

## Abstract

The International Organization for Standardization/Technical Committee on Geographic Information/Geomatics' (ISO/TC 211) standard for geographic metadata, ISO 19115, was finalized in 2003. Since then, its use has grown both within the US and globally. After an extensive review process, NASA's Earth Science Data and Information System (ESDIS) Project determined that its stakeholders would benefit if it were also to adopt ISO 19115 (Aleman, et al. 2011). This poster explores the impacts of adopting ISO 19115, how the standard's implementation will effect the flow of metadata within ESDIS and some of the initial steps being explored in the implementation process.

## Challenges and Benefits

One of the current issues in adopting a new metadata standard is the plethora of standards used within the NASA community (Fig. 1). However, when considered, the advantages of adopting a family of standards such as ISO 19115 do justify the costs (Fig. 2) (Noguerras-Iso, et al. 2011). ISO 19115 has the potential to increase discoverability and interoperability, both at the national and international levels. It brings the flexibility to meet the needs of upcoming missions while increasing the capacity to manage legacy data collections. Most importantly, it provides a framework to increase accountability, transparency, modeling, reporting and long-term trends analysis (Ostensen, et al. 2008).



Figure 1: Non-ISO metadata standards used in Earth observations.

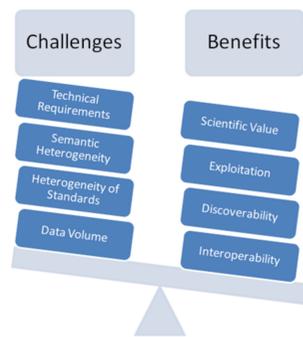


Figure 2: Challenges and benefits of adopting ISO 19115.

**ISO and the Flow of Metadata:** In general, science teams collaborate with DAACs to develop initial metadata. This is

then modified and provided for ingestion by ECHO and GCMD and passed on to users. Fig. 3 details this dynamic subsequent to implementation of ISO 19115.

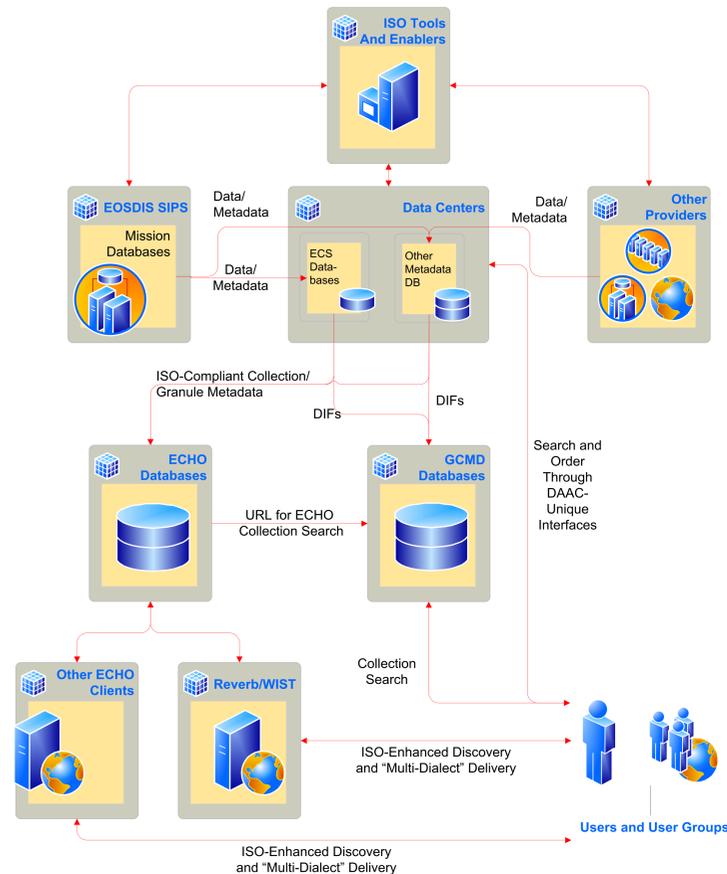


Figure 3. ISO metadata within the context of NASA ESDIS metadata flows (modified from Aleman, et al. 2011).

## NASA Best Practices for ISO Implementation

The Metadata Evolution for NASA Data Systems (MENDS) Tiger Team made several distinct recommendations for how NASA stakeholder data systems might best implement ISO TC/211 metadata. The initial phase of the MENDS project found that, foremost, NASA ESDIS should adopt ISO 19115 (Aleman, et al. 2011). It was found that a tiered, multi-phased approach to implementation would be most practical. Primary recommendations from MENDS were (Khalsa, et al. 2011):

- Early adopters should be prioritized and learned from.
- Manage evolution of ISO standards within NASA; the NASA "flavor" of ISO 19115, modified by stakeholder feedback, should be submitted to ISO.
- Baseline schemas should be provided to the Decadal Missions.
- Automatic metadata synchronization should be promoted.

