National Space Science Data Center

NSSDC NEWS

Volume 13, Number 2, JUNE 1997

NSSDC–HEASARC Memorandum of Understanding

By Joseph King

A key concept underlying the Space Science Data System is that, where it is likely to offer better user benefit at lesser or similar cost, science data should be managed by scientists expert in the data. For many years this has been the paradigm of the PDS for which NSSDC serves as a permanent archive and as a dissemination site for PDS-created CD-ROMs to the general public.

NSSDC and the HEASARC operated by the Laboratory for High Energy Astrophysics at Goddard have just signed a new MOU establishing a similar relation. The HEASARC will provide interfaces to and the actual near-line mass storage of such important HEA data sets as the XTE, the ASCA, the ROSAT, and the CGRO for network access. NSSDC will provide a permanent archive of these data and will support requests for HEASARC CD-ROMs and, if needed, for large numbers of replicated media.

The new MOU replaces one in which NSSDC and HEASARC shared the near-line mass storage roles. NSSDC's HEA data on the NDADS were accessible through both its own interfaces (ARMS, WISARD) and through the HEASARC's interfaces. As a result of this new MOU, NSSDC has stopped its ingestion of ASCA and ROSAT data to NDADS, which amounted to 180 GB in 1996. Users attempting to access HEA data from NSSDC/NDADS are linked to the HEASARC interface.

List of Acronyms

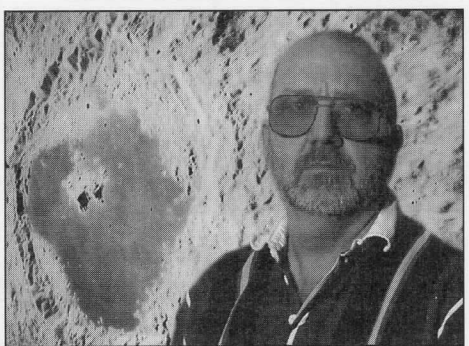
ARMS	Automated Retrieval Mail System
ASCA	Advanced Satellite for Cosmology and Astrophysics
CGRO	Compton Gamma Ray Observatory
HEA	High Energy Astrophysics
HEASARC	High Energy Astrophysics Science Archive Research Center
MOU	Memorandum of Understanding
NDADS	NASA Data Archive and Distribution Service
PDS	Planetary Data System
ROSAT	Roentgen Satellite
WISARD	Web Interface for Searching Archival Research Data
XTE	X-Ray Timing Explorer

NSSDC Apollo Film Archive Refreshed

By Joseph King and Robert Tice

Among the more popular NSSDC image data are lunar images captured by a series of Apollo astronauts on 70-mm film using Hassleblad cameras. In fact, owing to their use in satisfying repeated requests for images, NSSDC's film was starting to show some evidence of age. To rectify this situation, NSSDC has over the past few years worked with personnel at the photo archive of Johnson Space Center (JSC), where original film from NASA's manned missions has been held over the years.

Over the past year or so as part of its re-engineering, JSC has been creating thumbnail digital versions of all its imagery to be made network-accessible by JSC later this year and has been transferring its actual film holdings to the National Archive and Records Administration. JSC's commitment to leave the film storage and management business at this time made it reasonable to ship to NSSDC pristine copies all 70-mm Apollo Hassleblad film, plus



Robert Tice of the Photo Archive appears before an Apollo image.

copies of virtually all other Apollo film. This is film produced directly from the original film used by the astronauts.

In March 1997 NSSDC received 132 film reels from JSC. These were in a variety of sizes (16-mm movie, 35-mm Nikon, 70-mm Hassleblad, and 5" metric and panoramic) and hue (40 color, 92 black and white). There was some film from Apollo 4 (launched November 1967 into Earth orbit) and some film from each Apollo between 6 and 17. Some images are Earth-looking.

Of all these reels nine were of black and white Hassleblad imagery corresponding to NSSDC's prior film stock most in need of replenishment. NSSDC has had high quality copies of these made through a Washington area Department of Defense (DOD) photo facility. NSSDC will hold the JSC-provided copy in permanent archive conditions and will use the DOD-replicated copies as working copies from which to satisfy future requests.

Mr. Richard Slater and his colleagues at JSC were most helpful in preparing the film stock and associated inventory for transfer to NSSDC.

