PDS4 Hayabusa Archive Overview

(urn:nasa:pds:hay.mission)
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Kristina Lopez, PDS Small Bodies Node, Asteroid/Dust Subnode

1. Introduction

Hayabusa was a JAXA mission to the near-Earth asteroid 25143 Itokawa. The Hayabusa spacecraft spent September-December 2005 at Itokawa, and landed and obtained a sample which it returned to Earth. The primary instrument data from three Hayabusa instruments were archived in PDS: Asteroid Multi-band Imaging Camera (AMICA), Light Detection and Ranging instrument (LIDAR), and Near InfraRed Spectrometer (NIRS). Hayabusa also carried an X-Ray and Gamma Ray Spectrometer which did not archive data in PDS.

2. Archive Contents and History

During 2009-2012, the Hayabusa AMICA, LIDAR, and NIRS primary instrument data were archived in PDS in the PDS3 archiving standard. Subsequently, higher level data products derived from the Hayabusa primary instrument data have also been archived in PDS. In addition, ground observations of ECAS standard stars for the purpose of calibration of AMICA data were also archived.

Table 1. PDS3 Hayabusa data sets archived in PDS

Data Description	PDS3 Data Set ID	Date archived	PDS node
AMICA raw data	HAY-A-AMICA-3-HAYAMICA-V1.0	2010-03-15	SBN
LIDAR raw and calibrated data V1.0 (superseded by V2.0)	HAY-A-LIDAR-3-HAYLIDAR-V1.0	2009-02-03	SBN
LIDAR raw and calibrated data V2.0	HAY-A-LIDAR-3-HAYLIDAR-V1.0	2012-03-06	SBN
NIRS raw data	HAY-A-NIRS-2-NIRSRAW-V1.0	2011-03-28	SBN
NIRS calibrated data	HAY-A-NIRS-3-NIRSCAL-V1.0	2011-03-28	SBN
Hayabusa SPICE	HAY-A-SPICE-6-V1.0	2010-07-16	NAIF
Groundbased calibration observations for AMICA	EAR-CAL-I1376-3-AMICACAL-V1.0	2012-07-26	SBN

Data Description	PDS3 Data Set ID	Date archived	PDS node
Itokawa shape model	HAY-A-AMICA-5-ITOKAWASHAPE-V1.0	2008-10-09	SBN
AMICA geometry backplanes	HAY-A-AMICA-3-AMICAGEOM-V1.0	2012-03-06	SBN

During 2021-2022, the PDS3 Hayabusa holdings were migrated to the PDS4 archiving standard by the Small Bodies Node, using the On-Line Archiving Facility (OLAF) and the OLAF PDS4 migration tools. No changes were made to the data files in the migration. Some documents were updated and corrected where needed, and new documentation was created to describe the PDS4 archive structure. Metadata was migrated from the PDS3 labels to PDS4 labels, and updated and corrected where needed. Some ancillary files have also been corrected. The PDS3 versions will continue to be available in the archive, but except for historical purposes the PDS4 archive will generally be the preferred version since some errors have been corrected and the material organized in a more useable structure.

Table 2. The migrated PDS4 Hayabusa bundles

Data description	Bundle LID	Contents
Mission	urn:nasa:pds:hay.mission	Mission-level information
AMICA	urn:nasa:pds:hay.amica	AMICA raw data and ground calibration data
LIDAR	urn:nasa:pds:hay.lidar	LIDAR raw and calibrated data
NIRS	urn:nasa:pds:hay.nirs	NIRS raw and calibrated data
Shape Model	urn:nasa:pds:gaskell.ast-itokawa.shape-model	Itokawa shape model
Backplanes	urn:nasa:pds:hay.amica.itokawa.backplanes	AMICA geometry backplanes

3. Hayabusa Mission Bundle Contents

The Hayabusa Mission bundle contains information pertaining to the mission and archive as a whole. It has three collections:

The **document collection** contains the archive overview (this document), the Hayabusa mission description document, and the Hayabusa spacecraft description document.

The **xml_schema collection** contains copies of each of the PDS4 data dictionaries referenced by the archive. These dictionaries are also available at the PDS Dictionary Collection on the PDS website. The dictionaries define the metadata used in the PDS4 labels. See these if needed to understand the specific meanings of the label metadata.

The **context collection** contains the context files specifying the mission, spacecraft, telescope, instrument, and target context objects which are referenced in the PDS4 labels. See these if needed to determine the identity of the mission, observing system, or target bodies referenced in the labels.

4. Other Hayabusa Bundles

The other five Hayabusa bundles each contain a **document collection** and one or more **data collections**, and in some cases a **calibration collection**. See the bundle overview document in the document collection of each bundle for a detailed description of the bundle contents and structure.

5. Using the Hayabusa PDS4 Archive

See the PDS4 documentation set at the PDS website (https://pds.nasa.gov/datastandards/documents/) for detailed information about the PDS4 archiving standard. Here are some basic concepts to get you started.

Labels: All PDS4 data products have detached .xml files called labels to describe their format, context, and content. The labels contain metadata to facilitate discovery, display, and analysis of the data products.

Collections: Data and documentation products (files and their labels) are grouped into collections. In the Hayabusa archive, data products are grouped into collections by processing level.

Bundles: Collections are grouped into bundles. In the Hayabusa archive, the raw and/or calibrated data from each instrument is in its own bundle. Derived data each get their own bundle. And there is a Mission bundle with mission-level products.

Documentation: Look in the document collection of the Mission bundle for mission-level documentation. Look in the document collection of the individual instrument for instrument-level information.

Tools: Data archived in PDS4 are standard image arrays, binary tables, ascii tables, and csv tables which can be read and manipulated with widely available software. For PDS-provided

tools which work with the data via the PDS4 labels, see the Tools Registry at the PDS website (https://pds.nasa.gov/tools/tool-registry/).

6. References

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