

July 24, 1969... Apollo 11 Returns From the Moon

 **MICROWAVE
APPLICATIONS
GROUP**



Also on July 24, 1969... MAG Becomes a California Corporation



To Support Microwave & other RF Systems



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On land, on the sea, in the air



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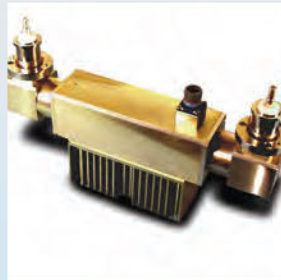
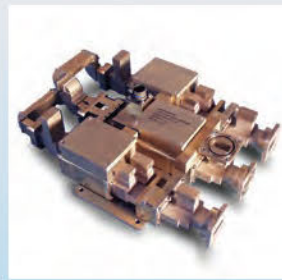
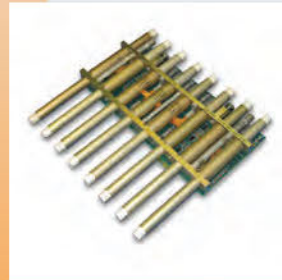
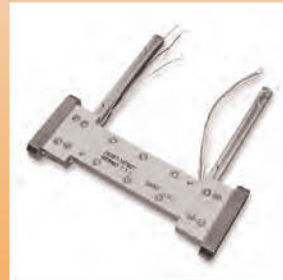
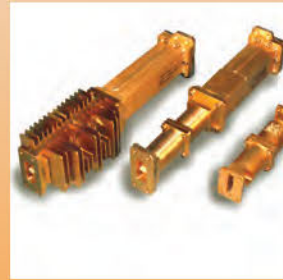
Fulfilling a variety of system needs



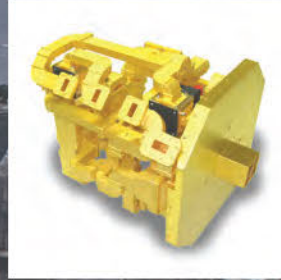
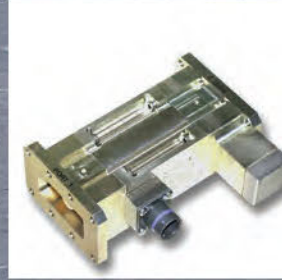
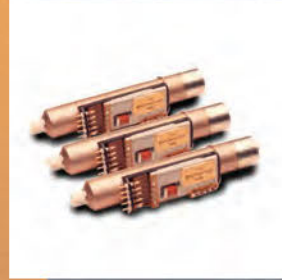
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with a wide array of solutions



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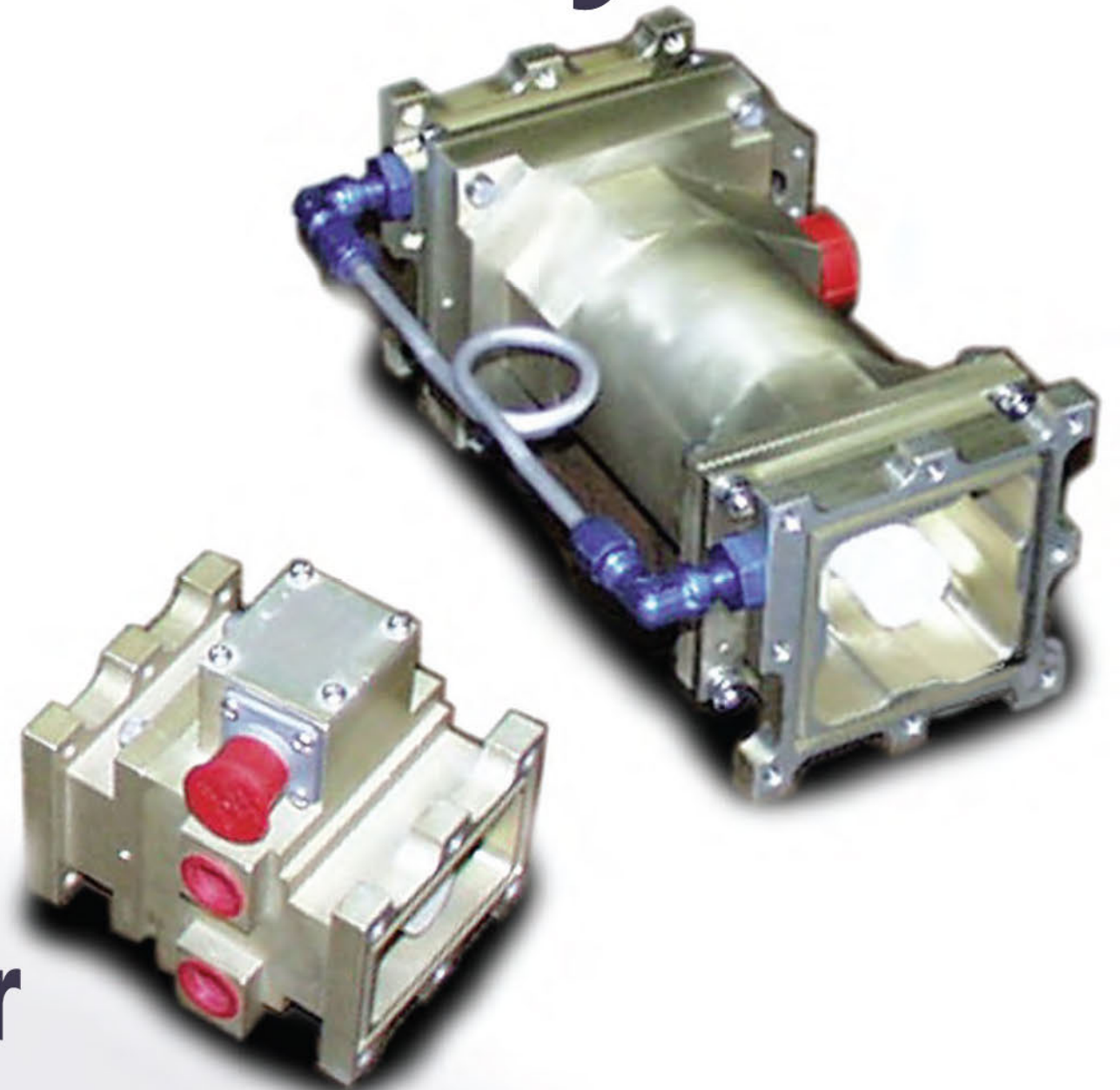
Ferrite Phase Shifters

S-Band Rotary-Field



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**High Phase Accuracy
Beam Offset Phase Shifter
Beam Steering Phase Shifter**

