NSSDC Provides Easy Access to Astro-1 Data

NSSDC has begun the ingest of data products from the Astro-1 Observatory, which was carried aboard the space shuttle Columbia on December 2-11, 1990. The instruments included three coaligned Ultraviolet (UV) telescopes—Hopkins Ultraviolet Telescope (HUT); Wisconsin Ultraviolet Photopolarimeter Experiment (WUPPE); and Ultraviolet Imaging Telescope (UIT)—and an independent pointing X-ray telescope called the Broad Band X-Ray Telescope (BBXRT).

The Astro-1 Observatory yielded unique data on a wide variety of astrophysical topics ranging from the solar system to galaxies, quasars, and cosmology. A follow-up flight, the Astro-2, containing HUT, WUPPE, and UIT, is currently scheduled for a 10-day mission in January 1995 and will also include a Guest Observer program.

NSSDC is working to bring the Astro-1 data sets onto the NASA Data Archive and Distribution Service (NDADS) for easy electronic access through the Automated Retrieval Mail System (ARMS). A description of each of the Astro-1 instruments follows.

HUT

Institution: The Johns Hopkins University
Principal Investigator: A. F. Davidsen

The Hopkins Ultraviolet Telescope (HUT) was a prime focus, 0.9 meter f/2 telescope with a Rowland-circle spectrograph with a photon-counting microchannel-plate detector. In first order, the system was optimized for the 900–1200 angstrom region with about a 3 angstrom resolution. During Astro-1, the HUT telescope observed 77 targets.

The NSSDC has received three types of uncalibrated HUT data: "raw" spectra, slit-jaw images of the target field, and engineering/housekeeping data on voltages, temperatures, payload commands etc. These files are in FITS format. PostScript files for plots of engineering parameters as functions of time are also available. FITS format reduced (calibrated) spectra with channel-by-channel error estimates will be delivered to the NSSDC in the future. The reduced spectral files are suitable for the spectral and timing routines available in IRAF.

UIT

Institution: Goddard Space Flight Center
Principal Investigator: T. P. Stecher

The UIT was a 38 cm, f/9 Ritchey Chetien type telescope with a focal length of 342.9 cm.
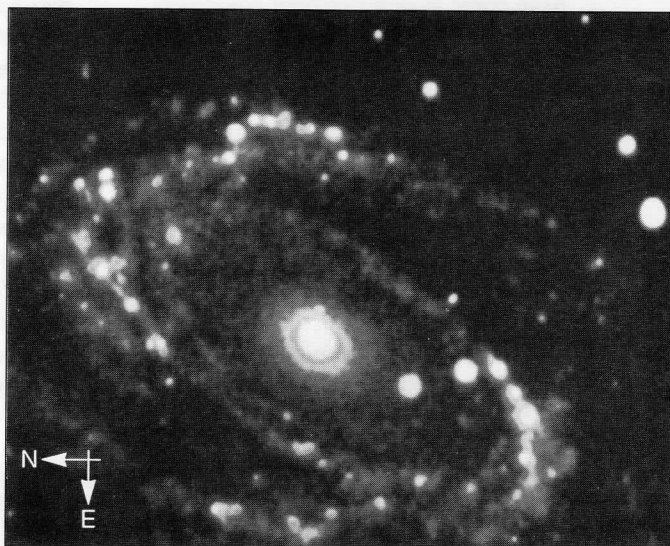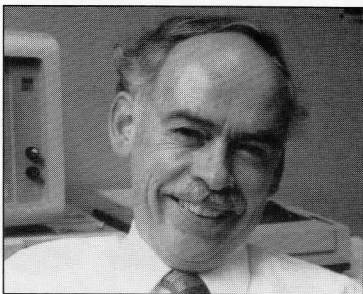

This UIT image of the spiral galaxy M81 was taken during the Astro-1 mission. The image reveals regions where new stars are forming at a rapid rate.

inside

Director's Message:
Facilitating User Access to NSSDC's Assets

Over the past several years, NSSDC has brought many of its information and data assets to electronic accessibility. This has resulted in a great increase in the access to and use of these assets by the research and other communities. These assets include the NASA Master Directory and NSSDC Master Catalog information bases accessible via NODIS, as well as data sets available from NODIS (e.g., solar wind field and plasma data), NDADS (IUE, ROSAT, IMP-8, and many others), and anonymous FTP (e.g., COBE data, Voyager and Pioneer field and plasma data).

