



## Flight-Proven Satellite Communications



### **Commercial Telemetry, Command & Ranging (TC&R)/ Telemetry, Tracking & Control (TT&C)**

- FM receiver/PM transmitter for commercial TC&R/TT&C applications
- Frequency agile in flight (<1 kHz resolution)
- Commandable or factory-set data rates
- 22.5-year mission life

### **Telemetry, Tracking & Command (TT&C) Transceivers and Transponders**

- U.S. DoD/NASA/ESA-compatible
- Over 1000 units flown since 1966
- Available with embedded COMSEC

### **Mission Data Transmitters**

- High data rate — Up to 320 Mbps flown, capable to 1.6 Gbps
- Over 4 decades of on-orbit experience
- U.S. DoD and NASA remote-sensing application

### **Information Security Products**

- Standalone or embedded solutions
- Multiple NSA certified designs
- Commercial - Policy 12

# SPACE PRODUCTS OVERVIEW

## Commercial TC&R/TT&C



### CXS-1000 — Multi-function Software Defined Transceiver

- Forward Link operation to 10 Mbps, return link to 25 Mbps
- Multi-waveform: BPSK, QPSK, SOQPSK, SGLS AM/FSK, and user defined
- Scalable 5 W, 10W or 20W RF S-band output options, external user power control
- Small size and weight: 3.69" x 4" x 4", (IU form factor), 1 lb.
- Serial control and status per IRIG 106-11



### CTKu-900/CRKu-900 — Ku-Band Commercial TC&R/TT&C Telemetry Transmitter/Receiver

- PM transmitter/ FM receiver for commercial TC&R/TT&C telemetry applications
- Frequency agile in flight (<1 kHz resolution) (both)
- Frequency tuning across 500 MHz band for transmitter (200 MHz band for receiver)
- Supports video downlinks >1 MHz bandwidth for all ranging channels
- Supports video downlinks >1 MHz bandwidth for all ranging channels (Transmitter)
- Commandable or factory-set data rates
- 22.5-year mission life



### CRKa-900 — Ka-Band Commercial TC&R/TT&C Command Receiver

- FM receiver for commercial TC&R/TT&C telemetry applications
- Frequency agile in flight (< 1 kHz resolution)
- Frequency tuning across entire Ka-band receiver range
- Commandable or factory set data rates
- High-reliability, radiation-hardened
- 22.5-year mission life

## Mission Data Transmitters



### CTK-830 — K-Band OQPSK Transmitter

- U.S. Dod and NASA remote-sensing application
- OQPSK
- Data rate 1.2 Gbps, capable to 1.6 Gbps
- PECL or LVDS interface
- Technology readiness Level 6 (TRL-6)
- High-reliability, radiation-hardened



### Ku/Ka-Band CDL Transmitter

- Joint product with L-3 Communication Systems-West
- Utilizes common data link protocol
- Data rate: >250 Mbps OQPSK (Ku-Band), >600 Mbps 8PSK (Ka-Band)
- +4.5 dBm of RF output power
- ORS application
- Flight-proven
- High-reliability, radiation-hardened



## TT&C Transponders/Transceivers



### CXS-610 — STDN/USB/DSN Transponder

- BPSK/PM downlink
- Utilizes multi-function ASIC for improved performance
- Flight-proven, High-reliability, radiation-hardened
- 15-year mission life
- Diplexer (optional)



**NSA Certified**

### CXS-810/C (KI-57) — Secure SGLS Transponder

- NSA certified, embedded encryption/decryption (optional)
- Utilizes multi-function ASIC for improved performance
- Flight-proven, High-reliability, radiation-hardened
- 15-year mission life
- Diplexer (optional)



**NSA Certified**

### CXS-2000 — Dual-Band, Multi-Mode Transponder

- NSA certified, embedded encryption/decryption (optional)
- 1553 interface (optional)
- Multi-mode PM, FSK/AM, BPSK (QPSK optional)
- Flight-proven, High-reliability, radiation-hardened, 15-year mission life
- Triplexer (optional)



### MSX-765 — Miniature L-/S-Band Tracking & Command Transceiver

- Compact, lightweight
- BPSK command receiver uplink data rate 64 kbps, capable to 2 Mbps
- BPSK telemetry transmitter downlink data rate 2 Mbps, capable to 10 Mbps
- Flight-proven, High-reliability, radiation-hardened
- Standalone transmitter or receiver configurations
- Diplexer (optional)

## Information Security Products



**NSA Certified**

### CDU-100 — Command Decryption Unit

- NSA certified Type 2 design
- Decrypt data rate 1 Mbps, 16 keys
- Supports both Caribou and Centurion algorithms
- Flight-proven
- High-reliability, radiation-hardened
- Redundant configuration - CDUA (optional)



### CDU-200/KIR-200 — Command Decryption Unit

- There are CDU-200/KIR-200 configurations to address CNSSP-12 and SECRET and BELOW (SAB) applications for foreign, allied and domestic use.
- 15-year mission life, 1 Mbps uplink
- Uplink command authentication
- Available in a single board embeddable solution



## Information Security Products Continued



**NSA Certified**

### MCU-110B — Miniature COMSEC Unit

- Standalone integrated encryptor/decryptor
- Compact, lightweight
- NSA certified Type 1 design
- Decrypt data rate 5 Mbps
- Encrypt data rate 10 Mbps
- Flight-proven
- High-reliability, radiation-hardened



**NSA Certified**

### MEU-121 — Miniature Encryption Unit

- Standalone Pegasus encryptor
- Compact, lightweight
- NSA certified Type 1 design
- Encrypt data rate from 51 Mbps to 80 Mbps, capable to 100 Mbps
- 64 keys
- Flight-proven
- High-reliability, radiation-hardened



**NSA Certified**

### MDU-133/135 — Miniature Decryption Unit

- Standalone Caribou decryptor
- Utilizes NSA certified Caribou device (CNSSP-12 Policy design)
- Dual uplink decryption
- Data rate 128 kbps, 16 keys
- Flight-proven
- High-reliability, radiation-hardened
- Redundant/cross-strapped configurations optional (MDU-135)



**NSA Certified**

### MCU-600 (CTP) — COMSEC/TRANSEC Processor

- Configurable encryptor/decryptor/TRANSEC
- Encrypt data rate 5 Mbps, capable to 100 Mbps
- Decrypt data rate 2 Mbps
- Internally-redundant, cross-strapped design
- Flight-proven
- High-reliability, radiation-hardened

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