



# Evolving role of NSSDC:

## Resident Archives in the Heliophysics Data Environment

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### Abstract

The requirement for scientific archiving of past, actual and future scientific missions is indisputable. NSSDC provides a vital service as NASA's only permanent multi-disciplinary Space Science archives. NSSDC's resources are focused on preserving as a proper steward of potentially highly valuable data.

As a general policy, NSSDC establishes an MOU with and acquires data from the Space Science (Heliophysics, Planetary Science, and Astrophysics) Active Archives for long term curation, and it provides it back to them when requested. NSSDC acquires data from projects and researchers for long term curation when those data are not germane to other AAs, and it makes such data available to researchers and the general public.

### Resident Archives

In the changing NASA environment, the NSSDC MOUs maybe with projects, missions, heliophysics Resident Archives, the Planetary Data System, and astrophysics SARCs.

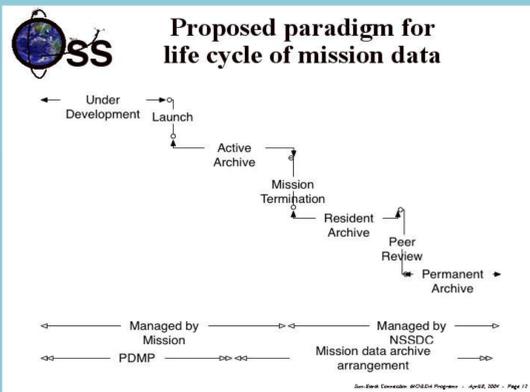
One example of a new mode of operation in the Heliophysics environment is the Resident Archive. There is a current process to establish guidelines for standards and how that will allow the best practices to be used to provide the scientific user high quality data in a reasonable search time. The possible evolution of multiple RAs builds on the lessons learned and dynamics of similar mission oriented interactions such as the PDS data nodes.

### Functions

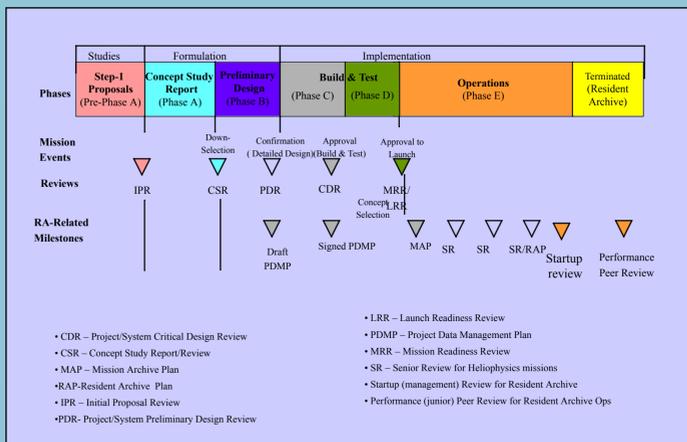
- Ensure that the mission data are served to the general space and solar physics community in an efficient and scientifically useful interoperable manner consistent with the community data environment standards
- Maintain the integrity of the data by safeguarding against data loss which could be effected by the use of mirror sites (NSSDC)
- Provide expert assistance with data issues
- Document the data (including mission and PI information) as required to maintain independent usability
- Obtain community feedback to ensure success
- Make sure the data will be archived after the RA is no longer needed (e.g., transferred to another RA, Consortium of RAs, or NSSDC)

