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Information Model Governance for Diverse Disciplines

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The PDS4 Information Model (IM) Version 1.13.0.0 was released for use in December 2019. The ontology-based IM remains true to its foundational principles found in the Open Archive Information System (OAIS) Reference Model (ISO 14721) and the Metadata Registry (MDR) standard (ISO/IEC 11179). The standards generated from the IM have become the de-facto data archiving standards for the international planetary science community and have successfully scaled to meet the requirements of the diverse and evolving planetary science disciplines.

A key foundational principle is the use of a multi-level governance scheme that partitions the IM into semi-independent dictionaries. The governance scheme first partitions the IM vertically into three levels, the common, discipline, and project/mission levels. The IM is then partitioned horizontally across both discipline and project/mission levels into individual Local Data Dictionaries (LDDs).

The Common dictionary defines the classes used across the science disciplines such as product, collection, bundle, data formats, data types, and units of measurement. The dictionary resulted from a large collaborative effort involving domain experts across the community. An ontology modeling tool was used to enforce a modeling discipline, for configuration management, to ensure consistency and extensibility, and to enable interoperability. The Common dictionary encompasses the information categories defined in the OAIS RM, specifically data representation, provenance, fixity, identification, reference, and context. Over the last few years, the Common dictionary has remained relatively stable in spite of requirements levied by new missions, instruments, and more complex data types.

Since the release of the Common dictionary, the creation of a significant number of LDDs has proved the effectiveness of multi-level, steward-based governance. This scheme is allowing the IM to scale to meet the archival and interoperability demands of the evolving disciplines. In fact, an LDD development “cottage industry” has emerged that required improvements to the development processes and configuration management. An LDD development tool now allows dictionary stewards to quickly produce specialized LDDs that are consistent with the Common dictionary.

The PDS4 Information Model is a world-class knowledge-base that governs the Planetary Science community's trusted digital repositories. This presentation will provide an overview of the model and additional information about its multi-level governance scheme including the topics of

stewardship, configuration management, processes, and oversight.