



**LOCKHEED MARTIN**

**AN/TPS-77**  
Tactical Transportable Radar

## Proven Performance...

### Now Available in a Tactically Transportable Package

21st century Expeditionary Aerospace Forces need high performance, reliable radar systems that are easy to transport, easy to deploy and ready to operate immediately. To meet these demanding requirements, Lockheed Martin is now producing the AN/TPS-77 (formerly TPS-117), 3-D, long range air surveillance radar - the latest offering in the company's proven line of all solid-state radars.

The AN/TPS-77 leverages 15 years of Lockheed Martin investment in the continuous improvement of radar technology and combines it with the company's experience in designing transportable radars for customers worldwide. The result is a new radar that places the best of the FPS-117's performance, reliability and low cost of ownership in a package that is now tactically transportable by C-130 aircraft.

Field commanders can count on accurate data on all targets at ranges up to 250 nautical miles and elevations up to 100,000 feet from a radar that can operate 24 hours a day - even with no on-site personnel. The AN/TPS-77 is in production and ready now for deployment around the globe.



**Lockheed Martin all solid-state radars have accumulated more than 5 million system hours of operation in environments as diverse as Arctic Ocean shores and the Arabian Desert.**



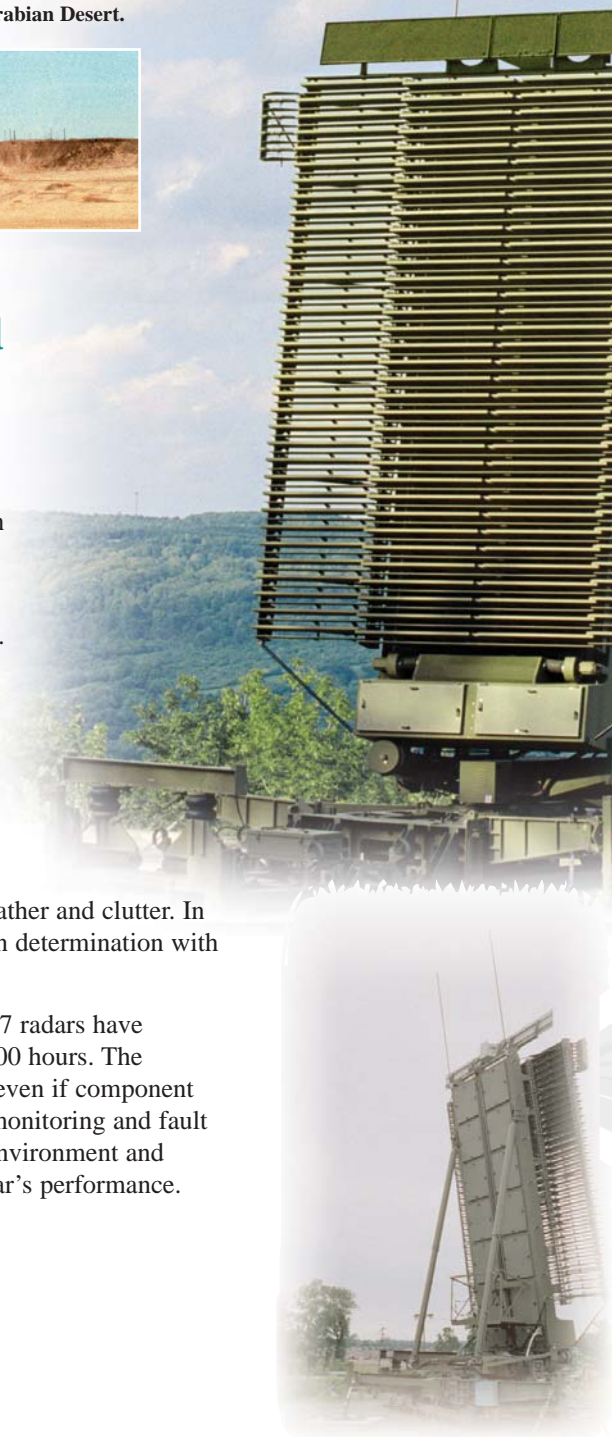
## An Architecture and Technology Ideally Matched for Performance and Reliability

The AN/TPS-77 is an L-Band, phased array, all solid-state radar. The radar's planar array antenna rotates to provide 360 degree azimuth coverage. As the antenna rotates, the radar transmits pencil beams that are electronically phase scanned to provide complete elevation coverage.

