NASA Taxonomy 2.0
Project Overview

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California Institute of Technology
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Providence, Rhode Island
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Publishing Cycle in the Real Time Organization

Discover

FirstGov

NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION

Classify

Logical & Intuitive Filters
Taxonomy

Create

Content
Assets

Site Maps
Search Engine
NASA Portals
Content Integration Networks

Finding the right information at the right time to solve the problem at hand

JPL Knowledge Management
Project Benefits: Enable Knowledge Discovery

- Make it easy for various audiences to find relevant information from NASA programs quickly
  - Provide easy access for NASA Web resources
  - Information integration for unified queries and management reporting
  - Improve search results targeted to user interests
  - Enable the ability to move content through the enterprise to where it is needed most
  - Facilitate Records Management and Retention Requirements

- Comply with E-Government Act of 2002
- Be ready to participate in federal XML projects

JPL Knowledge Management
Best Practices increase interoperability and extensibility

- **Faceted Classification Schema**
  - Facets give flexibility and power
  - Modular in nature for easier maintenance
  - Can tag what is appropriate to the use case

- **Polyhierarchy**
  - Concepts can appear more than once
  - Enables knowledge discovery from multiple viewpoints
  - User-centric organization


**NASA Taxonomy Best Practices**

- **Hierarchical Granularity**
  - Different levels of depth depending on attribute set and content
  - The NASA taxonomy is broad in nature by design
  - Integration points allow for mapping of local vocabulary terms back to larger semantic framework

- **Use of Standards**
  - Incorporates existing federal and industry terminology standards like NASA AFS, NASA CMS, FEA BRM, NAICS, and IEEE LOM
  - Complies with metadata standards like Z39.19, ISO 2709, and Dublin Core
  - Political buy in from COIs
NASA Taxonomy Best Practices

• Mapping Aliases
  - Librarian approach allows for a meaningful expression of relationships
  - Synonyms, acronyms, related terms, broader and narrower terms
  - Easily maintained in derived RDF files

  - Example: MER A=Spirit, MER B=Opportunity
  - Example: Section 366 = Section 372
  - Example: JIMO = Jupiter Icy Moons Orbiter = Prometheus 1

A means of holding our institutional memory

JPL Knowledge Management
**Project Progress: Initial Taxonomy Development**

**Phase 1**
- Audit Content practices
- Identify & survey stakeholders

**Phase 2**
- Build community of practice
- Agree on comprehensive branches & taxonomy detail

**Phase 3**
- Test & validate Taxonomy

**Phase 4**
- Dublin Core mapping
- Metadata specification
- XML schema development

**Follow-on Work**
- Integrate with applications
- Long term maintenance

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**PROJECT 1**
Fall 2002

**PROJECT 2**
Fall 03 - Spring 04

**JPL Knowledge Management**
Extend Taxonomy
Value Space as Needed

NASA Taxonomy Facets (Top Level)

- Access Security Requirements (new)
- Audiences
- Business Purpose (formerly Functions)
- Competencies (formerly Disciplines)
- Content Types (formerly Information)
- Industries
- Instruments (new)
- Locations
- Missions and Projects
- Organizations
- Subject Categories (new)

- Dates (formerly Chronology)
- Collections

## Implementing Strategic Value Using Semantic Frameworks

<table>
<thead>
<tr>
<th>Facets</th>
<th>Strategic Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access Requirements</td>
<td>Sensitivity and access control</td>
</tr>
<tr>
<td>Audiences</td>
<td>Who is the content intended for</td>
</tr>
<tr>
<td>Business Purpose</td>
<td>Why the content was created</td>
</tr>
<tr>
<td>Competencies</td>
<td>What field or discipline is relevant</td>
</tr>
<tr>
<td>Content Types</td>
<td>The genre of the content</td>
</tr>
<tr>
<td>Industries</td>
<td>External partners &amp; businesses</td>
</tr>
<tr>
<td>Instruments</td>
<td>Flight payloads that yield science</td>
</tr>
<tr>
<td>Locations</td>
<td>Sites where work occurs – on and off Earth</td>
</tr>
<tr>
<td>Missions/Projects</td>
<td>NASA’s lines of business</td>
</tr>
<tr>
<td>Organizations</td>
<td>NASA organizations</td>
</tr>
<tr>
<td>Subject Categories</td>
<td>The topic of the content</td>
</tr>
</tbody>
</table>

*JPL Knowledge Management*
**NASA Specific Metadata Fields**

*NASA has data sets unique to its business*

<table>
<thead>
<tr>
<th>Definition</th>
<th>NASA Taxonomy Mapping</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASA missions and projects</td>
<td>nasa:missionsProjects</td>
<td>Taxonomy: Missions and Projects</td>
</tr>
<tr>
<td>Business purpose</td>
<td>nasa:businessPurpose</td>
<td>Taxonomy: Business Purpose</td>
</tr>
<tr>
<td>Technical competencies</td>
<td>nasa:competencies</td>
<td>Taxonomy: Competencies</td>
</tr>
<tr>
<td>Standard industry categories</td>
<td>nasa:industries</td>
<td>Taxonomy: Industries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>From NAICS standard</td>
</tr>
</tbody>
</table>

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NASA Taxonomy Website and Resource

NASA Taxonomy - Top Level Facets

- Access Security Requirements
- Audiences
- Business Purpose
- Competencies
- Content Types
- Industries
- Instruments
- Locations
- Missions and Projects
- Organizations
- Subject Categories

Background and training materials

Links to Controlled Vocabularies

Tip on using the NASA Taxonomy:

What is the NASA taxonomy?

The NASA taxonomy is a controlled vocabulary that is designed to populate the NASA metadata core specification.

It is also a means of tagging NASA content so that it can be used and reused in many different contexts.

