National Space Science Data Center

NSSDCNEWS

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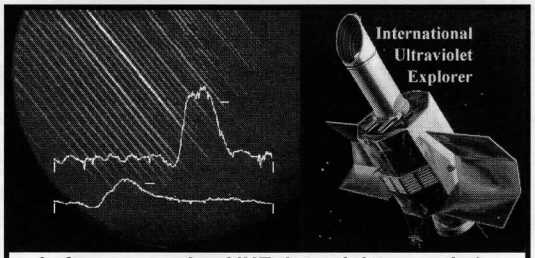
IUE Reaches Final Archive: What Lies Ahead

by Michael Van Steenberg and Joseph King

The long-lived International Ultraviolet Explorer (IUE) spacecraft, launched on January 26, 1978, made the last of its 111,627 astrophysical observations of about 9,300 objects on September 27, 1996. More than 2,000 Guest Observers from all corners of the world have made IUE observations. Approximately 3,500 scientific papers based on these observations have been published in peer-reviewed journals. In addition, more than 500 doctoral students have used IUE results in their dissertations.

Since the inception of the IUE program, NSSDC has played a number of vital roles, including being the permanent archive for IUE data and implementing the exchange of data among the IUE project's three international partners. NSSDC initiated its public near-line mass storage and dissemination activities (NDADS) with the IUE data in November 1991. Not including NSSDC's support for the final archiving effort discussed below, NSSDC supported an average of 7,000 requests for 100,000 IUE data files during each of the past several years. As it approached its sunset years, the IUE project with the encouragement of its scientific user community decided to create a Final Archive (FA) of all IUE data by doing a final processing using the best algorithms and calibration coefficients resulting from the many years of IUE data analysis. At this writing the final archiving of all the NASA and ESA IUE data has been accomplished after a five to six year effort. NSSDC provided significant support to the FA effort. The raw data for all observations were written to a special set of optical disks and provided to the IUE project ground/processing centers for final processing. NSSDC then received back electronically from the IUE project 1.1 TB of FA data that it ingested to NDADS. In addition, NSSDC has helped the IUE project resolve a number of apparent discrepancies in the IUE Observing Log as well as archive backup support for problem data tapes.



Left, an example of IUE data; right, an artist's conception of the IUE in orbit.

In the framework of the Space Science Data Services (SSDS) and under terms of an MOU signed in 1997 by STScI, the Goddard Laboratory for Astronomy and Solar Physics (which had hosted the IUE project), and NSSDC, the primary pathway to IUE data will be through STScI interfaces, and the most frequently accessed IUE data will be made accessible from STScI mass storage systems. All IUE data will remain network-accessible to STScI interfaces on NSSDC's NDADS system for the indefinite future. Permanent archiving of IUE data will remain an NSSDC responsibility.

SSDOO Addresses Year 2000 Compliance

by Nancy Laubenthal

The NSSDC and its host organization at Goddard, the Space Science Data Operations Office (SSDOO), share a potential problem with innumerable other NASA, U.S. government, other U.S., and world-wide organizations, namely the correct operation of their computers and resident application software as the year 1999 is overtaken by the year 2000. This is the widely apprehensively anticipated Y2K problem. To address the Y2K problem, SSDOO has followed the NASA Year 2000 Compliance Problem five-phase model: Awareness, Assessment, Renovation, Validation, and Certification. The SSDOO's goal is to certify mission-critical software and systems by September 30, 1998, and all other software and systems by March 31, 1999.

Within NSSDC the subset of applications software that most immediately affects NSSDC's core activities of managing NSSDC's permanent space science archives (tracking data volumes, etc.) and providing network access to currently important data (NDADS) has been declared mission-critical.

Comprehensive spreadsheet inventories of custom application software, Commercial-off-the-Shelf (COTS) software, and hardware used by the groups constituting SSDOO have been created. These are used to track the Year 2000 Compliance progress as software and systems are renovated, validated, and certified. The software inventories list about 150 custom applications of which 45 are mission critical and about 450 COTS packages for the various operating systems supported here of which about 75 are mission critical.

