

# BATTLESPACE ASSESSMENT TOOL SET “BATS”

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## **Abstract**

Politicians, military planners and strategists need the right tools to define current and potential threats to national security and to devise effective and flexible responses.

Strategic commanders have a requirement to understand clearly and precisely the relative dispositions of friendly and opposing forces. The increasing amount of data available today requires sophisticated management, interpretation and analysis tools. The display of relevant information needs to be informative, unambiguous and intuitive and the presentation of information must enable the correct decisions to be made in the shortest possible time

Land, air and sea force commanders have the need for current information and intelligence in order to assess the local, tactical situation and to integrate the intelligence effectively into battle planning. This requirement needs accurate threat assessment and the ability to disseminate intelligence rapidly and securely.

The electronic order of battle is playing an increasingly crucial role in effective Battlespace management and the growing use of satellites requires the full integration of space assets into the order of battle.

## **Effective C<sup>4</sup>i Procurement Strategies**

The dilemma facing many military forces is how to balance the requirement to integrate current and legacy systems with investment in new capabilities. The procurement of C<sup>4</sup>i systems is shifting away from the costly, high-risk development of an all-inclusive “system of systems” towards a cheaper / better /faster approach using Commercial Off The Shelf (COTS) tools to bring immediate and effective capabilities to force commanders while enabling future integration into a comprehensive, force-wide, command and control system.

Modular, or staged procurement acknowledges the credibility of “COTS plus” solutions and enables an immediate increase in effectiveness together with **local integration**, development and support for the C<sup>4</sup>i system

BATS is the integration of a number of operational COTS tools, designed to meet the new procurement strategies by integrating powerful COTS software applications with existing hardware and software in low-risk, cost-effective and flexible solutions. In essence, BATS evaluates, analyses and displays the relationships of all assets including Space, Land, Air, Sea and Submarine in real time, past time and future time

BATS integrates operationally proven software tools and cross platform capabilities (Unix / NT/ Linux) to bring database management and communication tools, accurate analysis, 2-D / 3-D Visualization in real time, mission planning and rehearsal, and tactical command and control.

In particular, BATS addresses the following issues

- ❑ Cost of procurement of C4i systems
- ❑ Integration of space assets into the battle
- ❑ Correlation / fusion of legacy radar system data with current and future data formats
- ❑ Rapid and effective dissemination of information and intelligence on networks
- ❑ 2-D and 3-D, real-time visualization of the Battlespace
- ❑ Radar and communication analysis

BATS tools support multiple operational capabilities including:

- ❑ Political/Strategic Planning and Decision Making
- ❑ Real-Time Battle Management
- ❑ Intelligence Gathering and Assessment
- ❑ Tactical Planning and Mission Rehearsal
- ❑ Operational Photo Interpretation
- ❑ Satellite Command and Control
- ❑ Communication systems planning and analysis
- ❑ Electronic Warfare database management and operational analysis

BATS analyses the relationships between static and dynamic objects, including space assets, allowing rapid and accurate analysis of:

- ❑ Radar performance
- ❑ Communications analysis / interference
- ❑ Link budget analysis
- ❑ Chains of multiple objects
- ❑ GPS availability and quality over time (GDOP)
- ❑ Ballistic Missile defense tools
- ❑ Areas covered by satellites / reconnaissance. aircraft

BATS incorporates the following COTS tools:

Satellite Tool Kit (STK) from Analytical Graphics inc. STK is the world standard satellite planning and operational COTS product. STK incorporates modules that enable the user to model and simulate the relationships between fixed and mobile objects including satellites, aircraft, land vehicles and ships. Radar systems (including satellite-based SAR) and communication systems can be modeled on any object in STK enabling the generation of link budgets and radar accesses. In addition, STK integrates with GIS tools such as ArcView and enables high resolution images to be draped on Digital Terrain Elevation Data on a globe and actual size, fully textured models to be added.

Database management tools from Sybase can access all database formats and can link to existing databases to provide intelligence for command and control. Data on all assets (such as vehicle serviceability, performance, weapons, etc.) can be “read into” BATS and then used to generate data to

support planners and decision makers. Maps, digital images, DTED and GIS files can be readily located, imported and exported using standard protocols.

ELT, from Paragon inc is a powerful suite of photo interpretation tools which incorporate state of the art graphics handling capabilities and data management. Intelligent image recognition and change recognition tools are also incorporated.

Satellite Command and Control tools from Braxton inc enable all elements of the operation of a satellite to be planned, simulated and executed using the same suite of software and hardware. Multiple tools include resource management, simulation (including hardware in the loop) and operational satellite command and control

RadBase from Soreal Technologies is a COTS tool which enables the user to generate an aspect-dependent, radar cross-section file from a 3-dimensional model, such as that generated within STK and use this file when modeling radar access.

BART (Battlespace Assessment in Real Time) from International Aerospace is a COTS tools that includes hardware interfaces to enable data from multiple sources to be correlated and fused. BART is fully integrated with STK to provide a COTS solution to real-time, 3D, Battlespace Awareness and analysis. The software incorporates a fully functional command and control suite providing a Recognised Air & Surface Picture (RASP) with the following facilities:

- ❑ Air, ground and sea tracks
- ❑ Ballistic Missile tracks with predicted impact points
- ❑ Chemical and Biological hazard areas
- ❑ Tote Information
- ❑ Threat Analysis and warnings
- ❑ Target Intercept Solutions.
- ❑ Tactical Areas, Reference Points, Maps, Grids, and Navigational Charts
- ❑ Recording and Playback facilities
- ❑ High resolution images

EWare from Systematic is a powerful suite of tools which cover all aspects of Electronic Warfare from the management of the data to the analysis of EW signals.

The General Simulation System from PSI inc and the associated Visual Development Environment and Run Time Graphics is a complete, large scale, discrete event simulation environment. GSS supports model and scenario development, simulation, and pre- and post-run analysis. Current applications for GSSS include real-time control systems and the analysis of wireless and wired communication systems and the strength of the system makes it an excellent tool for use in Network Centric Warfare planning.

Features include:

- ❑ Interface to existing models, databases and GUI interfaces
- ❑ Real-time communications and control
- ❑ Real-time and distributed simulation
- ❑ Multiprocessor simulation

