ESDSWG Meeting Oct 20-22, 2009
Wilmington, Delaware

10/20/2009 - TUESDAY

Initial Comments by Martha Maiden

Earth Systematic Missions (ESM) Program. Data centers – more heterogeneous, data flowing in from SIPS. 12 data centers & 14 SIPS.
EOSDIS now at "punctuated equilibrium" stage of evolution
More than a research system, now paying attention to applications and societal needs
Concerted effort with timelines – bring in new standards and technologies for missions to use
Core and community (DAACs and ACCESS projects; SIPS and MEaSURES)

Rama - Data system requirements and mission interfaces

No period of exclusive access to data for new missions
Project shall use data systems standards that are recommended as endorsed by NASA's Earth Science Data Systems SPG and approved by NASA HQ
Project shall use data and metadata format standards....

Jeanne Behnke - EOSDIS lessons learned

Tony Freeman - Challenges for DS Data Systems

http://www.nap.edu/catalog.php?record_id=11281
http://www.sdr.gov/ - Subcommittee on Disaster Reduction

Rich Ullman:

- Pragmatic advice to the core mission standards
- Nominate Standards

Tony Freeman: Lunch Time Talk

Societal Challenges
Set requirements for data acquisition

<u>Tsengdar Lee</u> – data for models – CMIP5 model, *primary need is for data in netCDF/CF to be most compatible*

TIWG/SPG Joint Break Out:

BRIAN WILSON:

Large-Scale, Distributed Data Fusion

- Dataset Discovery
- Space/Time Granule query
- Easy Data Access

- TIWG Road Map
  - Assisted Data Discovery
  - Loosely-coupled web services (SOA) REST or SOAP
  - Best Practices for Services
    - OGC WMS/WCS, OpenDAP, OpenSearch
    - Modless REST
  - Lessons Learnerd
- Some Best Practices
  - Easy Data Access –
  - Auto-data understanding CF-1.0? Use standards
  - Advertise your web services – service casting – simple aggregation – discovery – meachine readable
- SciFlo/ Query via ECHO
- Open Search interface – online URL
- FROST Solution (Federated Open Search)
- Social Collaboration – Talkoot Portal

- *Possible Tech Notes - Atom Publishing Protocol, OpenSearch, Federated OpenSearch (FROST)*

RUTH DUERR: Key issues in Data Interoperability

- http://www.esdswg.com/techinfusion/infusion_news/081027-datainterop
- Why? Inter-disciplinary science – Foster Collaborations – Enable model/ data integration and model coupling, Make data analysis easier, producing interoperable data is easier than it looks,
- Role of Data Center and Science Teams: Provide the means to access data. Make data usable now and future.
- Making data usable – documentation (i.e.. metadata, formats)
- Formats

- Good Metadata is KEY – OAIS reference model? Metadata documentations?
- ISO 19115
- PREMIS for non-science preservation components
- XML for import/ export

ROB RASKIN: Semantic Interoperability

- Associate resources with elements of dictionary where it is unambiguously defined
- “Smart” software tools use this information to assist humans
- Semantic metadata is integral part of provenance
    - Retaining knowledge
- Semantic web is an extension of current web
- Ontology is an explicit formal specification of how to represent the objects etc.
- Ontology:
    - Approach to stoer knowledge
    - Machine readable/ human readable
    - Definition of phrases
    - XML, RDF and OWL – triple – visual
    - Smart Search – Query expanson, sense disambiguation, type with restrictions
    - Proof
- swoogle.umbc.edu , www.planetont.org
- SWEET 2.0
- NASA TIWG Semantic Web Roadmap 1.0

10/21/2009 - WEDNESDAY

DAVID YOUNG:

CLARREO: Climate Absolute Radiance & Refractivity Observatory

Climate Sensitivity:
Climate benchmarks require accuracy for decadal trend detection, CLARREO always focused on societal benefits.

MISSION FORMULATION and CONCEPT: Two identical observatories – Atlas 5 launch.