Year 2000 Compliance test plans have been created by each major SSDOO group as well. These plans define the custom applications, the host and COTS dependencies, the Year 2000 renovation plans, basic software testing to be done, the system level tests required, readiness for system-clock testing (moving system clocks forward to 12/31/99 and letting them run across the boundary to 1/1/00), and schedules.

See Commonly Used Acronyms List on Page 4.

Open CDAWeb/ SSCWeb User Meeting Held at Spring AGU

by Robert McGuire

The CDAWeb and SSCWeb systems offer WWW-based graphic and numeric browse and retrieval options for ISTP Key Parameter and other data (CDAWeb) and for trajectory information for the many spacecraft relevant to the ISTP science program (SSCWeb). Usage of both systems continues to grow.

An informal open discussion with interested users of the CDAWeb and SSCWeb systems was held at the recent AGU meeting in Boston, Massachusetts, by the Space Physics Data Facility (SPDF) and NSSDC as an additional forum to gather user questions, suggestions, and perspectives on these services. There was extensive discussion about many topics, including the prospects for acquiring more high-resolution data from current missions into the NSSDC public archive and into CDAWeb; cross references to relevant but non-CDAWeb data and services; acknowledgments to data providers; system performance enhancements as might be gained by zipping ASCII output files for transfer. The CDAWeb/SSCWeb team will address all these suggestions and assess options for implementing them. A suggestion was made by a European group to become a mirror site for these systems to improve performance characteristics for European users.

Newly enhanced display capabilities for image data were shown at the meeting and were more extensively demonstrated during an invited poster paper on CDAWeb and SSCWeb. Image data can be displayed on geographic or geomagnetic latitude/ longitude grids. A Java-based "zoom" capability also now exists. Extensive Polar UVI imagery is already supported by CDAWeb; new Polar VIS imagery is also starting to arrive.

The CDAWeb/SSCWeb team is now planning both additional general meetings (e.g., at the fall AGU meeting) and the creation of a standing "user advisory committee" for these services. CDAWeb and SSCWeb are accessible from http://cdaweb.gsfc.nasa.gov/ and http://sscweb.gsfc.nasa.gov/.

SSDOO/NSSDC Participate in 1998 NASA Career Expo

by Carolyn Ng and Nathan James

SSDOO/NSSDC staff and Raytheon STX staff, the support contractor, reached out to hundreds of students and educators at the 1998 NASA/Junior ROTC Career Expo in the Prince George's Equestrian Center in Upper Marlboro, Maryland. Nathan James, Carolyn Ng, and Kathleen Maguire were present to answer questions, hand out posters, and explain NSSDC and other SSDOO services and products. The SSDOO booth was one of 50 from NASA, colleges, and government agencies. Approximately 200 students, educators, and chaperones picked up posters or talked to staff. William Towsend, GSFC deputy director, visited booths and introduced himself to NSSDC/SSDOO staff. Young visitors to the booth seriously interested in science were drawn to the Web pages and to the planetary images on CD-ROM. A solar composite videotape attracted many as did the magnetic tapes and optical disks displayed.

CD-ROM Usage for NASA Science Data

by Joseph King

NASA participated in the May 1998 annual SIGCAT meeting as one of several federal agencies reviewing their use of CD-ROM technologies over the years. The meeting was held at the Baltimore Convention Center with the NASA talk given by this author. The talk outlined NASA's use of mass-replicated CD-ROM and write-once CD-R disks for both data archiving and dissemination. NASA has created 85 sets of CD-ROMs with 958 unique disk titles. About two thirds of the titles hold planetary data while the largest number of separately identified sets of CDs, 40, hold NASA Earth science data. CD-R technology was highlighted in two ways. On the one hand, JPL and selected PDS nodes have produced a few copies of each of over 4,000 disk titles for long-term archiving. On the other hand, spaceflight projects are distributing data to their funded investigators on CD-R; for instance, ISTP distributed 13,500 CD-R disks and an additional 5,800 CD-ROM disks during 1997. The presentation then outlined some of the early milestones in NASA's use of CD-ROM and CD-R technologies and concluded with a demonstration of NSSDC's *Planetary Images* CD-ROM.

