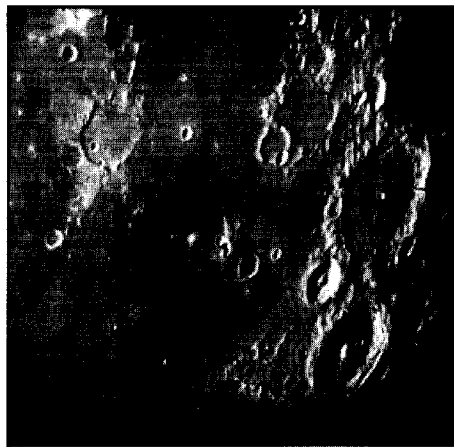


Planetary Images on CD-ROM and on the WWW

By David Williams

On Friday, July 31, 1964, just after 9:00 in the morning eastern daylight time, the Ranger 7 probe turned on its cameras, took its first picture, and transmitted it back to Earth. The picture showed a large lava plain and some craters on the moon, not a particularly spectacular view, except for the fact that it was the first picture of another body ever returned to Earth by a U.S. space probe. This image is one of over 200 planetary images on NSSDC's new *Planetary Images* CD-ROM, which covers all the planets and major satellites in this solar system as well as asteroids, comets, and rings from most of the planetary missions flown over the last 35 years. Each image includes a short descriptive caption

and a higher resolution full-screen version, grouped together by planet



Earth's Moon - Ranger 7

and mission. Many popular color images are included as well as

lesser-known black and white raw images from the missions that show greater detail. The CD-ROM also includes software that makes it both Macintosh and Windows compatible. The CD-ROM is available from NSSDC for \$10.00 per copy (plus \$5.00 per order for foreign mailing).

The images on the CD-ROM were selected from over 400 currently available on the World Wide Web on NSSDC's Catalog of Spaceborne Imaging, containing images organized by planetary body and more extensive data on each image in addition to the captions. Before the end of 1997, NSSDC hopes to include a sample of every type of image from all planetary missions held at the center.

NDADS About To Quadruple Its Capacity

By Joseph King and James Thieman

NSSDC's primary storage system for network-accessible astrophysics and space physics data is the near-line (robotics-involved) system called NASA Data Archive and Distribution Service (NDADS). Its storage capability has consisted primarily of a pair of 12-inch Write-Once Read-Many (WORM) optical disk jukeboxes front-ended by a VAX computer clustered with other NSSDC computers. As of this time NSSDC has written close to 2.0 Terabytes of data to WORM disks, with the overflow beyond NDADS's 1.6 TB near-line capac-

ity being accommodated by off-line WORM disks and a stand-alone WORM drive acting as a software-enabled virtual jukebox.

NSSDC is about to add to NDADS a Digital Linear Tape (DLT) jukebox with a physical capacity of 5 Terabytes, or 10 Terabytes of data when using vendor-supplied compression firmware. The order-of-magnitude media price advantage of DLT relative to 12" WORM, the rewritable nature of the tapes, and the increasingly widespread use of DLT make DLT the medium of choice for expansion of NDADS's mass storage capacity at this time.

The newly heterogeneous NDADS will work as follows: NSSDC-developed core software modules will receive data selection specifications from any of the available user interfaces, will consult a single Sybase inventory data base to determine which jukebox has the needed data along with which volume(s) and file(s), and will call the software "fetcher" appropriate to that jukebox to actually retrieve the right volume from its slot. It will then load the volume (WORM disk or DLT tape) to a drive and access the desired data. Typically, data are then staged to magnetic disk for ANON/FTP retrieval by users.



Many Ulysses Data Now Available from NSSDC

By John F. Cooper

By the end of 1996, the Ulysses spacecraft, launched in October 1990, had encountered Jupiter (February 1992), had made high latitude (80 deg) passes over the Sun's southern (September 1994) and northern (August 1995) polar regions, and had reached a point about 4.7 AU from the Sun and 12 degrees above the Sun's equator on its way to an early 1998 apohelion of about 5.4 AU. (1 AU is the mean distance between the Sun and Earth, about 150 million kilometers.) Through these years Ulysses has been collecting data on in-situ magnetic fields, plasmas, cosmic rays, plasma waves, dust, remotely generated radio waves, and gamma ray bursts, at locations including high heliospheric latitudes never before visited by spacecraft. Ulysses is a spacecraft of the European Space Agency; the mission includes significant NASA involvement.