Users learn of the availability of the NSSDC's information assets through various means, including this newsletter and NSSDC booths at professional meetings. Then, they typically visit NSSDC electronically, to interact with an NSSDC-built interface in specifying their needs in their information searches. The specification of search criteria is usually by values of fields. We have endeavored to create sets of keywords that are as nearly complete and orthogonal as possible to minimize the possibility that this query approach might miss relevant data sets.

Technologies for supporting information searches are evolving rapidly. Clearly, it is important that NSSDC use those technologies which:

◆ help users to find what they're looking for with very low probability of missing
◆ are comprehensible and user natural
◆ are least tedious
◆ are least resource consuming for NSSDC and for its customers

These criteria are not necessarily best satisfied, simultaneously, by any one technology. However, NSSDC needs to exercise and use the right emerging technologies.

An exciting and promising technology enabled by client-server architecture is the family of network-based tools such as Wide Area Information Search (WAIS), World Wide Web (WWW), and MOSAIC from the U. Illinois National Center for Supercomputing Applications (NCSA). The use of these tools has been exploding over the past year. They are described further by the "tiny tutorial" by Archie Warnock, on the facing page. The popularity of these high-tech tools means that a rapidly growing number of potential beneficiaries of NSSDC assets now have client systems on their computers. They can and are reaching out over the network finding information assets, including ours, without NSSDC having to reach all potential users of its assets through the more conventional channels of our newsletters, conferences, etc.

To date, NSSDC has been applying these technologies to a limited range of its assets. Note, for instance, the article by Jim Gass on page 3 concerning this newsletter's accessibility via WWW/MOSAIC. NSSDC still faces challenges in evolving a match between these new technologies and all the fielded query functionality NSSDC has traditionally offered to help data/information searchers find what they need (existence of data sets in many cases) with high reliability. We will be working on this in the coming months.

Be on the lookout for NSSDC information via various pathways. Most importantly, please provide feedback to me (via Internet at KING@NSSDCA. GSFC.NASA.GOV) regarding your perceptions of the various information query pathways NSSDC offers. What about their effectiveness, comprehensibility and ease of use, and reliability in providing all the relevant information you know should be retrieved? This may vary from application to application, and your comments are vital to NSSDC's evaluation process. I appreciate your taking the time to share your observations on this subject. Your experiences will enable us to plan and provide the most effective approaches for users to locate and access NSSDC's assets.

Joseph King

New Users' Guide Available

NSSDC has recently issued a new *Users' Guide to NSSDC Data and Services*. This hard copy document is available by request to NSSDC's Coordinated Request and User Support Office, telephone (301) 286-6695, or via E-mail at Internet address *request@nssdca.gsfc.nasa.gov*.

The guide is organized in part by discipline and in part by NSSDC system. This enables users to get an overview of the data and services relevant to the disciplines supported by NSSDC, and then quickly to find access instructions for each of the several systems and subsystems through which NSSDC provides its data and services.

The *Users' Guide to NSSDC Data and Services* is a two-sided pocket folder in which are nested pages that describe discipline support on one side of the folder and systems on the other side. This composition allows NSSDC to update and replace individual pages whenever necessary.

WAIS, World Wide Web—What's All The Fuss?

Client/server systems already function as the framework for many specialized information and data systems, but standardized open systems like Wide Area Information Servers (WAIS) and World Wide Web (WWW) provide content-based document search and retrieval with far wider accessibility than specialized, proprietary ones, both for information providers and consumers. Client/server applications are inherently more efficient than traditional login-type systems, and they provide excellent security, as well.

What Are WAIS and WWW, and Why Should I Care?

WAIS is a client/server system originally developed by Thinking Machines Corporation as a sample application of the NISO standard protocol Z39.50. The Clearinghouse for Network Information Discovery and Retrieval (CNIDR) now distributes it free of charge. WAIS servers have been ported to UNIX, VMS, VM, and, reportedly, MS-DOS. WAIS clients run on a wide variety of machines, from UNIX-based X-windows systems and character terminals to MS-DOS and Macintosh microcomputers. CNIDR's current version of WAIS is available by anonymous FTP from ftp.cnidr.org.

