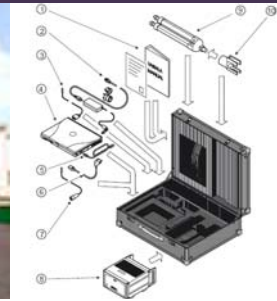




High Power Microwave Propagation Environment Measurement



HPM PEM Capability Summary

- Allows site-unique, day-of-test meteorological and oceanic updates to test predictions
- Measures atmospheric pressure, humidity, and temperature profiles
- Measures ocean wave and surface temperature characteristics
- Uses a tethered sonde for atmospheric measurements and a buoy for ocean surface measurements
- Includes ground station equipment for real-time viewing of the tethered sonde and buoy data
- Interfaces with the DETEC HPM Test Hazard Prediction Capability to update predictions
- Developed by Alliant Techsystems of Albuquerque, NM
- Available for use at the Naval Air Warfare Center Weapons Division

HPM PEM System Specifications

- Measures and telemeters atmospheric data up to 2 km altitude
 - Temperature: -50 to +60 C
 - Humidity: 0 to 1005 RH
 - Pressure: 500 to 1080 hPa
 - Uses UHF meteorology telemetry channel
- Measures ocean surface characteristics
 - Wave motion: Period to 100 s, height ± 20 m
 - Surface temperature: -5 to 46 C
 - Uses VHF buoy telemetry channel

The High Power Microwave (HPM) Propagation Environment Measurement (PEM) Capability was developed by the Directed Energy Test and Evaluation Capability (DETEC) project. The HPM PEM Capability measures atmospheric and ocean surface conditions within HPM beams. This capability addresses several high-priority shortfalls identified by the 2004 Tri-Service Study, which developed, scoped, and prioritized directed energy (DE) test and evaluation (T&E) infrastructure shortfalls. The shortfalls represented a need to provide near real-time monitoring of environmental conditions that affect HPM beam propagation.

HPM PEM Overview

The HPM PEM Capability measures atmospheric pressure, humidity, and temperature profiles; ocean surface wave characteristics; and water temperature using a tethered sonde subsystem and a buoy subsystem. HPM PEM provides these measurements to analysis tools, such as the DETEC HPM Test Hazard Prediction (THP) Capability, that then use the data to determine test hazard boundaries. The data from the HPM PEM Capability can also be used for HPM propagation calculations, such as atmospheric ducting, sea-surface scatter, and evaporation ducting.

Operational Description

A small crew that will launch and retrieve the tethered sonde and buoy, as needed, will operate the HPM PEM Capability. The tethered sonde and buoy each telemeter data to receiving stations and associated workstations. The HPM PEM operators can use the included laptop computer for real-time data preview of the tethered sonde and buoy data. The received data are stored or archived onto media for input into analysis tools.



Program Status

The DETEC Systems Integration Contractor (SIC) managed the development and fielding of the HPM PEM Capability. The DETEC SIC added the HPM PEM Capability development contract to the HPM THP project, being provided by Alliant Techsystems (ATK) in Albuquerque, NM. DETEC identified the Naval Air Warfare Center Weapons Division (NAWCWD) as the Host Site for HPM PEM in conjunction with the DETEC HPM THP Capability. The DETEC SIC delivered the capability to the host site in November 2008, concurrent with the HPM THP Capability delivery.

HPM PEM Capability Integrated Product Team

To guide the development process, DETEC formed the HPM THP Capability Integrated Product Team (IPT), with representatives from the Major Range and Test Facility Base (MRTFB), the military Services, and the HPM development community. DETEC expanded the HPM THP Capability IPT to include the HPM PEM Capability. The IPT represented the future users of both the HPM PEM and HPM THP Capabilities. The DETEC SIC structured the HPM PEM development to engage the IPT members to actively participate in the development effort by providing guidance and expert advice. The HPM THP Capability IPT members also participated in key reviews at significant points during design, manufacturing, testing, and fielding to verify the benefits and completeness of the capability for its intended users.

About DETEC

DETEC is funded by the Department of Defense Test Resource Management Center's Central Test and Evaluation Investment Program (CTEIP) to address joint service DE weapon system T&E infrastructure needs and implement solutions to these identified needs. DETEC develops and fields capabilities to address high-priority shortfalls identified in the 2004 CTEIP-funded Tri-Service Study.

The DETEC SIC, Science Applications International Corporation (SAIC), implements the DETEC project by working with Government and industry teammates to develop functional specifications for certain DE T&E infrastructure capabilities. The SIC acquires these capabilities in competitive procurements and integrates the capabilities into the MRTFB to help meet the testing requirements for current and future high energy laser and high power microwave weapon systems. ■

For further information about the HPM PEM Capability, please contact the DETEC team at detec@saic.com

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