National Space Science Data Center

NSSDCNEWS

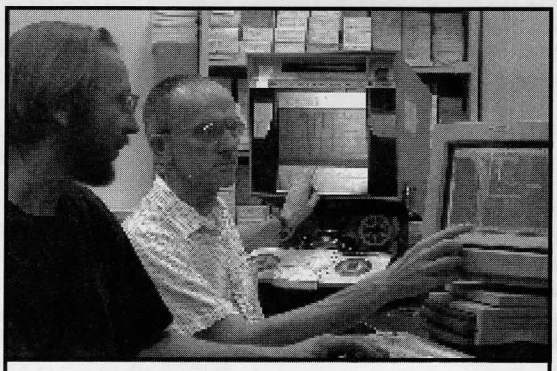
Volume 12, Number 2, JUNE 1996

NSSDC Archives Newly Digitized Alouette/ISIS Data

By Dieter Bilitza

In early July 1996 the first data from the Alouette/ISIS (International Satellite for Ionosphere Studies) Topside Ionospheric Sounder Data Project are expected to flow into NSSDC's near-line mass storage system at a rate of about 1.5 Gbytes per day. The topside sounder ionograms are being digitized from their original 7-track analog telemetry tapes by a Goddard Space Flight Center team led by Dr. Robert F. Benson (Laboratory of Extraterrestrial Physics). This important data set was in danger of being lost permanently when the Canadian Public Archives were no longer able to store the more than 100,000 telemetry tapes.

The Canadian Alouette 1 and 2 and ISIS 1 and 2 collected data for more than ten years each, covering altogether close to two solar cycles, and were the first satellites to carry an ionosonde into orbit and to provide a full mapping of the topside ionosphere. The highly successful program was ahead of its time, unfortunately also in terms of the computer power required to analyze the huge volume of ionograms. Typically, ionograms were taken every 24 seconds for about 15 minutes per orbit. Only about 15% of the telemetry tapes have been processed to ionograms, and an even lower percentage has been converted into electron density profiles. The science yield from this "small" data portion is impressive and to this day has been the defining standard data set for the topside ionosphere.



Robert Benson and Dieter Bilitza compare newly digitized ISIS ionograms with the early film version.

The project team will be able to save the contents of about 10,000 tapes assuming a two-year project duration. Averaged ionograms will be accessible from the CDAWeb system described below.

CDAWeb Provides New Access to ISTP's KP Data

By Ramona Kessel, Richard Burley, Robert McGuire, and Mauricio Peredo

The NASA/GSFC Space Physics Data Facility (SPDF) and NSSDC have just released a new World Wide Web-based system for accessing the public International Solar-Terrestrial Physics (ISTP) Key Parameter (KP) data base: CDAWeb, the Coordinated Data Analysis (Workshop) Web, is tied to a complete and current data base of the full public ISTP KPs presently in production, whose spacecraft Key Parameters supply particle and field measurements at approximately 1-minute resolution. This is a powerful new capability to better leverage the combined KP data base to accomplish the coordinated science objectives of ISTP.

There are now about 400 data variables from GEOTAIL, WIND, INTERBALL, ancillary spacecraft, and ground-based investigations, and more variables will be added in the near future from POLAR, the Solar and Heliospheric Observatory, and Cluster. CDAWeb supports interactive plotting of variables from multiple instruments on multiple investigations simultaneously on arbitrary, user-defined time scales. It also supports digital data retrieval in both Common Data Format and ASCII format.

The easiest paths to CDAWeb access to the full set of ISTP KPs are from either the SPDS Home Page at *URL* http://nssdc.gsfc.nasa.gov/spdf/ or the NSSDC Space Physics Home Page at *URL* http://nssdc.gsfc.nasa.gov/space/space_physics_home.html. CDAWeb users specify the mission and/or instrument type, are shown time spans and parameter sets for selected data sets, then specify desired parameters and time spans. The system returns (downloadable GIF) plots or data listings. The listings can be displayed to the screen or saved directly as (an) ASCII file(s) (as an option of the reader's local browser/use "source" mode), or readers can download the CDF data files themselves.

Additionally, the SPDF Home Page has links for access to the Space Physics Catalog (SPyCAT) Web interface to the NASA Data Archive and Distribution Service near-line archive, access to other CDAWeb data bases, and access to other useful information and tools. The platforms supporting these large data bases are being upgraded now, but response may be somewhat slow until upgrades are complete. This full ISTP KP data access will be the largest-scale user exposure to the system to date and the first wide exposure of the system combined with this data base.