NSSDC Roles						
Entity	NSSDC Role	NSSDC Relationship	NSSDC Level	Interface	Data Flow	
Astrophysics Archive Research Centers (SARCs)	backlog stewardship promotion	active of list request; curation	1	MOU	track inventory	request to NSSDC; transfer recovery backup
Space Physics Data Facility (SPDF)	provide infra; structure; second site	curation	1,2	draft MOU	CDP	data flow both directions
Solar Data Analysis Center (SDAC)	permanent stewardship	archive post active; curation	1	draft MOU	FITS	RAU; into NSSDC
Heliophysics sponsored Vehicle Observatories (VSOs)	serve; unique; data; standards	peer provider of data; peer through for requests; proxy for information	1,2,3	peer MOU; unique data repository	SPASE	data from NSSDC; transfer; Registry?
Heliophysics Resident Archives (RAs)	stewardship	management oversight	1,2	RA Data Plan; termination plan	HPGL; community consensus standards	data into NSSDC; transfer; recovery; mirror
Planetary Data System (PDS)	permanent archive; stewardship	curation; large volume delivery	1	MOU	POS standards	data into NSSDC; transfer; recovery
Projects	second site	intermittent; curation	1,2,3	PDMP; SAMP	negotiate standards	data into NSSDC; transfer; recovery
Investigators	requirements; organizational	data; information	1,2,3	MOU; LOR	negotiate standards	data into NSSDC
Requesters	unique data	archive of data and information	1,2,3,4	policy	request; email; web services; custom staff	data to requesters

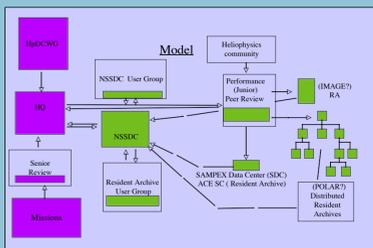
### RA Life Cycle Process



### Heliophysics Project Life Cycle with RA



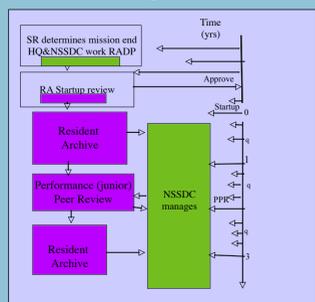
### HELIOPHYSICS RESIDENT ARCHIVE



### The startup mode of an RA.

A typical Senior Review (SR) is called by HQ with missions (PIs) expected to provide an RAP as part of the mission proposal. The RAP shall include an RA termination plan for archiving, e.g., with NSSDC. If a mission is given a low priority, and it is slated to cease, then the RAP may go through iterations with HQ and possibly with NSSDC. The time frame is to be no more than 3 months duration. A startup review is called by HQ to judge the proposal to determine if the group is ready to take on the functions of an RA and that the scope of data products is both timely and feasible. Part of this process is for the group to develop an implementation strategy that basically is the "How to" manual for their specific RA which lays out methods to meet the six functions. In the startup mode the RA has both a scientific and technical role.

### Startup RA



### The Operational Mode of an RA

Once the RA is selected, quarterly reports are expected along with participation in the Resident Archive User Group. The performance of an RA will be judged through a peer review process that will consider the six qualities listed before that are used to judge the performance of the RA. HQ funds the RAs but NSSDC will serve as the manager to negotiate and monitor grants which is assumed to start at the beginning of the RA. The RA can update the RAP during its lifetime in consultation with NSSDC

### RA Startup Structure

Mechanics of Management Startup Review

"startup review" composition: 3 members – HQ, non-RAUG (NSSDC only advises)

"startup review" judges on the six core functions of an RA, and the RAP meet 1/2 day for individual RA proposal when more RAs exist, can consider them as a group for prioritization

### RA Operational

Mechanics of Performance Peer Review

performance peer review composition: reviewers from the community, HpDCWG, SR?, grouping of RAs (CRA), RA judged separately on 6 functions (modified prioritization) meets 6 months before scheduled SR or at least bi-annually report to HQ, NSSDC submits separate report for concurrence

### RA Evolution

The general consensus was that the Resident Archive dealt with a real problem in Heliophysics missions but that it was prudent to have the discussions about the RAP early in the mission cycle (during assembly of the PDMP as shown in figure 4) so that data could be served in a most useful and effective manner before the RA stage. To be a cost effective approach to archiving data, the number of RAs (CRAs) needs to be limited since it is estimated that the cost of each RA (startup and operational) can be significant. Organization by science areas or instrument is feasible.