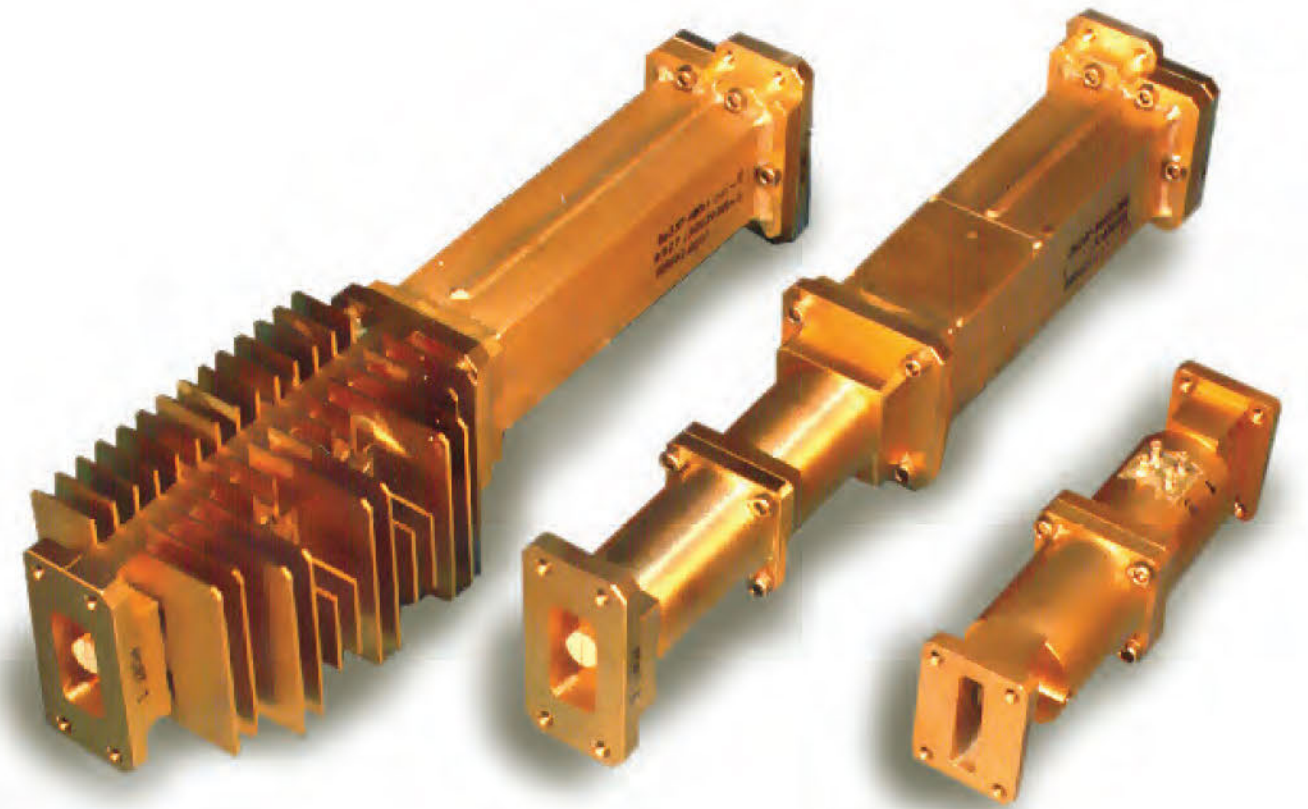


Ferrite Phase Shifters

X-Band Rotary-Field



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Low Phase Error

Modulo-360 Degree Phase Shift

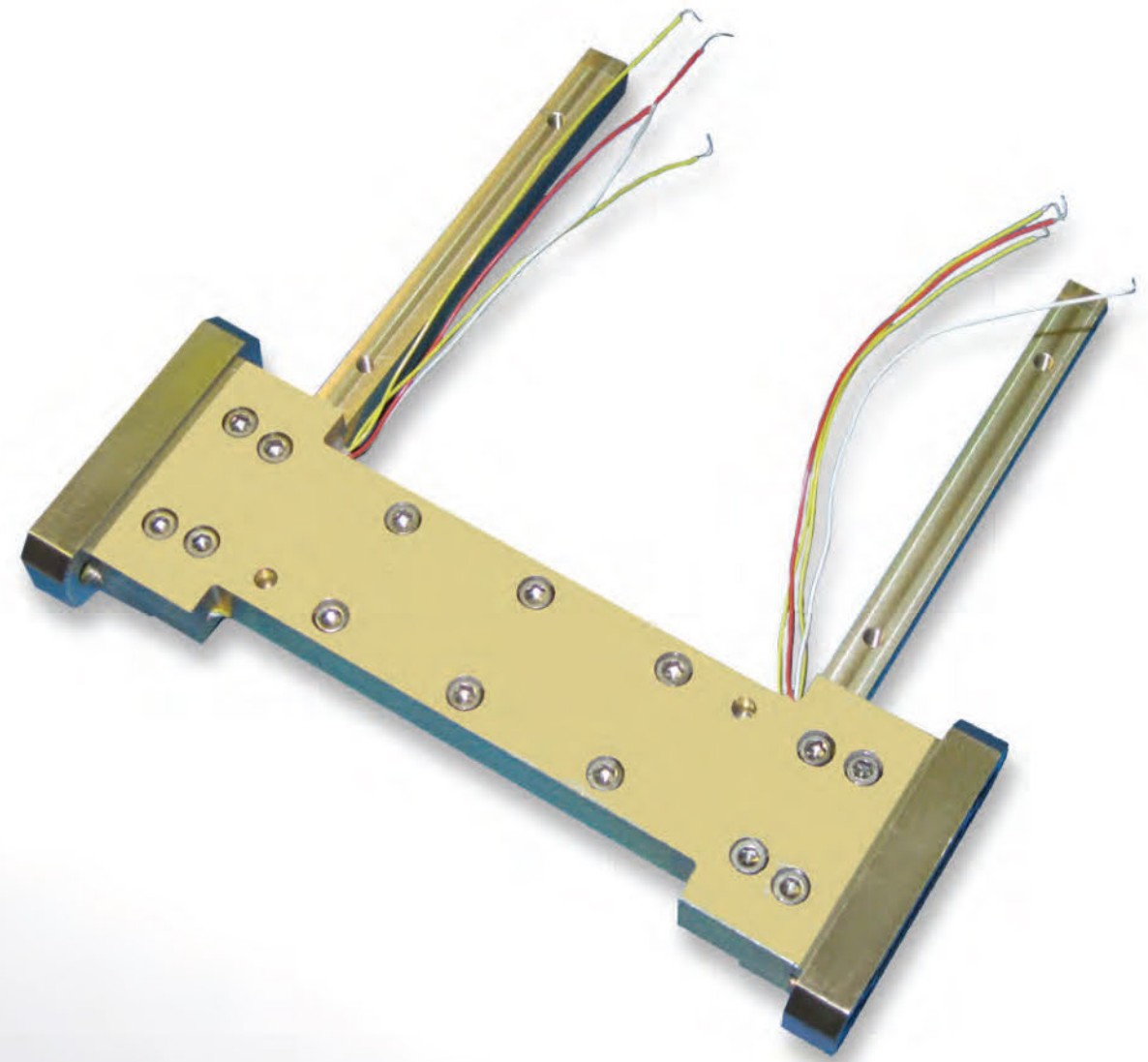
High & Low Power Phase Shifters & Delay Line

Ferrite Phase Shifters

X-Band Toroidal



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Good VSWR

Low Insertion Loss

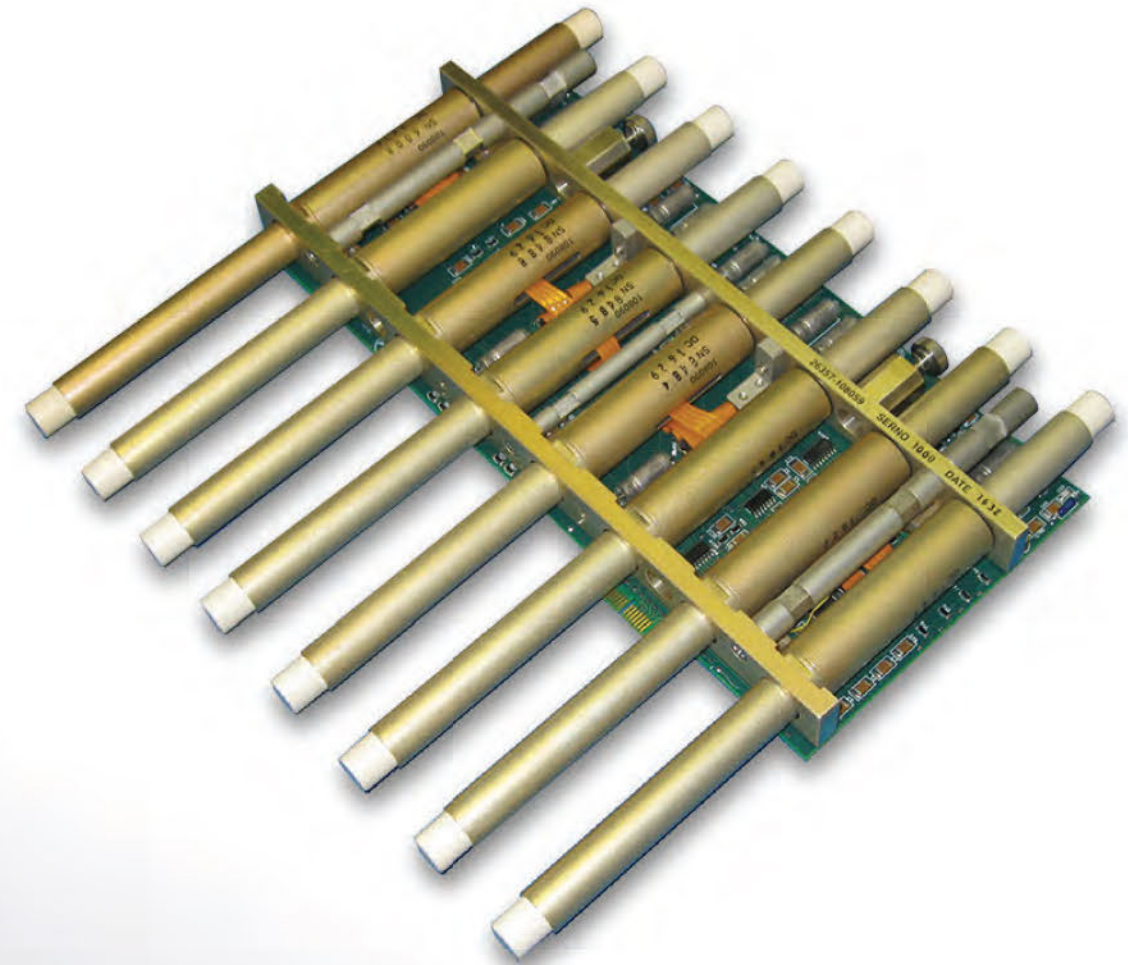
Minimal Insertion Phase Variation

Ferrite Phase Shifters

C-Band Dual-Mode PCM



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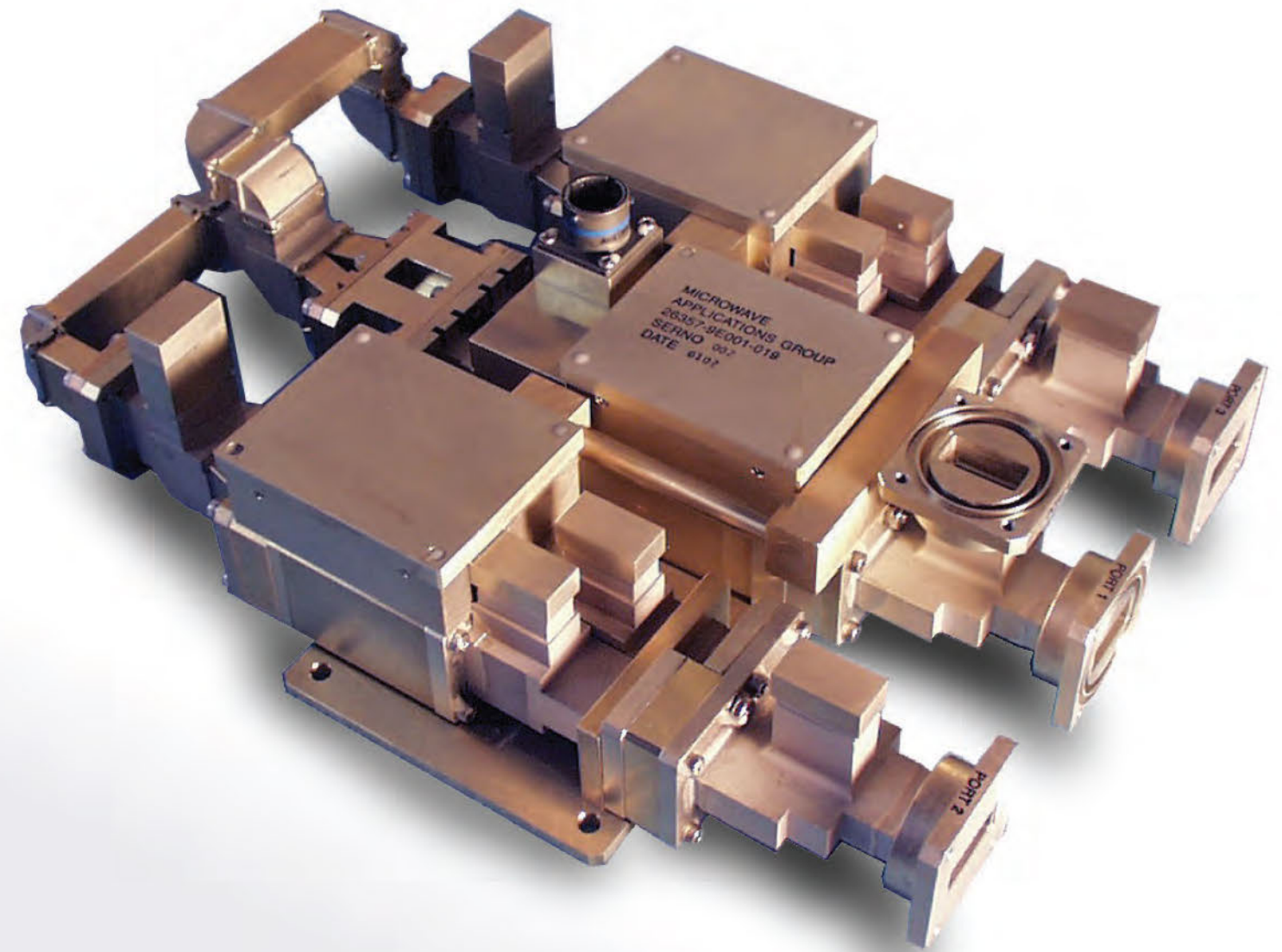
**8-Channel
Single Driver
One Phase Shifter per Channel**

