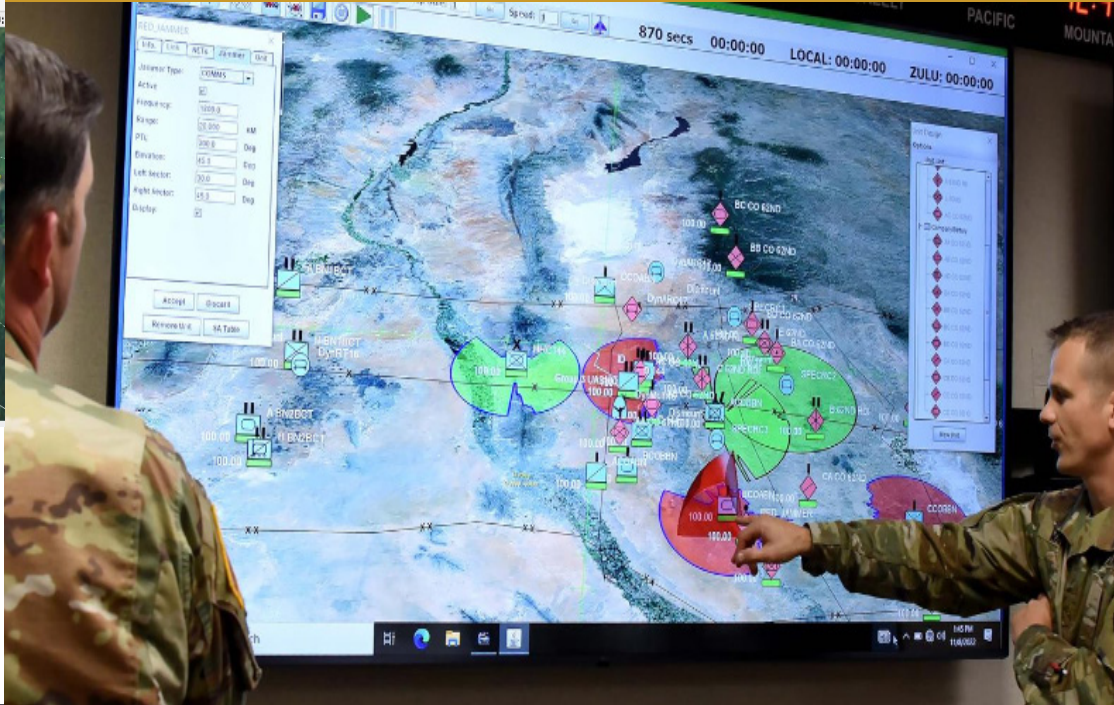
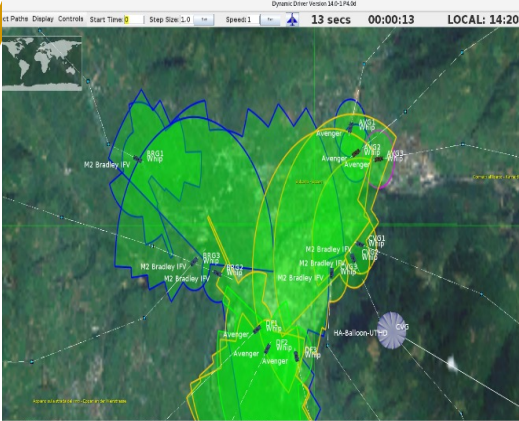




# SPACE WARGAMING ANALYSIS TOOL (SWAT)



*Space Wargaming Analysis Tool is a quick scenario generation and execution model to provide high-level analysis that includes space-based concepts.*

**S**WAT enables rapid and dynamic creation and execution of multiple platforms for wargaming courses of action. SWAT generates critical data that can be used to inform commanders and decision makers regarding space concepts, capabilities, concept of operations, and tactics, techniques and procedures in environments with and without space-based capabilities.

SWAT supports space, air and ground maneuver (red and blue) forces in a wargaming environment, while providing data collection and reduction in real time; allowing the user to get an understanding of the impacts of planned and injected events and platforms.

SWAT is not focused on system engineering of detailed operational analysis but for quick looks. SWAT trades off fidelity for ease of use. It is tailorable for future capabilities, without the need of full system definition to run. The 3D map gives commanders and leaders a unique understanding of the contributions, benefits and limitations of space - both red and blue.

