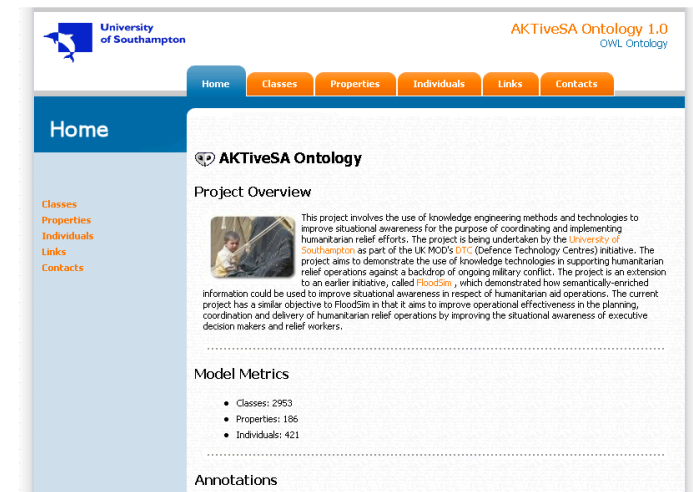
Band Sultan Dam Scenario

- Humanitarian and disaster relief operations
- Afghanistan
- Humanitarian events
 - earthquake
 - dam failure
- Background military conflict
 - coalition operations against Taliban insurgents
- Why not Binni?
 - actual events serve as context for knowledge acquisition
 - exploitation of real-world resources
 - knowledge models as reusable components
- Scenario Development
 - rapid prototyping with Google Earth client and KML



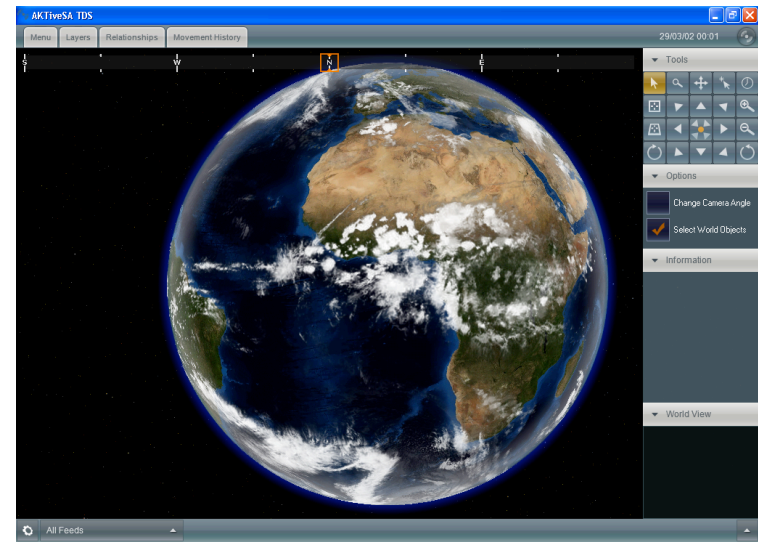
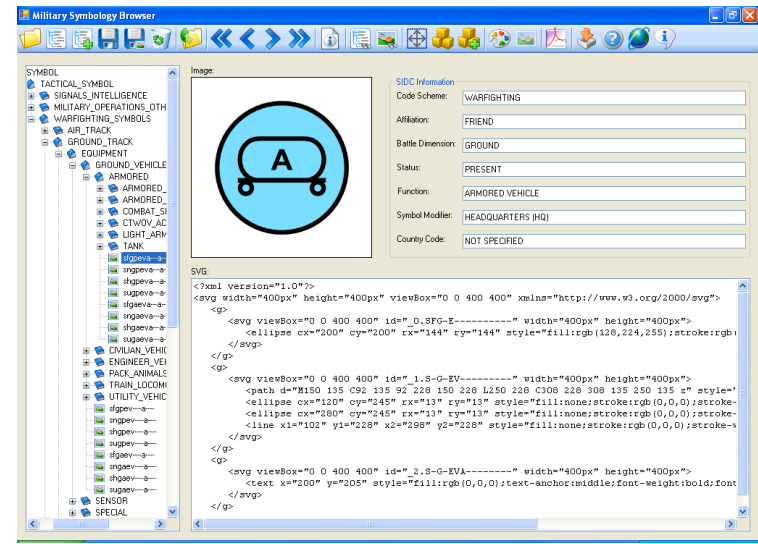
Knowledge Acquisition & Modelling

- Multiple knowledge domains, e.g.
 - humanitarian aid
 - meteorology
 - military operations/equipment
- Knowledge capture (LWC/RSA)
 - military experts
 - public domain sources
 - institutional web sites
 - SOP manuals
 - technical reports
- Knowledge representation
 - OWL DL ontologies
 - CLIPS rules
- Knowledge Web
 - delivered to UK forces in Afghanistan