RF Switches

X-Band Waveguide DPDT



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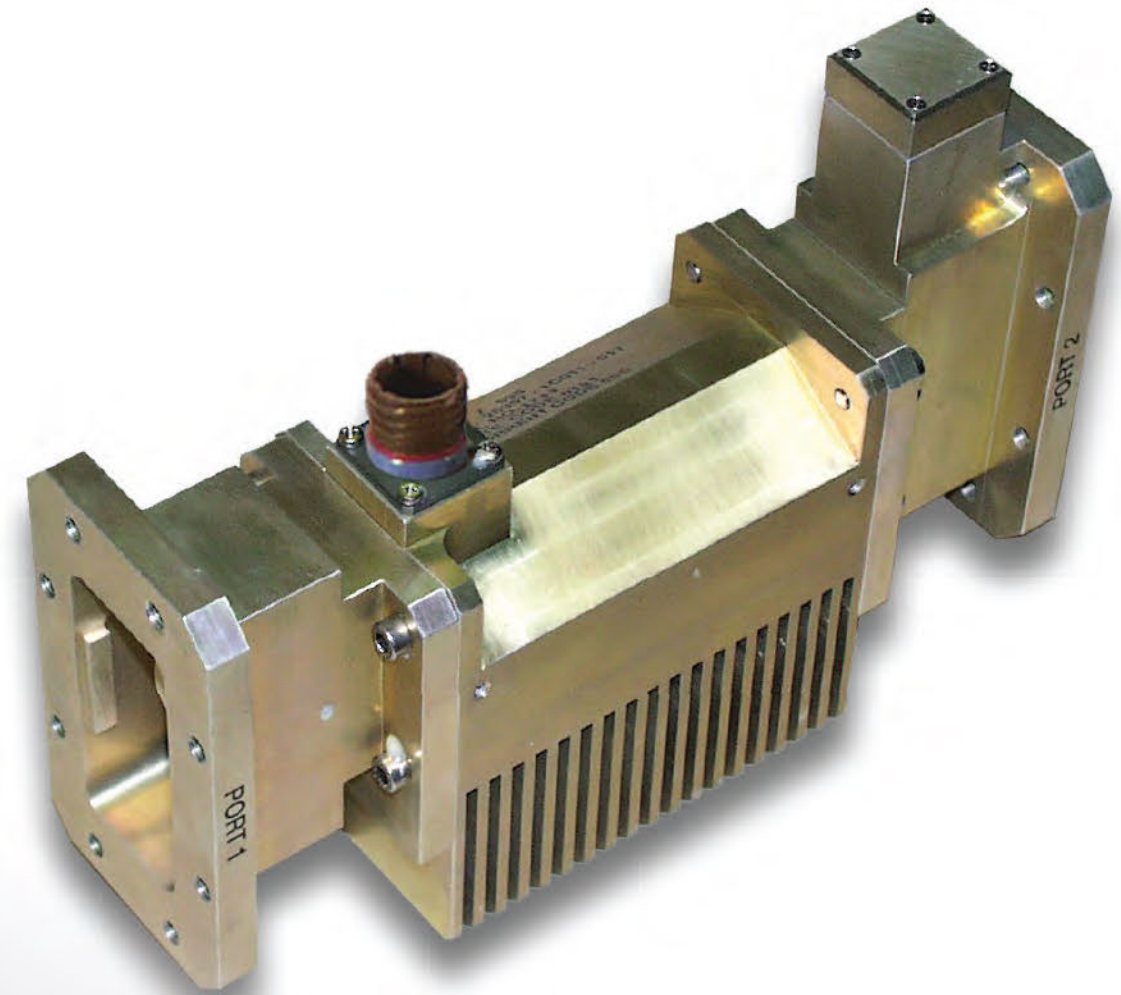
Duplexing
High Isolation
High Power Handling

Ferrite Phase Shifters

S-Band Rotary-Field



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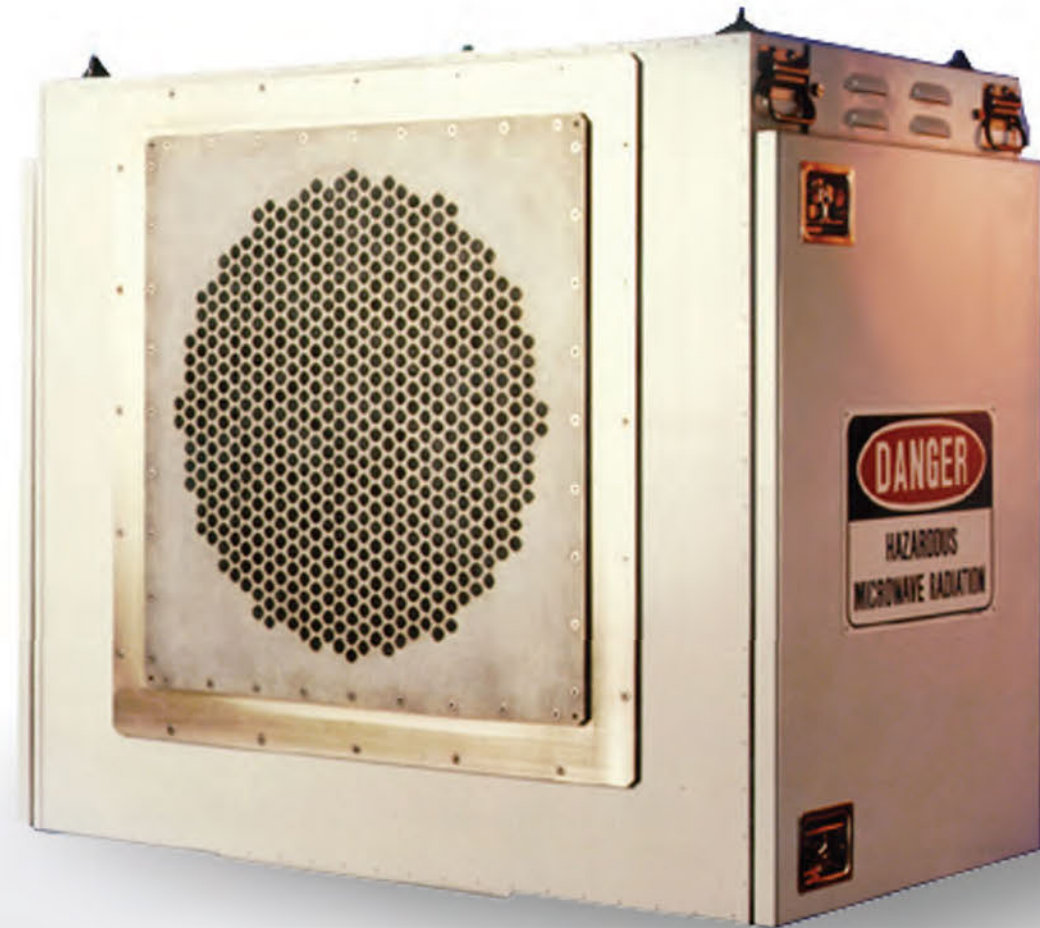
Low Phase Error
High Power Handling
Modulo-360 Degrees Phase Shift

Antennas & Subassemblies

C, X, & Ku-Band Antennas



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**Rugged
Economical
Dual-Mode Phase Shifter Based**

Ferrite Phase Shifters

X-Band Dual-Mode



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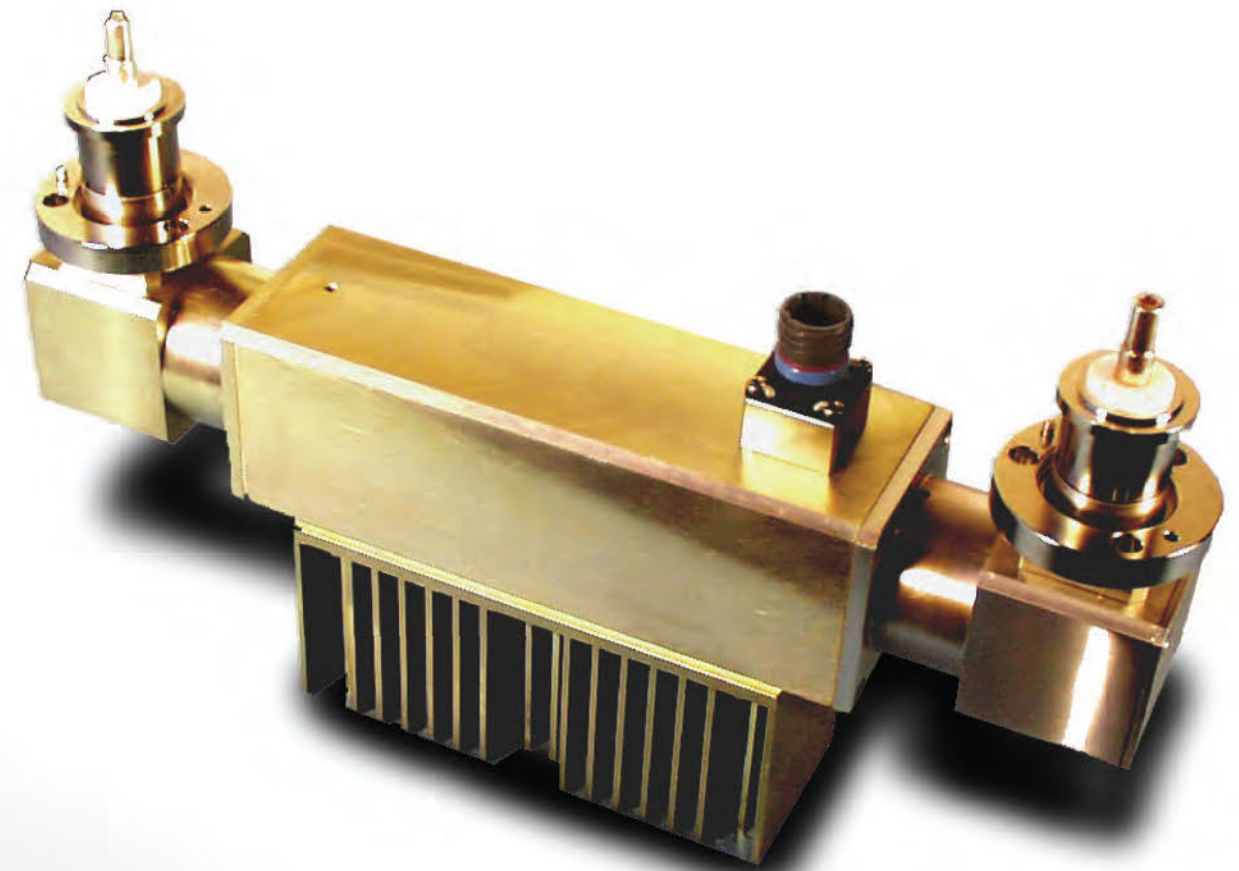
Latching
Reciprocal
Highly Shock Resistant

