



TAKING COMMAND THROUGH THE

DEVELOPMENT
OF INNOVATIVE
SPACE
TECHNOLOGIES



OUR HERITAGE CREATES SOLUTIONS

SPACE BUSINESS EXPERTS STRESS
THE THREE MOST CRITICAL ASPECTS
OF SUPPLIER SELECTION:

HERITAGE, HERITAGE, HERITAGE.

QUICK FACTS:

SPACE HERITAGE OF OVER **50 YEARS**

FILTERS (COAX & WAVEGUIDES), IMUX &
ASSEMBLIES

FROM **UHF TO V-BAND**

PARTNERED IN **150** DIFFERENT SPACE
PROGRAMS

USING OVER **200** DIFFERENT PRODUCT
DESIGNS

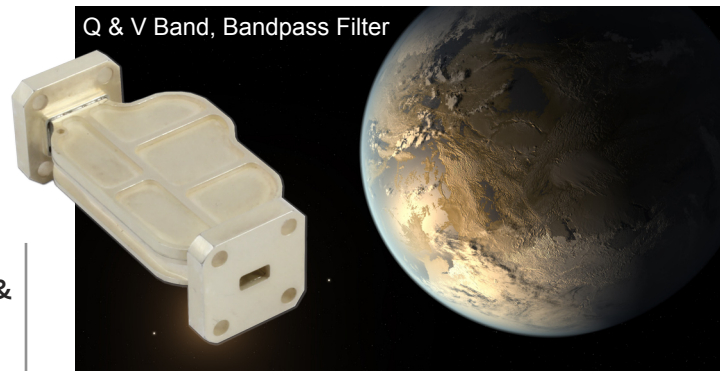
NASA AND **ESA** APPROVED PRODUCTS

DOMESTIC AND INTERNATIONAL PROGRAMS

COMMERCIAL AND MILITARY APPLICATIONS

DEDICATED TEAM

- SPACE ENGINEERS
- BUSINESS DEVELOPMENT & SALES
- PROGRAM MANAGERS Q&A
- PROCUREMENT
- CERTIFIED SPACE PRODUCTION
TECHNICIANS
- PRODUCTION PERSONNEL



WHERE CAN WE HELP?

DEFENSE SATELLITE



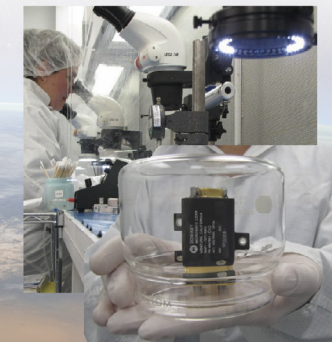
COMMERCIAL SATELLITE



CREW VEHICLE



TESTING



GROUND COMMUNICATION SATELLITE



QUALITY CERTIFICATIONS/ SOLDERING AND WORKMANSHIP STANDARDS

- IPC J-STD-001
- IPC J-STD-001S (FOR SPACE PRODUCTS)
- IPC-A-610 CLASS 3
- NASA-STD 8739.3 (WHEN REQUIRED)



CERTIFICATIONS AND PROGRAMS



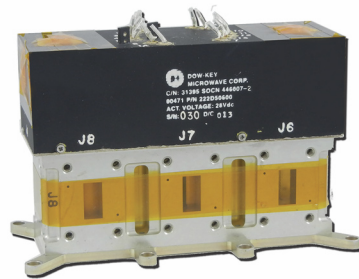
GPS BLOCK III
GPS BLOCK II
GPS BLOCK IIF
GALILEO 2ND GEN
GALILEO
GLONASS

ESA MOONLIGHT
LUNAR PATHFINDER
SKYNET
TURKSAT
SYRACUSE
COSMO-SKYMED
COPERNICUS - BIOMASS
COPERNICUS - ROSE-L
PLATINO
AMOS
ISRO
KOREASAT
SARAH
SICRAL

IRIDIUM CONSTELLATION
EXOMARS ROSALIND
FRANKLIN
MARS SCIENCE LAB
MARS EXPRESS
MUOS
GOES-R, S, T, U
JCSAT 17
KEPLER
EUTALSAT
INMARSAT
SAR-LUPE
CYGNSS
NOVASAR-S
RAPIDEYE
TOPSAT
GIOVEA
AND MANY MORE...



MICROWAVE PRODUCTS GROUP OFFERS MATRICES AND INTEGRATED ASSEMBLIES FOR THE MOST DEMANDING PLATFORMS, LEVERAGING DECADES OF EXPERTISE SUPPLYING CRITICAL HI-REL COMPONENTS, SUCH AS SPACE QUALIFIED FILTERS AND SWITCHES



Block of 3xWR51R



Waveguide Switch with Circulators



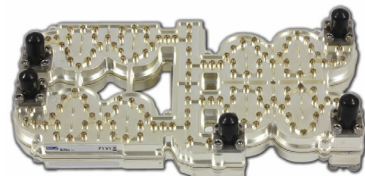
DC - 27 GHz, 3x5 Matrix

SOLID STATE SWITCHING/ MATRIX CAPABILITIES:

- BUTLER MATRIX NETWORKS
- HIGH THROUGHPUT MATRIX
- SOLID STATE PIN DIODE
- FET MATRIX SWITCHES

FILTERS ASSEMBLIES WITH:

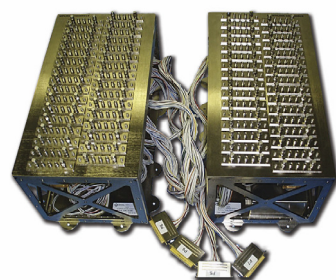
- POWER DIVIDERS
- TERMINATIONS
- CIRCULATORS
- ATTENUATORS
- ISOLATORS
- IMUX
- HYBRIDS
- LNAs



IMUX



H9010 Switch Block, 6x C Switches, 2x Power Dividers



Uplink/Downlink Switch Unit Matrix, 64 * SPDT's, CANBus controlled



Lumped Element / Suspended Substrate Mixed-Technology Filter

LUMPED ELEMENT FILTERS:
 FREQUENCY RANGES: 3 MHz TO 6 GHz
 OPERATIONAL BANDWIDTH: NARROW BANDS TO MULTIPLE OCTAVES



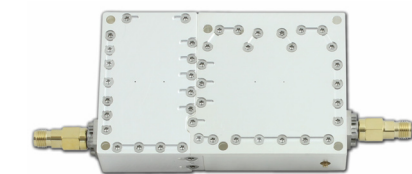
Lumped Component Filters

CAVITY FILTERS:

• COMBLINE & DIELECTRIC CAVITY
 FREQUENCY RANGES: 1 GHz TO 18 GHz
 OPERATIONAL BANDWIDTHS FROM 0.2% TO 50%



Space Flight Surface Mount Cavity Filters



L-Band Combiner Filter with Integrated PCB Enclosure

SUSPENDED SUBSTRATE FILTERS:

FREQUENCY RANGES: 1 GHz TO 18 GHz
 OPERATIONAL BANDWIDTH 10% OF FC TO MULTI-OCTAVE



Suspended Substrate Puck Filter

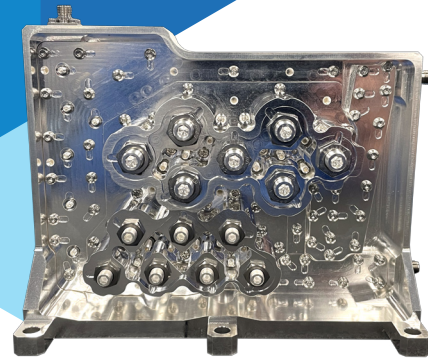
HIGH DIELECTRIC THIN FILM FILTERS:

FREQUENCY RANGES: 2 GHz TO 18 GHz
 OPERATIONAL BANDWIDTH 5% OF FC TO MULTI-OCTAVE



Thin Film Lumped Elements 3 - 40 GHz

INTEGRATED ASSEMBLIES



UHF Dielectrically Loaded Cavity Diplexer



Dual L-Band Cavity Filter
Temperature Compensated



1 to 2 GHz
L-Band Combine Filter



S-Band
Cavity Filter



Q & V Band
Bandpass Filter

WAVEGUIDE FILTERS

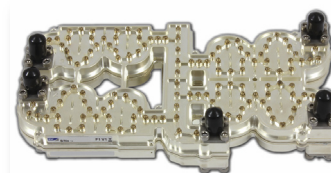
- FREQUENCY RANGES: 4 GHz TO 94 GHz
- OPERATIONAL BANDWIDTH 0.1% TO 25%
- HIGH POWER
- HIGH LEVELS OF REJECTION
- EXTRACTED POLE TECHNOLOGY
- DUAL MODE OPTIONS
- PHASE AND GROUP DELAY EQUALIZATION

Ku, Ka, Q, & V BAND PRODUCTS

Rectangular Waveguide Bandpass Filter
Designed for Q & V Band applications



Ka-Band
Waveguide Filter



Switch Filter Bank Assemblies
Input and output multiplexers, Channel filtering with temperature stable operations.



TEST CAPABILITIES

ON-SITE ENVIRONMENTAL TEST LAB

- VIBRATION AND SHOCK
- TEMPERATURE CHAMBERS
- THERMAL VACUUM CHAMBERS
- THERMAL SHOCK CHAMBERS
- HIGH POWER TEST BEDS
- NETWORK ANALYZERS UP TO 94 GHz
- PASSIVE INTER-MODULATION (PIM)
- CORONA
- MULTIPACTION
- SEAL (FINE AND GROSS LEAK)
- MOISTURE RESISTANCE / HUMIDITY
- SALT SPRAY
- LIFE TEST
- ACCELERATION
- ALTITUDE / BAROMETRIC PRESSURE (REDUCED)
- INSULATION RESISTANCE

INSPECTION

- OPTICAL COORDINATE-MEASURING MACHINE
- COORDINATE-MEASURING MACHINE
- X-RAY FLUORESCENT ANALYZER



CLEAN ROOM CAPACITY

- FOUR CLASS 7 CLEAN ROOMS TO ISO 14644-1
- CLASS 5 FLOW BENCH ASSEMBLIES

ON SITE CALIBRATION

- MIL-STD 45662, ANSI Z-540, AND ISO 10012
- TRACEABLE TO NIST STANDARDS





MPG

CONNECTING & PROTECTING

a **DOVER** company



MICROWAVE PRODUCTS GROUP UNIFIES THE HERITAGE,
PRODUCT LEADERSHIP AND INNOVATION OF SIX WORLD CLASS BRANDS
TO ENABLE COMMUNICATION, PROVIDE SIGNAL CONTROL AND
TAKE COMMAND OF SPACE TECHNOLOGY DEVELOPMENT

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