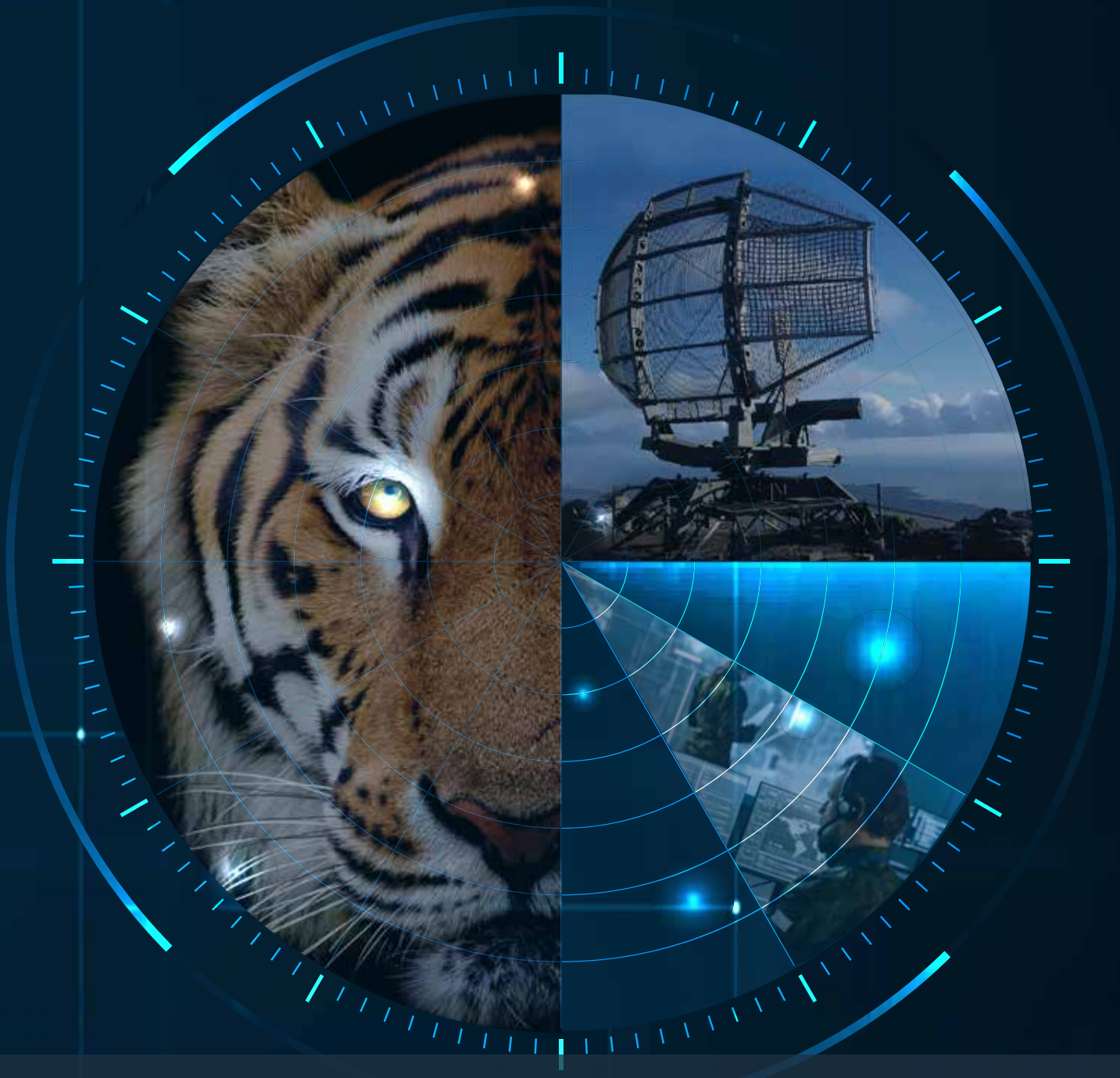
TSS SOLUTIONS

TIGAR

TSS Integrated Ground-based Air Radar



TSS Solutions | 7800 Technology Drive, Melbourne, FL 32904 | TSSsolutions.com

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

TSS Solutions is the recognized leader in supporting and modernizing Radar systems around the world. Building on our tradition of excellence, we proudly introduce the 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