IMP 8 Cosmic Ray Data Newly Archived at NSSDC

By Joseph King

Two new energetic particle data sets from the 1973-launched and still-active Interplanetary Monitoring Platform (IMP) 8 spacecraft have been recently archived at NSSDC. The smaller of the two holds, on one CD-ROM, 22 years of 15-min resolution count rates of electrons, protons, alpha particles, and carbon-nitrogen-oxygen nuclei. This data set was provided by Dr. Cliff Lopate of the University of Chicago and contains the coefficients and discussions needed to derive fluxes from the count rates.

The second data set holds, on five CD-ROMs/year, 20-sec resolution electron, proton, alpha particle, and medium-Z count rate data from the JHU/APL EPE and CPME instruments, similarly resolved data from the GSFC magnetometer, and 1-min data from the MIT plasma instrument. These data are being produced at JHU/APL by Dr. Rob Decker and provided by him to NSSDC. To date, data for 1990-1995 have been provided; data for 1973-1989 will be archived in the coming months. A preliminary version of this data set was created several years ago, wherein each year of data was written to 20 9-track tapes. The advent and maturing of CD-ROM offers great space savings over earlier media, yet CD-ROMs are low density relative to yet more recent media like DLT tapes.

NSSDC expects to put both data sets into its NDADS mass storage environment for network access by its scientific users.

NSSDC and the SSDS

By Joseph King

For the past two years, the NASA Office of Space Science (OSS) has been working to improve its data system infrastructure to support its four space science "themes" and foster interdisciplinary research across the tradition disciplines. The process involved, in sequence, assessment of NSSDC as an Institute, the "Linsky Report," and a broad community-involved "Town Meeting." The process also involved significant uncertainty about the future of NSSDC. The consensus that has emerged is to evolve a unified Space Science Data System (SSDS) environment, building on the foundation of data systems currently in place, including NSSDC. SSDS is envisioned as a coordinated confederation of data systems with interoperability as a high priority design goal to foster sharing, commonality, and broader access. A technical working group is being established with representation from current space science data activities, including this author, to define functional interfaces; to identify opportunities for integration, improved interoperability, and commonality; and to recommend implementation projects for the evolution toward an SSDS. It is expected that there will be clarification of functional roles and/or some exchange/transfer of functions across the current data systems, but it is important to note that fundamental ground rules for planning the transition are continuity of service to the research and general public communities, no failure to meet commitments currently in place, and no loss of science data in the process.

In the meantime, NSSDC and the Space Science Data Operations Office (SSDOO) are proceeding with the preparation of a request for proposals for support of the NSSDC and other activities pursued within the SSDOO. The new contract, to be in place by late January 1998, will recognize the probability that some current NSSDC activities may be migrated elsewhere during the contract life as the SSDS evolves.

As such SSDS realignments are implemented, they will be reported in these pages. However, this article will mark the end of the ongoing series of articles of the future of NSSDC.

ISTP CDHF Benefits from SFDU Usage

By Ramona Kessel, William Mish, and Rusty Whitman

The International Solar-Terrestrial Physics (ISTP) program, like other missions, handles many different types of data. It was recognized early on that to manage effectively such a diversity of data types it would be useful to have a file associated with each of the data files, in a single format. The Central Data Handling Facility (CDHF) adopted Standard Formatted Data Units (SFDUs). The SFDUs are separate header files, one associated with each data file. The CDHF extracts information from the SFDU file to populate its data bases including the data type, source, descriptor, discipline, start and stop times, generation date, and any accompanying notes. The information is used to catalog the accompanying data without actually opening the data sets or without being concerned with the format of the data files.

The CDHF has benefited from the use of SFDUs by simplifying the interface between the data files and the catalog, and the software required to support the system. The CDHF wrote its own specific software for writing and reading SFDUs and has made this available to the ISTP community, thereby encouraging the further use of the standard.

WWW6: Everyone, Everything Connected

By Jason Mathews

The Sixth International World Wide Web Conference (WWW6) was held by Stanford University and the Stanford Linear Accelerator Center (SLAC) at the Santa Clara Convention Center in California on April 7-11, 1997. "Everyone, everything, connected" was the theme of the conference, where researchers from commercial and educational laboratories presented papers about the future of the Web. The conference proceedings and other on-line information can be found at the URL http://www6conf.slac.stanford.edu/.

This was the sixth conference in a series of international conferences sponsored by the International World Wide Web Conference Committee (IW3C2), which represents the very heart of Web technology. During the week-long conference many innovative papers were presented, and the future of the Web was discussed, including such topics as Internet standards; Java; security; privacy; and, of course, "accessibility," which was a main part of the conference theme.