Instead of a single transmitter, the AN/TPS-77 utilizes 34 all solid-state transmitters and receivers that are located on the antenna array - directly coupled to their antenna elements. This architecture eliminates high power rotary joints and central transmitters - two common single points of failure in most long-range radars. Only low-level IF signals pass across slip rings to off-array signal and data processing equipment. The processing equipment, along with customized operator interface and communications equipment, is located in a single ISO shelter.

According to Skolnik's *Radar Handbook*, "L-Band is the preferred frequency band for land-based long-range air surveillance radars." The AN/TPS-77 provides all the natural benefits of L-band, including superior long-range detection performance, especially in weather and clutter. In addition, full monopulse processing in both azimuth and elevation allows accurate position determination with every "hit" on a target.

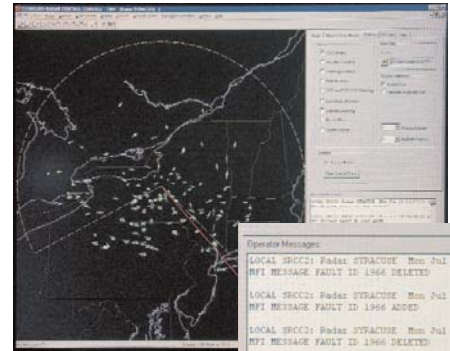
The all solid-state design of the AN/TPS-77 has proven its reliability. Comparable FPS-117 radars have consistently demonstrated mean-time-between-critical-failures (MTBCF) of more than 2000 hours. The AN/TPS-77's fault tolerant architecture also allows it to perform within its specifications even if component failures occur. To eliminate the need for on site technicians, a sophisticated performance monitoring and fault location (PMFL) system automatically recalibrates the radar to adjust for changes in the environment and component failures. The output of the PMFL can be remotely accessed to monitor the radar's performance.



# Simplified Logistics and Maintenance, and Reduced Personnel Requirements Mean Low Cost of Ownership

The United States Air Force and Lockheed Martin specifically developed the AN/FPS-117 Radar to reduce operating costs and manpower requirements at remote radar sites.

When the FPS-117 radar was introduced by the Alaskan Air Command, manning for its 13 radar sites was significantly reduced. Subsequent upgrade programs have further reduced personnel requirements. In fact, individual radar sites now operate without any on-site staff. The AN/TPS-77 delivers these same benefits to users of deployable air surveillance radars.



The AN/TPS-77's PMFL system continually monitors the radar status and reports system status to remote maintenance centers.



## High Reliability and Remote Maintenance Monitoring Enable a Smaller Deployment Footprint:

- Simplified maintenance means fewer skilled technicians
- No on-site technicians are required
- A single technician can remotely monitor several radars from virtually anywhere
- Requirements for on-site and theater spares are reduced
- 99.7% operational availability ensures mission performance with fewer radars

## Benefits of Common FPS-117 and AN/TPS-77 Support Infrastructure

- Reduced inventory of Line Replaceable Units (LRUs) and repair parts
- Common test and support equipment can be used
- Common training and technical manuals reduce logistics cost

### Missile Track Beam

Steerable up to 60° above the horizon

### Long Range Surveillance Beam

Reduced signal processing for increased sensitivity

### Special Processing Beam

Automatically applies special processing for weather/chaff

### Short Range Surveillance Beam

Uses MTI and Doppler processing to reduce ground clutter

### Valley Coverage Beam

Provides "look-down" capability from elevated sites

The AN/TPS-77's pencil beam architecture allows the parameters of each beam to be tailored to its environment - greatly reducing the effects of terrain and weather clutter. A six degree "lookdown" capability also permits coverage in valley areas inaccessible to "stacked beam" radars.

## Ready For the Next Threat

The AN/TPS-77 radar design has the flexibility to meet the evolving theater ballistic missile (TBM) threat. This capability has been proven with the AN/TPS-59(V)3, a similar Lockheed Martin radar in operation by the US Marine Corps.



Testing against live missile targets at White Sands Missile Range has confirmed the AN/TPS-59(V)3 radar's ability to detect and track TBM targets and to cue weapons systems at tactically useful ranges. Under the test program to validate the radar's capability, the TPS-59(V)3 faced TBM and cruise missile (CM) targets including multiple simultaneous TBM and CM launches. The TPS-59 radar successfully detected and tracked all targets, calculated launch and impact points and cued defensive missile batteries in support of successful intercepts.

## Electronic Protection

Design features of the AN/TPS-77 provide inherent capabilities for electromagnetic interference rejection. A full suite of electronic protection features is available as well.

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