

# National Polar-Orbiting Operational Environmental Satellite System (NPOESS)

## Executive Summary

- The National Polar-Orbiting Operational Environmental Satellite System (NPOESS) is being developed to provide, for a period of at least 10 years, a national remote sensing capability to acquire and disseminate global and regional battlespace environment data.
- The Air Force Operational Test and Evaluation Center (AFOTEC) conducted the operational assessment for the NPOESS program in accordance with the Test and Evaluation Master Plan approved by DOT&E.
- System technical difficulties delayed the launch of the NPOESS Preparatory Project risk reduction spacecraft.

## System

NPOESS consists of:

- Three operational satellites in the space segment provide sun-synchronous, near polar orbits with multiple advanced environmental sensors.
- The Command, Control, and Communications (C3) segment provides routing of mission data and spacecraft telemetry to Mission Management Centers.
- The Interface Data Processing Segment converts spacecraft sensor data into measurement formats for operational environmental products.
- The fixed and mobile field terminals of the NPOESS user segment are designed to receive and process data directly from satellites for operational system users.

## Mission

Combatant commanders, U.S. military forces, and federal partnership agencies will use NPOESS to provide timely characterization of environmental data.



- NPOESS is being developed to integrate and upgrade the capabilities of the current generation of operational military and civilian polar orbiting weather satellite systems.
- The operational missions using NPOESS will include aviation and space forecasts, ocean surface and internal structure forecasts for ship movements, search and rescue, and tropical storm reconnaissance and warnings.
- NPOESS provides data to a multitude of environmental prediction systems that generate mission critical terrestrial and space weather products for operational users.

## Activity

- AFOTEC completed the NPOESS operational assessment in January 2005.
- The NPOESS Integrated Test Team reviewed the current system test strategy and refined the system test plan during November 2004 and June 2005 to better integrate the testing of NPOESS system segments in development.
- The integrated NPOESS Senior User Advisory Group analyzed the NPOESS Preparatory Project risk reduction development effort during March 2005 for application to the later operational spacecraft of program.

## Assessment

- The AFOTEC operational assessment identified continued progress in areas related to operational effectiveness and unsatisfactory progress in areas related to system readiness for OT&E. The system does continue to make progress, but key concerns remain to be resolved in NPOESS system design, integration, threshold definitions for low-rate data user terminals, and user field terminal development for testing prior to launch.
- The NPOESS sensors, their integration, algorithm development, electromagnetic environmental effects, and

information assurance testing remain on a tight schedule and continue to face technical challenges including the launch of the NPOESS risk reduction satellite.

- The emerging differences between NPOESS system specification and the Integrated Operational Requirements Document II have not yet been synchronized to ensure developmental and operational testing criteria are consistent. Examples include the initial lack of space environment sensors on the first spacecraft and the potential lack of NPOESS satellite compatibility with the Air Force Satellite Control Network.

#### **Recommendations**

1. The risk reduction testing of NPOESS field terminals for individual agencies should take place before launch. During that testing, user terminals should interface with realistic NPOESS data sources in a controlled setting.
2. The NPOESS program should provide increased user community assistance in developing threshold definitions for low-data rate versions of the field terminals to allow for adequate and integrated testing on this portion of the user segment.
3. The NPOESS test strategy and test plan should be updated to incorporate testing information assurance, electromagnetic environmental effects, and the Air Force Satellite Control Network.
4. The NPOESS program should place special emphasis on the requirements of Operational Requirements Document II and the national security space responsibilities established for the system in the NPOESS charter.