This article highlights NASA's Hubble Space Telescope (HST) Java interface, some of the best papers presented at the conference, a good Web design panel, cascading style sheets, dynamic HTML,

eXtended Markup Language, HTTP, security, and the history of the Web. Further details on these highlights can be found in the full article on the World Wide Web *NSSDC News*. The next conference, WWW7, is to be held in Brisbane, Australia on April 14-18, 1998.

NSSDC Receives SIGCAT Award

By Joseph King

At its last national meeting the Special Interest Group on CD-ROM Applications and Technology (SIGCAT) Foundation presented NASA/NSSDC a Significant Achievement Recognition Award for its recently issued *Planetary Images* CD-ROM. This CD-ROM contains over 200 NSSDC-captioned images of the Moon and planets, runs in both Macintosh and Windows environments, and has been previously highlighted in this newsletter. The citation included the line, "This disk exemplifies the consistent utilization and innovation of CD-ROM applications within the National Space Science Data Center, and by the whole of NASA, which have been occurring ever since the advent of CD-ROM technology." The award was accepted by David Williams, the main driver of the *Planetary Images* CD-ROM, on behalf of the NSSDC CD-ROM team.

NSSDC Celebrates 30th Anniversary

By Joseph King

NSSDC celebrated its thirtieth anniversary at Goddard Space Flight Center's Recreation Center on Saturday, May 17, 1997. A happy throng of 160 NSSDC staffers, alumni/ae, and friends gathered to renew acquaintanceships and to enjoy a prime rib dinner.

After dinner a number of people key to NSSDC's birth and growth spoke: NSSDC's past and present directors, James Vette, James Green, and Joseph King; George Pieper, who hired James Vette to run the nascent NSSDC; Henry Brinton, who brought greetings from NASA/HQ; and Richard Bishop, who represented Hughes STX (his employer) and previous NSSDC support contractors.

ADF Science Steering Committee Report

By Cynthia Cheung

The ADF Science Steering Committee (SSC) met on April 22, 1997, to review the archival activities in the Astrophysics Data Facility (ADF). The committee examined multiple issues arising from the current space science data archive environment: tight fiscal constraints coupled with impending "astronomical" increase in data volume.

The committee recommended that the Astronomical Data Center (ADC) de-emphasize historical data restoration and put a high priority on providing a data search and browsing capability for the community. The browsable data products should include mission logs, astronomical catalogs, and journal tables regardless of the location of the physical archive. The committee further suggested that the ADF pursue partnerships with other groups working on data archive issues to avoid duplication of efforts and to ensure that the user will have easy connection between the different archive sites. In addition, the committee endorsed the publication of the CD-ROM *Selected Astronomical Catalogs, Vol. 4*, which will include updated catalogs originally published in Vol. 1 in 1992 as well as new titles suggested by the community.

Parameters Based on Latest Tsyganenko Magnetic Field Model on WWW

By Natalia Papitashvili and Joseph King

The National Space Science Data Center has created a Web page based on the latest magnetospheric magnetic field model of N. Tsyganenko. The page permits the computation of many parameters for a specified time and magnetospheric location. The model accounts for the magnetopause, ring current, magnetotail, regions 1 and 2 Birkeland currents, and effects of the interplanetary magnetic field (IMF) interconnection with the magnetospheric field. The model is dependent on the solar wind dynamic pressure, the geomagnetic activity index Dst, and IMF By and Bz components. Parameters computed include the model field at the specified point and at its magnetically conjugate point, the dipole and CGM coordinates of the specified and conjugate points, plus several others. The direct URL for this page is http://nssdc.gsfc.nasa.gov/space/cgm/ext.html.

Goddard Community Day a Big Success!

By Nathan James

To share with the public the excitement of the space program and its part in it, Goddard Space Flight Center hosted a Community Day on April 27, 1997. Over 1,000 people converged on the Goddard Visitor Center grounds for a day of out-of-this-world events, including tours, space suit demonstrations, videos, and model rocket launches.

As part of its own outreach, NSSDC participated in this Community Day with a booth showcasing space science on the World Wide Web and selected NSSDC CD-ROMs and other products of special interest to the general public. By the end of the day, a great many questions had been answered, nearly two dozen CDs had been sold, and just over 900 Milky Way posters and posters for the spacecraft Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) had been given away.

Daughters Visit SSDOO

By Kirk Borne

On Thursday, April 24, 1997, NASA participated in activities related to the national "Take Our Daughters to Work" Day. Goddard Space Flight Center hosted over 300 girls and their parents/mentors through a number of demonstrations, talks, videos, and hands-on exhibits.

