

Sensor Performance Modeling for Laser Range-Gated SWIR Systems

ECE Scholarly Paper Presentation

Eric Flug

Scholarly Paper Advisor: Dr. Yariv Ephraim
Graduate Advisor: Dr. Bernd-Peter Paris

April 1, 2009, 5:30 P.M.

STII Room 230A
Department of Electrical & Computer Engineering
George Mason University

ABSTRACT

As technology advances, the US military is continually trying to find ways to make Electro-optic (EO) sensor see farther, cost less, weight less, and be more reliable. The Cost Effective Target System (CETS) is a concept for unmanned ground vehicles to allow long range target detection and identification with a small, inexpensive EO sensor. This concept utilizes an uncooled Forward Looking Infrared (FLIR) sensor for detection and a laser-range-gated short wave infrared (LRG SWIR) sensor for identification. While FLIR sensors have robust sensor performance models that can aid sensor designers, when the CETS system was proposed, there was no such model for a LRG SWIR sensor. Researchers within the US Army have since developed a model that can predict target acquisition performance of a LRG imager. This significantly helps sensor designers perform quick and inexpensive trade studies without having to develop prototypes in the lab as well as aiding the Army in specifying and selecting a sensor for a future target acquisition platform. This paper discusses the attributes of LRG SWIR systems and details the parameters and equations that go into the sensor model.