

PDS Strategic Roadmap

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Strategic Roadmap Customer(s)

- Management Planning
- Stewardship of NASA Data
- Cost Projections for long term – 10 to 20 years
- Realistic Expectations
- Realistic Planning
- Minimize “Surprises”

Why Archives?

- Maintenance of irreplaceable records – I.e. Establishment and stewardship of an archive
- Deposition of said records into the archive
- Timely extraction of records from the archive

- And do all of these more efficiently in the face of increasing requirements and data volumes

(Bad) Lessons from the Past

- Burning of the Library of Alexandria
- The movement of record keeping in the United Kingdom from wooden tally sticks to writing, which led to the burning of the Houses of Parliament in 1834
- The loss of almost all the micro data of the U.S. Census of 1890 with the Commerce building fire of 1921

The Reactions – Loss of Irreplaceable Records

- What exactly was lost – and/or backed up – from the loss of the Library in Alexandria is not known (and further complicated by the fall of Alexandria in 642 during the Muslim conquest of Egypt, and the subsequent loss of Constantinople and all of its records in 1453 when that city fell to Mehmed II)

The Reactions – Fix the Problem

- National Archives in the United Kingdom and the United States, respectively, occurred as part of the backlash to the losses and destruction.
- But see also another record loss in the U.S. In 1973: [https://en.wikipedia.org/wiki/National Personnel Records Center fire.](https://en.wikipedia.org/wiki/National_Personnel_Records_Center_fire)

Technology Issues - 1

- The role of technology in each of these cases perhaps also rears mention. The scrolls in Alexandria had been the recording medium of choice, although a transition to a more “permanent” record in books - still using ink on vellum was just beginning to occur, e.g. Biblical codices commissioned by Constantine in 331
- The fact that these items still exist bears testament to the staying power of ink and vellum – perhaps second only to the stone tablets of Mesopotamia (e.g., https://en.wikipedia.org/wiki/Epic_of_Gilgamesh) in their preservation properties.

Technology Issues - 2

- The issue of somehow dealing with compilation of the 1890 census, given the issues of finalizing that of 1880 and the increased population expected in the 1890 exercise, led to a competition for technological innovation in order to deal with the problem. The winner was the engineer Herman Hollerith, whose census tabulator used punched cards the same size as 1887 ten dollar bills in order to make use of Treasury Department containers as card boxes. (These, of course, were the first “IBM cards”)
- An interesting question is whether the 1890 cards still exist. Subsequent census were microfilmed and the original paper copies destroyed, presumably due to space and cost issues.

Technology Issues - 3

- At the top level the preservation of the nation's data is now directly a significant driver within the National Archives and Records Administration (NARA)
- For some perspective, I tried to find out the estimated data holdings on NARA – with no luck. I did find that the Library of Congress (LOC) has (had in 2012) ~3 petabytes of digital data (see <https://blogs.loc.gov/digitalpreservation/2012/04/a-library-of-congress-worth-of-data-its-all-in-how-you-define-it/>).
- PDS holdings are approaching ~1 petabyte (need to have that number)
- For some perspective on the future, I suggest you all read the short story <http://folk.uio.no/knuthe/msfdinalbry.html> (also cf. https://en.wikipedia.org/wiki/MS_Fnd_in_a_Lbry).

“Terms of Reference” - Background

- NASA’s planetary missions archive their data in the Planetary Data System (PDS). The PDS has recently completed a full and open competition for the Science Nodes within the PDS. We are currently completing a performance review of the two directed elements within the PDS architecture, The Engineering node, and the Navigation and Ancillary Data Facility (NAIF).
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- The Planetary Science Division (PSD) within the Science Mission Directorate at NASA Headquarters has directed the PDS to set up a Roadmap team to complete a PDS Roadmap for the period 2017-2026. The purpose of this activity is to provide a forecast of both the rapidly changing IT environment, and the changing expectations of our science communities with respect to Planetary Data archives. The Terms of Reference for the Team are contained here. The Roadmap Team will report their findings to the PSD Director. The goal is to complete the activity by April 15, 2017.