WAIS provides a simple way to supply full-text indexing and searching of documents, network interface, and easy access to a variety of document viewers with minimal investment of resources. The NSSDC's STELAR Project successfully used WAIS to deliver of more than 20,000 scientific journal abstracts each month, and now the EOSDIS Information Management System's Guide system uses it to provide mission and instrument descriptions for EOS data.

WWW is a global hypermedia system, also built on a client/server architecture. Its servers deliver text, graphics, sound, and animation over the Internet, requiring no more from users than the click of a mouse button or selection of a highlighted word or phrase in a document. Hypertext links point to objects on server machines anywhere on the Internet and can request these objects by using a variety of mechanisms—ftp, telnet, WAIS, Gopher, and the WWW's native hypertext transfer protocol (http) are all supported.

The National Center for Supercomputer Applications (NCSA) has written a stunning WWW client called MOSAIC, which runs on X-windows displays, PCs with Microsoft Windows, and Macintosh computers. It is freely available by anonymous FTP from ftp.ncsa.uiuc.edu, where you will find executable versions already built for a wide variety of platforms. The easy availability of MOSAIC and other WWW clients has spurred an explosive growth in the use of WWW as a system for information discovery on the Internet.

A character mode (VT-100) client called Lynx is available and runs under both VMS and UNIX. You can reach it by anonymous FTP from ftp.cc.ukans.edu.

Inside The Web

Although documents in WWW may be simple ASCII text files, most documents are written in the Hypertext Markup Language (HTML), a very simple but powerful markup language based on SGML. HTML files are also ASCII files but contain markup "tags" that provide clients with information on display attributes (like italics, boldface, underlining), document layout (section headings and in-line graphics), and hypertext links.

Hypertext links in HTML are specified with a Uniform Resource Locator (URL), which tells the user's client how to submit a document request and what document to request. For example, the URL for the top-level NASA home WWW document is http://hypatia.gsfc.nasa.gov/NASA_homepage.html where "http" tells the client to use the hypertext transfer protocol, "hypatia.gsfc.nasa.gov" is the Internet node to send the request to, and "NASA_homepage.html" is the name of the document to request. If you want to jump directly to a document, just give the client the appropriate URL.

A recent development in HTML allows documents to contain text entry boxes and selectable lists of items that can be used to pass information from the end user back to the server. This means that two-way communications are now possible between client and server, making WWW an effective off-the-shelf user interface to on-line data bases and other types of query and processing systems.

Surf's Up!

A passing familiarity with the terms and ideas behind systems like WAIS and WWW gives only the smallest hint of what they're capable of doing. You really have to see it work to fully appreciate what the network community is doing. So, by all means, get a copy of MOSAIC or Lynx, and start surfing the net!

Archibald Warnock

Read Online Version of NSSDC News!

If you have a computer, you don't need to wait for *NSSDC News* to arrive in the mail before you can read it. Electronic copies of our newsletter are available on the Internet hypertext information service known as the World Wide Web (WWW) and via login to NSSDC's Online Data and Information Service (NODIS).

WWW has gained widespread popularity in the scientific community. Prior to the release of versions for MicroSoft Windows and the Macintosh, the WWW client software package called MOSAIC had already found over 100,000 users of the version for use with X-windows.

The NSSDC has begun to link its information and services to the WWW. Starting with the Fall 1993 issue, *NSSDC News* is available in hypertext form via the WWW. You can find it under the Uniform Resource Locator (URL) http://hypatia.gsfc.nasa.gov/nssdc_news/. The current issue is at URL http://hypatia.gsfc.nasa.gov/nssdc_news/winter_94/winter_94.html.

To find *NSSDC News* on NODIS, pull up the main menu of NODIS categories and select its multidisciplinary services option. You'll then see the multidisciplinary services menu, from which you may choose our newsletter. For more information about using NODIS, please refer to page 3 of the Summer 1993 issue of *NSSDC News*.

Please send your comments on both WWW and NODIS via E-mail on the Internet to KANGA@nssdca.gsfc.nasa.gov.