The data from the Ulysses investigations have now been archived at NSSDC, through the completion of the first northern polar pass for most investigations. Magnetic field and plasma parameter data are archived at 1-min and 1-hr resolutions through mid-1995. Energetic particle and cosmic ray data at resolutions between 10 min and 3.5 hr are archived mostly to the end of 1995. Ten-min radio and plasma wave data are archived to the end of 1995. Gamma ray burst data at 0.5-sec resolution are archived to mid-1995. Of course, these data sets are being periodically extended as time goes by.

Except for the 0.5-sec gamma ray data and microfiche browse data sets, all the Ulysses data are FTP-accessible from NSSDC. Several data sets are available through the World Wide Web (WWW)-accessible SPyCAT interface to NSSDC's near-line mass storage system NDADS. The hourly magnetic field and plasma data, merged with spacecraft position data, are available from the WWW-accessible COHWeb system.

The full on-line version of this article gives a great deal more detail on the mission and payload characteristics, some of the most exciting science results to date, and details about the individual data sets and the access pathways to each. WWW addresses for virtually all Ulysses sites are given. In

addition, the NSSDC contribution to the Ulysses Science Working Team meeting in November 1996 is discussed.

Initial Results of NSSDC User Survey

By Joseph King

In early October 1996 NSSDC added a User Survey option to its principal World Wide Web (WWW) pages asking people to characterize themselves (researcher or otherwise; disciplines of interest), to respond to a series of questions intended to enable NSSDC management to improve (or initiate) important services, to provide an overall evaluation of NSSDC's data and services, and to evaluate each of several individual services.

During October and November 1996 62 responses were received, split equally between people identifying themselves as researchers and those identifying themselves as non-researchers. Of those, 35, 24, and 20 people identified themselves as interested in astronomy, space physics, and planetary data/services, respectively. The research community was most interested in astronomy and space physics data/services, while the non-research community was most interested in planetary and astronomy data/services. Fifty percent of the respondents rated the NSSDC as "very good," 35 percent as "excellent," and 15 percent as "good" or lower.

Many good comments and suggestions have been received. In response to some of these, NSSDC is now working on an option "For the General Public" to appear on the NSSDC home page.

Ion Data from Lunar Surface Becoming Newly Available

By H. Kent Hills

In the early 1970s measurements of the energy spectra and mass composition of ions from 10 eV/Q to 3.5 keV/Q were

made from three Suprathermal Ion Detector Experiment (SIDE) instruments placed on the lunar surface by astronauts of the Apollo 12, 14, and 15 missions. Data from these investigations have been used in a wide range of lunar, magnetotail, and magnetosheath studies. These studies have used processed data now archived at NSSDC that represent about half of the data obtained by the instruments.

NSSDC has just completed the migration of data bits to new media from the original data tapes holding the data not previously processed or analyzed. Whether NSSDC proceeds to upgrade further the usability of these data is contingent on community interest in these data. Thus, reader comments are hereby solicited from anyone potentially interested in obtaining and analyzing these data.

The principal investigator for the SIDE investigations was John Freeman of Rice University. NSSDC's Kent Hills was a member of the original Rice team and has been supervising the SIDE data restoration effort at NSSDC.

New Space Physics Data Network-Accessible from NSSDC

By H. Kent Hills

Many new space physics data have become network-accessible from NSSDC over the past year. Relatively small-volume and high-interest data are held on magnetic disk for immediate access via ANON/FTP and various enhanced-functionality World Wide Web (WWW) interfaces. Larger volume data sets are held in near-line (robotics-involved) mass storage (NASA Data Archive and Distribution Service [NDADS]) for community access with delay times of minutes.

Near-Earth and deep-space solar wind field and plasma data continue to be made available via various OMNI and Coordinated Heliospheric Observations (COHO) interfaces, including OMNIWeb, COHWeb, and ANON/FTP. The article in this newsletter on the new heliospheric CD-ROM identifies the spacecraft and time periods covered today. ISTP Key Parameter data are also held on magnetic disk for

CDAWeb browse access (in addition to NDADS access described below). These data are from the following spacecraft: WIND, POLAR, GEOTAIL, SOHO, INTERBALL, GOES, LANL, and IMP 8; some ancillary ground station data are also available.

