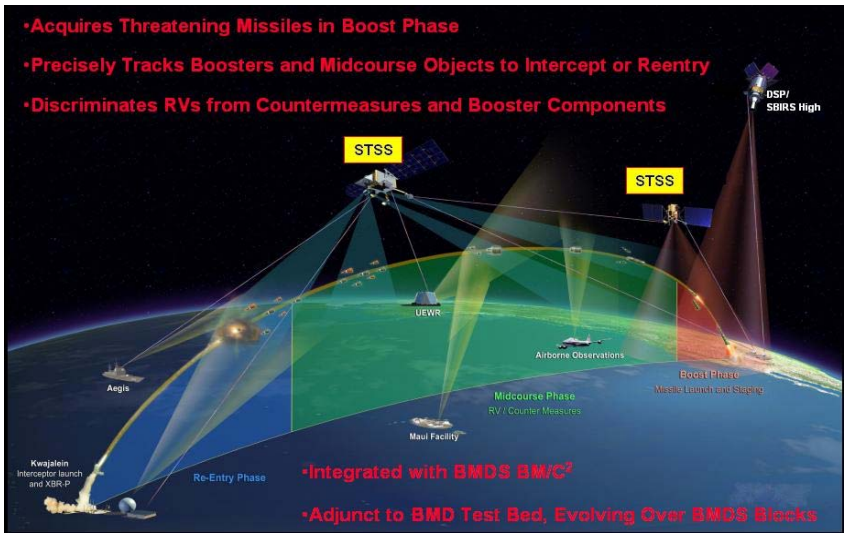
Space Tracking and Surveillance System (STSS)

Introduction

In Fiscal Year 2002 the SBIRS-Low program was restructured to reduce risk and fully incorporate the program into the Missile Defense Agency's (MDA's) approach of building missile defenses through a series of steps, building incrementally on demonstrated capabilities. The resulting program has been renamed the Space Tracking and Surveillance System (STSS). STSS is being pursued as part of the MDA's process of exploring a variety of methods to detect incoming ballistic missiles and pass this information to interceptors. These multiple approaches reduce overall system risk. MDA is investigating a combination of radar and optical sensor alternatives on land-, sea-, air- and space-based platforms of which STSS is one component.

Description



MDA is developing a series of interoperable, low-earth orbit research and development (R&D) STSS satellites and supporting ground equipment for the detection and tracking of ballistic missiles. Data from STSS will be used to allow the Ballistic Missile Defense System (BMDS) interceptors to engage ballistic missiles earlier in flight and pick out the warhead of an incoming missile from other nearby objects such as decoys. As technology matures and as lessons are learned from the first satellites, more capable satellites will be designed and launched. An STSS constellation will provide global tracking of ballistic missiles. Infrared sensors such as those STSS will use provides a different technology than radars enhancing the robustness of the BMDS. STSS will demonstrate key data processing and communication functions through the STSS Surrogate Test Bed (SSTB). The SSTB is a low-cost effort to integrate existing data collected from ground and airborne data collection assets emulating STSS sensors and data programs. The SSTB will participate in MDA flight tests to test tracking and discrimination software and exercise the communication interface into the BMDS's Command, Control, Battle Management and Communication system.

Initial Satellites

The STSS satellites will support the MDA's Block 2006 Test Bed - a collection of components, short of an operational system, that will allow large scale, realistic testing. They are being built from existing hardware to contribute a low-risk capability to the Test Bed. The initial satellites will demonstrate the ability to detect and track incoming missiles and distinguish between the warhead and other nearby objects with space-based infrared sensors, and pass this information to BMDS interceptors. Data from the initial satellites will be integrated into the command, control, battle management and communication (C2BMC) element. Northrop Grumman Space Technology (NGST) (formerly TRW) is on contract to deliver these satellites and to work with MDA on the definition of the desired capabilities of the next satellites.

The first two satellites are planned to be launched on a single Delta II launch vehicle in FY07. Subsequent satellites will be launched on the Air Force's standard launch vehicle, the Evolved Expendable Launch Vehicle (EELV).

STSS expands the BMDS Test Bed into space and provides the proof-of-concept for key STSS functions including processing and integrating data from multiple sources and passing this data to radars over the horizon and providing information on missile location to BMDS interceptors.

Future Satellites

New technologies will be inserted into subsequent R&D satellites, reducing the schedule risk for a potential operational system and demonstrating increasing capability. Incremental improvements can be expected in the areas of satellite lifetime, infrared sensors and sensor subsystems, data processing software, communications, and C2BMC integration.

The eventual operational system constellation size will be determined as the technology matures and is proven. Recent analysis has shown the value of a relatively small constellation (9-12) to ensure satellite-to-satellite communications. Increased coverage of key threat regions could be attained with a somewhat larger constellation (18-20) and worldwide coverage with an even larger constellation (25-30).