IR Measurements:

- < 0.1K brightness temperature
- Reflected Solar Instrument suite
- GPS Occultation

CLARREO Data Users:

- Primary - global climate modelers
- Ultimate users will be policy makers
- Reference intercalibration makes good accuracy

Science Data Products:

- 0 – Raw Dat
- 1B – Geo-located radiance etc.
- 2 - GNSS-RO refractivity, temperature and geo-potential height profiles
- 3 – Space time averaged radiances
- 4 – IR

Science Data Production Schedule:

- Downlink 500 Gbits/day/spacecraft compressed

DAVE CUDDY: DESDynI (**D**eformations, **E**cosystem **S**tructure, **Dyn**amics of **I**ce)

Mission Overview
End-to-End Data Flow

- Science – extreme events/ climate chane/ ice sheets

Scope: Two satellites –

Radar Data: NASA TDRSS Station, Comm Cloud, S/C Provider 1 Gb/sec, 4.9 TB per day
31 different products
44 TB/ day, No Latency
L0a – 4.9TB/day

Three nodes for three disciplines – File, resource and workflow management

Profile/ Registry Server –

Data Storage and Archive Strategy: Only validated data will be moved to DAACs. – Other data will be stored where it is generated!

STEVE KEMPLER:

DESDynI LIDAR:

400 km for the LIDAR Satellite
Multi-beam LIDAR operating in the infrared

EOSDIS Data and Operations System (EDOS)
Data Systems: science software from science team – S4PM-like, archive S4PA-like, replicator, backup

JOHN DIMARZIO:

ICESat – First map of Ice thickness
ICESat-2 Advanced Topographic Laser Altimeter System (ATLAS)
Currently (deltaMCR scheduled 1st week in November)
Mass loss (148 Gt/yr)

ICESat SIPS (Science Investigator-led Processing System) – estimate 40% reuse.

Precise Orbit Determination:

Metadata interface needs improvements
Security compliance was much more involved
Input: 61 GB/day

ROBERT TOAZ:

SMAP:

L-Band Radar/ L-Band Radiometer

EDOS –
Level 4 product – Goddard
Data Volume: 45 GB/day
10 data products

Wednesday : SPG Session
DAVE CUDDY:

AURA Guidelines:

Dave Cuddy – Aura experience with file format guideline. Creation of a common file format developed and used by the individual instrument teams (HIRDLS, MLS, OMI, TES) on NASA's Aura satellite. Each team was independent and under no mandate to use a common file format. The decision and implementation was a grassroots effort. Early on in the Aura program, the teams realized that a common data and file format would greatly facilitate the sharing of data. Teams agreed to base the common file format on HDF-EOS2 and then switched to HDF-EOS5. The switch was expected from the beginning. The standard that each guideline must meet – does it help the end user to develop one universal reader to read the primary data within the Aura teams' data files? Items not affecting the reading of the data were not standardized (ex: compression). Instrument specific data fell outside of the standardization process. Instrument teams were free to add any additional fields. Validation tool developed to check Aural level 2 data files for compliance. Teams shared their data files with other Aura instrument teams.

Yonsook – timeline to initial format guide?

Cuddy – Started meeting 4 yrs before launch, initial version in a year or so, kept refining up to launch. Version control very important. Document kept centrally so all working to same one.

SJSK – risk to choosing HDF-EOS 5 (new at the time)

Cuddy – fall back was HDF-EOS 2. Developed initial test files in HDF-EOS 2 and transitioned to 5 – pretty painless.

Rich – speculate on any changes if looking at data consumers

Cuddy – some data useful for assimilation but needed to speed up production significantly. No change to format (just PGE configuration)

Rich – translation needed by applications? Add users to guidelines team?

Cuddy – they didn't complain

Q (Dan M?) – use MLS data from Aura with UARS?

A – special reader to bring both to same format for interuse. Aura data was easier to work with

Comment – very easy to work with to developer of HDF to OPeNDAP tool

Siri Jodha's observation that Aura guidelines spec development itself would not fit the SPG process

SPG - Endorsed standards = "backwards looking", Tech Notes = "fowards looking" --> can SPG tech notes be used to track & predict emerging standards in reference architectures?

DAN MARINELLI:

ECS/EOSDIS Architecture:

Mission Side -> Network Side -> World
SDPS -> EDS, LaRC, NSIDC
EOSDIS Core System Architecture

- DAACs, SIPS, ECHO etc. Stakeholders
- Architecture – Data Providers, Tape Backup Archive, ECHO Data Providers
- Current Capacity (1PB at LPDACC, NSIDC 108 TB, LaRC, 739TB)
- Ingest Rates (111,000 granules at LP DACC), distribution rates etc were presented.
- Test data for development
- 15000 users currently
- Science Data Processing Tool Kit (SDPTK) – 15 IT facilities throughout the world. (e.g. time and date tools, algorithm theoretical basis for the toolkit)
- ECS/ ECHO references edhs1.gsfc.nasa.gov
- http://esdis.eosdis.nasa.gov/eed/index.html

