



# TIGAR

TSS Integrated  
Ground-based Air Radar



**We've Got Your Track™**

## TSS Solutions TIGAR at a Glance

### Description:

Fully modernized transportable 3D radar system, designed to provide a long-range air picture that detects, tracks, and automatically classifies the full threat spectrum.

### 3D Range:

Up to 240 nautical miles.

### Mobility:

Fully transportable by air, land, or sea, with rapid setup and teardown capabilities.

### Reliability:

Designed for minimal maintenance and high operational availability, even in harsh environments.

### Modernization

**imperative:** The TIGAR system is equipped with TSS-designed and integrated subsystems that deliver significantly improved performance, reliability, and operability over the current AN/TPS series of Radar systems.

# Introducing TIGAR

TSS Solutions matches emerging tech to modern defense needs

**T**SS Solutions is the recognized leader in supporting and modernizing radar systems around the world. Building on our tradition of excellence, we proudly introduce the **TSS Integrated Ground-based Air Radar (TIGAR)**, a fully upgraded and modernized AN/TPS-43 radar system.

We have leveraged our industry-leading expertise and our reputation for innovation to create TIGAR, powered by integrated, state-of-the-art subsystems that deliver significantly improved performance, reliability, and operability over the current AN/TPS series of radar systems.

In developing TIGAR, TSS Solutions has added a significant number of emerging technology upgrades to the TPS-43 radar system that greatly improve air surveillance detection, tracking, and classification for our partner nations. Our Radar Depot in Melbourne, FL, enables cost-effective technology insertions that greatly extend the service life of these systems, and our field service teams conduct installation and training required to assist our defense partners.

Having completed upgrades of the TPS-70 and TPS-75 for the U.S. Air Force, TSS Solutions is well positioned as the leader in technically refreshing legacy radar systems in support of our global defense customer base.

### Investing in the TIGAR system ensures:

- Enhanced detection ranges and accuracy.
- Improved resistance to jamming and electronic warfare tactics.
- Seamless integration with contemporary defense systems and networks.
- Extended service life and reduced maintenance burdens.

With the addition of the new Signal Processor, IF Receiver, Frequency Generator, RF Driver, and Array Signal Amplifiers, TIGAR is fully modernized for current and future threat scenarios, delivering a robust, adaptive, and sustainable asset, ready to tackle the challenges of today and tomorrow.



**Don DiFrisco, President and CEO**  
TSS Solutions

# System Upgrades and Replacements

The following major asset components are removed, replaced, or relocated from the AN/TPS-43/72 for the TSS Solutions TIGAR modernization:

## Upgraded

**Amplifier Assembly, RF** (new)

**Antenna**

Upgraded with new Array Signal Amplifiers, Receivers, Solid-State Receiver Protectors, and Circulators

**Console Assembly, PPI** (new)

**Radar Processor** (new)

**Manifold and Hose Assembly, Return** (new)

**Manifold and Hose Assembly, Supply** (new)

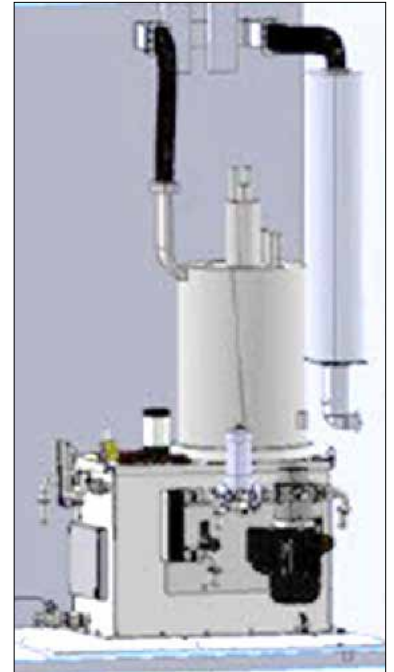
**OEM Tx Control Panel Assembly**  
Updated

**Power Distribution Panel Assembly**  
Modified and added new

**IFF Interrogator Mode 5/S**  
Upgraded

**Rotary Joint And Tilt Sensor**  
Upgraded, including Modes 5 and S;  
fiber bundle Slip Ring Technology

**Frequency Generator**  
Upgraded



## Replaced

**Focus Coil Assembly, Power Supply**

**Focus Coil** (recommended)

**Power Supply**

**Power Supply, Vacuum Pump**

**Soft Start Assembly** (Replaced with VFD)

**Waveguide Assembly** (Reused/Replaced)



## Reused, Relocated

**Harmonic Filter** (Reused)

**Track Assembly** (Relocated)

## Removed

**Shunt Regulator**

**Module Assembly, Pulse Forming Network**

**Amplifier Assembly, Trigger Amplifier/Modulator**

**Resistor Array**

**OEM Oil Tank Assembly**

**SF6 Tank Assembly**

**Diode Assembly**

## DISPLAYS

Legacy displays are replaced with our new touchscreen LCDs to deliver significant usability enhancements, including software that provides superior tactical interfaces for operators. All tracked and untracked videos are output from the video processor as ASTERIX Ethernet signals in CAT-240. The additional capabilities added to the AN/TPS-43 signal and post-processing functions include ADS-B data incorporated and available at the output and on the display. Legacy maintenance display functions can optionally be integrated into and handled by the TSS PPI display. A 3D Tracker is an available option.