Ferrite Phase Shifters

L-Band Rotary-Field



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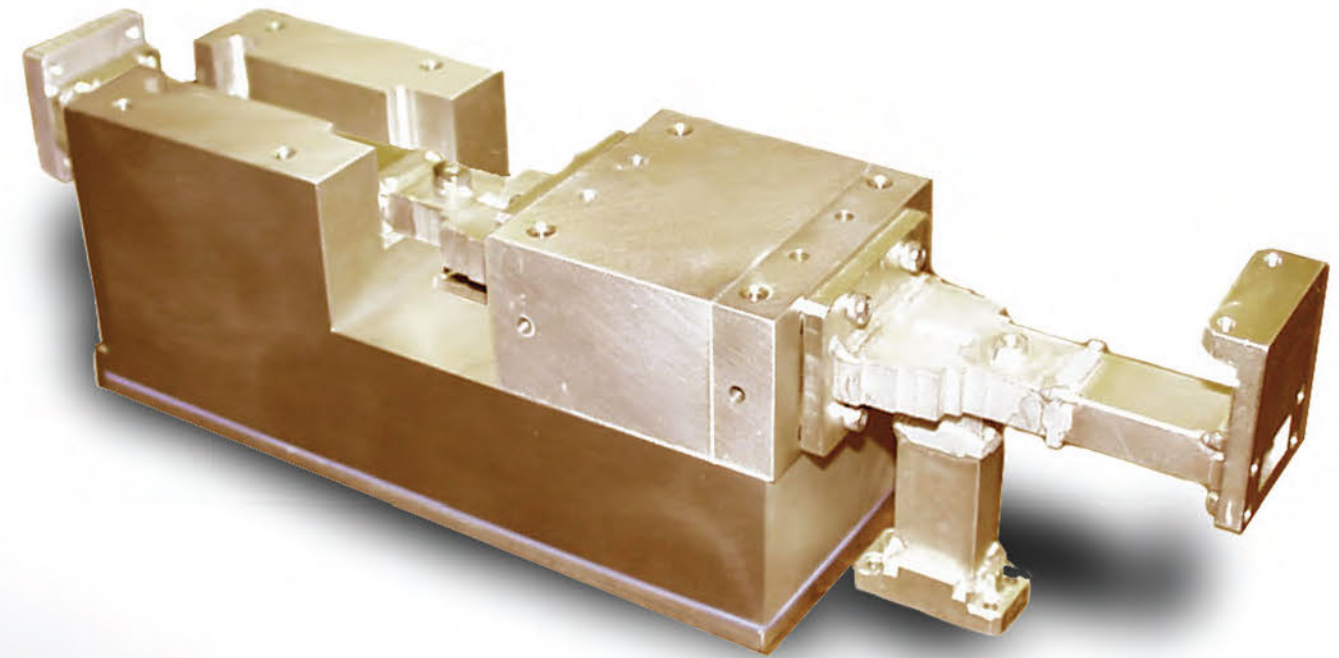
Reduced Size
High Performance
Custom Interface & Packaging

RF Switches

Ku-Band Resolver



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Low Loss

Good Phase Accuracy

Operates as Motion Compensation Device

Ferrite Phase Shifters

X-Band Reflectarray Dual-Mode



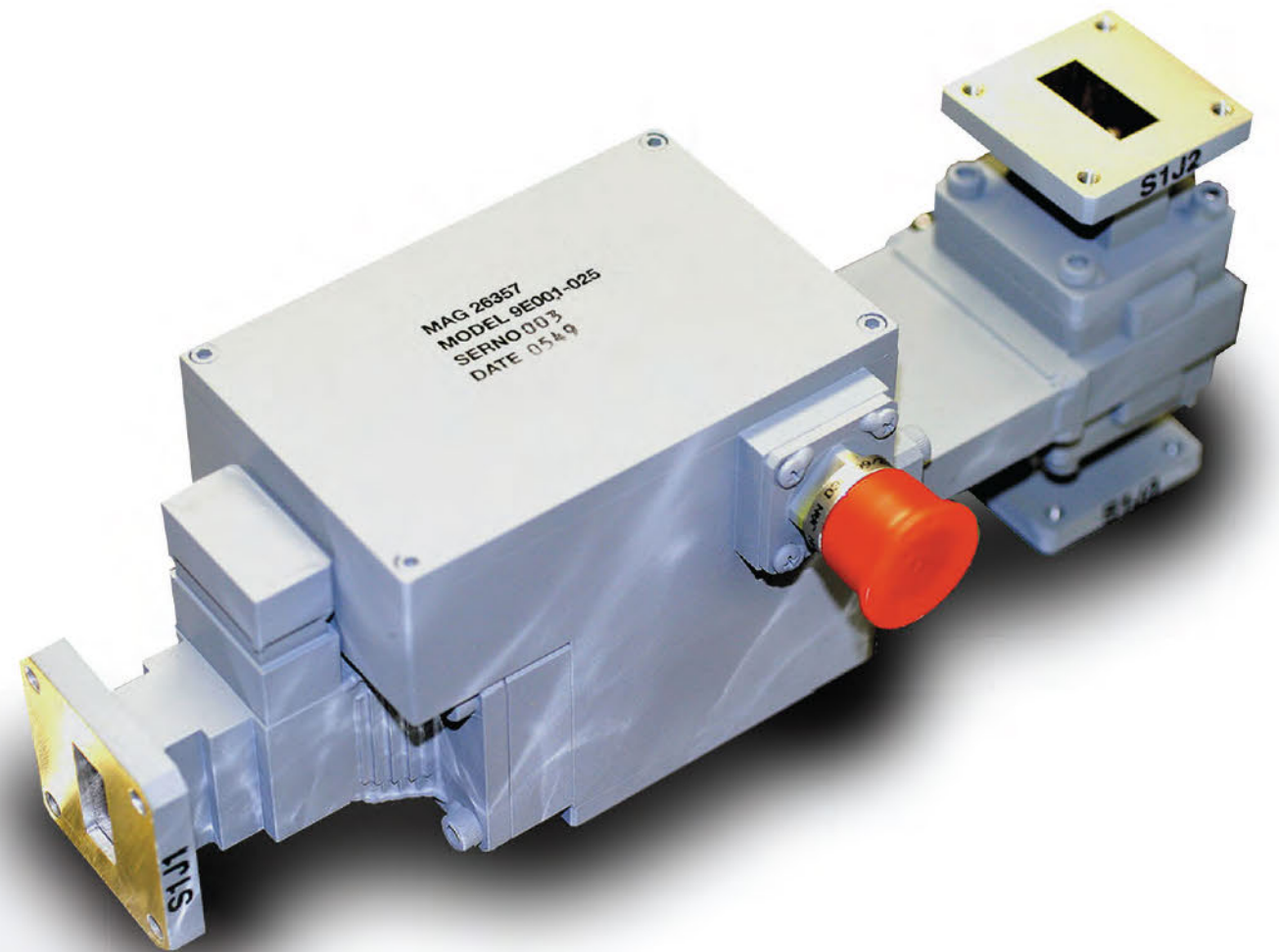
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Compact
Economical
Polarization Diverse

RF Switches

X-Band SPDT



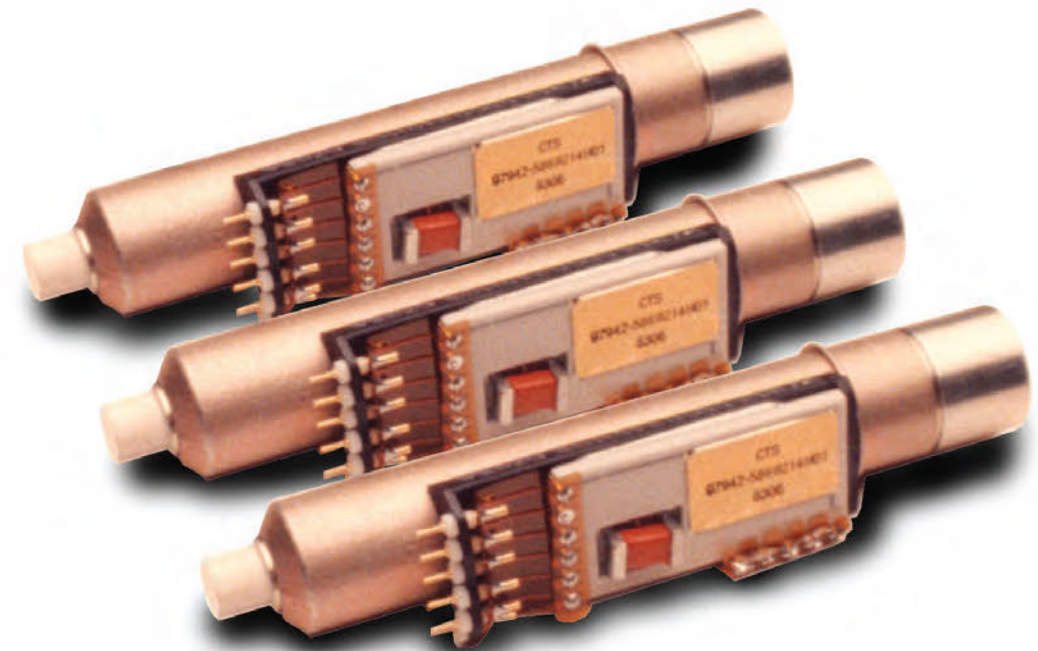
High Power Handling
Wide Operating Bandwidth
Able to Operate Over Broad Temperature Range