Fifth International WWW Conference Highly Successful

By Jason Mathews

The Fifth International World Wide Web (WWW) Conference was the largest Web-dedicated international event of the year. Multiple sessions provided over 2,000 attendees with an exhaustive and comprehensive view of where and how the Web is progressing today. The conference proceedings and other on-line information can be found at the *URL*s http://www.w3.org/hypertext/Conferences/WWW5/ and http://www5conf.inria.fr/.

Jason Mathews of the NSSDC presented a paper titled "Electronic Management of the Peer Review Process" describing what makes up the peer review process and how an electronic management system (EMS) automates the entire process through a Web-based interface. NASA/GSFC has supported both the WWW4 and WWW5 conferences with an electronic system.

The best paper of the conference, selected as the most interesting, was "Measuring the Web" by Tim Bray, senior vice president of the Open Text Corporation. This paper answered such questions as, How big is the Web?, What are the biggest and most visible sites?, and What data formats are being used?

The full on-line version of this newsletter article also addresses innovations, directions of the Web, multimedia, Java, VRML, mobile agents, tutorials, products, and future conferences.

NSSDC Uses WWW for On-Line Services and Interactive Browsing

By Jason Mathews and Joseph King

NSSDC is aggressively exploiting the World Wide Web (WWW) in making its more popular data and services easily accessible to the research community as well as the general public. Through the NSSDC Home Page (http://nssdc.gsfc.nasa.gov/) and its subsidiary pages NSSDC provides pathways to interactive data access systems as well as static documents and textual information.

OMNIWeb, COHOWeb, and CDAWeb, interactive systems providing access to heliospheric and magnetospheric data, provide capabilities of visualization, listing, subsetting, and data conversion through a WWW-based interface to the Interactive Data Language (IDL) and several generic data management applications.

The dynamically generated data products are displayed from an HTML page created from the Web server. Users make selections (e.g., time periods, data set, variables) from an on-line form, submit the selections to the NSSDC Web server, and the requested data product is presented. The generic framework is based on the Common Data Format (CDF) standard.

In addition to these systems, there are now generic WWW-based interfaces to the growing near-line data volumes of the NASA Data Archive and Distribution Service (NDADS).

Other interactive systems offer users the ability to specify their needs for ionospheric, atmospheric, or magnetospheric magnetic field model parameters in terms of time and place and to have those parameters computed on the fly and returned.

Yet another key capability offered is the NASA Master Directory wherein the user may specify values for any subset of available selection parameters and have descriptions of and links to data sets satisfying the criteria returned. Among the static items to which NSSDC's WWW pages provide access are software repositories, documents, newsletters, journal articles, Frequently Asked Questions (FAQs), and users' guides.

NSSDC Creates WWW Page for SPDS

By Andre Schneickert and James Thieman

NSSDC has just created a new WWW home page for the Cosmic and Heliospheric section of the Space Physics Data System. Principal architect of this page was Andre Schneickert, a German student spending a six-month learning period at NSSDC, sponsored by the Carl Duisberg Society in Cologne, Germany. The new page is reachable from http://spds.nasa.gov/spds.html.

OMNI and COHOWeb Data Bases Extended

By Natalia Papitashvili and Emily Greene

NSSDC continues to update its multi-source OMNI and COHOWeb data bases of heliospheric data. The OMNI data base, containing hourly solar wind magnetic field and plasma data and selected solar and geomagnetic activity indices reaching back to 1963 and Interplanetary Monitoring Platform (IMP) 8 energetic proton data reaching back to 1973, was extended with IMP 8 data to the end of 1995 during April 1996 for field and particle data and into 1996 for plasma data and activity indices. Currently, the most convenient access path to these OMNI data is OMNIWeb (http://nssdc.gsfc.nasa.gov/omniweb/ow.html).

COHOWeb contains magnetic field, plasma, and spacecraft position data from most spacecraft exploring the distant heliosphere. The table shows the present time spans for the field and plasma coverage for all the contributing spacecraft. COHOWeb is accessible at http://nssdc.gsfc.nasa.gov/cohoweb/cw.html. It is expected that NSSDC will issue a second heliospheric CD-ROM, a successor to its 1993 heliospheric CD-ROM, later in 1996 with the latest then-available data.