Upgraded PPI Display

## PROCESSOR

The new processor provides an IF receiver, signal/data processing, Radar control, and self-test/monitoring and frequency generator function while retaining all the functionality of the legacy processor. Improved system characteristics include:

### Pulse Correlator

Adaptable pulse compression technique ensures optimal S/N while maintaining sufficient range resolution

### Dual Beam Processing or Vertical Clutter Canceler (VCC)

Improved clutter mitigation and interference suppression

### Median Filter

Interference suppression and improved detection performance

### Doppler processing

Improved target detection and false target processing over legacy MTI processing

### CFAR/clutter maps

High-resolution clutter maps and CFAR processing for each Doppler filter

### Slow Clutter Canceler (SCC)

Enhanced Anomalous Propagation performance

### Plot Extractor

Improved positional accuracy (in both range and azimuth) and false target mitigation

## TRANSMITTER

The TSS transmitter incorporates the new TSS solid-state RF driver. The solid-state modulator has scalable output modulator power. This allows the modulator to decrease the brute force pulsing that was required in the past, adding the benefits of redundancy and longevity as a result of reduced pulse intensity. The output can be adjusted as a portion of the total in increments, which allows even degraded systems to continue to operate.

### Extended Service Life

The new Klystrons can output up to 4 MW but will allow longer service when a lower output is selected

### Redundancy

Solid-state modulators allow full power operation with one modulator failure and reduced power operation with two failed modulators



Our facilities on Florida's Space Coast have been specifically organized and equipped to provide a full range of technical support services to the communications, Radar, and sensor industries, including the ability to fully construct and test systems in our High Bay shelter integration area.

## RF DRIVER

The new TSS solid-state RF driver reduces the cost of future repairs and delivers several performance benefits. The increased phase stability of the output pulses allows better MTI performance on the receiver side. The TSS RF driver is part of the TSS transmitter but is also available in a FFF chassis to upgrade OEM RF drivers in the AN/TPS-43, 70, 72, and 75 radars. This design eliminates DMS issues.

## ROTARY JOINT

TSS Solutions' Rotary Joint is a proprietary design utilizing pressurized fiber bundle Slip Ring Technology, upgraded bearings for longer life, and a carbon face seal to control pressure leakage. Benefits of this design include:

### Enhanced S-Band Component

Supports the TSS transmitter

### Connectivity

Support for IFF Mode 5 and Mode S

### Enhanced Power Coupler

Provides additional power capacity at the antenna for upgrades

### Slip Ring Technology

Retains positive air pressure, contributing to extended system life

### Fiber Bundle Technology

Does not require brush lubrication or changeout between the typical 5-year service requirements

### Added Fiber Optic Channel

## IFF

The TSS Solutions IFF Mode 5 and Mode S upgrade incorporates AN/UPX-44A, which is the first IFF interrogator to achieve the more stringent test requirements of the new "B" level AIMS certification. The first AN/UPX-44A IFF production system has been delivered to JASDF U.S. The AN/UPX-44A is DoD AIMS program office certified. The TSS IFF upgrade requires the capabilities of the TSS Rotary Joint and makes antenna system modifications to support Mode 5 and Mode S.



The advanced features of TSS Solutions' TIGAR rival even those of top-of-the-line Radar surveillance systems at a fraction of the cost. The TIGAR upgrade also extends system life and delivers superior performance in several key areas, such as range resolution and small target detection.

## ARRAY SIGNAL AMPLIFIERS

TSS Solutions' array signal amplifiers (ASA's) increase antenna gain while lowering the noise floor.

### Solid-State Receiver Protection

TSS ASA's incorporate Solid-State Receiver Protection, which helps compensate for degrading gas tube protectors in the waveguide system and provides a test signal input. This gives the Radar extensive control of the video processor tracker, working on a higher signal amplitude above the inherent noise floor.

### Enhanced Processing

The design works in conjunction with modern high-performance TSS IF receivers, allowing additional processing after detection and throughput to the new TSS video processor.

## PROCESSOR TRACKER

Our video tracker software adds multiple video post-processing enhancements to the display system, allowing the operator to deal with clutter areas in the environment of the sited radar.

## DATA DELIVERY

All tracked and untracked videos are output from the video processor as ASTERIX Ethernet signals in CAT-240 and CAT-48. Data delivery via Ethernet. The upgrade delivers full Radar remote capability (except for power up/down) for transmitter, processor, display, and IF.

# TIGAR: The Superior Choice

The advanced features of TSS Solutions' TIGAR Upgrade rival even those of newer, top-of-the-line Radar surveillance systems at a fraction of the cost.

## PERFORMANCE

The TIGAR Upgrade delivers superior small-target detection, probability of detection, range resolution, height accuracy, and more.

## RECEIVER/ PROCESSOR

Equipped with ~8 MHz for Doppler Processing, TIGAR delivers robust electronic counter-countermeasure (ECCM) processing with an MTI improvement factor that rivals or outperforms newer systems.

## TRANSMITTER

TIGAR leverages 64 frequencies and a solid-state RF driver to deliver stable transmission power.

## ANTENNA

The TIGAR Antenna Upgrade includes our proprietary Enhanced Rotary Joint, which utilizes Slip Ring Technology and other enhancements for longer life and greater control over pressure leakage.



**RADAR**  
Solutions



**DEPOT**  
Solutions



**SATCOM**  
Solutions

**TSS Solutions** has been integral to national defense, homeland security, and counter-drug and counter-terrorism initiatives for more than 30 years.

**We have established a reputation as a proven and capable business partner,** integrating our engineering, manufacturing, service, and operational expertise to benefit the customers we serve.

**We are at the cutting edge of Radar and SATCOM modernization technology,** sharing and leveraging our expertise with customers across the globe.

➔  
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**We've Got Your Track™**