Ferrite Phase Shifters

X-Band Dual-Mode PCM



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Compact

360+ Degrees Phase Shift

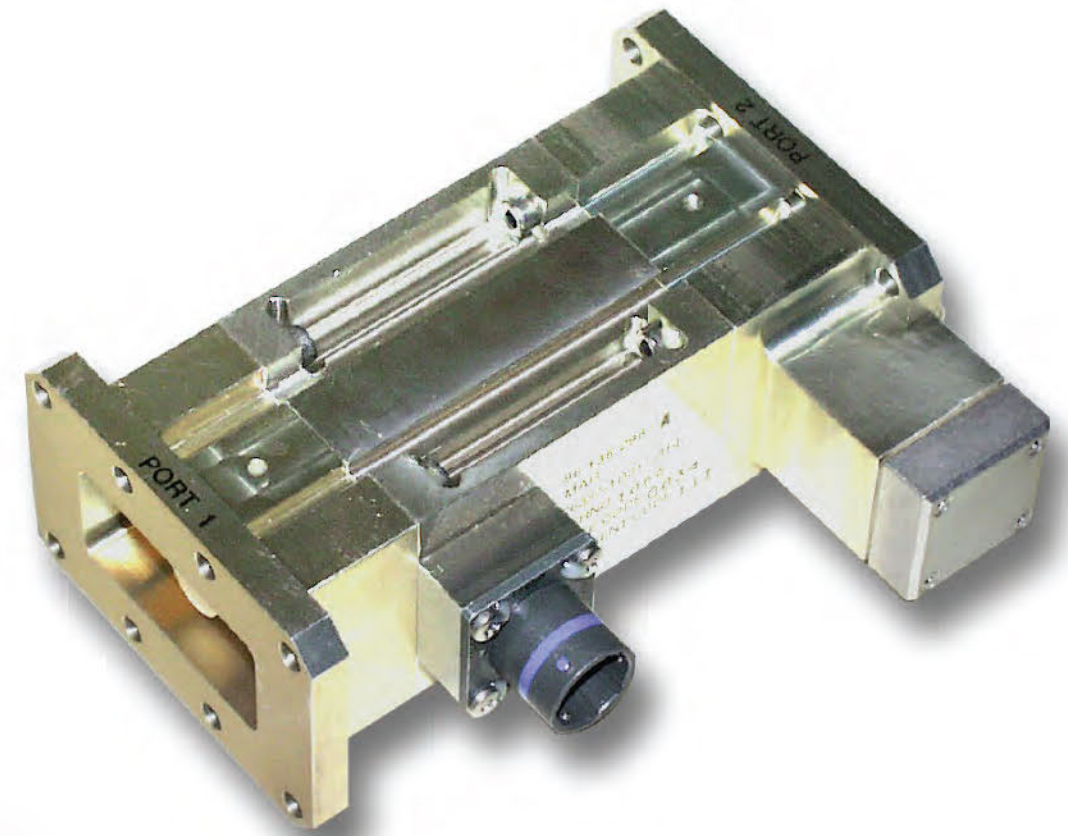
Polarization Diversity Capable

Ferrite Phase Shifters

C-Band Rotary-Field



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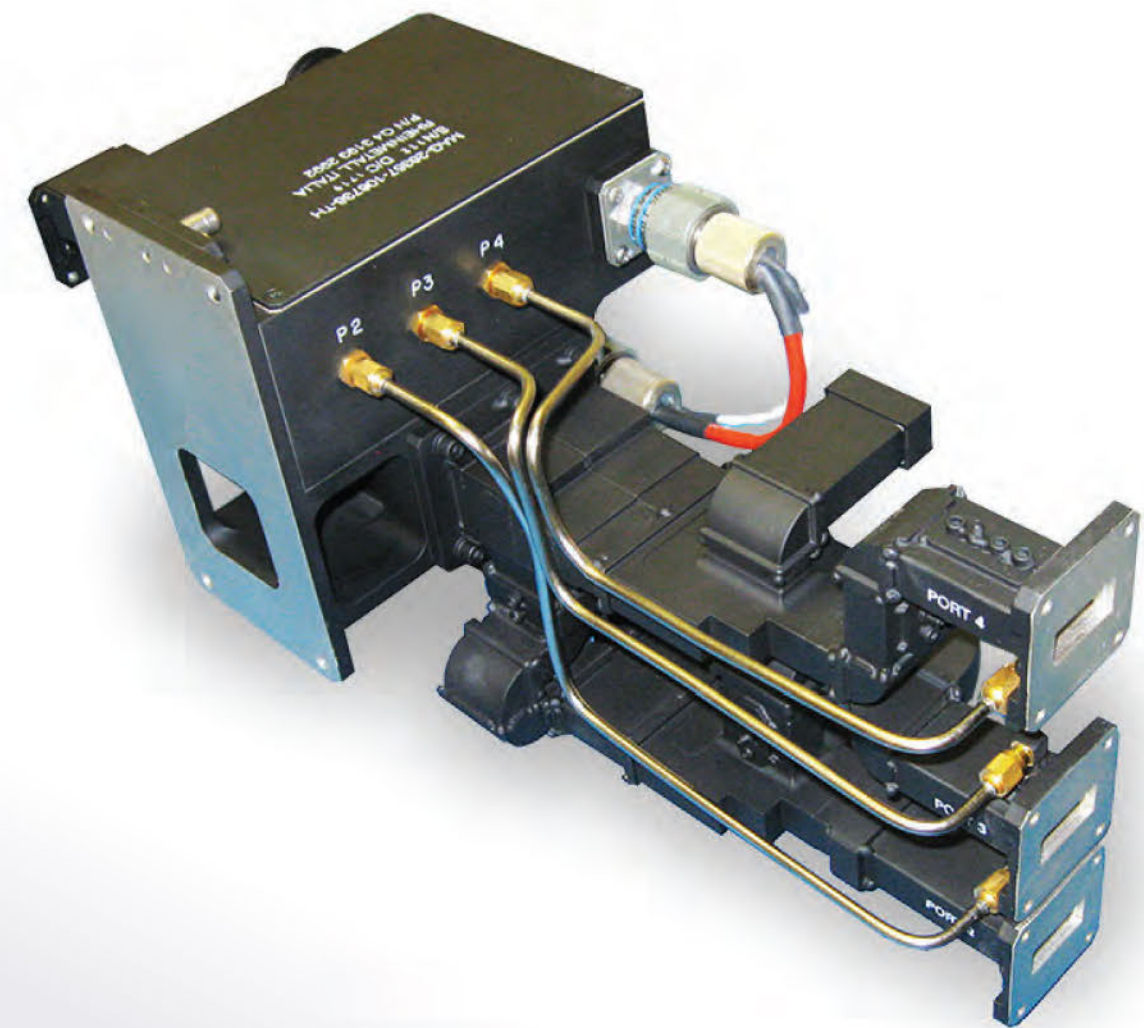
Low Phase Error
High Power Handling
Modulo-360 Degree Phase Shift

RF Switches

X-Band SP3T



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Low Loss

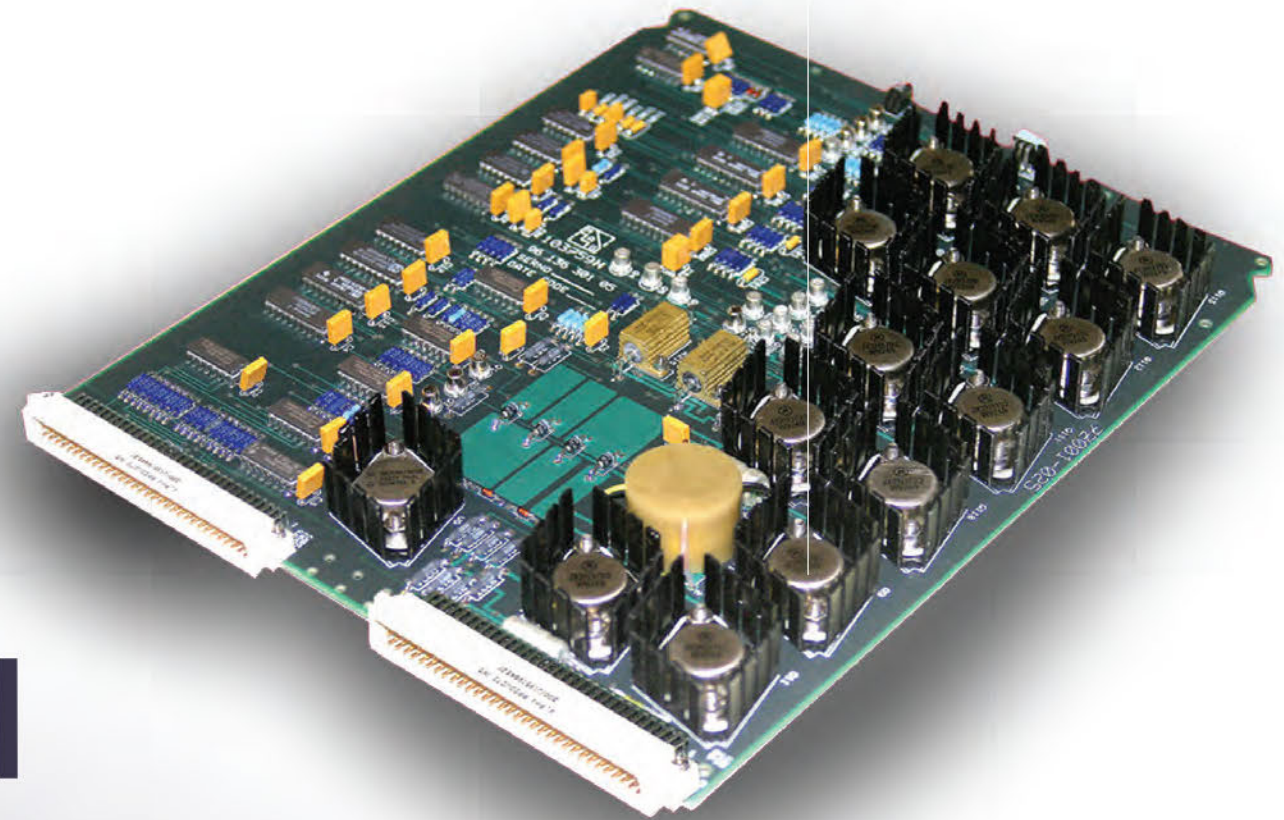
High Power Handling

Power Level Monitoring & Feedback

Electronic Power & Control Electronic Driver Board



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**Power, Data, & Control
Matched to Specific RF Device
Custom Interface & Mounting**

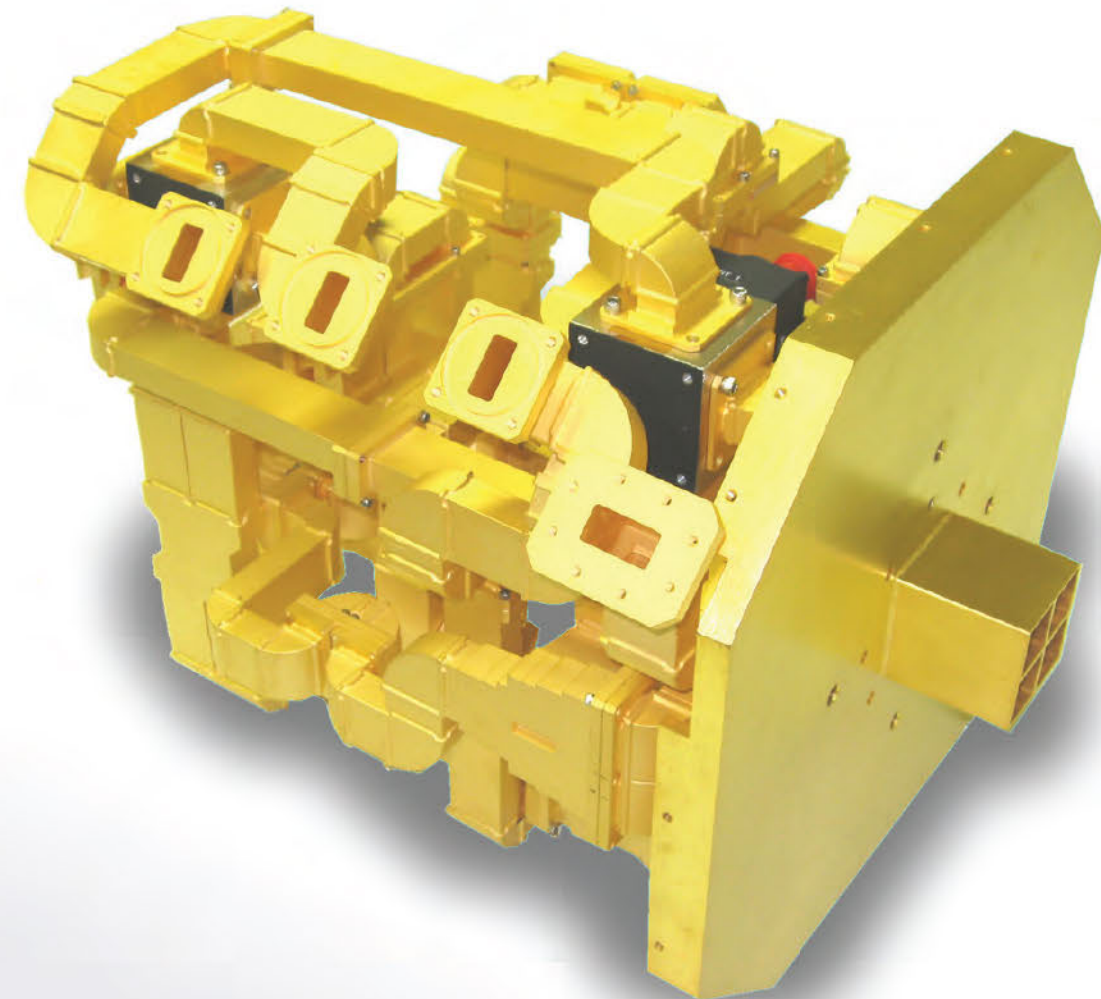
Waveguide Assemblies

X-Band Feed Network / Horn



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**Water-Cooled
LHCP & RHCP
Transmit & Receive**