Q – why are only three DAACs using ECS (LaRC, EDC, NSIDC)
A – evolution from 2005 to more distributed system
Jeanne – ingest/archive/distribution pretty easy to do now, and data systems do this routinely now
SJSK – what's best done centrally – *SDP toolkit*?
A – good plug and play piece
Jeanne – need common metadata model and APIs for it
The science data processing toolkit (SDPTK) is installed at 15 IT facilities in the US, Japan, and Europe. The algorithm theoretical basis for the toolkit algorithms were published in 1995.
SJSK – interfaces and protocols to SIPS
Rich – well-enough documented to submit as RFC to SPG?
A – yes
Jeanne – OAIS model (at least vocabulary)
Jeanne – all DS Tier 1 missions are all follow-ons, having prior experience with EOS and will probably reuse software from previous missions. DS missions are required to use ESDSWG standards – Rama wrote that in.

HELEN CONOVER: AMSR-E SIPS: Distributed Processing System

- Relatively small SIPS
- SIPS described (locations, science, products ingest rate, output rate etc.)
- Two pieces for SIPS (One piece at RSS, Santa Rosa and another another at Huntsville, AL)
- NSIDC is the DAAC
- AMSR-E description
    - Japanese instrument

  - US science team products based on JAXA Level 1A (e.g. L2A, L2B, L3 and custom products for field and validation campaigns)
- JAXA -> PODAAC->NSIDC DAAC <-SIPS-GHCC<-SIPS at RSS
- Interface coordination (ICDs, OAs, Data Management Plans)
- Communication (telecons, science teams)
- MOSS tests
- Hardware described (4 rach CPUS, 8TB SAN with 2GB/sec fibre channel switch, another RAID connected to the CPU)
- Functional Architecture Description:
- Product Generation: provided by science team – quality thresholds are used – Input Data -> Control Script (Ancillary Data) -> PGE -> Science and Metadata
- Pentad (snow), weekly ocean, monthly ocean, rain, snow
- Custom Subsets
  - With a database – specific for users
- Multiple Processing Environment: One Forward processing (CPU1), two for reprocessing (CPU 2 and 3), one for development, integration and test (CPU4)
- Data Storage: All L2A files are maintained (reprocessing and offsite archive)
- L2B and L3 files for 60 days, custom files are kept indefinitely
- Different transfer protocols -> commercial "Fast Copy" (error checking and error correction over normal ftp) from JAXA (JPL PODAAC)
- Sftp to users and PDRS (Product Delivery Record Server) to NSIDC DAAC – ECS defined SIPS-DAAC interface
- PDRS is described by the ICD between SIPS and EOSDIS Core System – Lists files
- Product acceptance notice (PAN) – indicates success or failure of data transfer
- PDR discrepancy (indicates syntactic problem with PDR)
- NewFiles+PDRS -> ftp pull PDRs & ftp pull new files
- PAN <-NSIDC
- PAN Handler -> Clean up after file transfer
- If problems, detect certain classes of errors, move processed PDRs and PANS off the FTP server once they are correlated and resolved.
- Collect PDRS related
- Standards Used: HDF-EOS2, EOSDIS/ECS Metadata, Data delivery DAAC-SIPS interface, Software: delivered algorithm package

  - ➔ Rich: Delivered algorithm package is a common theme?
  - ➔ Users may ask the DAAC to provide code to just to see the code (may not to run it)

- ➔ Frank: Should any science software be delivered to be wetted by the public?
- ➔ MEASURES policy is different? DAAC Policy is different?

PANs, etc are in ODL format metadata - does this make sense for new systems? Does Goddard DAAC still use PANs, etc? DAAC/SIPS interface is not a standard, maybe it's something we should standardize, or at least tease out those things that are standardizable. (Steve Kempler)

CHRIS A. MATTMAN:

Characteristic of Current Approaches:

