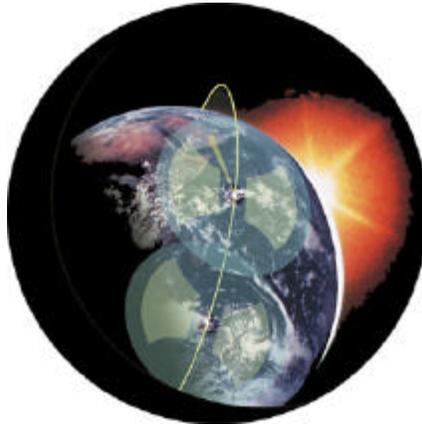


FACT SHEET

Discoverer II Joint Program



Mission

The Discoverer II Joint Program is a joint U.S. Air Force, Defense Advanced Research Projects Agency (DARPA) and National Reconnaissance Office (NRO) technology demonstration program. Discoverer II will demonstrate the technical feasibility and cost affordability of a space-based system offering high-range-resolution ground moving target indication (HRR-GMTI), synthetic aperture radar (SAR) imaging, and high-resolution digital terrain mapping data collection capabilities that will be directly taskable by theater or joint task force commanders and that will directly downlink collected data to theater ground stations. The Discoverer II program will design, fabricate and launch two research and development (R&D) prototype HRR-GMTI/SAR satellites, and conduct a one-year, on-orbit demonstration with the satellites in Fiscal Year 2004. The program is jointly managed by the Discoverer II Joint Program Office, located in Arlington, VA.

Features

The Discoverer II program will develop, design, fabricate and launch two research and development satellites that will demonstrate the capability to detect and track moving targets on the earth's surface, produce high-resolution imagery, and collect precision Digital Terrain Elevation Data (DTED). The Discoverer II satellites will also demonstrate the capability of U.S. military forces to directly task space-based collection activities and receive the requested data at theater ground stations in near-real-time, directly from the satellites, for areas of interest virtually anywhere around the world, both day and night, and in all-weather conditions. If successful, the Discoverer II program will usher in a revolution in the coverage and timeliness of reconnaissance and surveillance support under the direct control of theater commanders-in-chief or joint task force commanders.

Most significantly, the Discoverer II program will demonstrate for the first time the feasibility of fielding these capabilities at a cost that will make deploying a large operational constellation of Discoverer II follow-on satellites an affordable reality. With that in mind, the Discoverer II program intends to validate the feasibility of dramatically reducing satellite average unit production cost to less than \$100 million, and reducing the twenty-year life-cycle cost of a large operational system to less than \$10 billion.

Background

The Discoverer II program is motivated by a strong desire to significantly improve the reconnaissance and surveillance support available to the theater or joint task force commander. This venture capitalizes on significant pioneering R&D risk reduction programs from within the joint scientific and technical community.

Although airborne assets, such as Joint Surveillance Target Attack Radar System (JSTARS), U-2s and unmanned aerial vehicles (UAVs), are expected to do a superb job, additional theater reconnaissance and surveillance capabilities are required as a complement to the airborne platforms to ensure U.S. forces attain dominant battlefield awareness – as envisioned in Joint Vision 2010. With “information superiority” U.S. field commanders will be capable of employing smaller, lighter, highly mobile, and often widely dispersed, joint forces in decisive, high-tempo operations, engage and reengage with appropriate forces, protect U.S. and allied forces throughout the battlespace, and support those forces with tailored logistical operations.

To that end, additional capabilities are needed that will provide:

- Assured, on-demand reconnaissance of areas of interest worldwide during peacetime, periods of heightened tension, hostilities and operations other than war .
- Near-continuous surveillance of selected ground and maritime objects.
- Coverage of blind spots, or “shadowed” areas, obscured from view of stand-off airborne platforms.
- Rapid acquisition and tracking of mobile, time-critical targets throughout the depth of the theater.
- Precise geolocation of objects to support munitions targeting.
- High-quality terrain mapping.

