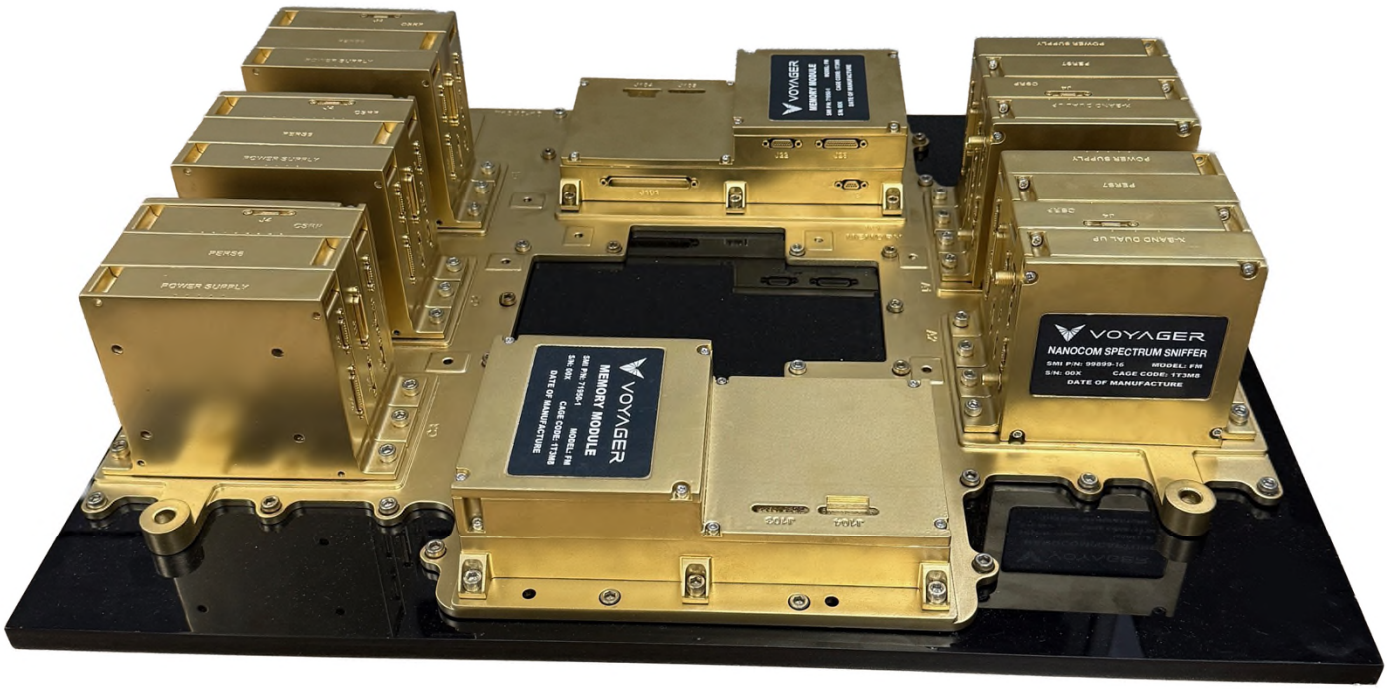
NANOCOM™ SDR Subsystem

S- and X-Bands



OVERVIEW

The Nanocom™ Software Defined Radio (SDR) subsystem integrates three (3) Spectrum Sniffer SDRs, two (2) Transport SDRs and two (2) Memory Modules. The subsystem is operated with a cold spare of each unit for redundancy.

Nanocom™ Transport SDR supports two (2) X-band downlinks, S-band Uplink and S-band Downlink, encryption, network protocols and on-board storage.

Nanocom™ Spectrum sniffer has three (3) RF channels for spectrum sniffing with two (2) independent LOs and sends the data over Aurora to the memory module for storage or stores locally.

The Memory Module is a high-speed, high-capacity 1.5 Terabyte onboard storage unit for next-generation science and defense payloads.

KEY FEATURES

- Zynq 7045 SoC; Dual-core ARM Cortex-A9
- Low SWaP
- On-orbit reprogrammable
- FW/SW co-development
- 7-year mission life

APPLICATIONS

- Commercial and Military SDR
- Mission Data Transmitter
- Signal Intelligence Receiver
- Satellite Orbits: LEO, MEO, GEO, Cislunar

NANOCOM™ SDR Subsystem (S- and X-Bands)

PRODUCT SPECIFICATIONS

TRANSMITTER	LOW FREQUENCY	X-BAND
Frequency	70 – 6000 MHz	8.025 – 8.4 GHz
RF Channels	1	2
RF Output Power	0 dBm	+10 dBm
Signal Bandwidth	56 MHz	1 GHz
Modulation	BPSK, QPSK, OQPSK, BPSK on subcarrier, Ranging, Coherency	
Data Rate	10 kbps - 1 Mbps	1 - 320 Msps, > 1 Gbps capable
FEC	RS (255,223) I=5, Convo (1/2) k=7, LDPC (7/8)	
Frequency Accuracy	±2 ppm EOL, locks to external 10 MHz	
Spurious And Harmonics	≤ -60 dBc, NTIA Spectral Mask Compliant	
EVM	< 4% RMS	

RECEIVER	
Frequency	70 – 6000 MHz
Data Rate	10 kbps – 1 Mbps
Modulation	BPSK, QPSK, OQPSK, BPSK on subcarrier
Dynamic Range	-70 dBm to 0 dBm
Max Input Power	+2 dBm
Channel Bandwidth	56 MHz
Acquisition and Doppler	± 60 kHz, 10 kHz/s

TRANSPORT SDR	
Power Consumption	< 48 W
Data / Ctrl Interfaces	RS-422, SpW, CAN, LVDS, 1PPS, 4 Aurora lanes (2 Gbps/lane)
Encryption	AES-256-GCM authenticated encryption

NANOCOM™ SDR Subsystem (S- and X-Bands)

PRODUCT SPECIFICATIONS

SPECTRUM SNIFFER SDR	
Frequency	70 - 6000 MHz
Memory	128 GB Flash, 300 MB/s
RF Channels	3 channels, 2 independent LOs
Dynamic Range	-70 dBm to 0 dBm
Max Input Power	+2 dBm
Channel Bandwidth	56 MHz
Power Consumption	< 28 W
Data / Ctrl Interfaces	RS-422, SpW, CAN, 1PPS, 4 Aurora lanes (2 Gbps/lane)
Encryption	AES-256-GCM authenticated encryption

MEMORY MODULE	
Memory Storage	1.5 TB Flash NAND
RAM	1 GB DDR3
Boot Memory	1 GB NAND
Aurora operating rate	2 Gbps/lane, 8 lanes
Power Consumption	7 W Standby, 19W Maintenance, 24W Operating
Data / Ctrl Interfaces	8x Aurora, 2x CAN, 1x RS-422, 1PPS, JTAG, 2x Ethernets

SDR SUBSYSTEM	
Outline Dimensions	520 mm x 439 mm x 15 mm
Mass	< 12 kg
Mission Life	Up to 7 years
Radiation	20 krads, LET > 43 MeV parts level
Input Voltage	18 - 40 VDC isolated
EMI/EMC	MIL-STD-461
Temperature Range	-30°C to +60°C (operating); -40°C to +85°C (unpowered)
Vibration	GSFC-STD-7000 (NASA GEVS) Qual Levels