### NSSDC MOU Template

Memorandum of Understanding between The Resident Archive and The National Space Science Data Center  
September 7, 2006  
Edwin Grayzeck, Head, NSSDC  
Task Lead, Active Archive (in space science terminology this could be a Resident Archive)  
Joseph Bredekamp, Program Manager, NSSDC  
AA Program Manager, NASA (in space science terminology this could be a Resident Archive)

### MOU Roles

The roles and responsibilities of RA and NSSDC

#### ROLES: RA

- Point of entry for that discipline and mission data
- Provide scientific user support as needed
- Supply data for an active mission, usually online distribution
- Negotiate any post-launch data agreements

#### ROLES: NSSDC

- SMD permanent archive for space science data
- Participate in defining a PDMP, MOU or AP as requested
- Supply general distribution per MOU, especially of bulk data
- Advise on Resident Archive Plan or Archive Plan naming NSSDC
- Provide copies of archived data in case of disaster recovery

### MOU Responsibilities

#### RESPONSIBILITIES: RA

- Interact with operating missions to provide data access
- Provide discipline specific data standards
- Ensure that data is independently usable
- Keep a specific catalog of holdings
- Serve data from Mission or RA to community, e.g., through VxOs
- Interact with NSSDC to determine service level required

#### RESPONSIBILITIES: NSSDC

- Provide broad archiving standards for data and documentation in SMD
- Interact with archives outside SMD, e.g., federal and international
- Ensure the independent usability of data and documentation
- Maintain a master catalog to show all holdings and track their status
- Provide for long term preservation and/or off-site storage
- Point to the discipline specific RA
- Provide access to unique data and science requests per MOU
- Practice good stewardship, e.g., through data migration
- Provide infrastructure based on requirements for RA service level

### RA Implementation

Implementation strategy for a Resident Archive associated with NSSDC

- Purpose of the <mission> <data set> Resident Archive**
  - The NSSDC manages a Resident Archive for a limited time period to prepare data to distribute as well as to prepare the data sets for archiving. The HQ and/or NSSDC can accept a proposal for the Resident Archive phase any time during a mission's lifetime but will actively solicit a proposal during the termination year of a mission. NSSDC expects a Resident Archive to exist for at least the duration of the proposed Resident Archive Plan in which the data are finalized (or longer, based on funds)
  - A Resident Archive reports to and receives assistance from the NSSDC; funding is through HQ.
  - The Resident Archive undergoes periodic reviews to ascertain if the updated data products are acceptable to the community, if the services are adequate, and if the value-time profile for the data justifies continued funding of the Resident Archive.
  - By the end of the time period the Resident Archive must provide for final archiving of the data sets as specified in the proposed RAP.
  - All community archive standards and processes apply to the Resident Archive data
- Services Provided By the Resident Archive**
  - Provide (and track) web access of the data otherwise done by the Mission
  - Prepare data (transform if needed) to community accepted formats
  - Provide additional services that add value to the data set through mission expertise that includes documentation so the data is independently useable
  - Interact with community data requests/comments on data products and services
- Other Responsibilities of Resident Archive**
  - Quarterly reports to NSSDC that show adherence to archive standards
  - Participate in biennial "performance peer review" administered by NSSDC
  - Plan and implement transition of data and services at end of performance period
- Responsibilities of NSSDC**
  - Develop community standards for archiving, formats, compliance, etc.
  - Validate data and documentation delivered by the Resident Archive
  - Help RA with transition at end of performance period
- NSSDC oversight elements**
  - quarterly reports should also focus on requests and level of service provided
  - data usage as recorded by file transfer or executions logged to IP addresses
  - data products developed as in the RAP that are available and useful
  - integrity for the data site needs to be provided, e.g., backup or mirror sites