

NORTHROP GRUMMAN

AN/TPS-78 Solid-State Radar Family



*Unequaled Reliability,
Survivability & Performance*

AN/TPS-78 Features and Benefits Include:

- The reliability of solid-state
 - High operational availability at low operation & maintenance (O&M) cost
- Long- and mid-range versions
 - Operational and logistic commonality
 - Ease of system integration
- Commercial-off-the-shelf (COTS) electronics
 - Low acquisition and O&M costs
- Optimized stacked-beam architecture
 - Assured all-altitude target detection
- Multi-Mode Moving Target Indicator (MTI) and Moving Target Detection (MTD) processing
 - Superior all-altitude, all-weather target detection and tracking
- Single, 14-foot (4.3 m) ISO shelter and ISO antenna pallet
 - Minimum airlift, ground transport, and setup time
- Superior antenna sidelobes
 - Survivability and anti-jam performance
- Fixed and mobile operation
 - Operational flexibility
 - Cost savings via common logistics
- Integral beacon antenna
 - No setup time
 - Low antenna sidelobes
- Extensive ECCM features
 - Frequency agility
 - CFAR
 - Low antenna sidelobes
 - JATS
 - 10% bandwidth



Mobile Operation



Fixed-Site Operation



Independent and Netted Command and Control and Remote Operation

AN/TPS-78 Family of Radars Characteristics

Characteristic	Long-Range AN/TPS-78	Mid-Range TPS-703
Instrumented Range	240 nmi (445 km)	75 nmi (140 km)
Frequency	2.8-3.1 GHz	2.8-3.1 GHz
Data Rate	10 Seconds	5 Seconds
Height Coverage	100K/500K Ft (30.5/152.4 km)	100K Ft (30.5 km)
Elevation Angle	0-20°	0-40°
Moving Target Indicator (MTI)	≥50 dB Full Range	≥50 dB Full Range
Moving Target Detection (MTD)	Rain/Chaff Performance	Rain/Chaff Performance
MTBCF	>2000 Hrs	>2000 Hrs
Cooling	Air	Air
Operating Temperature	-30 to +55°C	-30 to +55°C
Color Displays	Flat Panel (Liquid Crystal)	Flat Panel (Liquid Crystal)
Shelter	1 14-Ft. (4.3 m) ISO	1 14-Ft. (4.3 m) ISO
Setup Time	<30 Min/4 Men	<20 Min/4 Men
Antenna Size	215"W x 100"H (5.5 m x 2.5 m)	215"W x 79"H (5.5 m x 2.0 m)
Prime Power	60 kW@50 or 60 Hz	45 kW@50 or 60 Hz

AN/TPS-78 Solid-State Radar Family

AN/TPS-78: An Unequaled Combination of Capabilities

The new AN/TPS-78 is the latest generation of the Northrop Grumman AN/TPS-70 radar family, operationally proven with the United States Air Force and in twenty-two countries worldwide. The AN/TPS-78 provides a combination of capabilities never before achieved in a single radar: superior architecture, fully solid-state transmitter, the world's best anti-jam performance, and maximum survivability.

These capabilities are made possible by combining advanced Northrop Grumman solid-state technologies with operationally-proven designs, such as used in the AN/FPS-130 solid-state, totally-unattended long-range air defense radar and the ASR-12 solid-state air traffic control radar. This combination provides outstanding operational performance, survivable multi-mission capability, complete operational flexibility, and maximum cost-effectiveness.

AN/TPS-78 Commonality Provides Total Life Cycle Cost Savings

The AN/TPS-78 is available in two versions. The long-range radar is known as the AN/TPS-78, and the mid-range radar is known as the TPS-703.

Having two versions assures that mission requirements can be met with a high degree of operational and logistic commonality, providing maximum returns on both acquisition and O&M investments. All major subsystems and Line Replaceable Units (LRUs) are shared by both versions.

The AN/TPS-78 offers greater than 90% software commonality with the TPS-703. Thus, software maintenance, modification, and documentation costs are significantly below those of competing products. The software is hosted on open-architecture signal and data processors, enabling cost-effective future upgrades.

