

Focus on CSIR

Services in Optronic Sensor Systems

Motion Simulation Facility

At the heart of the of the system
is a three degrees of freedom
Flight Motion Simulator and
a robot manipulator
Target Motion Simulator.

The Motion Simulation Facility consists of several interconnected segments which, when utilised together, provides the hardware-in-the-loop simulation (HILS) capability within the CSIR's Optronic Sensor Systems research group.

The HILS capability presents a reduction in time and cost of the evaluation, testing and development of a device under test as evaluations are done in a controlled, high-fidelity laboratory environment that allows for repeatability. There is a significant reduction in risk and mitigation when compared to expensive flight trails. A simulation environment also allows for user-defined test scenarios.

CSIR

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FACILITY CAPABILITIES

Directed Infrared countermeasure effectiveness evaluation

The effectiveness of a directed Infrared countermeasure system is influenced by the pointing and tracking stability, as well as the accuracy of the laser under dynamic conditions. The CSIR's system allows for the evaluation of the tracking and pointing accuracy by simulating actual platform and target motion. In addition to evaluating the tracking and pointing performance, the effectiveness of modulation techniques of a laser source can be evaluated on captive missile seekers in a HILS evaluation with the addition of the Target Source Adaptor to the Target Motion Simulator.



Characterisation

The characterisation of a missile seeker aims to determine the seeker performance and characteristics for the purpose of exploiting these parameters for the development of countermeasure techniques. The system allows for the integration of a device under test, such as a missile seeker, of which the flight control signals are fed into a HILS control system for the control of the Flight Motion Simulator. By doing this, the dynamic behaviour of the device can be evaluated under different scenario conditions.

Missile flight analysis

In support of the characterisation process, the missile flight analysis aims to investigate the dynamic flight parameters of a missile during flight.

Target tracking evaluation

The dynamic deterministic movement characteristics of the Target and Flight Motion Simulators allow for optical payloads that are intended for airborne or naval platforms to be mounted in order to study the underlying tracking and stability performance of these optical payloads under platform movement conditions.

Bi-directional reflection distribution function measurements

The movement accuracy of the Target and Flight Motion Simulators allow for the precise and deterministic profiling of the bi-directional reflection distribution function of different surfaces when used in combination with a bi-directional reflection distribution function measurement block.

Inertial navigation unit evaluation

The Target and Flight Motion Simulators can be used to perform detailed inertial navigation unit evaluation and calibration when a deterministic platform movement profile is available.

Infrared countermeasure effectiveness evaluation

The addition of a Target Source Adaptor to the Target Motion Simulator allows for the evaluation of simulated infrared countermeasures against a captive missile seeker installed on the Flight Motion Simulator in a HILS test.

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