Antennas & Subassemblies

X-Band High Power Attenuator



Very High Power Handling
Between XMTR Power Amplifier & Feed
Passive Reduction of Radar Effective Radiated Power

Ferrite Phase Shifters

X-Band Dual-Mode PSPS Module



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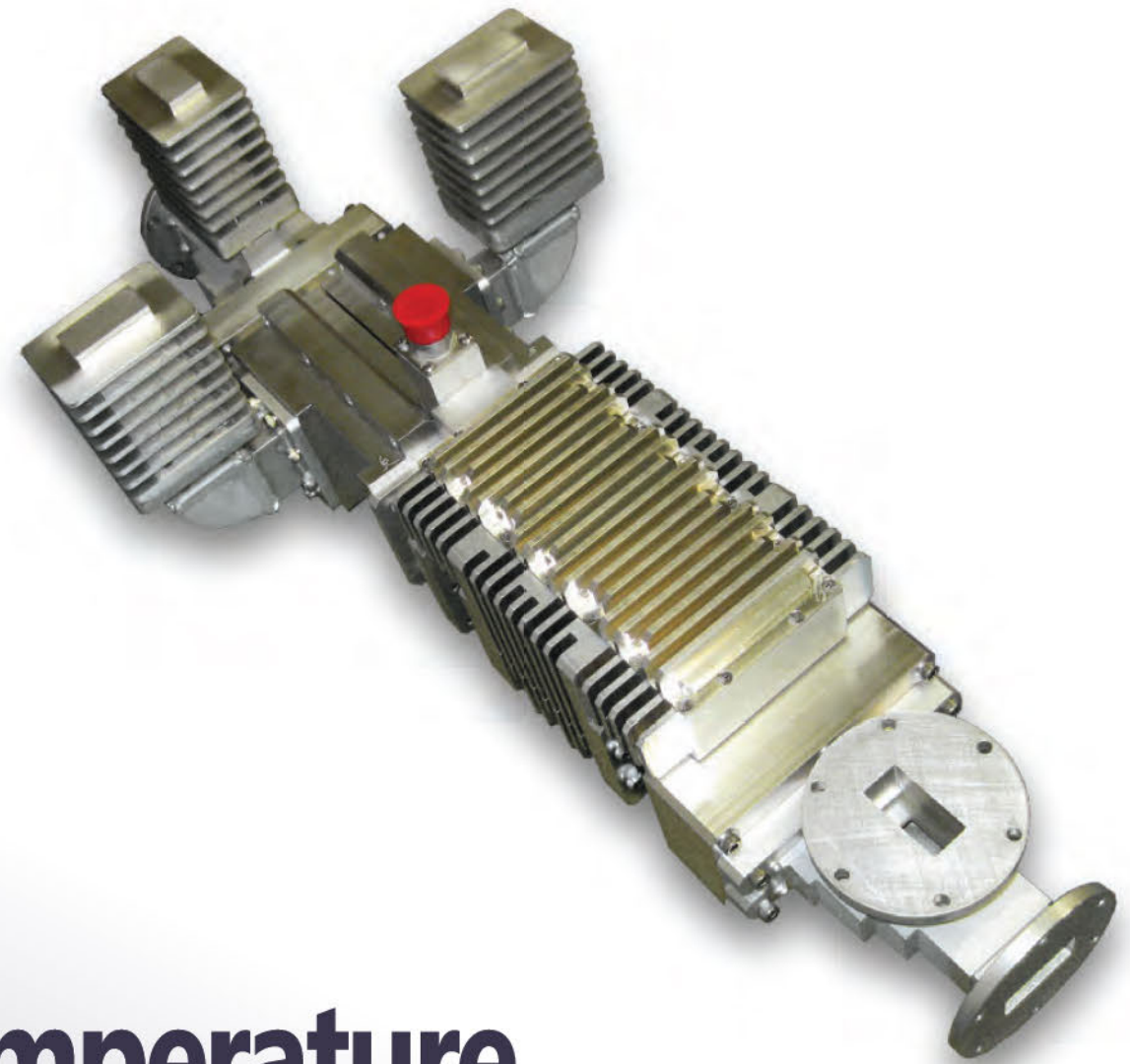
**Phase Shifters
Polarization Switches
16-Channels, Single Driver**

RF Switches

C-Band SPDT



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High Power Handling
Good Performance Over Temperature
Packaging & Interfaces per Customer Requirements

Ferrite Phase Shifters

Ka-Band Dual-Mode



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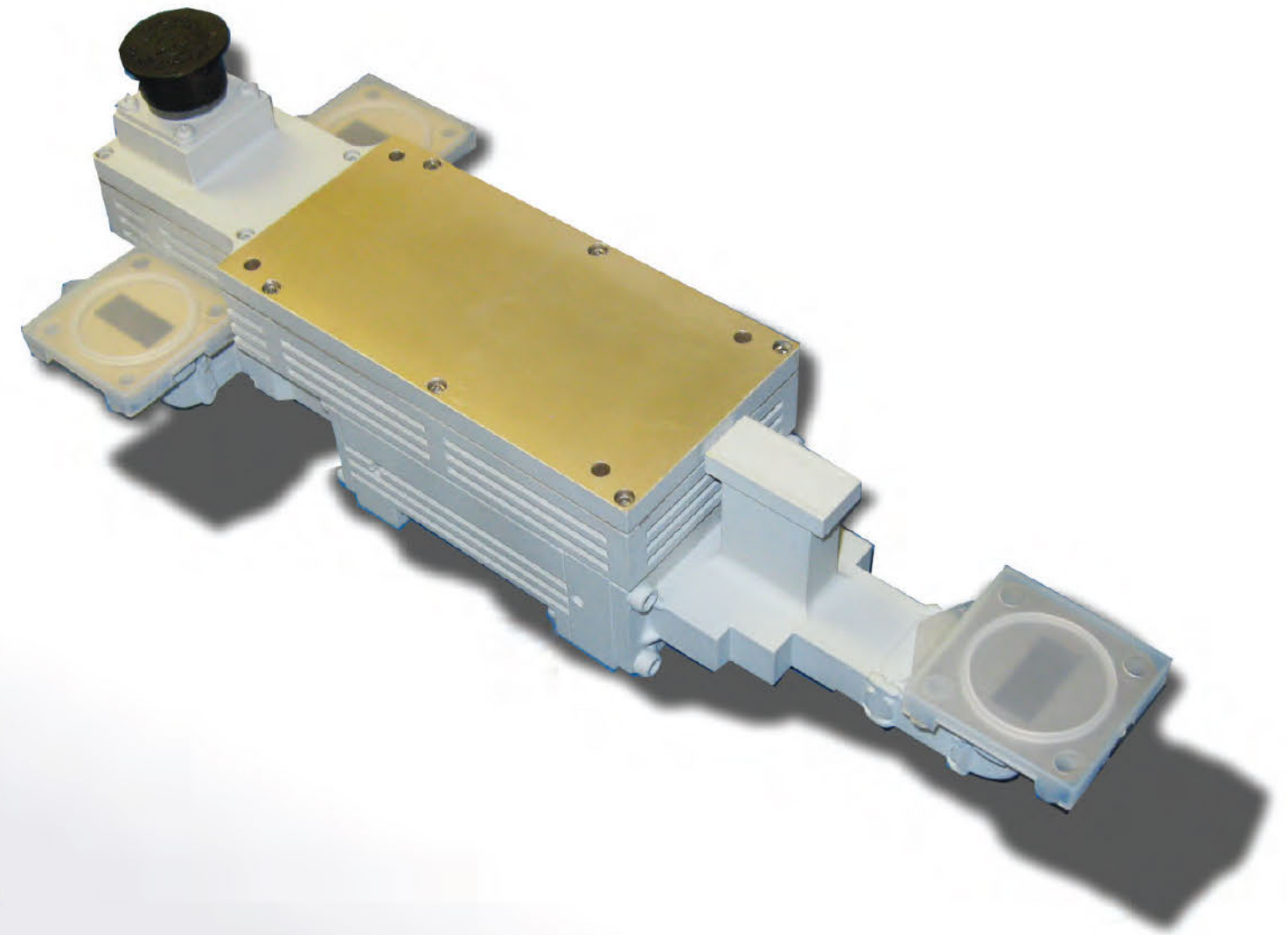
Compact
Latching, Reciprocal
Less than 1/3rd Ounce Each