AN/TPS-78 Long-Range



TPS-703 Mid-Range



Common

- Signal Processor
- Data Processor
- Receiver
- Frequency Generator
- SSTx Panels
- IFF
- Display
- Software

Commonality = Cost Savings

The Northrop Grumman Solid-State Heritage Continues

Northrop Grumman has a long history of providing highly modular, ultra-high reliability solid-state systems for a broad array of demanding applications. These solid-state systems operate in some of the world's harshest, most unforgiving environments.

What is common to these applications is that they demand virtually 100% operational

availability. Northrop Grumman solid-state systems are providing dependable, uninterrupted service, worldwide. The AN/TPS-78 family of S-band radars is made possible by the latest technology advances in power transistor design and manufacture.

AN/TPS-63SS



AN/FPS-130



AN/SPS-40



Mode S

More Than 300 High Performance Solid-State Systems Produced



LASS



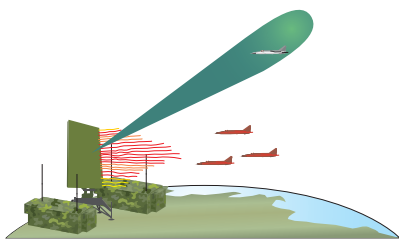
ASR-12

Extensive Solid-State Heritage Extends to the AN/TPS-78 Family

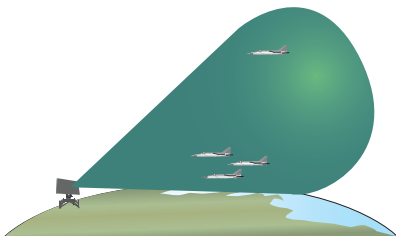
Superior System Architecture

Excellent All-Altitude Detection

Unlike systems using pencil beam architectures, the AN/TPS-78 uses a stacked beam architecture to provide superior full-time, full-volume coverage of all targets at any azimuth position. The AN/TPS-78 detects targets at all altitudes, including low-altitude targets in heavy ground and sea clutter. The AN/TPS-78 suffers no detection degradation in the presence of long-range clutter.



Pencil Beam Part-Time Coverage Only Detects Threats Some of the Time



AN/TPS-78 Stacked Beam Provides Full-Time Coverage of All Threats

Assured Target Tracking

The AN/TPS-78 provides full-range Moving Target Indicator (MTI) and Moving Target Detection (MTD) processing to 90 nmi to cancel both fixed and moving clutter. The full-range MTI ensures detection and tracking of low altitude targets at all ranges in heavy clutter conditions. MTD suppresses moving clutter and ensures optimal target detection and tracking, even in heavy rain and chaff.



Superior Target Tracking in All Environments

The integral tracker is tightly coupled to the AN/TPS-78 characteristics for optimum tracker performance.

Extended Operability

The AN/TPS-78 Solid-State Transmitter combines the outputs of many ultra-high reliability solid-state modules. These modules are inserted into identical, interchangeable power panels. Full radar coverage and performance does not require all of the solid-state modules to be operating. The AN/TPS-78 also does not require transmit/receive (T/R) modules on the rotating antenna.



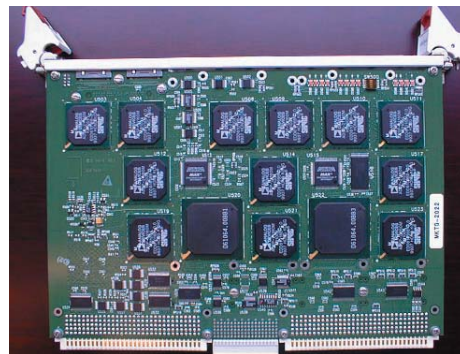
AN/TPS-78 Solid-State Transmitter Incorporates Redundancy Throughout

Redundancy at Every Level

The AN/TPS-78 system incorporates redundancy at every level: power supplies, drivers, modules, panels, air blowers, environmental control units and processors. Should a fault occur, the system automatically reconfigures itself so that full operational capability is preserved. This provides a mean time between critical failure (MTBCF) in excess of 2000 hours, with operational availability greater than 99%.