- Quick scenario generation/editing/execution
- Intelligence, surveillance and reconnaissance collection planning and coverage visualization and effectiveness testing
- Defense laydown effectiveness insights (sensor/launcher emplacement)
- Insight on organizational designs' and systems' battlefield effectiveness
- Communication architecture planning/visualization (sensor to shooter)
- Developing augmented reality view and interactions for users



## SIMULATING THE BATTLEFIELD

Space Wargaming Analysis Tool is easy to use, generates quick scenarios, and enables high-level analysis of single or multiple platforms supporting space, air, and ground maneuver (red & blue) forces in a wargaming environment, while facilitating quick looks of courses of action.

Warfighters make and revise strategies on a continual basis resulting in the need for a tool that develops multi-domain scenarios to provide situational understanding of the potential impacts of strategic and tactical decisions.

SWAT simulates the battlefield in a rapidly deployable quick-scenario generation and execution tool that enables high-level analysis of single or multiple platforms supporting the armed forces in a wargaming environment. SWAT is used to gain a real-time understanding of the effects of its actions against an adversary. This government-off-the-shelf tool is available to all DoD organizations wanting to visualize a space-enabled wargaming environment.

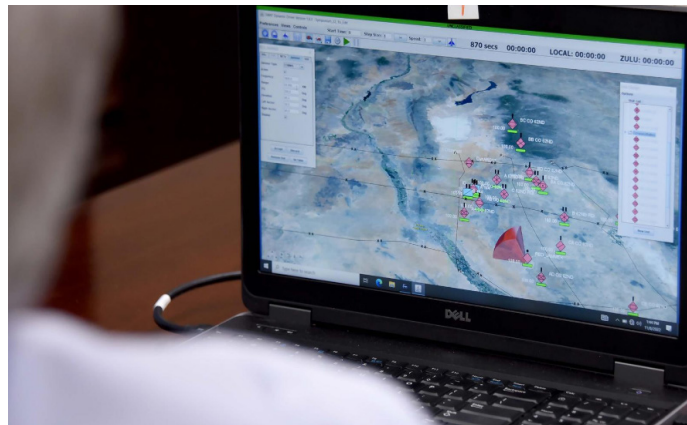
SWAT's primary function is to generate red-team versus blue-team wargames, where two sides battle each other virtually with planned or dynamically injected interactions and the effects of those actions play out against each other. SWAT can enable the dynamic deployment of battle assets — divisions, brigades, battalions, companies, platoons and fire teams — in real time or faster than real time, providing further insight into potential scenarios. These scenarios can include uncommon events, such as degradation or jamming of communications, which force users to adjust strategies on the fly.

SWAT imports satellite flight paths and satellite constellations so that all domains, including space, are included in the wargaming analysis. A comprehensive understanding of all outcomes requires a comprehensive input of scenarios, and SWAT achieves just that.

The program is accessible on a laptop and tablet in both Windows and Linux.

SWAT provides a 3D game view with augmented reality being developed. In the future, augmented reality headsets and peripherals will provide a virtual sand table to enable easy collaboration and communication.

The user interfaces in both augmented reality and desktop views are based on National Aeronautics and Space Administration's Worldwind Map Engine data. This is an open-source virtual globe that allows developers to quickly create interactive and accurate visualizations of the Earth. In addition, SWAT can use compressed ARC digitized



raster graphics and digital terrain and elevation data for visualization. These user interfaces help the warfighter understand their area of interest.

## HIGHLIGHTS:

- Develop “base case” scenarios consisting of space, air and ground entities with planned paths
- Utilize Satellite Orbit Analysis Program file data for satellite constellation paths.
- Scenarios include planned events entered into the base case scenario.
- WorldWind 3D Terrain Elevation Engine, Digital Terrain Elevation Data levels 0-2 and compressed ARC digitized raster graphics
- Red versus blue with multiple user views of the battle.
- Interactive mode that allows for dynamic injection of entities and event in real time. Events would include (but not limited) degradation of communications, jamming, spoofing and damage.
- SWAT supports a faster than real-time function but can be paused, saved and edited at any point in the scenario.
- Detailed events describing space, air and ground force states at different points of the scenario.
- Supports an initial capability of an augmented reality view of battle.



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