RF Switches

X-Band Resolver



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Low Loss

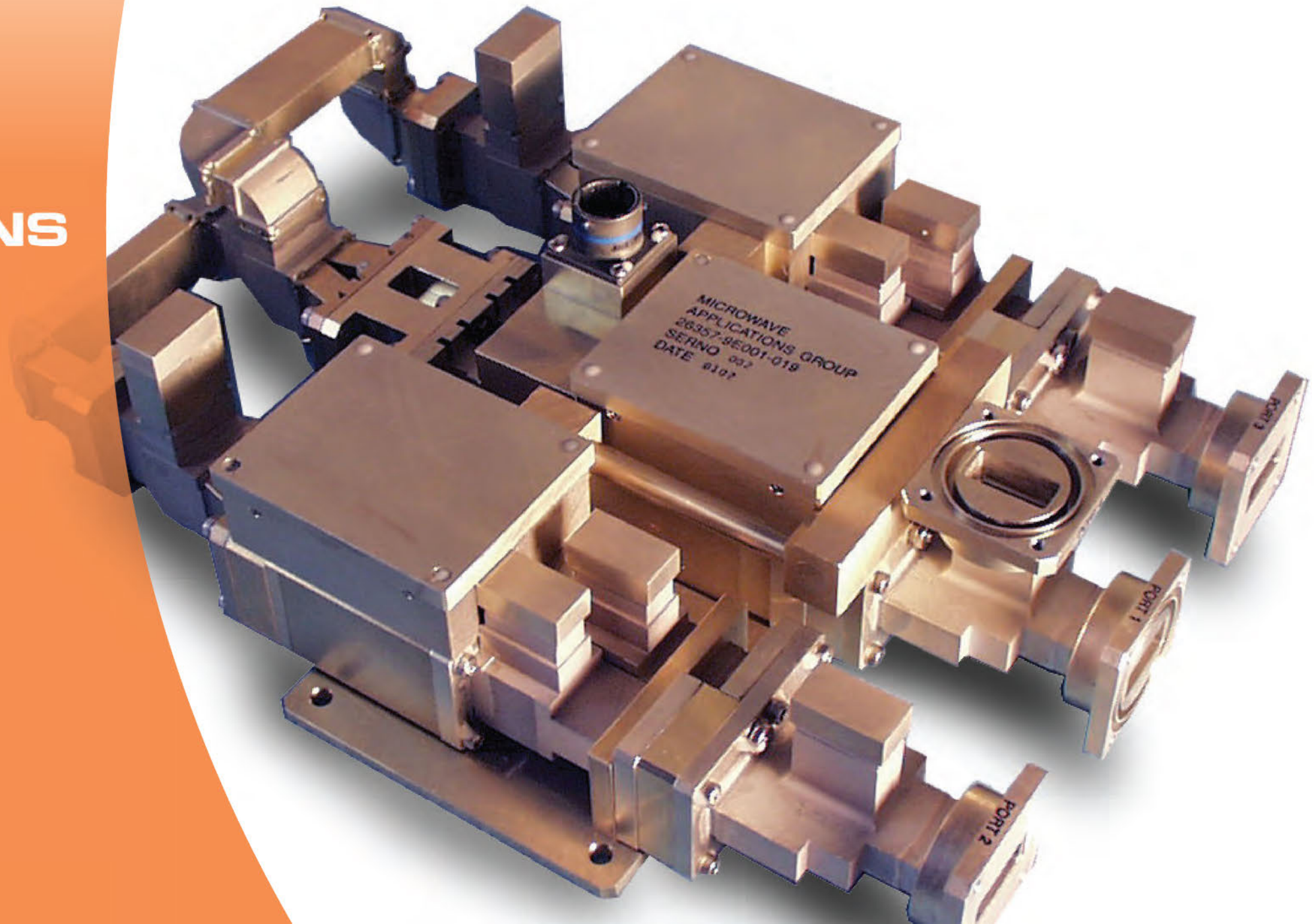
Good Phase Accuracy

Operates as Motion Compensation Device

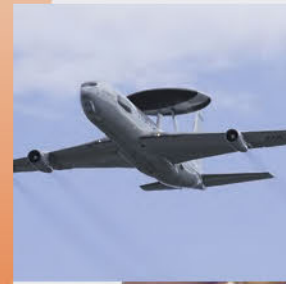
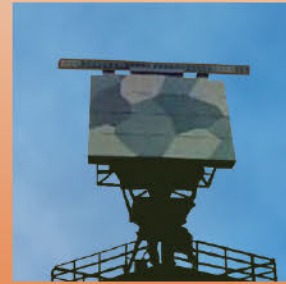
Offering a variety of products



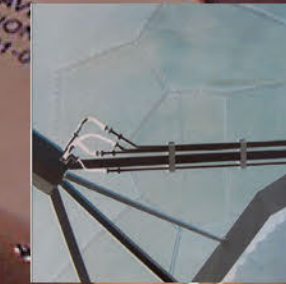
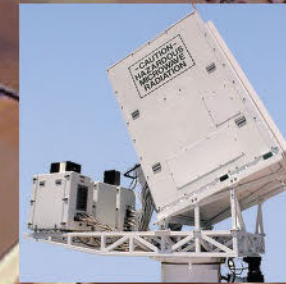
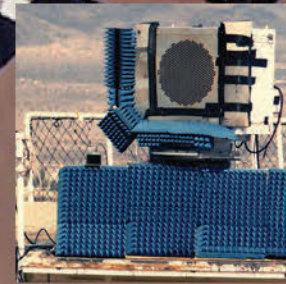
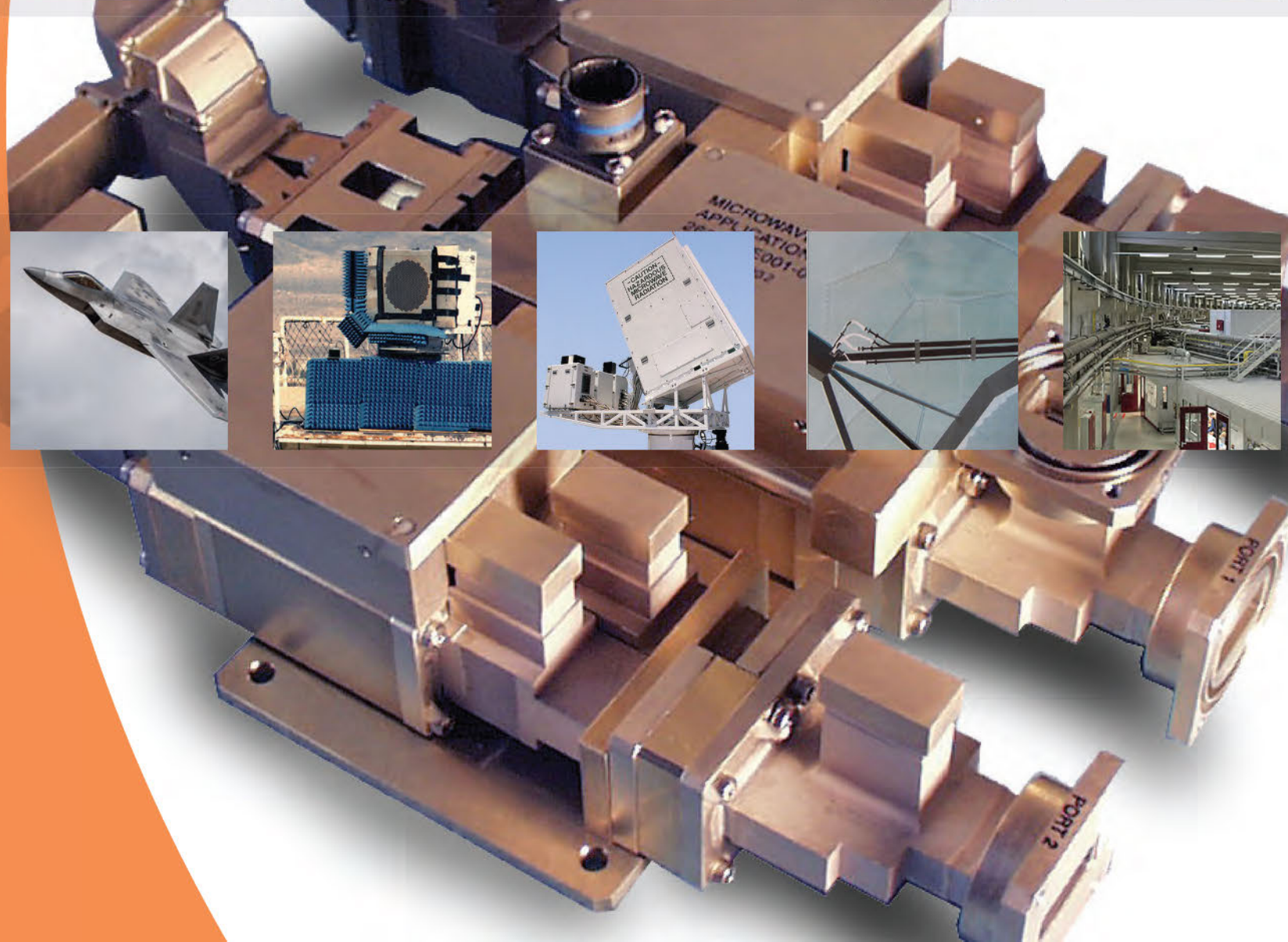
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to support a wide array of programs



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For Aircraft Landing Control SPN-35C Approach Control Radar



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Airborne Offensive Radar

APQ-164 B-1B ORS PESA



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Air Defense TRS22XX 3D Air Defense Radar



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Warning & Control APY-1/2 AWACS Surveillance Radar



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Surveillance & Tracking SPQ-9B Detection & Tracking Radar



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Synthetic Aperture Radar

Global Hawk SAR



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Fire Control Skysshield 35 Air Defense Radar



Low Probability of Intercept Radar

APQ-181 B-2 All Weather Radar



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Weather Observation DWSR-2501C Doppler Radar



Air & Surface Defense Smart-L 3D Radar



High Altitude Surveillance ASARS-2 Synthetic Aperture Radar



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Threat Identification APS-143 CP-140 Imaging Radar

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Threat Simulation

ARTS-V1/2 Advanced Threat Radars



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Test Range

TPAAS Test Range Antenna Systems



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Range Instrumentation

I-30 Range Instrumentation Antenna



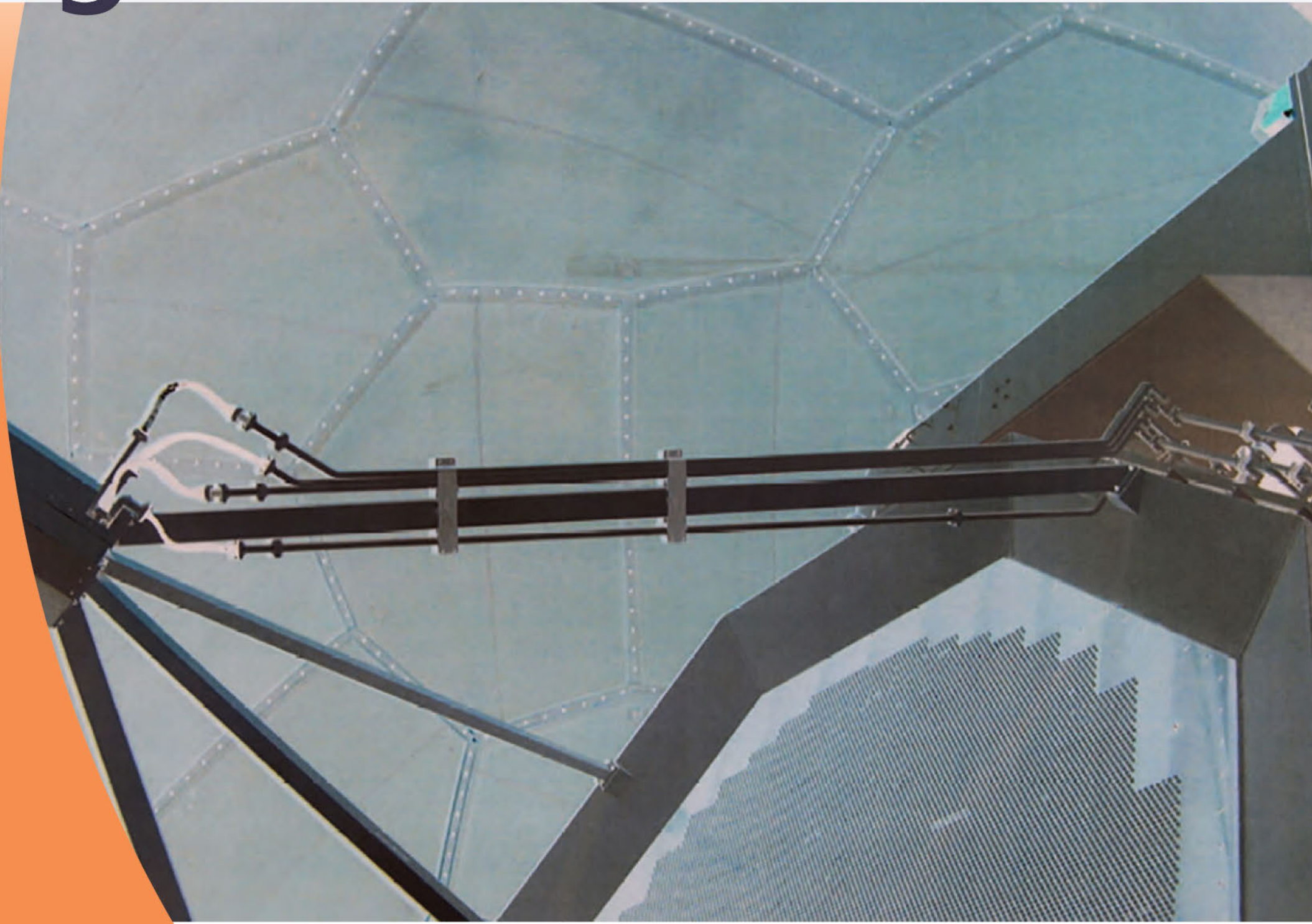
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Reflectarray I-15/23 Range Radar Simulator