Complete Modularity with 100% BIT/FIT

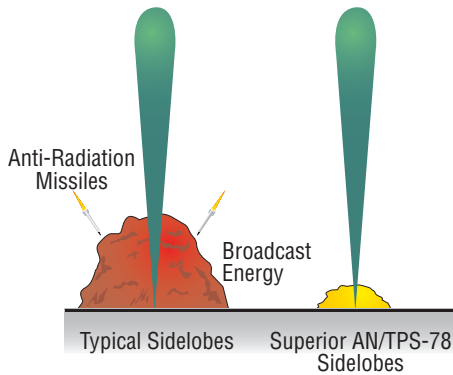
The AN/TPS-78 system is exceptionally modular. The entire transmitter requires only 9 different LRUs. All power modules and power panels are identical and fully interchangeable. Fully-automated Built in Test/Fault Isolation Test (BIT/FIT) provides fault detection and isolation for every module on every panel.



Maximum Use of COTS Hardware for Low Cost Supportability and Multi-Mission Flexibility

Survivability is Everything

If a radar is not survivable, it cannot perform its operational mission. The Northrop Grumman AN/TPS-78 radars have been designed to operate and survive in the most difficult conditions. This outstanding survivability is achieved by combining the best mobility in its class, unmatched sidelobe levels, a “cool” antenna, and weight and size significantly less than competing systems.



Poor Transmit Sidelobes Broadcast Energy and Compromise Survivability



Rapid Antenna Operational Deployment on Single 5-ton Truck



Standard ISO Shelter Configuration

Unmatched Mobility

All AN/TPS-78 electronics including the transmitter are packaged in a single 14-foot (4.3 m) ISO shelter which accompanies the antenna. The complete system can be transported in a single standard C-130 aircraft. Competing systems typically require two or three times the volume, weight, airlift, and ground transport of the AN/TPS-78. Both the long-range AN/TPS-78 and the mid-range TPS-703 require less than 30 minutes to set up or disassemble.

Small RF Signature

Northrop Grumman antennas have the world's lowest sidelobes. The most important benefit of the AN/TPS-78 Low Sidelobe Antenna is that it maximizes energy on target, rather than broadcasting it as a beacon, which highlights the radar's location to adversaries. Low-receive sidelobes and narrow beamwidth improve performance in active ECM.

Small Infrared (IR) Profile

The AN/TPS-78 has no active radiating elements on the antenna, thus providing a “cool” array. There are no transmit/receive modules or high power phase shifters. The AN/TPS-78 is therefore more difficult for infrared-guided systems to detect.

Small Visual Profile

The long-range AN/TPS-78 antenna is only 2.5 meters high and 5.5 meters wide. The mid-range TPS-703 has an even smaller antenna. Some competing antennas are typically two to three times larger and are therefore much easier to detect.

