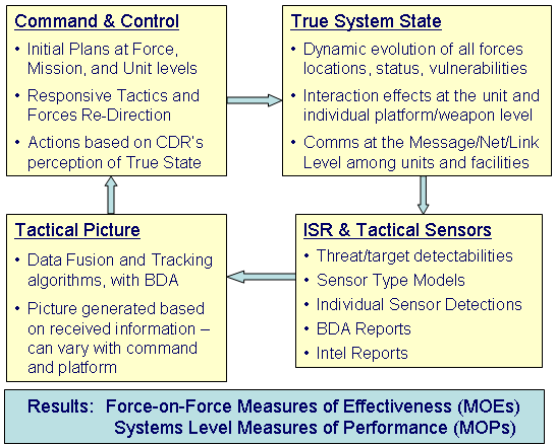
What is NSS?

The Naval Simulation System (NSS) provides a comprehensive force-on-force mission-level modeling and simulation capability. NSS represents individual platforms, weapons, sensors, C3 systems, and the responsive tactical decision making of commanders. The model is n-sided and can represent C4ISR, logistics, force engagement, and commander's logic simultaneously at a common level of fidelity. NSS models operations ranging from mission-level M x N engagements to full theater-level campaigns. The simulation collects a variety of performance metrics that provide for graphic display and post-processing data analysis.

Functionality

NSS models the interaction of various force assets based on initial plans as well as the dynamic reaction of commanders. Command decisions in NSS are based upon a generated, perceived tactical picture, not the ground truth position of targets. Organic and remote sensor inputs generate the tactical picture. Commanders dynamically respond to this perceived tactical picture based on user-defined tactics tables and the availability of resources.

NSS Functional Segments



Applicability

Assessment and Acquisition Analysis

NSS can be used for assessment as part of the budgetary process, by acquisition commands in defining requirements, or by Industry. In these contexts, NSS models warfare scenarios with the goal of understanding capabilities, performance, and interactions of forces and systems in combat. The result is a quantitative assessment of force performance, specifically including the contribution of C4ISR systems and CONOPS to force level results.

Exercise and Experiment Support

NSS can interface with command and control systems to inject simulated entities into exercises or experiments. NSS can augment live exercise participants and systems with simulated entities. NSS is DII COE Level 7 and HLA compliant.

Operational Support

NSS can support Joint and Naval operational plan development and evaluation. In this process, NSS promotes creative thinking by allowing users to assess a range of likely plans, tactics, and outcomes. Commander, Pacific Fleet has employed NSS in this role since 2001.

Models Federations

NSS supports federation with more detailed engineering level models representing warfighting systems, electronic warfare (e.g. Builder), protocol level communications (e.g. OPNET, JCSS), and human cognition (e.g. Soar).

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Application of Operations Research and Simulation Sciences for DoD Assessments and Acquisition

Scenario Development

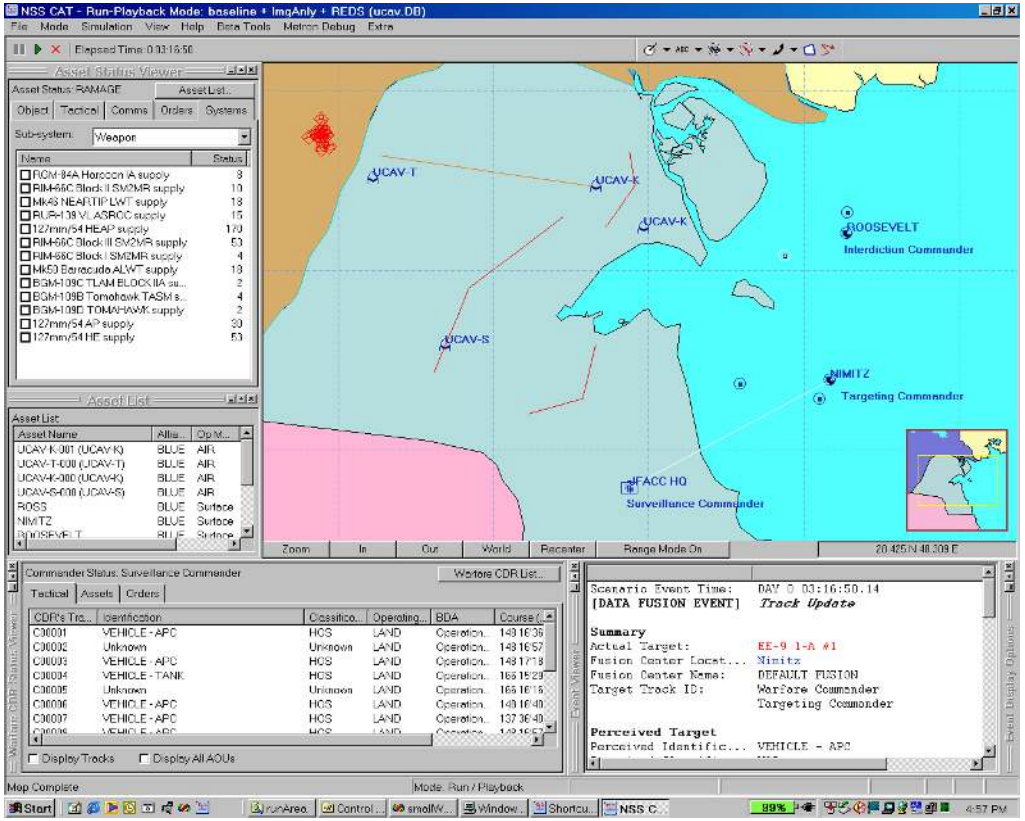
The NSS Graphical User Interface (GUI) provides a five-step process for creating scenarios. The user defines:

- **Forces** – Order of Battle, command structures, alliances, and assignment of asset control to commanders.
- **C2 Plans and Tactics** – Initial plans and user-defined responsive tactics for every commander and asset.
- **Operational Plans** – Motion plans for surface, subsurface, land and space assets. Specific communication networks, surveillance schedules, and logistic plans.
- **Platform Mission Plans** – ISR, AW, ASW, SUW, and STW plans for aircraft.
- **Metrics** – More than 100 pre-defined metrics that may be customized by users.

Characteristics and Performance Database

NSS comes with a fully-defined but modifiable classified Joint database containing data on specific U.S. and foreign platforms, sensors, and weapons systems.

NSS Graphical User Interface



Define Scenario → Run/Playback Visualization → Execute Simulation Runs → Evaluate Results

Interactive Playback

The NSS Run/Playback mode provides interactive review of an NSS scenario. The Run/Playback interface allows the user to display the following features:

- Ground truth location of assets.
- Commanders' perceived location of targets for selected assets and facilities.
- Commander and Asset Status Viewer to display the tactical picture of each commander and asset, messages transmitted, and orders given and received.
- Sensor and weapon ranges.
- Communication links and message transmission.
- Alert messages indicating the details of each event in the scenario.

Quantitative Analysis

Once the scenario is built, the user employs the NSS study mode to set up and execute production simulation runs. The study mode interface lets the user select the number of replications and other parameters for each batch. Metrics are automatically collected during batch execution. Data generated by NSS can be exported to Microsoft Excel for graphical visualization and post processing.

Examples of NSS Results