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Laboratory & Research

Laboratory RF Phase Control

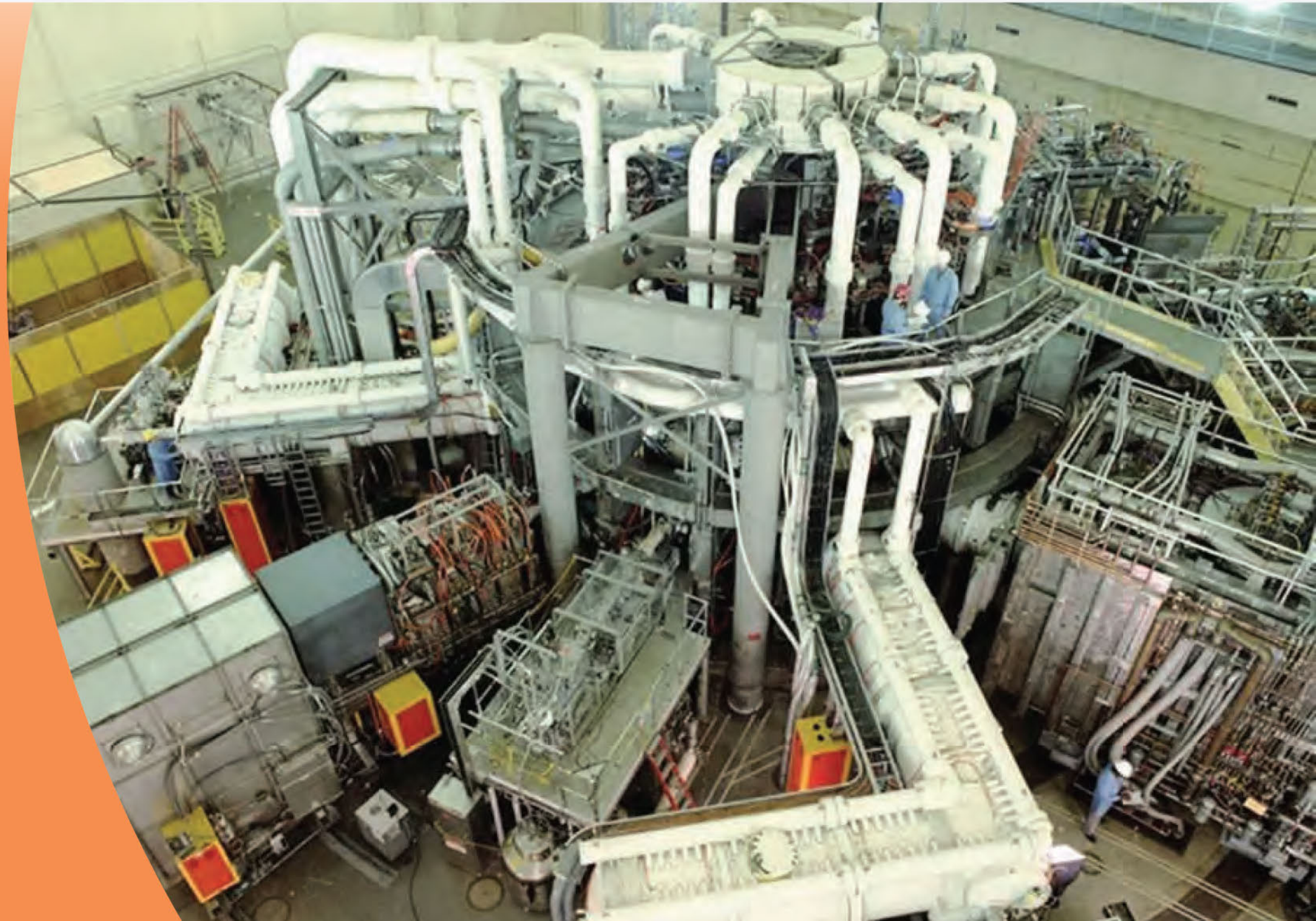


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Fusion Research

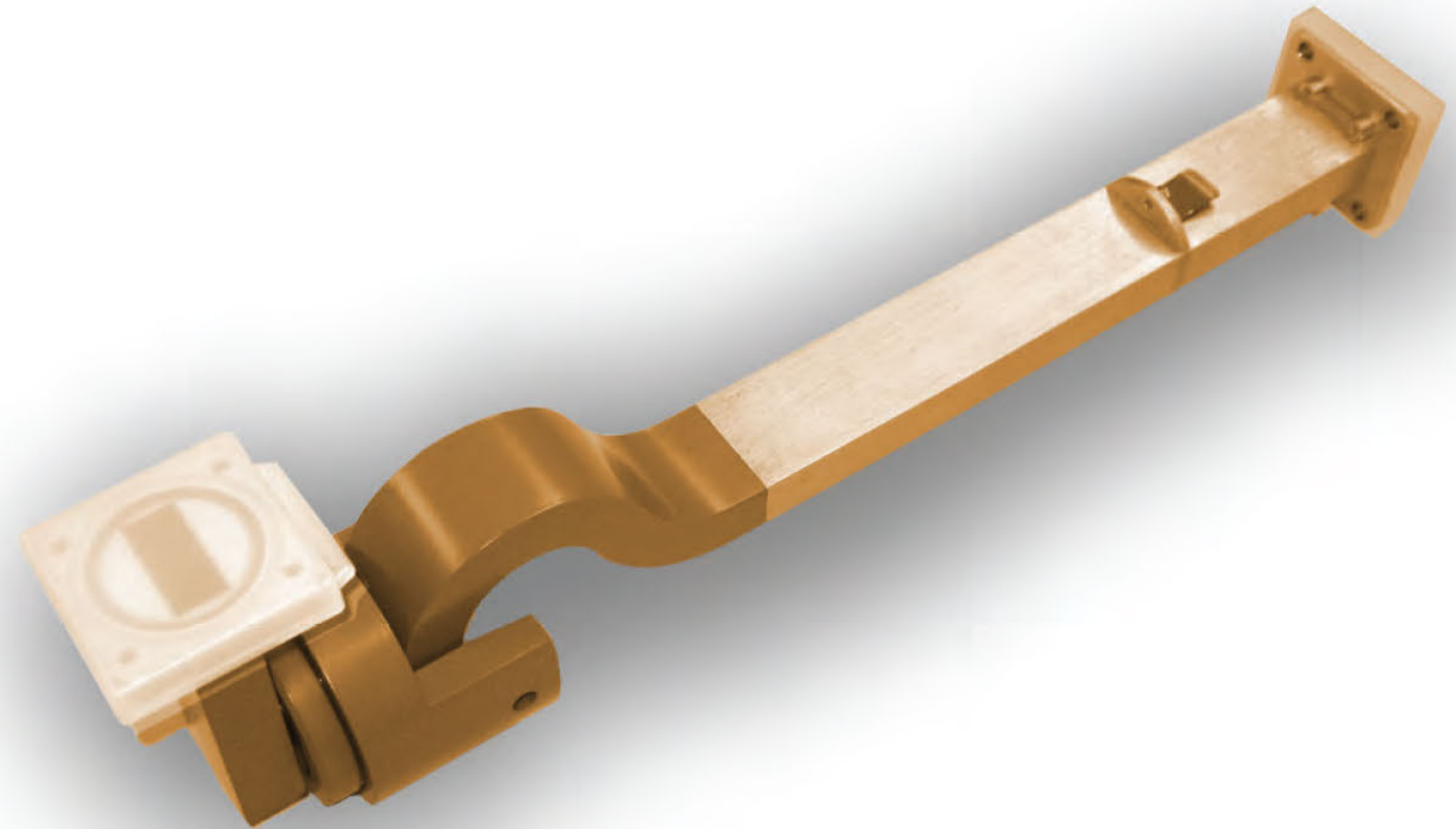
PPPL Tokamak Fusion Test Reactor



DMSMS Support X-Band Rotary Coupler



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DMSMS Support S-Band Load



DMSMS Support X-Band Microwave Ferrite Rotator

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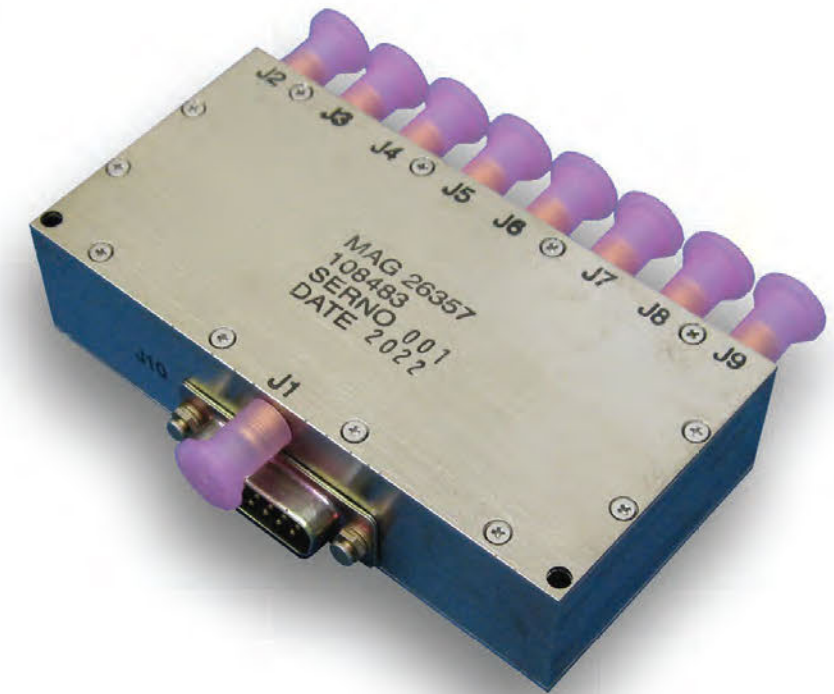


DMSMS Support

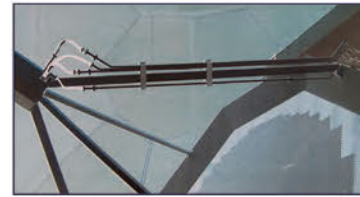
UHF SP7T / 8T PIN Diode Switches



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Acknowledgments



EWA



USN



USAF Staff Sgt. Brian Ferguson



USN MC2 Jason R. Zalasky



USAF 2nd Lt. Samuel Eckholm



USAF



USN



The Finnish Defence Forces



USAF Bobbi Zapka



USN MCS2 Mark R. Alvarez



USN MCS Matthew Cavenaile



USAF Airman 1st Class Dwane R. Young



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Torsten Baetge

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