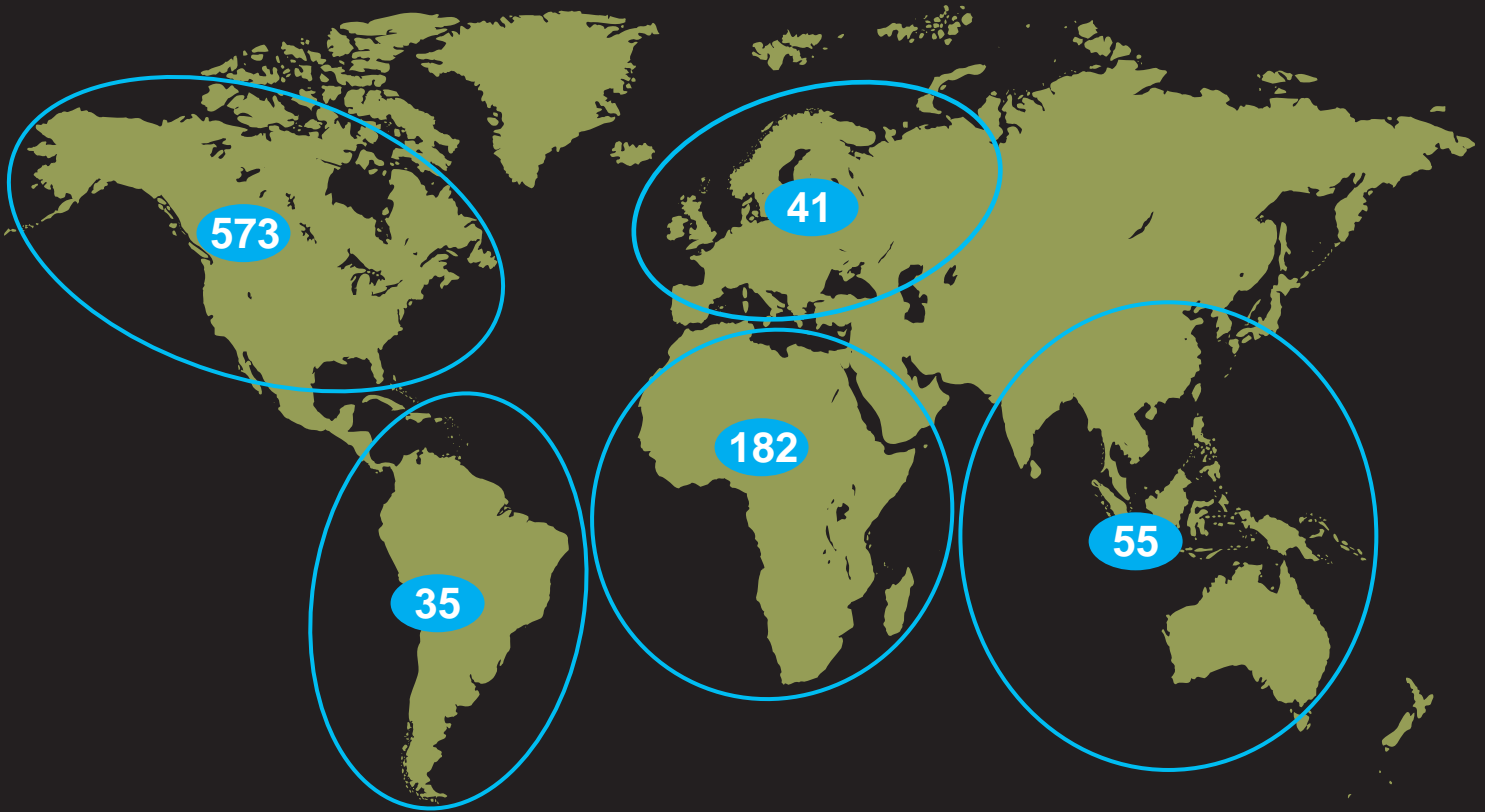
Comprehensive Logistics Support

Northrop Grumman provides complete logistics support for the life of the AN/TPS-78 including:

- Logistic modeling, analysis, and planning
- Spares
- Military and commercial documentation (including electronic media)
- Training
- System installation and checkout
- On-site technical support
- Repair and overhaul
- Comprehensive Depot & Electronic Repair Center
- 24-hour Technical Support Hotline manned by experienced engineers

The AN/TPS-78 and TPS-703 use programmable processing techniques and modular design to reduce the number of LRU types by a factor of 5:1. Northrop Grumman provides comprehensive training including Computer-Based Training. We can provide any level of training from language skills and basic electronics to intensive, AN/TPS-78-specific Operations and Maintenance training.

Northrop Grumman Ground-Based Radars: Unmatched Global Presence



Northrop Grumman: A 50-Year Radar Heritage

Northrop Grumman is the largest radar producer in the world, with more than 900 ground-based radars in use worldwide. Northrop Grumman radars are providing critical, real-time information all day, every day, in every part of the world.

NORTHROP GRUMMAN

For more information, please contact:

Northrop Grumman Corporation
Electronic Systems
P.O. Box 17320, MS B545
Baltimore, MD 21203-7320 USA
24-Hour Customer Service: 1-410-552-2455