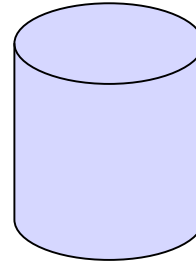
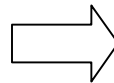
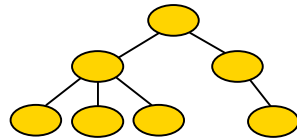
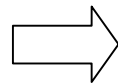
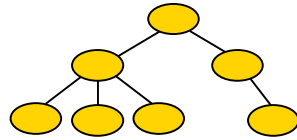
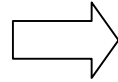


Technology Components

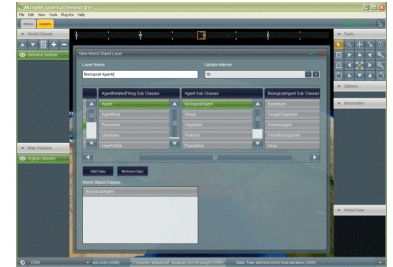
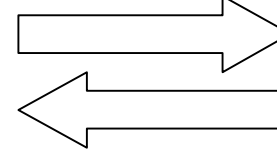
- Knowledge Repository
 - Windows-based triplestore
 - semantic query interface
 - HTTP interface
- Symbol Generation Utility
 - NATO standard military symbols
 - alignment of symbol identification codes with semantic-level representations
- Reasoning Subsystem
 - inference & decision support services
 - performance issues!
- AKTiveSA TDS Client
 - 3D visualizations
 - semantic filters



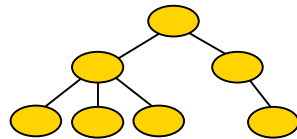
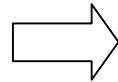
Information Integration



Integrated Knowledge Base



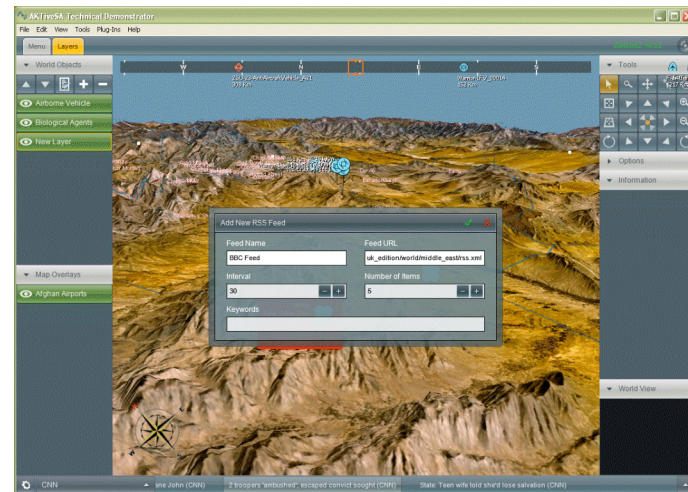
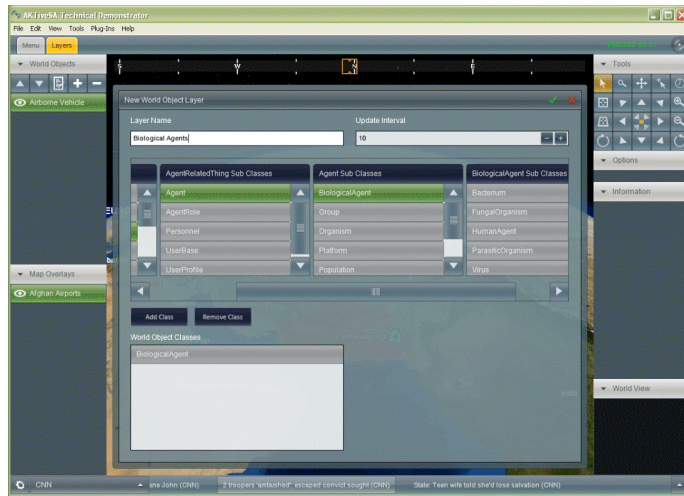
End User Applications



