Serving Space Science Data at the Laboratory for Atmospheric and Space Physics (LASP)

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Since 1948, LASP has been building a unique collection of datasets of various measurements pertaining to space science, including the sun, the atmosphere, space plasma, space weather and the magnetosphere, planetary science, etc.

LASP serves these datasets via an OPenDAP compliant data access framework called LaTiS, which leverages a domain agnostic, functional data model. Bundled with the model are pluggable readers that map data sources into the model, writers that map from the model to the desired output format, and operations that perform server side computations, such as reformatting, subsetting, aggregation, statistical analyses, etc. The pluggable framework supports code extension and reuse. New operations can be defined to create new server capabilities, including project specific capabilities. The RESTful interface uses the HTTP query string to order and invoke operations. With this interface is it possible to read and apply processing arguments to a dataset in a single server request. Interoperability is facilitated by allowing the end user to stream data directly into memory while pushing data wrangling overhead back onto the access server. LASP currently uses multiple instances of LaTiS to serve a wide variety of datasets in various domains. The most recent involves server side fusion of wind barbs with images for informing mitigation of forest fires.

Metadata about the datasets served by LASP are stored in a separate semantic database. To develop and manage the database, the VIVO semantic framework was leveraged. The VIVO ontologies were augmented with both the pre-existing VSTO ontology as well as LASP's own 'laspds' ontology, developed to describe our space science data. This database is evolving to serve as the single source of truth for metadata. Humans and applications such as web sites have access to this vetted, managed information. Metadata interoperability is provided via the ability to crosswalk from this representation into other schemas, such as SPASE, a heliophysics standard used in the heliophysics community, and also ISO 19115, used internationally.