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

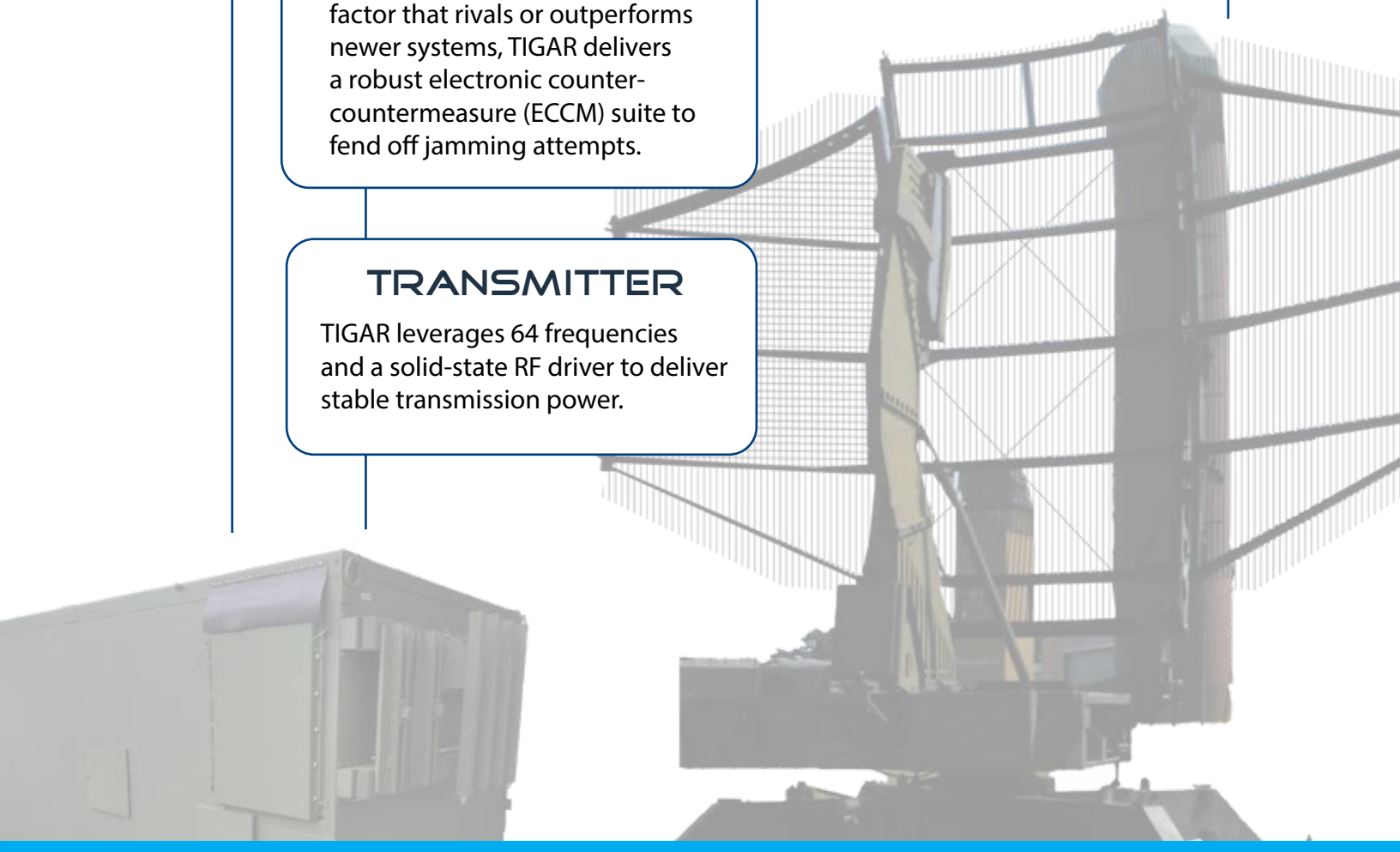
In addition to ~8 MHz bandwidth, which yields an MTI improvement factor that rivals or outperforms newer systems, TIGAR delivers a robust electronic counter-countermeasure (ECCM) suite to fend off jamming attempts.

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.



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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, 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 (new)
Includes Modes 5 and S;
fiber bundle Slip Ring Technology

Frequency Generator
(new)

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 includes IF receiver, signal/data processing, Radar control, self-test/monitoring and Frequency Generator functions while retaining 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 deliver improved performance and system longevity using only 2.8 MW power output

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

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

The proprietary design of the TSS Solutions high-power Rotary Joint utilizes Carbon Seals, Fiber Bundle Technology and a fully pressurized housing for longer service life and better system

Enhanced Service Life

We pressurize the entire Rotary Joint, including the slip ring package, significantly extending service life by keeping out contaminants and moisture.

Enhanced S-Band Channel

As part of the TIGAR upgrade, we have implemented a more robust high-power S-Band channel. Our design exceeds the power requirement by a significant margin.

Mode S and Mode 5 Support

An added L-band circuit allows for the seamless integration of Mode S and Mode 5 to your system.

Fiber Bundle Technology

The fiber brush slip ring is a bundle of conductive micro-fibers that are arranged to maintain electrical contact with a rotating metal ring. As the ring spins, the fibers move and flex, allowing for continuous conductivity without the friction and wear that traditional slip ring contacts experience. Fiber brush slip rings also have several other advantages over conventional slip ring contacts, including: low contact force per fiber, low noise, and low electrical and contact wear rates. The fiber brush slip rings do not require lubrication and produce virtually no wear debris.

Fiber Optic Channel

We have added a fiber optic channel to the Rotary Joint to support future high-bandwidth technology advancements and decrease susceptibility to electromagnetic interference and data loss.

Slip Ring Power Capacity

We have doubled the capacity of the power slip ring to support future technology advancements. This works in conjunction with the Fiber Optic Channel, allowing for upgrades and reducing Rotary Joint obsolescence risk.

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.

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AN ACORN COMPANY

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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.

Contact Our Team

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We've Got Your Track™