

## At a Glance

### What is it?

■ TacSat-4 is a Navy-led joint mission to provide relevant capabilities and to enable Operationally Responsive Space. TacSat-4 provides ten Ultra High Frequency (UHF) channels, which can be used for any combination of communications, data ex-filtration, or Blue Force tracking. Notably, TacSat-4 provides communications-on-the-move with legacy radios and provides a wide band “MUOS-like” channel for early testing.

### How does it work?

■ TacSat-4 uses relatively low-cost, small satellite and launch vehicle technologies. The spacecraft is 450kg with a 1000W solar array and a 12 foot diameter payload antenna to provide high gain, enabling most communications-on-the-move to be supported without ground antenna pointing. A “low HEO” (highly elliptical orbit) with a 4 hour period (6 orbits per day) provides long dwells over theaters.

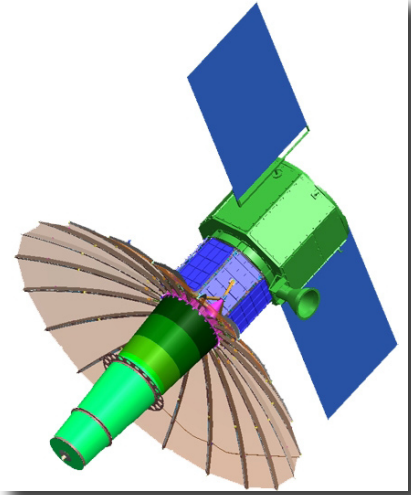
### What will it accomplish?

■ TacSat-4 will augment operational communications. Ten UHF channels will allow communication-on-the-move, data-exfiltration, and Blue Force tracking. The unique orbit augments geosynchronous communications by allowing near global, but not continuous, coverage including the high latitudes.

### Point of Contact

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The Tactical Microsatellite (TacSat) Innovative Naval Prototype (INP) program began in FY06 to prototype new naval space capabilities. This INP represented the Navy's first science and technology investment in response to the Department of the Navy's Space Policy approved in 2005, which emphasized the need for Navy to invest in space science, technology, research and development. The initial investments were aligned with the Navy's 2005 Wald study, which stated the need for space to improve maritime domain awareness, data-exfiltration, sub-detection, and communications-on-the-move (a Marine-stated need). TacSat-4 supports three of these areas and has been developed applying FORCEnet principles for user capabilities and collaboration.



TacSat-4 payload technologies include a 12-foot UHF deployable antenna, advanced thermal control using several heat pipe technologies, and compact ten channel transponder electronics, all provided at a lower cost point for spacecraft. Development areas include spacecraft bus standards, long dwell orbits, dynamic tasking, and net-centric operations.

The Minotaur-IV launch vehicle will be used to achieve orbit. A single satellite can provide 2 hours of coverage three times a day over a given theater (2000nm diameter), as well as support multiple theaters throughout the world each day. Users will use their existing equipment or early wide-band radios, when applicable. Advanced capabilities such as bridging multiple channels, converting UHF voice comms to SIPRNET, or specific data ex-filtration scenarios such as buoy collections transmitted to Navy ship IP networks, will be provided with unique terminals each supporting a 2000nm area. The Blossom Point (BP) Ground Station in Maryland provides the command and control for TacSat-4 and maintains its user tasking system. BP's flexible common ground architecture allows rapid transitions and enables net-centric operations. Payload tasking will be performed via the SIPRNET-based Virtual Mission Operations Center, with frequencies allocated by the Joint Task Force-Global Network Operations and theater managers, as appropriate.

### Research Challenges and Opportunities

- *Payload technologies include a 12-foot UHF deployable antenna, advanced thermal control using several heat pipe technologies, and compact ten channel transponder electronics all provided at a lower cost point for spacecraft.*
- *Early wide band communications testing using the MUOS wide band frequency spectrum.*
- *Advance operationally responsive space by developing spacecraft bus standards, long dwell orbits, dynamic tasking, and net-centric operations.*