Satisfying these needs will require a large constellation of space-based radar satellites offering:

- Day/night, all-weather, near-continuous, global GMTI search/track, and high-resolution imagery,
- Theater dynamic tasking of space-based, or “overhead,” GMTI and imagery collection,
- Near-real-time, direct downlink to theater of overhead GMTI and imagery collection; and,
- Collection of precision Digital Terrain Elevation Data (DTED).

In addition, it is essential these enhanced capabilities not come at the cost of added requirements for unique, in-theater infrastructure, or increased in-theater manning. Any operational system must use the same tactical ground stations to be used by theater airborne collectors, such as the U-2 and UAVs.

In an effort to substantiate the technical feasibility and cost affordability of a space-based radar system with these features, the Air Force, DARPA and the NRO formed the Discoverer II Joint Program as a technology demonstration initiative in February 1998.

The Discoverer II program is currently entering its concept development phase, or “Phase One”. Phase One will last approximately 18 months. During this period, selected Phase One contractor teams will perform concept definition, system capabilities and performance trade studies, cost trade-off analyses, and preliminary system design. At the 12-month point, at least two of the most promising contractor teams will be selected to complete preliminary system design.

At the end of Phase One, one or two contractors will be selected to proceed to Phase Two to perform final design and fabrication of the two Discoverer II satellites. Phase Two will last approximately four years, and will culminate in the launch of the two Discoverer II satellites in late 2003, and the performance of a year-long, on-orbit demonstration ending in late 2004.

During the on-orbit demonstration, an Army Tactical Exploitation Station (TES), modified with appropriate tasking, communications and data processing software, will be used for communication with the Discoverer II satellites to validate the use of tactical C³ assets for direct tasking of space-based collection activities and reception of requested data in near-real-time directly from the collecting satellite.

If the Discoverer II program proves successful, the Department of Defense will decide whether to proceed with the acquisition of an operational constellation of perhaps 24 Discoverer II follow-on satellites that would revolutionize the coverage and timeliness of reconnaissance and surveillance worldwide. A follow-on, operational system would support U.S. military forces deployed around the globe, as well as national-level users. If a go-ahead decision is made, initial operational satellite launches could occur as early as 2007. Additionally, the Discoverer II demonstrator will provide a technological foundation for related efforts in the parent agencies.

General Characteristics

Primary Function: Space-based HRR-GMTI detection and tracking of surface targets, high-resolution SAR imaging, and high-resolution digital mapping data collection.

Primary Contractors: Source selection on-going.

Constellation Size: Two satellites (demonstration system); TBD, approximately 24 satellites (objective system).

Power Plant: Solar panels (end-of-life peak power TBD).

Launch Vehicle: Medium or Heavy Lift Vehicle. Two or more per launch vehicle (objective system).

Weight: 1,500 kg-class (3,300 lbs) (est.) (objective system).

Radar Frequency: X-band (10 GHz)

Radar Antenna Type: Two-dimensional, electronically scanned array (ESA)

Radar Antenna Dimension: 40 m² (est.)

Orbit Altitude: 770 km (400 nm) (est.)

Design Life: 1 year on-orbit operation (demonstration system); 10 years (est.) (objective system).

Date of First Launch: 3QFY03 (demonstration system); FY07 (est.) (objective system).

Date Constellation Operational: 1QFY04 (demonstration system); FY08 (est.) (objective system).

In-Theater Command and Control: Dynamic, on-demand collection tasking; near-real-time, direct downlink of mission data.

Theater Ground Station: Common Imagery Ground/Surface Station (CIG/SS) compliant ground station (e.g., Air Force CARS, Army ETRAC/TES, Navy N-TIS, Marine Corps TEG).

In-Theater Communications: Modified CDL (548 Mbps) (est.)

Reach-Back CONUS Communications: Relay and/or satellite cross-links.

Point of Contact

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