“Terms of Reference” – Purpose of the Roadmap Team

- The purpose of the PDS Roadmap Team is to complete a Roadmap for the PDS for the period 2017-2026. The team will start with the community responses to the recent PDS Request for Information, due January 25, 2016, assess the current state of the PDS, request and review any self study material needed from the nodes, and encourage broad public input from both the Science, and the Information Technology communities. They will work through teleconference calls, face-to-face meetings, and community meetings at National Venues, such as the Lunar and Planetary Science Conference and the annual Division of Planetary Science meeting.
- The fact-finding activity will be also include: 1) understanding and improving the archiving process; 2) Improving the submission and data and peer review process; 3) broad scheduling issues (how long does do major steps take and what are the major schedule drivers from the provider perspective); 4) the usefulness and transparency of Archive Preparation Documents; 5) and cross node issues for providers who work with several nodes.
- The Team will think: 1) 20 years out for Missions; 2) 10 years out for flight technologies.
- Think 5 years out for changes in the IT infrastructure. The team will consider how we can ensure that IT implementation is consistent with current Federal Best Practices (<https://playbook.cio.gov/>).

“Terms of Reference” – Appointment, Staffing, Schedule, and Reporting

- The membership of the PDS Roadmap Team will consist of 10 to 12 members actively involved (or recently so) in archiving planetary data in the PDS, or active users of PDS data holdings or expert in the Data Science. The PDS Chief Scientist will chair the meetings of this group, and the PDS Project manager will serve as his alternate.
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- The PDS Chief Scientist will be responsible for the timing and agenda (with the concurrence of the PDS Project Manager) of each meeting, and a written report of the their deliberations submitted to the PDS Program Scientist and Program Executive. There will be three meetings year, with at least one in Washington DC. The team may hold town meetings at National meetings or survey the provider community. The Chief Scientist will report the results if the Roadmap Activity to the Planetary Science Division Director.
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- The team is independent of the PDS Management Council.

“Terms of Reference” – Ownership of Terms of Reference

- The Terms of Reference will be approved by the Division Director of the Planetary Science Division, but will be held at the PDS Management Node at Goddard Space Flight Center.

PDS Requirements

- ***NOT being revisited***
- Current version is that of 11-12 April 2014
- Originated 6 July 2005
 - Levels 1, 2, 3, and 4
 - Uses “will” rather than “shall” – e.g. required; hence, a consideration should likely be made for this change (globally)

Response to PDS Request for Information (RFI)

- 23 Responses – still being digested

Current Plans – Establish Roadmap

Team - 1

- PDS Engineering Node and NAIF discussion with Michael New – Friday afternoon in Flagstaff, AZ
- 1. Node staff – but **not** “representatives”
- 2. DAP proposer
- 3. PDART proposers
- 4. Mission people
- [Above are self-nominations]

Current Plans – Establish Roadmap Team - 2

- 5. Serious amateurs → Emily
- 6. E/PO → Kristen Ericson, etc.
- 7. IT professionals →

- Post notices for panels at: ROSES, PEN, DPS Newsletter, LPSC

- Need deputy for Ralph

Current Plans – Establish Roadmap Team - 3

Establish website by end of February (2016)

Topics:

- (1) Documents
- (2) Internal tools
- (3) Software
- (4) Astrobiology-type data
- (5) Ingestion for everyone
- (6) The Cloud
- (7) MPC, ARES – integration
- (8) Data from HEO-funded missions

Projected Product(s)

- Written Report - ~30 to 50 pages (at most)
- PowerPoint briefing package
- Posting of materials at PDS website

Thoughts and Comments from Nodes

- [Atmospheres](#)
- [Geosciences](#)
- [Cartography and Imaging Sciences](#)
- [Navigational & Ancillary Information \(NAIF\)](#)
- [Planetary Plasma Interactions \(PPI\)](#)
- [Ring-Moon Systems](#)
- [Small Bodies](#)