- Stove-piped, limited reusability, reuse is basically the people, no reusable components or product lines, no standard pradigm of how you build systems at all 3 levels
- AMMOS MGDS, Alaska SAR Facility and NSCAT, SeaWinds – Leverage object oriented data technology (OODT)
- OODT
  - JPL's developed a product line for earth science products using OODT
  - Product lines give more ROE?
  - Decadal system challenges
    - Performance issues
      - Storage, distribution, schedule and manage 10s of 1000s
    - Interoperability Issues
      - Integration of algorithms and the SDS
      - Support for varied platforms
    - Architectural issues
      - Separate ingestion from processing?
      - Technology
  - Product Line Architectural Principles
    - Component distribution
    - Loose coupling
    - Model independence
    - Common interfaces
    - Common information packages
    - Standards/ protocols
    - Open source
    - Everything is metadata
  - SDS Architecture: Processing

        - Separation of file and workflow management, allow for heterogeneous computing resources, integrate PGEs, same ingestions
    - Examples
        - OCO –
        - NPP Sounder PEATE
        - SMAP Testbed
    - Lessons learned:
        - Architecture first, product-line second, implementation third
        - Architecture components useable as-is or together in tandem
        - Support product lines
    - Continued movement towards distributed processing and operations
        - DESDynI and other decadal scale missions

CHRIS CURRY: CLARREO Data Manager

- Rich's Question – what standards are used or any needs not met by the DS missions?
- Software Reuse/ Standards confusion?
- Described data production schedule
- Data reception, transmission and routing (PSLAs w/ CLARREO)
- SDS Context diagram –
- CLARREO Telemetry standards (ESMO coordinating), DPREP
- ECS Toolkit is used (reuse for PGEs?)
- File Formats – HDF5, HDF-EOS5, netCDF3, netCDF4 (same package for all standard products)
- Storage / archive? Only production for now!
- Metadata (HDF Products only) – core metadata generated using ECS SDP Toolkit
- SIPS/ASDC Interface Metadata/ ASDC Archive and Order Tools Metadata, metadata exported to ECHO.
- Automation needed
- Computer Infrastructure: Unified Fabric/ Need interconnect that scales easily, reliably and economically?
- Evaluate Framework in the coming year
- Need fully automated science operations
- Data Access – OpenDAP/ OpenADDE protocol + McIDAS

Standards Used:

SIPS/DAAC interface
Metadata standards – science codes generate ECS core metadata using ECS SDP toolkit; generate product specific metadata;
SJSK – ECS metadata has awkward handling of product specific metadata
Data formats (HDF5 or HDF-EOS5, netCDF3 or 4) – goal is to use the same format package for all standard products; modeling community likes NetCDF3 but benefits from NetCDF4?
Data access standards – OPeNDAP & Grads analysis software and also maybe OpenADDE & McIDAS

JOHN DIMARZIO: IceSAT-2

- Data Flow (SIPS)
- SCF was separate for IceSAT-1 but will be combined in IceSAT-2
- SDMS developed on HP-UX using C, C++, Tcl/Tk using STK DLT tape libraries
- Replaced IceSAT-1 subsystems into Java
- Stand-alone linux platforms/ compressed linux
- Described IceSAT-2 SIPS – DBMS –redundant also Data storage
- Data Format Standard: NetCDF(?) but others will be evaluated.
- RDBMS – Oracle – TBD
- Metadata – tools on creating standard metadata
- Kent Yang: Is Java performance good? Answer: Yes; Are you stuck using Fortran, so only machine/ hardware specific solutions? Answer: g95 is used so the code is portable!
- Rich: DAAC delivery? Answer: SIPS interface

90% of scheduling & data management system software and 60% of processing control software reuse expected from ICESat. Standard data format – considering NetCDF (JASON uses) but others will be evaluated. Metadata standard – interest in easy usable tools to create standard metadata.

EMILY LAW: PDS Reference Architecture & Standards

- Planetary science/ Earth Science have a lot of similarity
- IEEE 1471 – Reference Architecture, Key Architecture Principles
    - Standard for describing the architecture of a software intensive system
    - Provides definitions/ a meta model for architecture description

