NTS SERVICE SPOTLIGHT

HERO TESTING

THE COMPLETE SOLUTION

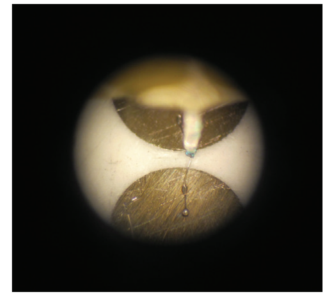
Ordnance can be classified as an explosive, chemical, or pyrotechnic devices used in equipment such as bombs, rockets, and ammunition carried on airborne, sea, space, or ground systems. All ordnance systems are required to meet a number of rigorous performance reliability and safety requirements prior to deployment. Among these requirements, Hazards of Electromagnetic Radiation to Ordnance (HERO) must be addressed. HERO exists due to a fundamental incompatibility between firing circuits contained within ordnance systems, and the external radiated electromagnetic environment (EME) they encounter during deployment.

When sufficient amount of energy is coupled into the firing mechanism to cause unintentional or premature operation, a safety and/or reliability consequence exists. Accidental EID activation can jeopardize safety through unintentional initiation of explosive trains, or on reliability through duding (EIDs can no longer perform their intended function, thus rendering the system incapable of performing its mission). In either case HERO consequences can lead to disastrous results.

Currently, MIL-STD-464 requires all branches of the DoD to ensure that ordnance is designed to provide sufficient immunity from its expected EME prior to deployment, and verified by testing and analysis. The general approach for a HERO evaluation is to expose inert, instrumented ordnance

Chemring M34 Flares launcher loaded configuration

1 to 2 GHz Antenna Array



Installation of sensor onto the EID bridgewire

to a controlled test electromagnetic environment and to monitor the explosive initiation device (EID) contained within the ordnance for a possible response. For most EIDs, the response is quantified in terms of the amount of RF current induced into the heating element, or bridgewire, of the device.

A common objective in all HERO testing is to determine the maximum or worst case response at each test frequency for various ordnance configuration phases (i.e., transportation and storage, assembly and disassembly, handling/loading, and platform loaded). These are also known as the stage to stockpile or "S4" phases.

The general approach is to establish a desired test EME level at a selected test frequency while measuring the induced current. Specific test procedures may vary according to the type of test facility being used, for example, an open-air site, a mode-stirred chamber, or an anechoic chamber.

THE HERO EXTRAPOLATION METHOD

In many cases, HERO testing may be performed a reduced exposure levels by utilizing the field extrapolation method described in MIL-HDBK-240. This entails of a commonly accepted practice of measuring the response of the EID at the maximum achievable field intensity. The measurements are then extrapolated those measurements to determine the Maximum Allowable Environment (MAE) the EID can be exposed to before reaching its Maximum No Fire current (MNFC) value.

THE HERO EXTRAPOLATION METHOD CONTINUED

The extrapolation method is also used to determine the maximum level which ordnance can be safety certified in order to facilitate the safe handling of the item in higher environments should the need arise in the future. NTS has developed specialized extrapolation worksheets to quickly and accurately calculate these critical characteristics.

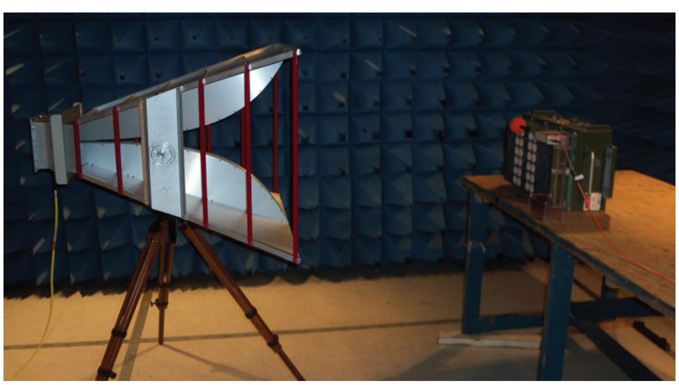
NTS Commonly uses sensitive fiber optic thermal couples when conducting HERO evaluations. These sensors are carefully installed onto the EID bridgewire then calibrated to establish a linear correlation between temperature rise and induced current flow.

NTS ACHIEVABLE FIELD LEVELS COMPARISON TO DO160G CATEGORY L

NTS provides EMI compliance testing to MIL-STD-461,and MIL-STD-464 (among many others), achieving RF field levels in excess of 200 V/m CW, PM, SW, AM & FM from 10 kHz to 40 GHz, up to pulsed HIRF field levels of Category L per RTCA DO160. In addition to a wide array of anechoic chambers, NTS has achieved pulse field levels in excess of 14,000 V/m through continuous advancements in technology.

CAPABILITIES & FACILITIES

- Multiple indoor and outdoor fully instrumented facilities
- Survivability testing
- Weapons evaluation



Chemring M34 Flares in launcher configuration during HERO Test at 200 MHz – 1 GHz

Chemring M34 Flares in Crated configuration during HERO test at 12 GHz – 18 GHz

CAPABILITIES & FACILITIES CONTINUED

- Extensive environmental testing including;
  - » Temperature
  - » Humidity
  - » Icing
  - » Freezing rain
  - » Salt fog
  - » Sand and dust
  - » Vibration
  - » Shock
- Ballistics
- Onsite design and fabrication of fully adjustable test fixtures capable of supporting a variety of test samples

ABOUT NTS

Every hour of every day, NTS is fully invested in helping you build better, stronger, safer, more reliable products, and bring those products to market quickly and efficiently. Since conducting our first rounds of tests in 1961, NTS has become one of the largest commercial test laboratory networks in North America.

Our test, inspection and certification services cover environmental, dynamics, EMC, wireless, product safety and much more. NTS engineers have exceptional knowledge of domestic and international test and conformity requirements. Client partners in Aerospace, Defense, Telecom and Energy rely on NTS to make sure they're putting their best products forward, and so can you.

NTS

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