OBJECTIVE: High fidelity background clutter generator is proposed for scene projection in Hardware-in-the-Loop (HITL) test and evaluation of Missile Warning Sensors (MWS).

DESCRIPTION: Performance testing of MWS sensors is hardware challenging due to the false alarm and realistic clutter environment background requirements. An MWS must be able to distinguish a threat against a clutter background and give a false alarm rate not greater than specified. A method of constructing high fidelity background clutter generator is proposed for scene projection in Hardware-in-the-Loop (HITL) test and evaluation of Missile Warning Sensors (MWS). Hardware performance testing, beyond benchtop component level, is designed to prompt and evaluate a desired response from the sensor to external stimuli (not injected scenes). To date, hardware test for 2 color MWS includes various models of 2 color scene projectors based on DMD technology with incremental improvements. The DMDs work well to achieve proper scene radiances and ratios and can be configured to provide high contrast by linear combination of modulator arrays and sources. Tests can be combined further to operate holistically with pointer/jammer HITL testing for combined system evaluation.

PHASE I: Study feasibility of novel high fidelity background clutter generation approaches, tuned specifically toward dual color IR clutter generator including all the IR wavelength regimes (SWIR, MWIR, and LWIR). Materials, efficiency, manufacturability, stability, and ruggedness on a flight motion table are all considerations. Specific designs and test results for mature implementation of new clutter generator will result.

PHASE II: As informed by Phase I, build a prototype dual color IR clutter generator. These prototypes would include any software items needed to test and develop IR models and scenes using this technology, which can then be used to stimulate IR sensors and countermeasure systems.

PHASE III DUAL-USE APPLICATIONS: These projectors, once productionized, can support multiple Government test labs throughout DoD as well as Programs of Record.

REFERENCES:
1. Igor Anisimov and Yakov Soskind, "Infrared Dynamic Scene Projector"

KEYWORDS: infrared imaging, infrared imaging scene projector, threat detection, sensors, hardware in the loop, testing and evaluation