Program of Research and Experimentation

This Telephonics RADAR RDR-1600, RT-1601 is a weather search and rescue radar system. This pulsed RADAR system will be part of a safety system designed to ensure no aircraft will be illuminated by a high-powered laser. The Telephonics pulsed, X-band RADAR was selected since the aircraft-detection performance characteristics of such systems have been previously characterized and approved for use in laser safety systems by the Federal Aviation Administration (see Duck et al, Applied Optics, Vol 44, Issue 23, pp 4937-4945).

This RADAR will be installed as part of the Mt Wilson Aerospace Facility for Integrated Optical Testing (MAFIOT). MAFIOT is an optical telescope facility being developed by The Aerospace Corporation to support research in a number of areas important to National Security Space including atmospheric propagation of lasers, hard target laser ranging, atmospheric LIDAR, and free-space optical communications. Several of these research areas will require the propagation of high powered lasers through the navigable air space.

The radar will be mounted to a gimbal atop a concrete pier. The motion of the gimbal will be slaved to track the motions of an identical gimbal system to which the laser transmitter will be mounted. Prior to operations, the radar and laser transmitter will be aligned and calibrated such that they maintain a co-boresight. During operations, the radar returns for each pulse will be digitized and analyzed to look for signals from aircraft in the beam. If it is determined that an aircraft is within the radar beam, the transmission of the laser will be inhibited until the airspace is once again determined to be clear. The beam width and pulse rate of the radar will be sufficient to ensure aircraft are detected prior to interaction with the laser. Early operation of the radar will involve testing to optimize the aircraft detection threshold and collect a large data set to validate detection performance to the FAA.