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Fact Sheet

Long Range Discrimination Radar (LRDR), Clear Space Force Station (CSFS), Alaska

LRDR is designed to provide the warfighter advanced ground sensor capabilities supporting the range of requirements from missile warning, through tracking and discrimination, to space domain awareness. LRDR provides an unparalleled ability to simultaneously search, track and discriminate multiple small objects, at very long ranges, 24/7/365. LRDR combines proven solid-state radar technologies with proven ballistic missile defense algorithms, all based upon an open architecture platform capable of meeting future growth. LRDR utilizes a unique approach to accurately identify threats in a dense operating space, setting it apart from current ground-based sensors. Dual monostatic arrays, each measuring 60 feet high and 60 feet wide, and gallium nitride technology combine for a more powerful, more capable radar. This technology is designed to be:

- Multi-mission capable: LRDR is a multi-mission, multi-face radar capable of conducting integrated missile defense and space domain awareness (SDA) missions through a wide field of view. LRDR tracks and discriminates multiple threats simultaneously, providing precision track, discrimination, and hit assessment data to the Missile Defense System firing units such as the Ground-Based Midcourse Defense (GMD) System. LRDR can monitor satellites orbiting the earth, detecting, tracking, and identifying active/inactive satellites, spent rocket bodies, and debris, in support of the SDA mission.
- Adaptable for Future Threats: The radar can be scaled and extended to adapt to new threat sets, such as hypersonic threats, through software enhancements, without changing the hardware design. Dual monostatic arrays provide the full multi-mission capability throughout the extensive field of view, covering a vast volume against threats originating from various regions around the globe.
- Efficient and Reliable: Scalable and modular gallium nitride based “subarray” radar building blocks provide advanced performance and increased efficiency and reliability.
- Persistent: The unique maintain-while-operate capability provides very high operational availability and enables continuous track and discrimination.

Overview: LRDR is currently undergoing radar and MDS integration at CSFS, Alaska, and provides persistent, long-range midcourse discrimination, precision tracking, and hit assessment to support the Homeland Defense Capability against missile threats to the homeland and in the Pacific theater.

- The LRDR operates in S-band frequencies featuring a scalable, open systems architecture to mitigate evolving threats. The LRDR is integrated into the missile defense system through the Command and Control, Battle Management and Communications (C2BMC) element.
- LRDR’s improved discrimination capability in the Pacific architecture increases the defensive capacity of the homeland defense interceptor inventory by conserving the number of Ground-Based Interceptors required for threat engagement.

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Maturity, Testing & Fielding: The core technology has already been declared Technical Readiness Level 7 by the U.S. Government – which means that LRDR demonstrated its system prototype in an operational environment.

- This TRL assessment was primarily achieved through the integration and testing conducted at Lockheed Martin's (LM) Solid State Radar Integration site (SSRIS) in Moorestown, NJ.
    - The SSRIS is a scaled version of the LRDR radar that uses production hardware, tactical backend processing equipment, along with tactical software and successfully demonstrated prototype system performance in an operational environment.
    - Since 2018, the SSRIS performed numerous live, precision satellite tracking exercises, including the Lincoln Calibration Sphere-4 (LCS-4). These events reduced risk for the LRDR SDA mission and enabled the radar to verify calibration, track accuracy, and system performance. During an LRDR Capability Exercise Event in December 2020, the SSRIS tracked over 200 satellites for an eight hour period, highlighting LRDR's Active Electronically Steered Array (AESA) technology and overall readiness.
    - Throughout 2021, the SSRIS tracked five space launches from NASA's Wallops Island and Cape Canaveral test facilities, demonstrating the ability of LRDR software to detect and track a variety of rocket launches.

- Ground test activities are underway for LRDR. These tests certify the operational capability of the missile defense system software. The missile defense system ground tests consist of test cases comprised of operationally realistic raids of complex ballistic missile threats, interceptors, and space objects. The tests use accredited modeling and simulation (M&S) to drive end-item deployed systems, using a hardware-in-the-loop (HWIL) system. These test cases exercise significant missile defense system element capability with raid size, threat complexity, launch/impact locations, and interceptor density combinations impossible to replicate in a live flight test.

- LRDR demonstrated system maturity and capability by successfully tracking Resident Space Objects (RSOs) in support of the SDA mission. In November 2021, the LRDR Western Array successfully tracked 137 RSOs over a two day period demonstrating the SDA mission capability.

- LRDR completed the Initial Fielding milestone on December 6, 2021, which signified the completion of the LRDR facilities construction, radar installation and checkout, and the transition to radar testing, training, and operations. LRDR is continuing to track RSOs while conducting radar testing and verification activities. Pending completion of ground testing and verification, operational fielding of the LRDR capability at CSFS, AK is on track to occur in 2023 when LRDR is fielded with the other missile defense system components.

Solid State Radar Integration Site (SSRIS) (Moorestown, NJ)

LRDR Complex, Clear Space Force Station, AK.