Information Sources

Local Ontologies

AKTiveSA TDS Client

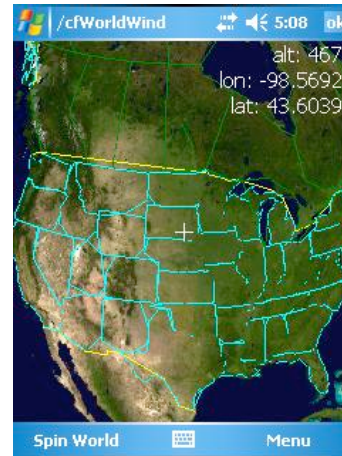


System Evaluation

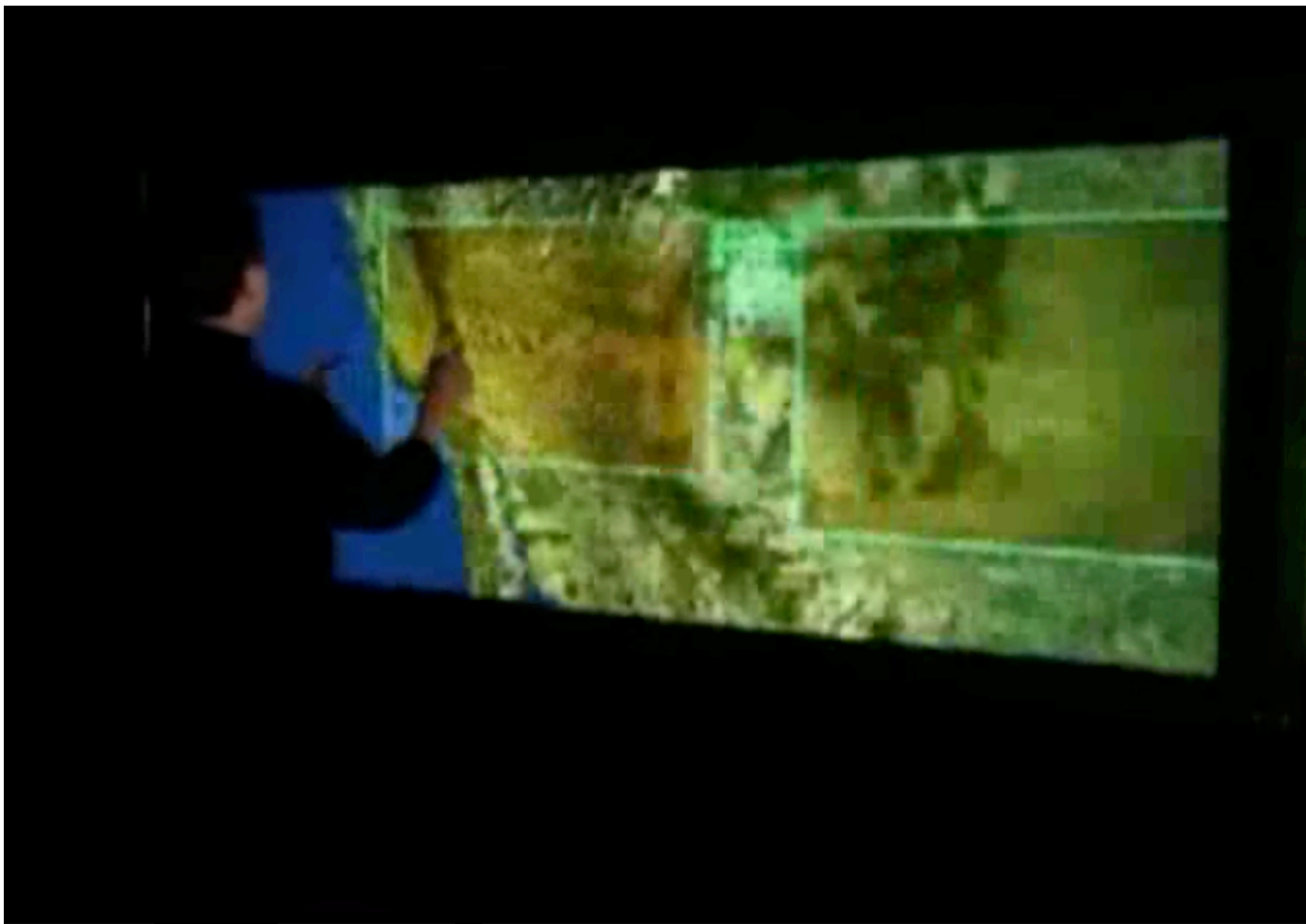
- Favourable feedback from military stakeholders
- Visualization capabilities vs. knowledge processing
- More work required for:
 - content acquisition
 - decision support
 - predictive capabilities
- Situation awareness evaluation
 - human factors evaluation – University of Cardiff, UK
 - recommended user interface manipulations
 - are current conceptions of *individual situation awareness* really applicable to coalition situations where the emphasis is on *team situation awareness*?

Future Work

- Mobile Capabilities
 - portable devices
 - mobile information access
- Resource classification
- Content acquisition
 - knowledge extraction from textual sources
 - Artequakt
- Virtual Adviser
 - 'conversational' context for information exchange
 - multi-model stimuli and dual task performance
 - vocal alerts less obtrusive than popups or visual 'assistants'?
- Rule execution
 - inference engine optimization
 - more control of rule firing



Multi-Touch Capability



Summary

- Good infrastructure for further development
 - knowledge repository
 - symbol generation
 - scenario development and visualization capabilities
 - suite of user interface component
 - pluggable component architecture
- Key challenges
 - real-time knowledge extraction
 - decision support
- Funding for additional development
- Operational focus areas
 - humanitarian relief
 - information operations
 - humanitarian demining
 - EOD
- Requirements
 - input from subject matter experts
 - decision support focus areas
 - testing, evaluation & feedback
 - actual scenarios and case studies