Data from many missions have been ingested to NDADS over the past year. These include ISTP Key Parameter data plus data from the following spacecraft: Dynamics Explorer 1, IMP 8, ISIS, SAMPEX, Ulysses, Voyager 1 and 2, and YOHKOH. All except the YOHKOH data are accessible through the WWW-based Space Physics Catalog (SPyCAT) interface. Further details on parameters, time resolutions, and time spans are included in the full article on line.

New Chicago IMP 8 Data Set Arrives at NSSDC

By Joseph King

The University of Chicago IMP 8 team, led by Dr. Clifford Lopate since the recent retirement of Professor John Simpson, has just created and provided to NSSDC a new, more readily usable data set of its unique cosmic ray data spanning 1973 to the present. Whereas the Chicago team has conscientiously archived its basic coincidence mode count rate and pulse height data from its multisensor "telescopes" flown on numerous NASA missions, these data have been difficult to use and hence have been little used.

The new data set contains, instead of sampled pulse height information, "box counts" that are readily combined with coincidence-mode rate data to obtain fluxes of cosmic rays in the following species/energy bins: electrons in three energy bins from .7-2 to 12-50 MeV; protons in nine energy bins from 11.24-12.62 to 74.50-94.78 MeV; helium nuclei in ten energy bins from 10.90-12.89 to 84.32-94.81 MeV/nucleon; and one 25-250 MeV/n CNO (carbon-nitrogen-oxygen) channel.

The data were provided at 15-min resolution on one CD-ROM on which were also included extensive documentation files and Standard Formatted Data Unit labels. NSSDC expects to make these data

electronically accessible shortly. It is hoped that this new data set will stimulate new use of the long and unique IMP 8 Chicago cosmic ray record.

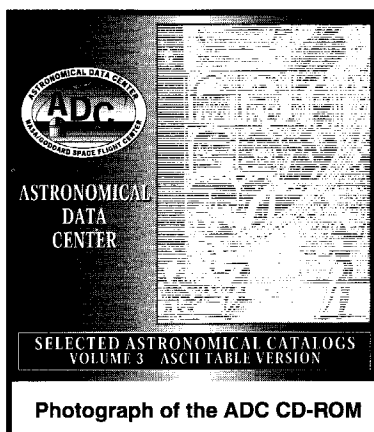
New Heliospheric CD-ROM Available

By Natalia Papitashvili

NSSDC has just issued a new heliospheric CD-ROM that updates and extends the hourly solar wind magnetic field and plasma data of the first heliospheric CD-ROM. More than 35 spacecraft-years of data were added, bringing the total available to about 140 spacecraft-years of data. Spacecraft involved includes Helios 1 and 2, Pioneer 10 and 11, Ulysses, Voyager 1 and 2, and IMP 8. Data from several spacecraft run to late 1995.

NSSDC has also made these files ANONYMOUS/FTP-accessible from "MERGED" subdirectories under each spacecraft subdirectory in the Coordinated Heliospheric Observations (COHO) directory on nssdca.gsfc.nasa.gov. An updated version of MS-DOS software for data retrieval and visualization was provided for both the new CD and FTP-transferred files. The FTP address on nssdc.gsfc.nasa.gov for this software is [pub/cdrom/software/dos](ftp://pub/cdrom/software/dos), filename [helios_n.exe](#).

These data are also the input files for NSSDC's WWW-accessible COHWeb, which has uniform sets of parameters for all spacecraft. Copies of the CD-ROM may be ordered from NSSDC's Coordinated Request and User Support Office (CRUSO) at request@nssdca.gsfc.nasa.gov.



New ADC Head Announced

By Joseph King

The Space Science Data Operations Office is pleased to announce that Dr. Cynthia Cheung of the Astrophysics Data Facility has assumed the role of head of the Astronomical Data Center from Dr. Nancy Roman (Hughes STX), who in turn assumes the role of chief ADC acquisition scientist. Cynthia has also assumed the role of ATR (assistant technical representative) from Dr. David Leisawitz in guiding the ADC services provided by SSDOO's on-site contractor (Hughes STX). Cynthia's internet address is cccheung@nssdca.gsfc.nasa.gov.

New ADC WWW Search Capabilities and New CD-ROM

By Cynthia Cheung

The Astronomical Data Center (ADC) has recently increased accessibility to its data in two ways: two new hypertexted indices and a third ADC CD-ROM. The new indices of authors and holdings will help users find needed catalogs and tables in the ADC's archives and can be accessed from the ADC World Wide Web (WWW) home page at <http://adc.gsfc.nasa.gov/>. A keyword list is also being compiled, available in early 1997. In addition, users can use the existing WAIS search capability to query a data base of descriptions of the catalogs and journal tables.