NASA Taxonomy - Top Level Facets

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Contact the NASA Curator

NASA Official: Jayne Dutra
Last Updated: May 25, 2004

http://nasataxonomy.jpl.nasa.gov

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Built Demonstration of Taxonomy Value in Search and Navigation

219958 items

by Organization
NASA Affiliated Institutions 1378
NASA Centers 76545
NASA Contractors 10108
NASA Enterprises 815
NASA Headquarters 4042
Other NASA Partners 999

by Competencies
Business 386
Engineering 393
Mission 555
Scientific 410
Technical 218

by Subject
Aeronautics 26532
Astronautics 31758
Chemistry and Materials 17086
Engineering 39631
Geosciences 30770
Mathematical and Computer Sciences 13286
Space Sciences 22685
4 more

by Information Type
Catalogs and Databases 32
Designs and Specifications 62
Plans and Agendas 158
Results and Analyses 260
Reviews and Lessons Learned 1819
Status Reports 119
Technical Reports 229
6 more

by Missions and Projects
Aerospace Technology 60
Biological and Physical Research 68
Data 140
Earth Sciences 1497
Human Exploration and Development 10880
Planetary Missions 4819
Space Sciences 8467
by Date
1972 2382
1973 8512
1974 7828
1975 7704
1992 8131
1993 8519
1994 7712
74 more

by Collection
Lessons Learned 1370
NTRS 213900
SIRTF 4054
Webb 834

Multiple collections viewed through a unified interface

...that provides common access framework across test collections
Search & Browse Demo Site


Logon: nasa
Password: facets

Hosted by Siderean www.siderean.com with Seamark software

JPL Knowledge Management
... at the NASA Level

- Metadata specification for all NASA content publishers
- RDF schema published with agreed standards (to enable appropriate use and reuse)
- Enhancement of Agency Web publishing processes
- Integration with NASA public portal content management system for:
  - Reduced publishing cycles
  - Better quality of Web materials – coordinated themes
- Integration with NASA Search Engine, Web Site Registration System
- Application in many technical areas, including engineering and science disciplines (STEP and science data dictionaries)
Project Outcomes: NASA Taxonomy Benefits

... at the Federal Level

- NASA taxonomy development in accordance with e-Gov Act of 2002
- Integration with FEA at the BRM & DRM level
- Increased interoperability with other federal agencies through common data models and standards
- Better interoperability with industry partners for increased speed of mission development
- Enhanced results in First Gov search engine
- Readiness to actively participate in e-Gov initiatives

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Taxonomy Follow-on Work

- **Taxonomy stewardship**
  - Maintenance, education and training
  - Facilitate standard adoption process

- **Apply in public and internal portals**
  - Public and Engineering portals
  - Search integration
    - Verity K2
    - Faceted search and navigation - Seamark
  - Content integration networks for real time delivery

- **NASA Enterprise Architecture Group standards development**
  - Agency Registries, RSS Syndication, Semantic Web components

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Wrap Up and Discussion

Thanks for your time!

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j.busch@worldnet.att.net

JPL Knowledge Management
White Papers and Supporting Documentation

- NASA Taxonomy –
  http://nasataxonony.jpl.nasa.gov


Back Up Slides
<table>
<thead>
<tr>
<th>Dublin Core Elements</th>
<th>Definition</th>
<th>NASA Taxonomy Mapping</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>A name given to the resource</td>
<td>dc:title</td>
<td>String</td>
</tr>
<tr>
<td>Creator Affiliation</td>
<td>Content maker Organization employing creator</td>
<td>dc:creator</td>
<td>String</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dc:creator.affiliation</td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td>Content topic</td>
<td>dc.subject</td>
<td>Taxonomy: Subjects</td>
</tr>
<tr>
<td>Publisher</td>
<td>Entity responsible for making the resource available</td>
<td>dc:publisher</td>
<td>Taxonomy: Organizations</td>
</tr>
<tr>
<td>Format</td>
<td>File format of the resource</td>
<td>dc:format</td>
<td>String – Internet Media Types</td>
</tr>
<tr>
<td>Type</td>
<td>Content Genre</td>
<td>dc:type</td>
<td>Taxonomy: Content Types</td>
</tr>
</tbody>
</table>
## NASA Metadata Specification and Dublin Core Mapping - II

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<tr>
<th>Dublin Core Elements</th>
<th>Definition</th>
<th>NASA Taxonomy Mapping</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>An account of the content of the resource</td>
<td>dc:description</td>
<td>String</td>
</tr>
<tr>
<td>Identifier</td>
<td>Unique searchable identifier</td>
<td>dc.identifier</td>
<td>String</td>
</tr>
<tr>
<td>Date</td>
<td>Date the resource was published</td>
<td>dc:date</td>
<td>Format: yyyy-mm-dd</td>
</tr>
<tr>
<td>Language</td>
<td>Language of the resource</td>
<td>dc:language</td>
<td>String – RFC 3066</td>
</tr>
<tr>
<td>Rights</td>
<td>Copyright info</td>
<td>dc:rights</td>
<td>String</td>
</tr>
<tr>
<td>Coverage</td>
<td>Spatial locations</td>
<td>dc:coverage</td>
<td>Taxonomy: Locations</td>
</tr>
<tr>
<td>Audience</td>
<td>Entity for whom the resource is intended</td>
<td>dcterms:audience</td>
<td>Taxonomy: Audience</td>
</tr>
</tbody>
</table>
Governance Processes

Recommendations

• Create NASA Taxonomy Team
  – Taxonomy Editor as facilitator and manager
  – Steering Committee

• Institute a process for management of source controlled vocabularies

• Team meets on a regular basis to decide:
  – When vocabularies should be modified
  – How vocabularies should be modified
  – Tracking of earlier versions