        - Address stakeholders' concerns – are inherently multi-view and modular
    - Process Architecture/ Data Architecture/ System Architecture
    - Architecture Principles: loosely coupled, reusable, abstracted & common service interfaces, model independent, technology independent, distributed
    - Mission systems END -> END
    - Reference Architecture (Again)
        - Process Architecture
            - Policy
                - Delivery and Backup
                - Vetting and Integrity
            - System Process
                - Ingestion
                - Distribution
            - System Management
                - Resource Administration
            - User Management
                - User Support
        - Data Architecture
            - Information Model
                - Types/formats/metadata/objects/relationships
            - Repository Structure
            - Data Dictionary
            - Ontology, Metadata, schema language, data formats
        - System Architecture Layers
            - Client, Presentation (http, ftp, wms, wfs,wcs), Application Service (html, flex, http, REST, SOAP, XML), Data Distribution (WMS, WCS etc.), Data & Resource Management (CCSDS Information Architecture), System Service
        - Standrds needs for decadal missions:
            - Architecture views? Areas?
            - Pieces and elements?
            - What to be considered for recommendation of an optimal set of standards?
            - Examples? Common reference architecture views/ Process/ Documentation/ Data/ System
            - PDS- who handles data quality? Answer: A peer review board validates data.
            - Rich: Processes are part of architecture, product maturity is earth sciences, but is the work of SPG?

- Rich: Commonality of components?

IEEE 1471 reference architecture standard (*process*, data, system architectures); Establishes a framework and vocabulary for software architecture concepts; provides definitions; architectural descriptions are inherently multiview and modular; provides guidance for capturing architectural rationales, design, and evolution;
Key architectural principles – loosely coupled components; abstracted and common service interfaces; data model independent; technology independent; distributed
Data Architecture – information model (data types, data formats, metadata, data objects, relationships); repository structure; data dictionary

PDS Standards and Technologies:
Ontology - OWL, frames; Metadata - Dublin Core, ISO 19115, 11179; XML schema,
Data Formats - PEG2000, GeoTIFF, home grown,
Others - W*S, WebDAV, CCSDS information architecture standards (OAIS),
Emphasis on distributed analysis functions (Provided by DAAC? Supported by DAAC data services?)
Slide 18 - Standards Needs for Decadal Missions - a great starting point for discussion

Discussion (led by Emily)
Looking for common reference architecture, interface standards
Discussion of "quality flag" and what it means
John Moses – common processing reference architecture like OAIS??? Considering writing up something to submit to SPG.
Social network for user feedback on data (standard process for this?)

RICH – DISCUSSION NOTES:

Standards Process Overview

- Standards Role
- Process Basics
- Endorsed Standards
- Discussion:
  - Reference Architecture: There are time limits, Level 1 requirements are going to be set soon.
    - Interface between mission control/ SIPS/ DAACS standardization?
    - A lot of components?
    - Standard Product Content from SIPS -> DAAC – identify what pieces are important for the product ->
    - Use ECS Data Model? ISO 19115? Doesn't still decide the granule size

- Comment: Simplifying the interfaces between SIPS -> DAAC again!
- What level of details do we need? Siri Jodha – metadata is already there in HDF-EOS.
- Question: What guidance DESDynI is looking for?
- David Cuddy: guidance/ requirement?
- We have a way of supporting missions now? Do we come up with ways to support future missions?
- Form a Working Group within the SPG for reference architecture- Jeanie provide an RFC?
- First level of reference architecture might be familiar to people, but as we go along, things may get more complicated!
- What is the output, when will it be produced, what is its relationship to level 1 requirements? – Answer: Reference architecture tech note, HQ recommendation. It gives the SPG a way to provide guidance to decadal survey missions.
- Comment: Start getting familiar three years before launch?
- Question on Mission focus: Are these DAAC led missions?

SJSK – does SPG need to do more active gap analysis to make sure we have an appropriate suite of standards for the DS missions?
Allan – standards are inherently retrospective (don't know if good until use). Tech notes are forward looking – best practices, etc. – that can encourage people to try these technologies
Emily's list of potential areas to standardize. Reference architecture would guide where standards are needed.
Lola – aspects of standards that overlap (i.e., general service registries – for other services in addition to OGC services)
Rich – SPG set up on purpose not to be about advocacy (b/c of then-current skepticism toward top-down approach). SPG can say that these standards work, but not judge how they fit the community in question. If community points to something not endorsed, need to look at it closer, maybe submit RFC for it.
Steve K – discipline-specific reviews of RFCs?
Rich – harder than it sounds
Dave Cuddy – mixed message to projects: "thou shalt use HDF5" or "it's one of several good choices"
Robert Wolfe – archive format (e.g., HDF5) vs. distribution formats (netCDF, GRIB, GeoTIFF, etc.) Jeanne concurs.
Jeanne – still writing the requirements for DS missions. Requirements can still be negotiated with instrument teams.
LiPing – what does "endorsed standard" mean?

