

NGRM

Next Generation Radiation Monitor



Customer Benefits for Different Use Cases

Space Weather Research & Forecast

- Proven and no-risk solution to quickly deploy a space weather monitor, covering the main particles and event
- Small physical footprint makes it easy to deploy as hosted payload on any spacecraft
- Use NGRM as a remote interface for your dedicated sensor external via the sensor port to reduce development risks and easier accommodation on spacecrafts
- Gain better understanding of the radiation environment of target orbits

Operators & Platform Providers

- Gain better understanding of the radiation environment through-out mission duration
- Obtain long term profile of the critical particles
- Increase mission security by monitoring the relevant radiation environment
- Small physical footprint allows easy accommodation on any satellite
- Support in spacecraft anomaly handling by providing relevant space weather information at the time of anomaly

Key Features

- Versatile Radiation Monitor for various mission profiles to measure Electrons, Protons & Heavy Ions
- Monitoring Function
 - Alert & Saving function
 - Support to the platform
 - Science & Space Weather Information
- Controlled via TM/TC
- Supports autonomous operation
- Extendable with external sensor via dedicated interface
- Available with different standard digital interfaces (MIL-STD-1553B, SpaceWire, CAN, RS-422)

General Specifications

Power	2W	primary bus voltage +28.0 V / + 50.0 V
Mass	~ 1.4 kg	including thermal protection
Size (H, W, L)	~ 1 liter	Max. H: 68 (av. 52) mm, W: 132 mm, L: 150 mm
Mounting Area	198 cm ²	
S/C Interface	MIL-STD-1553B	MIL-STD-1553B is baseline and implemented. SpaceWire, UART (RS-422), CAN are available upon request
Thermal Interfaces	Conductive thermal interface - Contact area: 19649 mm ² - Contact conductance: 300 W/ m ² ·K - Conductance: 5.9 W/K	Radiative thermal interface (w/o MLI): - Radiative area: 72024 mm ² - Infrared emissivity of outer surface (alodine): 0.463
Operating temperature	- 40 C to + 65 C	NGRM is covered in MLI, the Sensors are covered with SLI NGRM needs to dissipate its energy via the S/C.

Measurement Ranges

Particle Electrons

Minimum Energy	100 keV
Maximum Energy	7 MeV
Log energy bins	8
Maximum Flux	10 ⁹ cm ⁻² s ⁻¹ (at 100KeV)

Particle Protons

Minimum Energy	2 MeV
Maximum Energy	200 MeV
Log energy bins	8
Maximum Flux	10 ⁸ cm ⁻² s ⁻¹ (at 2MeV)

Particle Heavy Ions (Cosmic Rays and Solar Events Ions)

Minimum LET	0.1 MeV cm ² /mg
Maximum LET	10.0 MeV cm ² /mg
Log energy bins	8
Identification	Particle discrimination between electrons, protons and heavy ions
Total dose	up to 100 krad (Si)
Non ionizing dose	derive from particle spectra

TC Requirements - Overview

NGRM acts as remote terminal and responds to TC/TM

Requires no periodic TM/TC services and can operate autonomously

NGRM has the following operation modes:

- Power off
- Initialisation
- Stand-by
- Calibration
- Operation
- S/W patching

The TC budget can be tailored along the following needs:

- Available TC budget from S/C
- Operational requirements and thus the TC budget needs to be discussed with end-user of the radiation data

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