Overview of MIRO Archive Data on PSA and PDS

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Work Effort for Data Products & Archiving

Half time commitment

    Lei Pan (archiving, pipeline)

    Paul Springer (algorithm implementation, pipeline)

    Velusamy Thangasamy (calibration procedures)

Support

    Pete Schloerb

    Seungwon Lee

    Mark Hofstadter

    Paul von Allmen

CODMAC Levels and Descriptions

1. Raw data: Telemetry data with data embedded

2. Edited data: Corrected for telemetry errors and split or decommutated into a data set for a given instrument. Sometimes called Experimental Data Record. Data are also tagged with time and location of acquisition. NASA Level 0 data.

3. Calibrated data: Edited data that are still in units produced by instrument, but that have been corrected so that values are expressed in or are proportional to some physical unit such as radiance. No resampling, so edited data can be reconstructed. NASA Level 1A.

4. Resampled data: Data that have been resampled in the time or space domains in such a way that the original edited data cannot be reconstructed. Could be calibration in addition to being resampled. NASA Level 1B.

5. Derived data: Derived results, as maps, reports, graphs, etc. NASA Levels 2 through 5.

6. Ancillary data: Nonscience data needed to generate calibrated or resampled data sets. Consists of instrument gains, offsets; pointing information for scan platforms, etc.

7. Correlative data: Other science data needed to interpret spaceborne data sets. May include ground-based observations such as soil type or ocean buoy measurements of wind drift.

8. User description: Description of why the data were acquired, any peculiarities associated with the data sets, and enough documentation to allow secondary users to extract information from the data.

CODMAC Levels for PDS

Level 1 – *Telemetry*. Reserved for Radio Science.

Level 2 – *Uncalibrated*. Data in one of the fundamental structures.

Level 3 – *Reversibly calibrated*. Data in units proportional to physical units. Since PDS allows offsets and scaling factors in its array and table structures, this would be the minimum level capable of satisfying the "in physical units" requirement.

Level 4 – *Irreversibly processed*. Higher-level products from a single source that cannot be losslessly converted back to the lower-level products from which they were derived. These might also satisfy the "in physical units" requirement.

Level 5 – *Derived data*. Products created by combining data from more than one source (instrument, observer, etc.).

Level 6 – *SPICE data*.

Level 7 – Reserved.

Level 8 – *Documentation*.

NASA Data Product Levels

Level 0	Reconstructed, unprocessed instrument and payload data at full resolution, with any and all communications artifacts (e.g., synchronization frames, communications headers, duplicate data) removed. (In most cases, the EOS Data and Operations System (EDOS) provides these data to the data centers as production data sets for processing by the Science Data Processing Segment (SDPS) or by a SIPS to produce higher-level products.)
Level 1A	Reconstructed, unprocessed instrument data at full resolution, time-referenced, and annotated with ancillary information, including radiometric and geometric calibration coefficients and georeferencing parameters (e.g., platform ephemeris) computed and appended but not applied to Level 0 data.
Level 1B	Level 1A data that have been processed to sensor units (not all instruments have Level 1B source data).
Level 2	Derived geophysical variables at the same resolution and location as Level 1 source data.
Level 3	Variables mapped on uniform space-time grid scales, usually with some completeness and consistency.
Level 4	Model output or results from analyses of lower-level data (e.g., variables derived from multiple measurements).

Current Data Pipeline Functional Diagram

archiving

Revision 4.4, 11/8/2013

Legend:

○ Process
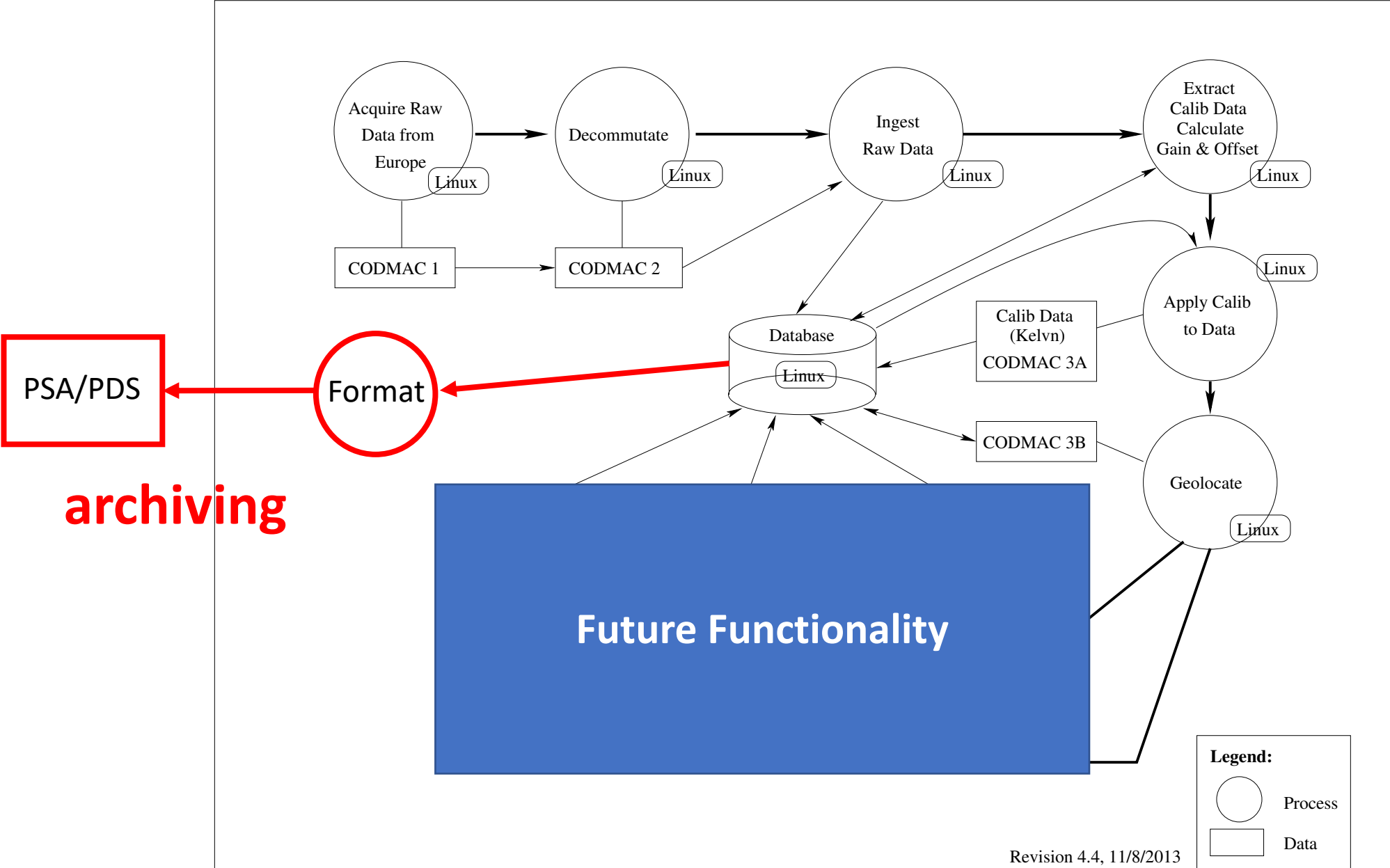
▭ Data

MIRO Data Currently Archived in PSA/PDS

Raw data
    Continuum (millimeter and sub-millimeter band)
    Engineering
    Spectroscopic

Calibrated data
   Continuum (millimeter and sub-millimeter band)
    Geometry
    Spectroscopic

Document
    Logs
    User manual

Current archiving status
- PRL, ESC1-3 published
- Delivered ESC4 - addressing science RIDs (new calibration of spectroscopic data close to completion, planned delivered by 06/2017)
- Delivered EXT1-2, EXT-3 will be delivered within 1 week

