

## PRODUCT DATASHEET

# SPACE-GM – High Reliability Radiation Counter System

*1<sup>st</sup> generation*

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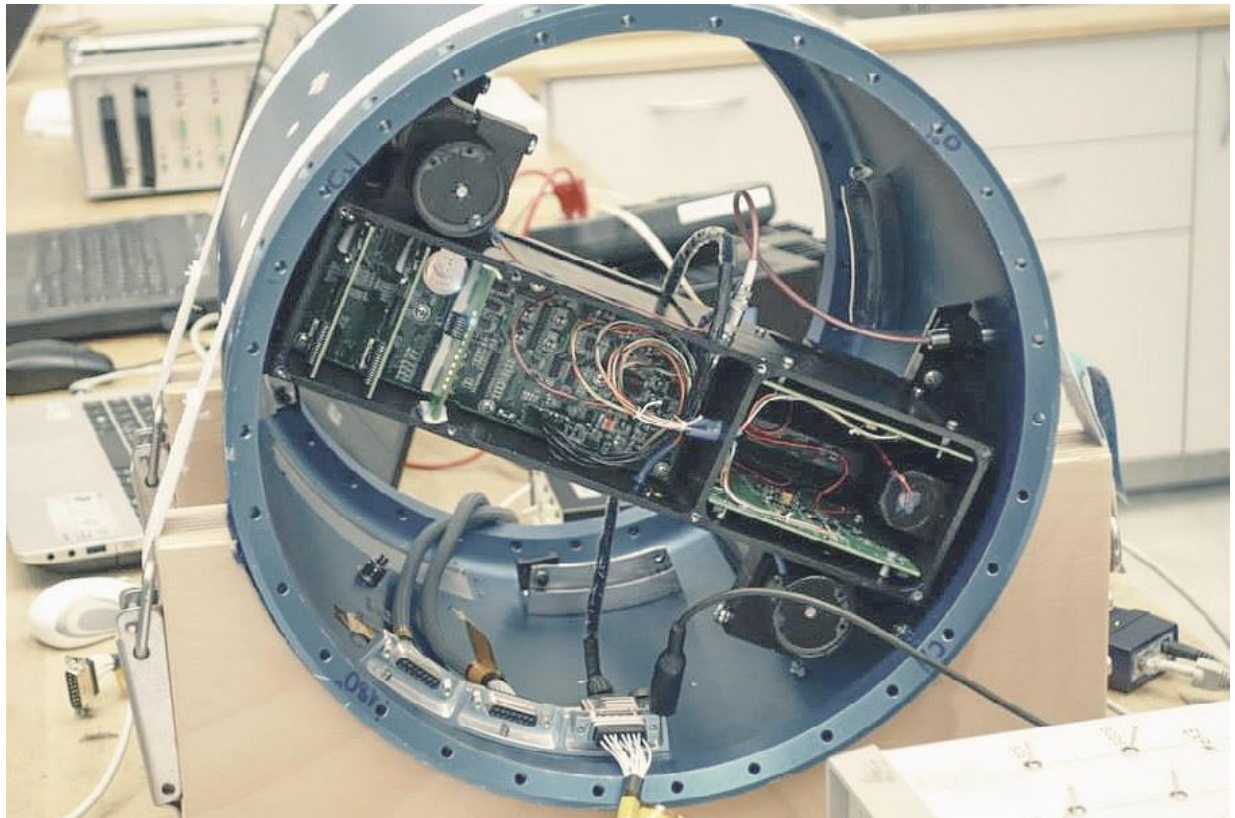
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# 1 Purpose and Scope

The present document provides detailed technical information about the SPACE-GM High Reliability Radiation Counter System.

The definitions and glossary of terms from ECSS-S-ST-00-01C [AD 1] apply to this document.