Request Support Office Changes

by Joseph King

For a number of years, NSSDC's CRUSO office was stably and ably staffed by Barbara Pope, Melissa Larkin, and Jennifer Ash-Poole. In recent months Melissa and Jennifer have both moved on to other challenges. Joining Barbara Pope in CRUSO is Marie Dowling, who has years of experience with NSSDC's group that actually does the work to satisfy requests by retrieving CD-ROMs and replicating data volumes as needed. Marie in particular had a special role in handling photo requests. Another near-term change is a move from Goddard's Building 26 to Building 28 where NSSDC's archive and all its data operations staff are located. This move will increase request handling efficiency by bringing together staff responsible for customer interactions and staff responsible for satisfying requests.

Missions Provide Continuing Data Flows into Archive

by H. Kent Hills

NSSDC receives data for its near-line archive (NDADS) from current missions in a quasi-continuous way or in a more intermittent way. This article focuses on the space physics data being received in a quasi-continuous way, defined as data transfers at least as often as monthly.

For efficiency these continuing data streams are normally handled via an automated pipeline that results in archiving the data in the NDADS near-line data system and in many cases also making the data WWW-accessible via the CDAWeb or other WWW interfaces. In some cases data files are pushed daily via network to directories on NSSDC's computers; in other cases the data come in at longer intervals. More easily generated semi-automated procedures are used in many cases where there may be multiple periodic submissions of data but not enough to justify setting up a completely automated run. Data received and handled in this way include ISIS 1 and 2 restoration data (mainly digitized ionograms) and much ISTP-associated data, including FAST; Geotail; GOES 6, 7, 8, 9; IMP8 (selected data); Interball (including ground-based);

Polar; SAMPEX; SOHO particle instruments; Wind; geosynchronous investigations (LANL spacecraft 1989-046A, 1990-095A, 1991-80B, and 1994-084A); and ground-based investigations (CANOPUS, DARN, SESAME, and Sondestromfjord).

The ISTP CDHF puts data into the pipeline with a normal delay time of only a few days with a subsequent few days delay for NSSDC ingest. The spacecraft data are from launch onward; other data cover the time span 7/6/92 to present, although of course not all of the sources have data throughout this interval. Other types of data, usually of higher time resolution than the KP, are also archived in NDADS.

NSSDC Personnel Win RSTX Peer Awards

by Miranda Beall

NSSDC's support contractor, Raytheon STX (RSTX), held its Washington area Annual Business Meeting on April 28, 1998, to recognize for 1997 its employees working at NSSDC and on other projects with peer and other awards.

RSTX recognized its NSSDC employees for ten- and 20-year anniversaries; customer recognition; outstanding performance; commendations; education and outreach participation; publications and presentations; team achievement awards; as well as peer awards.

Peer awards went to David Strope for his VMS Systems work and Margaret Russell for her work with the Astrophysics Data Facility's ASCA and XTE data processing groups. Other awards went to Jennifer Ash-Poole, Richard Baldwin, Dr. Edwin Bell, Dr. Kirk Borne, Christine Cain-Shaffer, Vivek Dwivedi, Harold Felder, Jay Friedlander, Carrie Gallap, James Gass, Dr. Emily Greene, Kelly Gygax, Karen Horrocks, Tami Kovalick, Louis Mayo, Ella Munoz-Gonzalez, Carolyn Ng, Dr. Sten Odenwald, Sardi Parthasarathy, Robert Patterer, Dr. Mauricio Peredo, Edward Pier, Barry Schlesinger, Dr. William Taylor, Julie Weaver, and Dr. David Williams. Some of these employees received several different awards.

Franz Hoyer Interns at NSSDC

by James Thieman

NSSDC is currently hosting its second German computer science student in two years. Franz Hoyer arrived at NSSDC in April 1998 for a six-month practical internship as a part of his computer science studies at the Technical University in Rosenheim, Germany.