Jim Gass

Astro-1, from p. 1

It had a 40 arcmin field of view and a 2-arcsec angular resolution.

The UIT images were taken in two bands NUV (1650–2900 angstroms) and FUV (1100–1700 angstroms), each of these bands had a set of 6 filters available (not all combinations were used). The images were recorded on film, which were developed and digitized on the ground after the flight. During Astro-1 the UIT telescope observed 73 targets.

There are three types of data being archived at the NSSDC: calibration data taken before the flight, housekeeping information of the flight, and the digitized film frames and data derived from them. Astronomers will be most interested in the last selection of data. For each of the observations made, there will be a raw density image and a calibrated (flat fielded and converted from density to intensity) image. Most observations also have a north-up astrometrically corrected image, and many have a table of photometric measurements for objects in the field. The NSSDC UIT archive will consist of about 15 GBytes of data.

WUPPE

Institution: University of Wisconsin
Principal Investigator: A. D. Code

WUPPE consisted of a 0.5m f/10 Cassegrain telescope with a modified Monk-Gilleson grating spectrometer with various spectropolarimetric analyzers. The WUPPE detector was an intensified dual 1024 pixel Reticon self-scanned photodiode array. WUPPE obtained simultaneous spectra and polarization measurements from 1400 to 3200 angstroms. A set of halfwave plates provided spectropolarimetric data with 10 angstrom resolution on point-sources and a "Lyot" analyzer was used to provide 50-100 angstrom resolution spectropolarimetric data on faint point targets and diffuse nebulae. WUPPE observed 76 targets during Astro-1. A visible-sensitive Zero-Order Detector (ZOD) CCD camera was used for purposes of target location and tracking.

The WUPPE data are currently being loaded to NDADS. NSSDC has received the Level 0 Spectrometer Data (SCAN), the Level 0 Zero-Order Detector Data (ZOOM, FIELD, and DOWNFIELD), and the Engineering data plots in PostScript format. The SCAN, ZOOM, FIELD, and DOWNFIELD data are archived in FITS format.

Most of the WUPPE data were received in two forms. One set is organized by Mission Ellapsed Time (MET) day number and a second set is organized by the target name. The Level 1 WUPPE data (halfwave and Lyot data) will be delivered to NSSDC in the near future and will also be archived on NDADS in FITS format. The WUPPE archive will eventually consist of about 6 Megabytes of data. Several documentation files and FORTRAN 77 programs to read and display the WUPPE FITS files will also be archived on NDADS.

BBXRT

Institution: Goddard Space Flight Center
Principal Investigator: P. J. Serlemitsos

BBXRT consisted of two co-aligned X-ray telecopes using conical-foil mirror technology developed at GSFC. These mirrors combined, for the first time, broad-band X-ray coverage (0.3–12 keV) with moderate energy resolution. The same mirror technology is employed in the ongoing Japanese-US X-ray mission, ASCA (Astro-D). The detectors were cryogenically-cooled lithium-drifted silicon spectrometers. BBXRT was attached to its own dedicated pointing system (TAPS) during the mission, and it followed a different observing timeline than the three UV telescopes. BBXRT performed more than 160 observations of 82 celestial X-ray sources.

BBXRT high-level data products have been released to the public since September 1992. These include the mission catalog, target spectra, background spectra and light curves for each observation, response matrices and documentation. The low-level photon event data base became public in February 1993. These comprise the complete photon event files for the entire mission, including background and calibration raw data, housekeeping data, pointing information, and mission quality data. Note that a photon "event" corresponds to the arrival of an individual X-ray photon. Except for the documentation, the data products are all in standard FITS format. The BBXRT data base has a total volume of more than 2.6 GBytes.