SPACECRAFT	*MAGNETIC FIELD* Time Span	*PLASMA* Time Span
Helios 1	74/12-81/06	74/12-80/12
Helios 2	76/01-80/03	76/01-80/03
OMNI_M	64/01-95/12	64/01-96/02
Pioneer 10	72/03-75/11	72/03-94/11
Pioneer 11	73/04-92/08	73/04-92/05
Pioneer Venus	78/12-88/08	78/12-92/09
Ulysses	90/10-93/09	90/11-94/12
Voyager 1	77/09-89/12	77/09-80/11
Voyager 2	77/09-88/12	77/09-95/11

NSSDC Supports MIDEX Selection

By Joseph King

In an effort to streamline and improve space exploration, NASA has recently revamped the Explorer program, which now has two categories of major missions defined within it: the Small Explorer (SMEX) missions, which will cost no more than $35 million to launch, excluding the launch vehicle, and the Medium-Class Explorers (MIDEX), which are limited to $70 million. NASA recently completed the selection of the first two MIDEX missions. The MIDEX Announcement of Opportunity involved a two-step selection process. NSSDC's Dr. James Thieman, MIDEX program scientist since April 1995, arranged for the Step-One science peer review and any subsequent review made necessary by changes to the proposed science in Step Two, which addressed technical, cost, and management factors in addition to science. Dr. Huntress, administrator of the Office of Space Sciences, chose 13 out of 43 proposals to proceed to Step-Two and then two of the 13. The Imager for Magnetosphere-to-Aurora Global Exploration (IMAGE), scheduled for a late 1999 launch, was chosen for the first flight. Its principal investigator is Dr. James Burch of the SWRI. The Microwave Anisotropy Probe (MAP) will be launched in 2000 to measure the structure within the cosmic background radiation with much higher resolution than that of the Cosmic Background Explorer (COBE). The principal investigator is Dr. Charles Bennett of Goddard Space Flight Center.

Education Committees Meet with GSFC-Appointed Education Officer

By James Thieman and Nathan James

On April 10, 1996, a joint meeting of the Space Science Data Operations Office (NSSDC's parent organization) and the Hughes STX (NSSDC's support contractor) Education Committees was held. Dr. Robert Gabrys, recently appointed by Goddard Space Flight Center as a full-time education officer and formerly the assistant state superintendent at the Maryland State Department of Education, was invited to speak about his new position and plans for Goddard's educational support. Dr. Gabrys explained some of the areas of focus of the Education Programs Office, which include examination of various education programs instituted to date, careful assessment of their impact on teachers and students to determine the "yield of investment," and more effective use of this measurement in determining the allocation of present resources as new opportunities for education outreach arise.

NSSDC Continues Support To Rescue Community-Held Data

By Ralph Post and Joseph King

NSSDC continues to maintain a 7-track magnetic tape capability to enable it to read the remaining 7-track tapes in its archive (mainly holding Earth science data) and to support the rescue of older but still important data held on such tapes by groups in the distributed NASA research community. Functioning 7-track tape drives are a rarity in this community.

Two recent examples of community support involve NSSDC's rescue of 14 7-track tapes holding unique lunar surface thermal emission data from the Apollo 17 Infrared Scanning Radiometer Experiment from Johnson Space Center, and additional tapes from the University of Chicago holding unique balloon observations of 50-2000 MeV electrons bridging the interval between flights of the Orbiting Geophysical Observatory (OGO) 5 (1968 launch) and the International Sun-Earth Explorer (ISEE) 3 (1978 launch), which carried equivalent instrumentation. In both cases, responsible scientists expect to process their old data and produce new archive products that will come back to NSSDC for archiving and public access.

NSSDC Future Addressed by New Committee Advising NASA

By Joseph King

NASA's Office of Space Science (OSS) has created the Science Data Management Task Group to make recommendations about possible changes and privatizations of elements of OSS's data management environment, including NSSDC. The task group, chaired by astrophysicist Dr. Jeff Linsky of the University of Colorado, consists of about a dozen scientists primarily representing the OSS science disciplines (astrophysics, space physics, planetary science).

This group visited NSSDC on May 15, 1996, and spent several hours hearing presentations by Steven Holt, director of Goddard's Space Science Directorate; James Green, chief of the Space Science Data Operations Office; and this author, head of NSSDC. They also were given demonstrations of several of NSSDC's World Wide Web-based information and data systems. The presentations and demonstrations were punctuated by frequent queries and discussions between task group members and the Goddard and NSSDC personnel involved.

The task group is now deliberating on its recommendations and is expected to deliver a report to NASA in July 1996. NSSDC will post an update to the on-line version of this newsletter when the group's recommendations have become public. It is possible that some internal NASA deliberation will follow the release of the group's report prior to the detailed clarification of NSSDC's future.

New NSSDC Contractor Project Manager Is Long-Time NSSDC Friend

By Joseph King

In April 1996 Dr. William (Bill) Taylor assumed new duties as project manager for NSSDC's support services contractor, Hughes STX. In this position Bill directs the activities of about 100 physical scientists, computer scientists, data operations personnel, and others supporting NSSDC and other elements of the Space Science Data Operations Office.