Rich – SPG has found that the standard is useful within NASA ES data systems. We are not a standards development organization. Martha has accepted our recommendation to endorse. Up to HQ what to do with that.
Steve K – to be recommended or mandated?
Jeanne – DS L1 requirements still being drafted. L2 (developed by project) will be more specific. Maybe L1 will say use standard format, L2 will specify which one.
Rich – Use standards from the list unless there's a good reason why not. If choose something not on the list explain why it's better and work to get it on the list.
Emily – look for commonalities and identify standards for those areas (top down)
M Burnett – what is reference architecture vs. what are the different views of it? Which are the right sets of views? Tiger team???
Rich – SMAP has near term decisions to make – what are time constraints for DS?

Robert Ferraro – suggest that we define interface between processing systems and DAACs. Need to identify what information is currently missing for data products today. Metadata content – e.g. geolocation for AIRS buried in data file; Data formats; Data transmission?
Will require interchange between DS missions and DAACs
There are time constraints with SMAP. Mission will resist any changes from the outside after a certain point; Before CDR, everything will need to be nailed down. A simple architecture is needed – what the mission sicence processing controls; what daac controls. The interface between the two. Then branch out to a reference architecture.

Jeanne – ESDIS write ref arch for this as an RFC. Include EDOS as well.
Steve K – has been tried but hard to do. Generic across all instruments or specific to each?
Jeanne – file names
Robert Ferraro – Need to understand the specifics of what the DAAC has difficulty with for the data (ex: subsetting,…); If we can get all the data and metadata needed by the DAAC from the missions by identifying the standards early, that is important. Missions are responsive to science teams and to HQ and that's it.
Rich – thought HQ wants missions to interface with applications?
Robert – If it is not written into the Level 1 requirements by HQ, it's not going to happen.
Robert – Items that missions can control – specify the interface between the mission and the DAAC. Define the standard product content that's delivered from the SIPs to the DAAC – such that the DAAC can do all the things it needs to do without having to go back to the mission to fill in the gaps. What pieces of info is critical to be delivered to the DAAC by the missions? Having the info early for these things– subsetting, identification of relevant products, combining data across multi disciplinary areas, knowing the size of granules, easier to locate data of interest, data of time series, etc.
Robert – Identifying the interface – description of the granule being passed from the mission system to the DAAC is very important. Revisit the standards that you think are mature enough. Here's an opportunity to solve some problems that have existed

in the past – simplify the interace between the missions and the DAACs in the future. Requires an interchange between the missions and DAACs – come to agreement on a min set of standards.
Burnett – Are we talking about knowing the value chain of the data from mission to the DAAC?

SJSK – what's the problem with AIRS?
John Moses – several problems including geolocation separate from science data
Steve K – need to document these issues so we understand what they are and can address
Rich – Can potentially solve this problem, but don't know that we can foresee uses of data.
John – geographic search on swath data is unsolved problem. Even if specification exists (e.g., NOSE), may not be followed.
? from PO.DAAC – common architecture standardized SIPS structure internally, and built product specific ingesters upfront (like maybe extracting geolocation information from within file)
Rich – Tech notes to document these things – metadata model or content. Needs to come from people with experience with the data/metadata. When do we need and who will write?
R Wolfe – can better address when bring data center into the mix b/c they know user community
Dave Cuddy – getting L1 requirements from HQ. Mgrs may not be interested in guidance from ESDSWG
Rob T (SMAP) – science team already has the expertise in metadata and data use. Ready to march forward with what they think are right (*HDF5/netCDF, ISO 19115*). HDF-EOS swath construct doesn't match conical SMAP data. Don't want to hear later that they need to do something else.
Jason Hyon – current reference architecture and practices are fine for today's needs. SIPS needs to be ready to support other users – information not just data, application users not just science team. See if current reference architecture will support these new requirements – look to future.
Emily agrees – need to keep wide view in addition to specific needs of the moment
Jason – focus more on other interfaces than SIPS/DAAC.
Rich – TWG for *Jeanne's proposed RFC* can pick up this work. Noted that first level ref arch is pretty common among systems we've looked at today.
Jeanne – where does Robert's concern get worked? Is this the right working group?
Q – How does work of ESDSWG relate to L1 requirements?
Jeanne – L1 requirements says missions must use endorsed standards
RT – but netCDF4 and ISO 19115 aren't on the list. Some discussion that netCDF Classic data model can apply to either library (3 or 4)
Discussion about whether DS missions need to respond to applications users, or just science team (and DAAC works with all the user communities in new ways)