The BBXRT data products have been accessible via the HEASARC Online Service and also via anonymous FTP from legacy.gsfc.nasa.gov since their public release. NSSDC has now archived them permanently on NDADS. To get information automatically returned to you on the available Astro-1 data holdings in the NDADS archives, send an electronic mail message to the ARCHIVES account on NDADSA. The subject of the mail message should contain the word 'HOLDINGS' and the project name (HUT, UIT, WUPPE, or BBXRT). For example (via DecNet):

> Send to: NDADSA::ARCHIVES
> Subject: HOLDINGS BBXRT

For further assistance please contact the appropriate acquisition scientist through the Internet addresses listed below:

HUT: kemper@nssdca.gsfc.nasa.gov
(301) 441-4208

UIT: voels@nssdca.gsfc.nasa.gov
(301) 286-9492

WUPPE: noliversen@ndadsa.gsfc.nasa.gov
(301) 441-4207

BBXRT: ccheung@nssdca.gsfc.nasa.gov
(301) 286-2780

*Nancy Oliversen, Ed Kemper,
Stephen Voels, Cynthia Cheung*

New Data Arrive!

During the past three months, NSSDC has been migrating data from these missions to NDADS for remote user access: from the HEAO-1 A2 instrument, data migration was completed; data migration from the ASTRO-1 WUPPE instrument began; migration of data from ROSAT, IUE (both "normal" and final archive data), and IRAS continued. More Astronomical Source Catalogs were also migrated to NDADS.

New data arriving at NSSDC since October 15, 1993, are listed in the table on the facing page.

These New Data Are Available at NSSDC:

| NSSDC ID	PLATFORM	INSTRUMENT	CONTACT	MEASUREMENT	TIME SPAN	MEDIUM	STATUS
71-083A-01A	OSO 7	X-Ray & EUV Spectroheliograph	Neupert	Complete Data Set From Solar Extreme UV	10/01/71 - 06/01/74	Original Digital Mag	new
71-083A-01B	OSO 7	X-Ray & EUV Spectroheliograph	Neupert	Complete Data Set From Solar Extreme UV	10/01/71 - 06/01/74	4-mm Tapes	new
73-078A-01L	IMP-J	Magnetic Field Experiment	Lepping	1-min Averaged Magnetic Vectors Data	07/18/91 - 12/31/92	Original Digital Mag	new
73-101A-00D	AE-C		Hanson	AE-C Telemetry Data		8-mm Tapes	new
73-101A-00E	AE-C		Hanson	AE-C Orbit/Atitude Data		8-mm Tapes	new
75-075A-01c	Viking 1 Orbiter	Orbiter Imaging		Mars Images in Compressed Format		CD-ROM	cont'd
75-075A-01d	Viking 1 Orbiter	Orbiter Imaging		Viking Orbiter Images of Mars in Browse		CD-ROM	cont'd
75-083A-01a	Viking 1 Orbiter	Orbiter Imaging		Viking Orbiter Experiment Data Record		CD-ROM	cont'd
75-083A-01b	Viking 1 Orbiter	Orbiter Imaging		Viking Orbiter Images of Mars in Browse		CD-ROM	cont'd
75-096A-00D	AE-D		Hanson	AE-D Telemetry Data		8-mm Tapes	new
75-096A-00E	AE-D		Hanson	AE-D Orbit/Atitude Data		8-mm Tapes	new
75-107A-00D	AE-E		Hanson	AE-E Telemetry Data		8-mm Tapes	new
75-107A-00E	AE-E		Hanson	AE-E Orbit/Atitude Data		8-mm Tapes	new
77-076A-01V	Voyager 2	Imaging Science (ISS)	Martin	Jupiter Images		CD-ROM	cont'd
77-084A-01P	Voyager 1	Imaging Science (ISS)	Martin	Jupiter Images		CD-ROM	cont'd
77-102A-00M	ISEE 1		Herbert	MultiCoordinate Ephemeris Data	10/22/77 - 09/26/87	VAX Formatted Optical	new
77-102A-04R	ISEE 1	Fluxgate Magnetometer	Russell	60 sec averaged 24 hr/ Panel GSM Coord	10/22/77 - 12/17/83	4x6 in. B&W	cont'd
77-102A-04X	ISEE 1	Fluxgate Magnetometer	Herbert	ISEE 1 Decommutated Magentic Field Data	10/22/77 - 09/26/87	VAX Formatted Optical	new
77-102B-00K	ISEE 2		Herbert	Multicoordinate Ephemeris Data	10/22/77 - 09/26/87	VAX Formatted Optical	new
77-102B-04S	ISEE 2	Fluxgate magnetometer 3-axes, +/-2	Herbert	ISEE 2 Decommutated Magnetic Field Data	10/22/77 - 09/26/87	VAX Formatted Optical	new
78-012A-01M	IUE	Low-/High-Resolution, Ultraviolet	Van Steen	IUE Final Archive Data in FITS Format		4-mm Tapes	new
78-051A-06D	Pioneer Venus 1	Cloud Photopolarimeter (OCPP)	Travis	OCPP Digital Imaging Data		Original Digital Mag	new
78-098A-10E	Nimbus 7	Temperature/Humidity Infrared Radio	Sissala	Cloud Data TOMS Format (BCLT)	04/01/79 - 11/04/84	Original Digital Mag	cont'd
81-070B-03E	Dynamics Explorer	Neutral Atmosphere Composition	Hedin	NACS/WATS/LANG/FPI/RPA, UA Data&O/A Data	08/09/81 - 02/16/83	Original Digital Mag	new
81-070B-04E	Dynamics Explorer	Wind & Temperature Spectrometer	Hedin	NACS/WATS/LANG/FPI/RPA, UA Data&O/A Data	08/09/81 - 02/16/83	Original Digital Mag	new
81-070B-05C	Dynamics Explorer	Fabry-Perot Interferometer	Hedin	NACS/WATS/LANG/FPI/RPA, UA Data&O/A Data	08/09/81 - 02/16/83	Original Digital Mag	new
81-070B-07C	Dynamics Explorer	Retarding Potential Analyzer	Hedin	NACS/WATS/LANG/FPI/RPA, UA Data&O/A Data	08/09/81 - 02/16/83	Original Digital Mag	new
81-070B-09F	Dynamics Explorer	Langmuir Probe	Hedin	NACS/WATS/LANG/FPI/RPA, UA Data&O/A Data	08/09/81 - 02/16/83	Original Digital Mag	new
84-108B-02C	ERBS	Stratospheric Aerosol and Gas II	McMaster	SAGE II Aerosol Profile Archival Data	10/05/84 - 09/30/93	Original Digital Mag	cont'd
88-026A-00D	San Marco D/L		Vette	San Marco Distributed Data Tapes		Original Digital Mag	new
89-033B-01B	Magellan	Synthetic Aperture Radar (SAR)	Ford	Magellan SAR Altimetry and Radiometry	09/15/90 - 09/13/92	CD-ROM	cont'd
89-033B-01C	Magellan	Synthetic Aperture Radar (SAR)	Arvidson	Magellan SAR Compressed-Once Image Data	09/15/90 - 09/13/92	CD-ROM	cont'd
89-033B-01D	Magellan	Synthetic Aperture Radar (SAR)	Arvidson	Magellan SAR Compressed-Twice Image Data	09/15/90 - 09/13/92	CD-ROM	cont'd
89-033B-01E	Magellan	Synthetic Aperture Radar (SAR)	Arvidson	Magellan SAR Compressed-Thrice Image Data	09/15/90 - 09/13/92	CD-ROM	cont'd
89-033B-01F	Magellan	Synthetic Aperture Radar (SAR)	Arvidson	Magellan SAR Full-Resolution Image Data	09/15/90 - 09/13/92	CD-ROM	cont'd
89-033B-01G	Magellan	Synthetic Aperture Radar (SAR)	Ford	Magellan SAR Global Emissivity Data	09/15/90 - 09/13/92	CD-ROM	cont'd
89-033B-01H	Magellan	Synthetic Aperture Radar (SAR)	Ford	Magellan SAR Global Reflectivity Data	09/15/90 - 09/13/92	CD-ROM	cont'd
89-033B-01I	Magellan	Synthetic Aperture Radar (SAR)	Ford	Magellan SAR Global Slope Data Records	09/15/90 - 09/13/92	CD-ROM	cont'd
89-033B-01J	Magellan	Synthetic Aperture Radar (SAR)	Ford	Magellan SAR Global Topographic Data	09/15/90 - 09/13/92	CD-ROM	cont'd
89-033B-01Q	Magellan	Synthetic Aperture Radar (SAR)	Arvidson	Magellan SAR Full-Resolution Image Data	09/15/90 - 09/13/92	8x10 in. B&W	cont'd
91-062A-01A	Yohkoh	Hard X-Ray Telescope: 5 arc s-resol	Morrison	Yohkoh Data for All Instruments	09/01/91 - 09/05/92	8-mm Tapes	new
91-062A-02B	Yohkoh	Soft X-Ray Telescope 0.25 to 4.0 ke	Morrison	Yohkoh Data for All Instruments	09/01/91 - 09/05/92	8-mm Tapes	new
91-062A-03A	Yohkoh	Wide Band Spectrometer	Morrison	Yohkoh Data for All Instruments	09/01/91 - 09/05/92	8-mm Tapes	new
91-062A-04A	Yohkoh	Bragg Crystal Spectrometer: Fe XXV	Morrison	Yohkoh Data for All Instruments	09/01/91 - 09/05/92	8-mm Tapes	new