Since his service in the Magnetospheric Physics Branch at NASA Headquarters (HQ) some 20 years ago, Bill has pursued a career in private industry and at NASA HQ. During those years and largely as an avocation, he aggressively pursued education and public outreach activities, highlighted by the on-line *CANOPUS Newsletter*, and more recently the Interactive NASA Space Physics Ionosphere Radio Experiments (INSPIRE) program involving large numbers of students

attempting to observe radio signals from NASA Shuttle and Russian MIR flights. Bill also plays key roles with the recently selected MIDEX/IMAGE (Medium-Class Explorer/Imager for Magnetopause-to-Aurora Global Exploration) mission, involving science from the Radio Plasma Imager and education and public outreach for the whole project.

Russian Visitor Brings Ionospheric Data

By Joseph King and Dieter Bilitza

Dr. Alexander Feldstein of World Data Center B2 for Solar-Terrestrial Physics in Moscow visited NSSDC for the week of April 8-12, 1996, to discuss many areas of common interest concerning the management of space science data. He brought with him a floppy disk containing sample data from the Cosmos 1809 spacecraft, which was active between December 1986 and May 1993. This spacecraft, also called IONOSONDE because it carried a topside ionospheric sounder, was in a 960 km, 82.5 deg inclination orbit. It also carried an impedance probe, a high-frequency probe, a mass spectrometer, a photoelectron spectrometer, a DC electric field detector, and low- and high-frequency wave analyzers. The data samples (plots) were prepared by Dr. Yu Romanovsky of the Institute of Applied Geophysics in Moscow and are available at ftp://nssdc.gsfc.nasa.gov/pub/spds/cosmos1809.

NOST NEWS

By John Garrett

NOST personnel are continuing to spearhead both the international and the U.S. archiving standards efforts by the ISO and the Consultative Committee for Space Data Systems (CCSDS). The Archive Reference Model serves a variety of purposes. It identifies the high-level abstractions that underlie current archival systems, defines common terminology and concepts that allow the architectures of existing and future systems to be described and compared, will identify various archive functionality, and will provide a conceptual framework within which independent teams of experts may proceed with detailed discussions and agreements regarding archiving responsibilities.

NOST is still actively working with CCSDS to develop recommendations in the data dictionary area and solicited comments from other NASA projects on the CCSDS internal draft of a Data Entity Dictionary Specification Language.

COHOWeb Wins a Goddard Award

By Joseph King

The NSSDC-created, uniformized, multisource heliospheric magnetic fields and plasma data set and accompanying World Wide Web-based interface, together called COHOWeb, has won a 1996 Goddard Productivity Enhancement Award. The uniformization process involved casting magnetic field vectors and spacecraft position data into common coordinate systems. Adding to the value-added aspect of the COHOWeb data base were certain error detection and removal, and the creation of records in which the independently arriving field data, plasma data, and spacecraft position data were merged into single records. A key motivator for building this uniform data base was to facilitate multipoint analyses of heliospheric phenomena. The existence and uniformity of this data set eliminates the need for many researchers' studying such phenomena to find and acquire needed data from multiple sources and to perform needed uniformizations themselves. NSSDC COHOWeb team members sharing in the award were (alphabetically) John Cooper, Joseph King, Jason Mathews, Natasha Papitashvili, Sardi Parthasarathy, and Syed Towheed.

IMAGE Selected for MIDEX Program

By James L. Green

The newly selected IMAGE mission will be a unique space physics mission in that it will provide global remotely sensed representations of the Earth's magnetosphere. Launch is planned for the year 2000, and the principal investigator is Dr. James Burch of SWRI. Radio wave, ultraviolet, and related neutral atom imaging techniques will be used. Concurrent observations of the varying magnetopause and magnetospheric particle populations will be made. Goddard's Space Sciences Data Operations Office has overall responsibility for developing and operating the IMAGE data system. IMAGE data will become quickly accessible to the science community at NSSDC.

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.

Joe King, Head
Miranda Beall, Editor
Erin Gardner, Graphics, WWW

NSSDC Information

To discuss the archiving of data at NSSDC, contact

JOSEPH H. KING, HEAD
NSSDC, CODE 633
NASA/GODDARD SPACE FLIGHT CENTER
GREENBELT, MD 20771, U.S.A.

To request data or information from NSSDC, contact

NSSDC (for U.S. requesters) or WDC-A-R&S (for non-U.S. requesters)

both at

Coordinated Request and User Support Office (CRUSO)
NSSDC, Code 633
NASA/Goddard Space Flight Center
Greenbelt, MD 20771, U.S.A.
Telephone: (301) 286-6695
FAX: (301) 286-1771
Internet: request@nssdca.gsfc.nasa.gov
NSI/DECnet: NSSDC::REQUEST

To access NSSDC's WWW home page, enter this URL:

http://nssdc.gsfc.nasa.gov/

To access NSSDC's education home page, enter this URL:

http://www.gsfc.nasa.gov/education/education_home.html