- Stakeholders should be encouraged to remain engaged.
- User support should be provided.

Based on the MENDS findings, early adopter collaboration and user needs analysis, the following implementation plan was drafted:

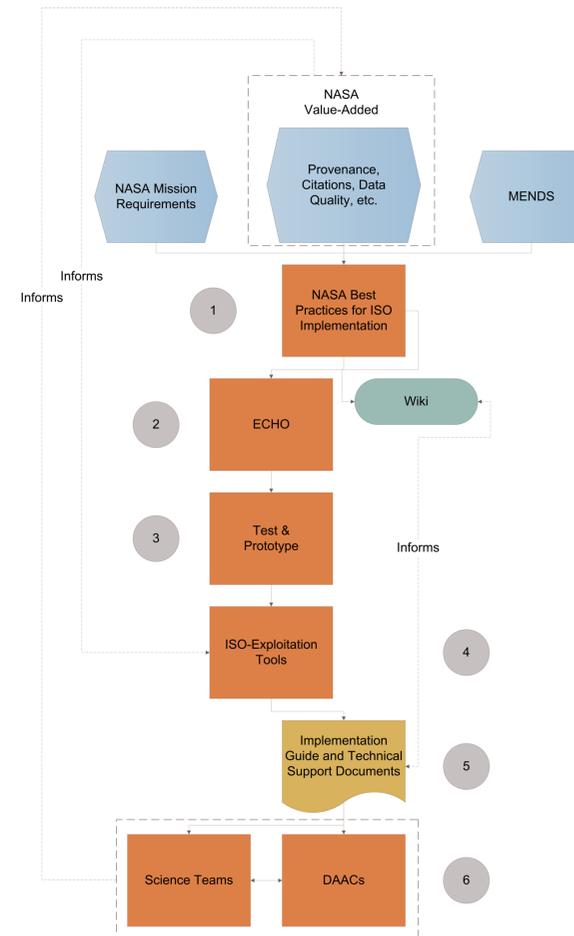


Figure 4: Draft implementation plan for ISO 19115, from best practices (1) to final implementation (6).

**A Family of ISO Standards:** The implementation of ISO 19115 will alter the ESDIS metadata landscape. However, it will be necessary to make use of additional geographic information standards within the ISO family, some of which are:

- ISO 19115-2 Metadata - Part 2: Extensions for imagery and gridded data
- ISO 19139 Metadata: XML schema implementation
- ISO 19157 Data quality
- Additional standards focus on topics such as land cover, GML, geodesy, geopositioning

**Prototyping:** The early adopters will work with ECHO and Reverb to test the capacity to generate and ingest ISO 19115 compliant metadata. The ECHO ingestion process requires minimal core fields (Table 1) and the testing process is not anticipated to be overly challenging. That said, technical ca-

capacity varies, with some of the DAACs already well along the way to implementing ISO 19115.

Collection-Level	Granule-Level
Dataset ID	Collection Dataset ID or Shortname/Version ID
Short Name	Granule UR
Version ID	Temporal
Description	Spatial
Temporal	Platform/Instrument/Sensor
Spatial	Online Access URLs
Platform/Instruments/Sensor	Online Resource URLs
Archive Center	Browse Image URLs
Processing Level	Last Update Date
Campaign	
Online Access URLs	
Online Resource URLs	
Browse Image URLs	
Last Update Date	

Table 1: ECHO core fields.

## Conclusions

Although inherently complex, ISO 19115 is a sophisticated standard that will significantly benefit the NASA stakeholder community. However, the use of ISO standards necessitates thorough testing and demonstration, user support, community engagement and value-added toolset development. NASA has the opportunity to meet these challenges and play a leading role in the evolution of the ISO geospatial standards.

## References

Aleman, Alicia, Armstrong, Ed, Beaty, Tammy, et al. 2011. "Recommendations of the MENDS Tiger Team to the ESDIS Project to the ESDIS Project Regarding Adoption of the ISO 19115 Metadata Standard". A technical report prepared by the MENDS Team, January 23, 2011.

Javier Noguerras-Iso, F. Javier Zarazaga-Soria, Pedro R. Muro-Medrano: Geographic information metadata for spatial data infrastructures - resources, interoperability and information retrieval. Springer 2005: I-XXI, 1-263

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Olaf Østensen, Douglas O'Brien and Antony Cooper, 2008. "Measurements to know and understand our world". ISO Focus - The Magazine of the International Organization for Standardization, February 2008.

