Notes Regarding New LRO LOLA Releases and PDS3 to PDS4 Migration

PDS Geosciences Node

March 15, 2023

These notes apply to Lunar Reconnaissance Orbiter (LRO) Lunar Orbiter Laser Altimeter (LOLA) data archives at the PDS Geosciences Node. All LRO data sets were originally archived under the PDS3 standard.

Notes on New Releases

Beginning with PDS Release 53, March 15, 2023, new LOLA data products are archived under the PDS4 standard. The older data products are in the process of being migrated to PDS4.

No files have been removed from the PDS3 archive volume. The only change is the addition of PDS4 labels and documentation files. New LOLA data products include both PDS3 and PDS4 labels.

Instead of the data sets and archive volumes in PDS3, products in PDS4 are organized into collections and bundles. A collection is a set of related products, which may be data products, document products, browse products, miscellaneous products, etc. A bundle is a set of related collections.

Two PDS4 bundles have been defined for the LOLA datasets. The LOLA bundle raw data bundle has one data collection, two document collections, a calibration collection, and a miscellaneous collection that holds the PDS3 index table. The other LOLA bundle has four data collections of higher order product types, three browse collections, two document collections, a calibration collection, and a miscellaneous collection. The tables below show the correspondence between the PDS3 volume and PDS4 bundle and PDS3 product types and PDS4 collections, respectively.

LRO LOLA PDS4 Bundles and Corresponding PDS3 Volumes and Data Set IDs

Archives	PDS4 Bundles	PDS3 Volumes	PDS3 Data Set IDs
LRO LOLA raw data	urn:nasa:pds:lro_lola_edr	lrolol_0xxx	LRO-L-LOLA-2-EDR-V1.0
LRO LOLA higher order data	urn:nasa:pds:lro_lola_rdr	lrolol_1xxx	LRO-L-LOLA-3-RDR-V1.0 LRO-L-LOLA-3-RADR-V1.0 LRO-L-LOLA-4-GDR-V1.0 LRO-L-LOLA-5-SHADR-V1.0

LRO LOLA PDS4 Data Collections and Corresponding Collection IDs

PDS Collection	PDS4 Collection ID
LRO LOLA raw data	data_raw
LRO LOLA calibrated data	data_calibrated

LRO LOLA gridded data (includes sldem2015 products)	data_gridded
LRO LOLA radiometric data (RADR)	data_radr
LRO LOLA spherical harmonic models	data_shadr

A bundle is identified by a file named **bundle_*.xml** in the root directory of a bundle; it describes the bundle and lists the collections that belong to it. A collection is identified by a file named **collection_*.xml** in a subdirectory. The file **collection_*_inventory.csv** is a list of the products that belong to the collection.

Every product, collection, and bundle in PDS4 has a Logical Identifier (LID) that is guaranteed to be unique throughout PDS. The LID is defined in the PDS4 label using the tag **<logical_identifier>**. For data products, the LID is analogous to PRODUCT_ID in a PDS3 label.

Not every PDS3 directory has a PDS4 counterpart. The PDS3 data, catalog, document, and index directories have been made into collections, but the label and extras directories have been left unchanged. No PDS4 labels have been provided for **aareadme.txt, voldesc.cat,** and **errata.txt** in the volume root directories. Information that would have been added to errata.txt now is found in the release_notes.txt file in the document collection. A **readme.txt** file describing the PDS4 bundle is located in the bundle root directory. Note that the SIS documents in the document directory refer to the PDS3 datasets.

Notes on Migrated Data

The metadata in PDS3 labels have been copied to PDS4 labels, so that each data product will have both a PDS3 and a PDS4 label. PDS4 labels are labels are written in XML (Extended Markup Language).

The data products in the PDS3 LOLA archives at the Geosciences Node, except for the JPEG2000 images, are already PDS4-compliant, so there will be no need to alter the data files when the older data are migrated. JPEG2000 is not an acceptable PDS4 storage format. As such, these products are not considered to be part of the PDS4 bundle. No PDS4 labels are provided for the JPEG2000 images. However, these images are still included as part of the PDS3 archive.