Planned Extension of Data Processing Pipeline

Revision 4.4, 11/8/2013
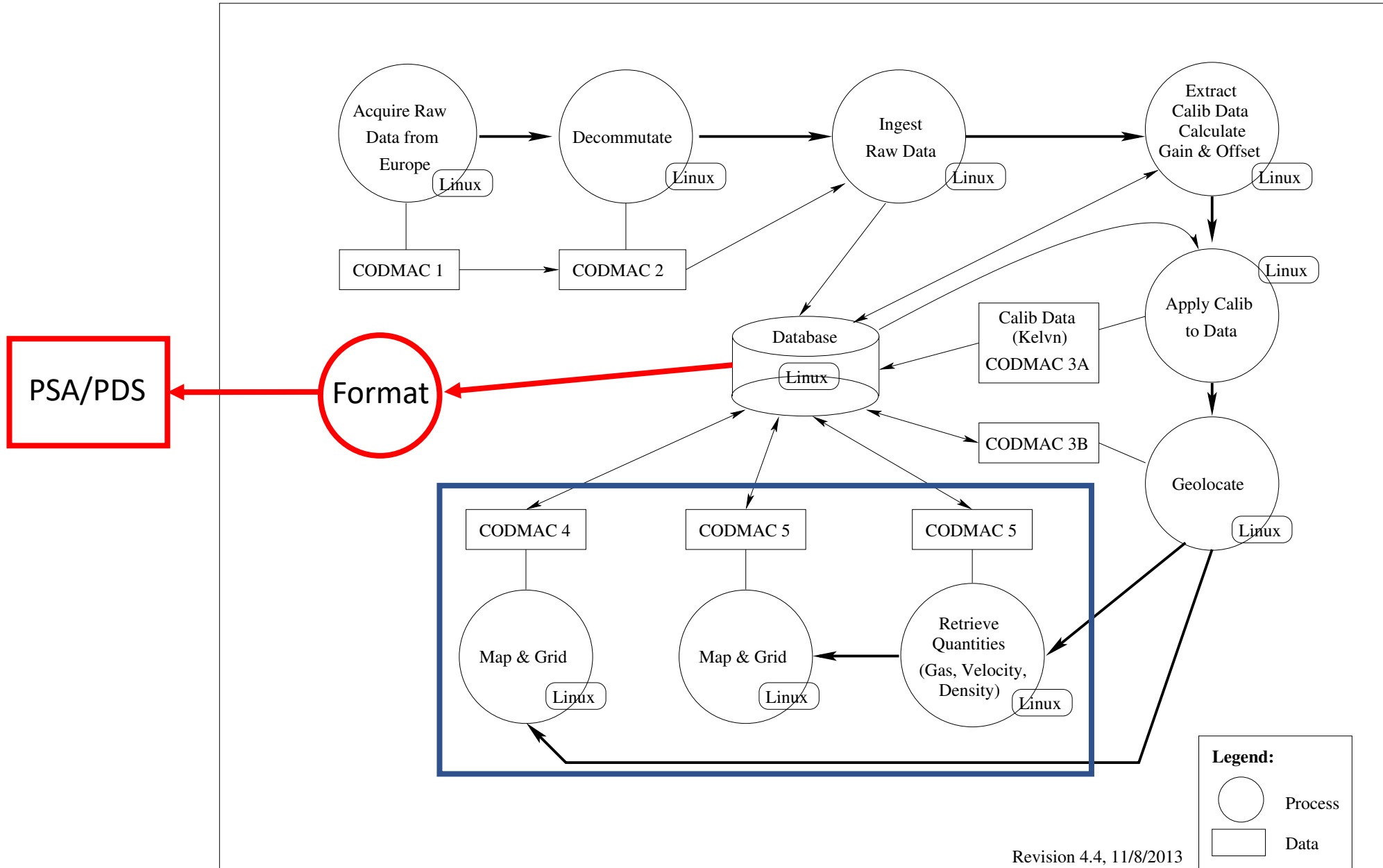
Status for Archiving Higher Level Data Products

Data Product	CODMAC	NASA	Delivery
Calibrated continuum data	3	1A	Completed
Calibrated spectroscopic data	3	1A	Completed
Improved geometry data	"6"	ancillary	Completed
"1-second" data	4	1B	Completed
"Folded" spectra	4	1B	Completed
Nucleus TA maps	5	3	Postponed
Coma TA maps	5	3	Postponed
TA Maps at ToOs	5	3	Postponed

Additional Data Products (if resources permit)

- 3-D coma retrievals (gas density, temperature & velocity distributions) (L4)

- Maps of nucleus material properties (porosity, ice content, …) (L4)

Improved Calibration Procedures

- Improved beam efficiency assessment

- Improved sideband ratio

- Optimized calibration parameters

- Uncertainty quantification