About ten SSDOO staff members participated with seven visiting daughters in several specific activities. Following a demonstration of NSSDC's WWW services and new *Planetary Images* CD-ROM, the visiting girls ran the halls of the building in quest of answers to 16 questions posed in an "Information Scavenger Hunt." This hunt required the girls to find answers to questions about the organization, the science support services, and operations activities by looking at the numerous, colorful, informative posters adorning the walls of NSSDC's halls. They then enjoyed pizza and ice cream during a lunch panel discussion at which several ladies on the SSDOO staff described their life experiences.

High School Girls Shadow SSDOO Women

By Ramona Kessel, Nancy Grace Roman, Carolyn Ng, Jennifer Ash-Poole, and James Thieman

The Goddard Space Flight Center Education Office requested the Space Science Data Operations Office (SSDOO) education and outreach group to allow two high school girls to "shadow" women scientists to get an understanding of their day-to-day activities. Four of the SSDOO staff volunteered to be involved, each spending about an hour with Paige Fleming and Rachel Courtland, visitors from Bethesda-Chevy Chase High School.

Jennifer Ash-Poole of the Coordinated Request and User Support Office (CRUSO) demonstrated CD-ROMs and the Web server, discussed the different types of systems on which she works, and took Paige and Rachel to the Photo Archive to see the different formats and ways the NSSDC stores film. Dr. Ramona Kessel of the Space Physics Data Facility gave the girls a sense of what would happen if they chose to pursue a career in physics, since both girls are currently taking physics classes. Carolyn Ng of Special Projects had a casual chat on their background and academic interests after which the young ladies joined other SSDOO staff members in listening to Dr. Joseph King speak on the results of the NSSDC User Survey. Dr. Nancy Roman told them about the Astronomical Data Center (ADC) and its purpose and took them to the library where they helped her search a number of volumes of the *Astrophysical Journal* for tables that would be worthwhile additions to the ADC.

NOST NEWS

By Donald Sawyer

Highlights of the results from the recent Consultative Committee for Space Data Systems (CCSDS) Panel 2 workshop held in Silver Spring, Maryland, from May 11-20, 1997 follow.

Archiving Reference Model: Intended to facilitate communication and lead to improved functionality and quality in archival operations, the "Reference Model for an Open Archival Information System (OAIS)" is on track for ISO Draft International Standard and CCSDS Red Book status in May 1998.

Metadata Registration: European Space Agency (ESA) participants in CCSDS have made Web-based software available to support the registration and dissemination of metadata by Control Authority (CA) offices. These and related CA Agent services map well into the current Internet draft on requirements for establishing a Universal Resource Name (URN) service, which is a big step beyond URLs in that links using URNs will be much less likely to break with the movement of data and machine addresses.

Protocol for Accessing Distributed Catalogs: Those who have an interest in protocols for access to distributed catalogs should investigate the Catalog Interoperability Protocol (CIP). Interested readers can find out more about this effort and its applicability to other disciplines by contacting NOST at nost@nssdca.gsfc.nasa.gov.

Data Entity Dictionary Specification Language: The efforts of the Planetary Data System are noteworthy in formalizing the definitions of terms (data entities) so that more automated services can be provided. The CCSDS "Data Entity Dictionary Specification Language" Red Book review period has been extended to August 30, 1997.

New Standards Approved–EAST and Referencing Environment: The CCSDS Management Council has approved the EAST Recommendation and the Referencing Environment Recommendation as Blue Books, or new CCSDS standards.

EAST Tools: CCSDS participants from CNES, the French space agency, have been active in developing tools for using the EAST data description language. These tools support description generation, parsing, data access, and display. New versions will be available in July 1997.

NSSDC Adds New Web Page for Public

By Nathan James

One recurrent theme of several responses to NSSDC's user survey was to make it easier for non-scientific members of the general public and education communities to find from among the numerous NSSDC World Wide Web (WWW) pages those data and services likely to be of most interest to them. Accordingly, NSSDC has built an option on the NSSDC top page for accessing a page that specifically identifies and provides further links to the WWW pages for such data and services.

Included on this page are NSSDC's Image Catalog, Photo Gallery, CD-ROM catalog, planetary "Fact Sheets," the NSSDC/SSDOO Education/Outreach page, and also links to a few other extra-NSSDC pages likely to also be of significant interest to the general public. The direct URL for this WWW page is http://nssdc.gsfc.nasa.gov/nssdc/gen_public.html.

NSSDCNEWS

NSSDC News is published quarterly by NASA's National Space Science Data Center. Please send your address changes and requests to the appropriate address listed in the box below. Your comments are welcome.

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