Franz's major interests are in the areas of C/C++ and Java programming, Web development, and system administration. Currently, he is working on an interface to a new data base of the NSSDC photographic holdings. This work involves designing the interface to interact with the photographic inventory data base currently being developed in Oracle and then implementing it in Java.

Franz is one of 100 German students with a study-abroad scholarship from his sponsoring program. He hopes to work in the aerospace industry upon graduation in the summer of 1999.

NOST News

by Donald Sawyer and John Garrett

The CCSDS completed its biannual international workshops in Houston, Texas, over the period May 4-15, 1998. This issue of "NOST News" highlights results from Panel 2, which addresses information interchange.

Topics addressed included JAVA as a Data Description Language, the role of universal names/identifiers in various contexts, the possible extension of the SFDU packaging standard, the extension of the PVL standard to include an extended character set, the harmonization of DEDSL with ISO 11179 and ANSI X3.285, the status of software for the generation and use of the EAST Data Description Language, and the status of the ISO = 93Reference Model for an Open Archival Information System (OAIS) = 94.

NSSDC 1997 Annual Report Available

by Joseph King

NSSDC has issued a series of annual reports over most of its history. The key objective of each report is to characterize the volume and heterogeneity of the data and related information inflows to and outflows from NSSDC during the year. The state of the archive at the end of the year is also characterized. Some of the key numbers of the annual report for 1997 are as follows:

- 2.1 TB of data newly arrived at NSSDC.
- 2,429 data volumes arrived, dominated by ISTP CD-R disks.
- 458,000 data files downloaded from NDADS.
- 184,000 data files (non-NDADS) downloaded from ANON areas.
- 45,000 plots created in CDAWeb, OMNIWeb, COHOWeb; 13,000 files created and downloaded (75% CDAWeb).
- 3,200 off-line requests handled; 6,220 CD-ROMs and 2,383 photo products mailed.
- 4,560 data sets from 383 spacecraft managed; 2.4 TB of total 13.2 TB network-accessible.

NASA Interacts with Science Teachers

by James Thieman

Several NSSDC personnel were very involved in the NASA exhibit at the National Science Teachers Association (NSTA) meeting, April 16-19, 1998, in Las Vegas, Nevada. James Thieman and Sten Odenwald joined a cast of many others from GSFC, Headquarters, and other NASA centers to help design and implement a new NASA exhibit for the meeting. The NASA OSS based its part of the exhibit on the four main science themes: the Sun-Earth Connection, Structure and Evolution of the Universe, Solar System Exploration, and the Astronomical Search for the Origins of Life and Planetary Systems. The Sun-Earth Connection Education Forum (SECEF) had a lead role in the development of the SEC part of the exhibit.

The OSS exhibit was spread out over 900 square feet of the exhibit hall but was still only a part of the overall NASA exhibit. NASA traditionally has been the largest exhibitor at the NSTA national conferences, and the relationship has been beneficial for both NASA and NSTA. The meeting in Las Vegas, Nevada, was the largest ever for NSTA with over 16,000 teachers in attendance. In addition, there were approximately 3, 000 people there as exhibitors. NASA's was still by far the most popular exhibit. Teachers constantly expressed their gratitude for the materials and stated that they use them all the time in the classroom. It was clear that the meeting represented the kind of high leverage activity that NASA seeks in which a limited amount of resources can be used to make an impact on a large audience.

NOST Issues New Draft FITS Standard

by Richard White

The NOST Draft Standard 100-1.2, Definition of the Flexible Image Transport System (FITS), was released for community review and comment in mid-April 1998. This standard is being developed by a NOST-sponsored Technical Panel. This is the first revision of the FITS standard since the adoption of Version 1.1 in 1995. The main changes involve the inclusion of image and binary table extensions and the use, syntax, and formatting of keywords and their values.

