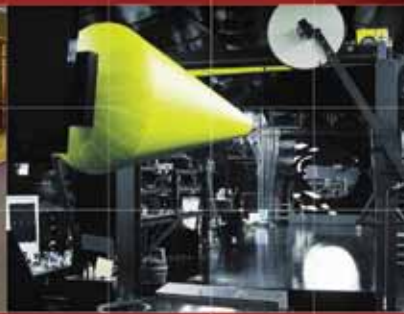




# AMOR

Advanced Measurements Optical Range



## Summary

- Large Optical Telescope System
- Targets (2-meter diameter cylindrical target space)
- Simulated Ranges (10-750km)
- Available Ladar Transceivers (10.6 $\mu$ m, 1064nm, 532nm)
- Target Mount (Spin, Precession, Wobble, and Translation)
- Targets Available (Vehicle Representative to Calibration Sources)

**The AMOR is a compact optical test facility specifically designed to test advanced ladar sensing technologies/concepts, measure reflectance distribution properties, and characterize target optical signatures.**

The AMOR is a compact indoor Laser Detection and Ranging (ladar) measurements facility designed to develop and test advanced ladar sensing and measurement concepts. AMOR is a multifunctional facility capable of supporting Target Measurements, Ladar Sensor Testing, Algorithm Testing & Development, Material Characterization, and Advanced Ladar/Passive Sensor Concept Development. The availability and use of the AMOR facility is open to U.S. government agencies/services, U.S. government contractors, industry, academia, and others.

### Overview

The U.S. Army Space and Missile Defense Command/U.S. Army Forces Strategic Command (USASMDC/ARSTRAT) operates the AMOR as a ground-based test bed specifically designed to develop and test advanced lidar sensing and measurement concepts as well as characterize customer objects or materials. As increasingly sophisticated threats emerge in the 21st century, development of advanced sensing and measurement capabilities is crucial. The availability and use of the AMOR is a vital capability for the U.S. national defense.

### Benefits for Tomorrow's Defense

AMOR is a multifunctional facility capable of supporting the following vital defense mission areas for today's military and the Future Force.

- Target Measurements – AMOR provides the capability for lidar measurements on a wide variety of test objects (re-entry vehicles (RVs), decoys, satellites, technology components, countermeasures, tactical and analytical targets, etc.).
- Sensor Test Bed – AMOR is an excellent lidar sensor test bed from visible to long-wave infrared (LWIR) wavelengths. Flexibility in the AMOR facility design allows integration and testing of a wide variety of lidar sensors.
- Algorithm Development & Testing – Range Doppler images, range resolved target cross sections, and total cross sections of realistic targets undergoing user defined object motion provide essential data input for user's intended algorithm development and testing under controlled conditions.
- Advanced Lidar/Passive Sensor Concept Development – Advanced electro-optical sensors with both lidar and passive capabilities will be required to become more sophisticated and capable as technologies mature. AMOR provides a unique test bed environment for developing lidar/passive sensor concepts while controlling the conditions prior to carrying the sensors to the field.

### Technical Concept

AMOR is an indoor lidar measurements facility possessing several unique features. The following are specific utilities within the national defense arena.

- Optical Aperture – The large optical telescope system features a two-meter diameter primary mirror which provides the capability for AMOR to make realistic lidar measurements of up to full scale military and non-military test objects.
- Target Motion – The target mount provides realistic target motion of full-scale test targets. The target mount can hold targets at aspect angles from 0 to >90 degrees, as well as providing spin, precession, target wobble, and translation.
- Far-field – The optical system provides the capability to take the output of a transmitter and produce a high-quality collimated beam of about 2 meters in diameter, which provides an illumination of the target with the characteristics needed for far-field measurements. The optical system also provides the necessary optics to collect scattered radiation from the target with a very narrow angular field-of-view to complete the far-field simulation. Variable range capabilities (10-750 km) also include an optical zoom system for fly-in simulations using active or passive sensors.
- Lidar Transceivers – AMOR receivers can make coherent (heterodyne detection) measurements at 10.6  $\mu\text{m}$  & 1064 nm as well as incoherent (direct detection) measurements at 532 nm. Wide-bandwidth waveforms allow detailed target signature measurements.
- Calibration – All lidar measurements are calibrated using specular reflecting spheres of known cross-section.



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