The Selected Astronomical Catalog Series Volume 3 CD-ROM, available in January 1997, contains 20 large popular catalogs not previously published on either of the first two volumes. It also contains new releases of over 50 catalogs that have been updated or corrected since their publication on CD-ROM Volumes 1 and 2. Information on the contents of the new CD-ROM is available on the WWW at http://adc.gsfc.nasa.gov/adc/adc_other_media.html. CD-ROMs may be ordered through the NSSDC's Coordinated Request and User Support Office at request@nssdca.gsfc.nasa.gov or <http://nssdc.gsfc.nasa.gov/cd-rom/>. Other queries concerning the new CD-ROM may be sent to help@adc.gsfc.nasa.gov.

Remembering Lance Sprayregen

By Patricia Ross

The NSSDC lost an important member of its family when Lance Sprayregen passed away suddenly on September 13, 1996. A principal programmer/analyst with a series of contractors at the data center since 1974, he had an encyclopedic knowledge of the many information systems and computer systems that evolved over the years at the center. He was recognized for his technical skills by being awarded several group achievement awards and in 1992 received a peer award from the HSTX Technology Applications Group. Lance held a bachelor's degree from the University of Texas.

Family, friends, and colleagues recently gathered at the NSSDC building at Goddard Space Flight Center to plant a tree and place a memorial plaque in Lance's memory.

Update: Current Plans for NSSDC Evolution

By Joseph King

Since the appearance of the last *NSSDC News* issue, NASA's Office of Space Science (OSS) has received the report of the Task Group on Science Data Management. The task group strongly reaffirmed the principles enunciated over a decade ago by the National Academy of Sciences' Committee on Data Management and Computation (CODMAC), whose primary tenet was that data should be managed to the maximal extent feasible by the scientific community that best knows the data.

The task group envisioned an OSS public data environment, the Space Science Data System, characterized by a Coordinating Office at Goddard Space Flight Center (into which NSSDC would evolve), a competitively selected Permanent Archive responsible for both data preservation and such off-line data dissemination (e.g., the mailing of CD-ROMs to members of the general public) as was needed in the increasingly electronic networked era, and a series of competitively selected community-based discipline nodes. Guidance and prioritization would be provided by a community-based Information Systems and Operations Working Group. OSS is presently firming up its plan for moving the evolution of its data management and archiving environment forward.

Education and Outreach Emphasis Grows

By James Thielemann

NASA is acting on the U.S. government's increased emphasis on improving the science skills of America's students and on raising public awareness of the value of technological leadership. The Office of Space Science (OSS) at NASA Headquarters has developed a strategic plan for education and outreach designed to meet the required goals, available on the Web at <http://www.hq.nasa.gov/office/oss/edu/educov.htm>.

One of the recommendations of the plan is the establishment of education "forums" or centers of excellence dedicated to major discipline areas of interest. For example, the plan suggested that Goddard Space Flight Center (GSFC) be the forum for the discipline of "Sun-Earth Connections." Dr. Robert Gabrys, the GSFC education officer, has proposed the establishment of a virtual "Education Mall" on the WWW where NASA's Web sites and information relevant to Sun-Earth connections can be categorized and made available to network users. For example, the "stores" of the mall can be dedicated to particular groups such as teachers, students, or the general public, or they could be classified by useful subject areas such as the science fair shop or the photo gallery. The existing NSSDC education and outreach Web site is recognized as a prime candidate for the "mall," and the Space Science Data Operations Office Education and Outreach Committee has been one of the most active groups at GSFC to promote and coordinate educational activities in support of NASA and GSFC goals.

NOST News

By John Garrett

The NASA/Science Office of Standards and Technology (NOST) continued its coordination efforts on the development of ISO archiving standards through leadership and participation in both U.S. and international forums. The latest version of the Reference Model for Open Archival Information Systems may be obtained at http://bolero.gsfc.nasa.gov/nost/isoas/ref_model.html. This model is addressing

the lack of common terms and concepts surrounding what it means to be performing a true archival function for digital information. This lack has greatly inhibited the ability to compare and contrast existing archives, to evaluate the performance of archives, and to encourage vendor support in meeting archival requirements. See the full article for information on how to participate and on the status of other draft international standards (documents).



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

both at

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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