The Technical Panel will review and respond to all comments (posted to the fitsbits exploder at fitsbits@fits.cv.nrao.edu by July 15, 1998) either incorporating the substance of a comment into the standard or providing the reasons for not doing so and describing any revision motivated by a comment. After the panel has completed review of and responded to all comments, the final version will be submitted to NOST for certification. Upon certification the final version number will be 2.0. It will then be submitted to the IAU Commission 5 for formal acceptance as the IAU standard.

Summer Intern Preview

by Nathan James

This summer, NSSDC and its sister organizations within the SSDOO will open their doors to approximately 18 teacher and student interns for six to ten weeks each. About 12 members of the regular staff will serve as mentors for these guests, who will work on a variety of activities ranging from programming and other computer science tasks to data analysis and other physical science tasks. These teachers and students come to NSSDC/SSDOO through a variety of programs mostly administered through Goddard's Personnel Office and also some through RSTX, NSSDC/SSDOO's support contractor.

NSSDC Sponsors TODTWD Activities

by Miranda Beall

NSSDC sponsored activities coordinated by Dr. Kirk Borne on April 23, 1998, Take Our Daughters to Work Day. Activities for the 12 attending girls, ages six to 14, included a scavenger hunt of NSSDC's many wall posters for the answers to 16 questions; ice cream; and a question-answer session with a panel of three NSSDC women scientists, Ramona Kessel, Carolyn Ng, and Nancy Laubenthal. The purpose of the panel was to educate the girls as to the many careers available to them in modern technical and scientific areas. Each girl was also given a bag of posters, stickers, and CD-ROMs to view as they reflected on the events of the day.

NSSDC Retires Its VAX 9410

by Joseph King

NSSDC's workhorse computer for nearly eight years, the VAX/9410 known as NSSDCA to staff and external users, has now been retired. Originally purchased to do double duty as a VMS gateway to the supercomputers of the Space Data and Computing Division (of which NSSDC was then a part) and as an NSSDC computer, it became solely an NSSDC computer within a year of its arrival. It was DEC's high-end VAX at the time (40 VUPS, 125 MFLOPS, 256 MB memory, 2.4 GB disk), yet its specs only match those of high-end PCs of today. It is survived in the NSSDC/SSDOO computer environment by a couple of smaller VAXes and several DEC Alpha, Sun, and SGI workstations.

Commonly Used Acronyms

AGU	American Geophysical Union	KP	Key Parameter
ASCA	Advanced Satellite for Cosmology and Astrophysics	LANL	Los Alamos National Laboratory
		MOU	Memorandum of Understanding
CANOPUS	Canadian Auroral Network for the Open Program Unified Study	NDADS	NASA Data Archive and Distribution System
		NOST	NASA Science Office of Standards and Technology
CCSDS	Consultative Committee for the Space Data System	OAIS	Open Archival Information System
		OSS	Office of Space Sciences
CD-R	CD-Recordable	PDS	Planetary Data System
CDHF	Central Data Handling Facility	PVL	Parameter Value Language
CRUSO	Coordinated Request and User Support Office	SAMPEX	Solar Anomalous and Magnetospheric Particle Explorer
DARN	Dual Auroral Radar Network	SEC	Sun-Earth Connection
DEDSL	Data Entity Dictionary Specification Language	SESAME	Severe Environmental Storms and Mesoscale Experiment
ESA	European Space Agency		
FAST	Fast Auroral Snapshot Explorer	SFDU	Standard Formatted Data Units
GOES	Geostationary Operational Environmental Satellite	SIGCAT	Special Interest Group for CD-ROM Applications and Technology
IAU	International Astronomical Union	SOHO	Solar and Heliospheric Observatory
IMP	Interplanetary Monitoring Platform	STScI	Space Telescope Science Institute
ISIS	International Satellite for Ionosphere Studies	UVI	Ultraviolet Imager
ISTP	International Solar-Terrestrial Physics	VIS	Visible Imaging System
JPL	Jet Propulsion Laboratory	XTE	X-Ray Timing Explorer

NSSDCNEWS

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