1. Figure – SPACE-GM System

## 2 Application and Key Features

### 2.1 APPLICATION

#### ✓ **Cosmic Ray and Research**

- Proven cosmic ray research equipment for stratospheric missions (ballons, sounding rockets)
- To determine the cosmic ray flux profiles
- To study shielding effects of the surrounding environment
- To generate cosmic ray event alerts
- Operated on board REXUS-17 sounding rockets

#### ✓ **Nuclear Environment Monitoring**

- To map contaminated areas
- To localise radiation sources
- To protect humans from radiation
- Operated on-board drones for radiation mapping

### 2.2 KEY FEATURES

- ✓ **GM-counter based cosmic ray instrument for harsh environments**
- ✓ **GM-counters can be used in stratospheric balloon flights or on-board sounding rocket missions**
- ✓ **2-dimensional sensitive measurement system**
- ✓ **Configurable system**
  - Different type of GM-counters
  - Up to a maximum number of 6 GM-counters
- ✓ **Fully autonomous operation**
- ✓ **Controlled via graphical user interface or TM/TC**
- ✓ **Available interfaces: CAN, RS-422**

# 3 Specification

## 3.1 GENERAL SPECIFICATION

1. Table – General specification

Parameters	Values
Power	1.9 W
Mass	3.5 kg
Dimensions	349 mm; 180 mm; 249 mm
Operational temperature range	-40°C...+70°C
Non-operational temperature range	-40°C...+85°C
Operational pressure range	10 <sup>5</sup> Pa...10 <sup>-4</sup> Pa
Outgassing rate	<1% TML <0.1% CVCM
Data range	1 kbit/s

## 3.2 ENVIRONMENTAL SPECIFICATION

2. Table – Environmental specification

Parameters	Values	
Thermal	Temperature environment	-40°C...+85°C
	Pressure environment	Up to 1.2·10 <sup>5</sup> Pa
	Humidity environment	20...65%relH
Thermal vacuum	Temperature environment	-40°C...+85°C
	Vacuum environment	<10 <sup>3</sup> Pa
	Max. depressurization rate	5.0 kPa/s
Vibration	Sine vibration environment for 3-axis	10...700 Hz, 4.0 g
	Random vibration environment for 3-axis	5...2000Hz, 6.0g <sup>RMS</sup>
	Shock pulse for 3 axis	±20 g, 2.0 ms
EMC	EMC environment	Tailored ECSS-E-ST-20-07C Rev.1 [AD 2]

## 3.3 INTERFACES

3. Table – Interfaces

Parameters	Values
Input power bus*	24.0 V...36.0V (redundant)
TM/TC interface*	Can Bus / RS-422 (redundant)

## 3.4 MEASUREMENT CAPABILITIES

4. Table – Measurement capabilities

Radiation Monitor	
GM types	Centronic ZP1210, ZP1200
Particle types	protons, charged particles
Dose rate range	1 µGy...100 mGy
Counting rate at 10 <sup>-2</sup> mGy/h	28 cps (for ZP1200) 110 cps (for ZP1210)
Dead time	90 µs (for ZP1200) 200 µs (for ZP1210)
Noise level	<0.2 (for ZP1200) <1.2 cps (for ZP1210)

# 4 Flight Heritage

**5. Table – Flight heritage**

Mission name	Hosting platform	Orbit details	Duration	Remarks
<b>BEXUS-14</b>	TECHODESE experiment	~30 km altitude range (N86°)	6 hours	With 2 GM-tubes
<b>REXUS-17</b>	REM-RED experiment	88 km maximum altitude (N86°)	10 minutes	With 6 GM-tubes
<b>HEMERA flight</b>	RADMOS experiment	~30 km altitude range (N86°)	6 hours	With 2 GM-tubes



## 5 List of Abbreviations

<b>AD</b>	Applicable Documents
<b>ECSS</b>	European Cooperation for Space Standardization
<b>GM</b>	Geiger-Müller counter
<b>RD</b>	Reference Documents
<b>REXUS</b>	Rocket Experiments for University Students
<b>TC</b>	Telecommand
<b>TM</b>	Telemetry

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## 8 References

### 8.1 APPLICABLE AND NORMATIVE DOCUMENTS

6. Table – Applicable and Normative Documents

AD	Title	Reference	Issue
[AD 1]	ECSS system - Glossary of terms	ECSS-S-ST-00-01C	1 Oct 2012
[AD 2]	Space engineering – Electromagnetic compatibility	ECSS-E-ST-20-07C Rev.1	7 Feb 2012

### 8.2 REFERENCE DOCUMENTS

7. Table – Reference Documents

RD	Title	Reference	Issue
[RD 1]	-	-	-

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