

Van Allen Probes RBSPICE Data Handbook

<http://rbspice.ftecs.com/Data.html>

Lou Lanzerotti, RBSPICE Principal Investigator
Don Mitchell, RBSPICE Instrument Scientist
Jerry W. Manweiler, RBSPICE SOC Lead Engineer

Purpose

This handbook is intended to guide RBSPICE data users in locating, identifying and understanding the content of the RBSPICE data files maintained by the RBSPICE Science Operations Center (SOC). As data products are added or changed, or other changes are made to the system for storing and accessing the RBSPICE data, this document will be updated accordingly.

The RBSPICE Data Handbook is a follow-on document in conjunction with the Van Allen Probes Mission Book and the RBSPICE Instrument Chapter.

Organization

- Field by Field description of RBSPICE Calibration Tables
- Software Requirements
- High Level Description of the RBSPICE SOC Archives
 - RBSPICE Product Specification
 - RBSPICE Instrument Modes:
 - Electron Energy (ESRxxx) , Ion Energy (ISRHELT), and Ion Species (TOFxPH and TOFxE)
 - RBSPICE Data Products correlated with Instrument Modes
 - Eg: ESRHELT – Electron Species Rates High Energy Low Time – accumulated every $S*N1*N2$ sectors
 - Eg: ESRLEHT – Electron Species Rates Low Energy High Time – accumulated every S sectors

Data Production Descriptions

- High Level Organization of the Processing Workflow
 - Download Telemetry
 - SPICE Processing
 - MOC Data Organization
 - Data Characterization
 - Level 0 Processing
 - Level 1 Processing
 - Level 2 Processing
 - Level 3 Processing
 - Level 3 PAP Processing

Data Production Descriptions

- Step by Step detailed descriptions of each workflow algorithm
 - Identification of key fields required from source data to calculate product
 - Section by section of the key fields such as Timing Fields
 - Description of the algorithm on how time is utilized from SCLOCK through UTC
 - Description of the accumulation used by the RBSPICE instrument
 - For example:



- How multi-spin accumulation is handled by the instrument
- How spin is simulated by the instrument during eclipse periods
- Basic Rate Calculation (EBR, IBR, ISBR)
- Counting Rate Calculations (ISRHELT, ESRHELT, ESRLEHT, TOFxPH and TOFxE)

Higher Level processing

- Level 1 Processing
 - Calculation of R_{in} versus R_{out} (R vs R)
- Level 2 Processing
 - PRBEM Standard Variable Naming convention
 - Conversion of Rate to Flux using Calibration Table data
 - Additional variables added to Level 2 data products from external Sources
- Level 3 Processing
 - Pitch Angles using EMFISIS Magnetic Field and SPICE telescope pointing
 - Additional variables added to Level 3 data products: external and quality
- Level 3 Pitch Angle and Pressure (PAP) Processing
 - Flux – Pitch Angle binning algorithm
 - Aggregate Variable calculations: $P_{\parallel}, P_{\perp}, n, I_E, I$

RBSPICE SOC

Data Repository Directory Structure

- MOC Data Organization
- RBSP Spacecraft Organization
 - RBSP
 - RBSPA
 - ECT
 - HOPE
 - MAGEIS
 - REPT
 - EFW
 - EMFISIS
 - RBSPICE
 - Telemetry
 - Level 0
 - Level 1
 - Level 2
 - Level 3
 - Level 3 PAP
 - Level 4

RBSPICE SOC Products

- Description of each data product and short name conventions
 - E.g.: ISRHELT, TOFxEH, TOFxEO...
- Production Filename convention
 - References Project level Filename Convention Document
 - CDF/CSV Filename conventions
- Data Release Plans
 - Production Release Schedule (to be added)
 - Release to NSSDC
 - Web Services
- RBSPICE Data Field Descriptions
 - Field by Field description of each data product by level
 - Field Name (CDF/CSV), Array Specifications (CDF only), Data Type, Min, Max, Units, Description
- References (to be added)
- Appendix – FAQ, other needed appendices
- Glossary – (to be added)
- To be added in Final Production/Archive year
 - Gap Lists for each product and cause of gap
 - Description of Quality analysis algorithms and quality flags
 - Additional items to be determined

Van Allen Probes – Plans Moving Forward

- Van Allen Probes – Revised Mission Book
 - Possibly Virtual Publication with NSSDC as repository
 - Instrument Data Handbooks for each Instrument
 - ECT
 - HOPE
 - MAGEIS
 - REPT
 - EFW
 - EMFISIS
 - RBSPICE
 - RPS
- Sasha soliciting ideas