Curt Barrett Assumes Key Management Role
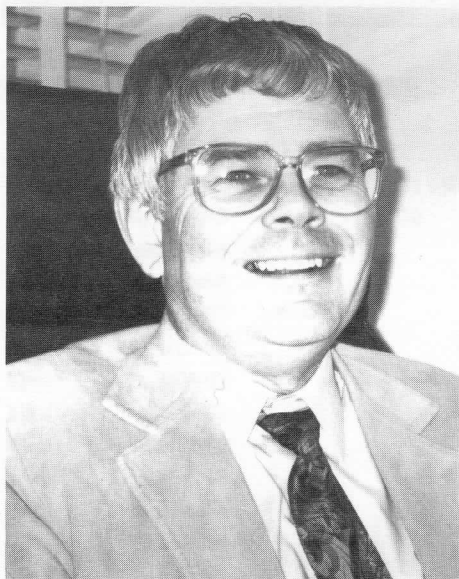
Curt Barrett now heads NSSDC's Archive Operations Facility.

Curtiss Barrett has just been named Head of NSSDC's Archive Operations Facility. He joins NSSDC from the newly decommissioned Space Station Office in Reston, VA, to assume responsibility for NSSDC's online, nearline, and offline data operations and for its archive, computer, and photo lab facilities.

Curt had been at the Space Station's Reston facility since 1987, first as chief of the Software Support Environment Office and subsequently as a Space Station hardware/software configuration manager. From 1962 through 1987, Curt was at Goddard Space Flight Center holding of series of increasingly responsible software-relevant positions.

During the period of 1979–1981, he served as software manager for the Orbiting Spacecraft Projects Office, which even today is responsible for such missions as IUE and IMP-8, whose data regularly flow to the NSSDC archives that Curt now manages. From 1985–1987, Curt worked on software for Goddard's Space Station elements and provided requirements for the Space Station program's Software Support Environment and Technical Management Information System.

Curt has B.S. and M.S. degrees in aerospace engineering from West Virginia University and Catholic University.

Kenneth Silberman

SSDOO Welcomes Two Software Experts

NSSDC's parent organization at GSFC, the Space Science Data Operations Office, has added two software experts to its staff of civil servants. Gregory Galiardi and William Lawson both come to SSDOO as the result of the closing of the NASA Space Station Office in Reston, VA.

Greg and Bill have joined the Space Physics Data Facility and the Astrophysics Data Facility, respectively. Both worked on the Space Station's Technical Management Information System (TMIS) before joining the SSDOO.

Greg will be responsible for the design, development, and evolution of various software systems to be used in support of the Global Geospace Science program, including the NASA WIND and POLOR spacecraft. Present relevant systems include Coordinated Data Analysis Workshop and the Satellite Situation Center.

Greg earned a B.S. in computer science at the U.S. Air Force Academy in 1985. After five years of active duty with the Air Force, he joined NASA as an information services manager responsible for many aspects of the Space Station TMIS

data base at Reston. He is presently pursuing a Master of Science degree in computer science at Johns Hopkins University.

Bill Lawson is responsible for an equivalent range of software activities in support of NASA astrophysics missions, specifically the X-ray Timing Explorer (XTE), the Far-Ultraviolet Spectroscopic Explorer (FUSE), and, if Goddard is selected, the Spectrum-X-Gamma.

Bill has been involved with the Space Station TMIS program since 1987, first as a Booz, Allen, & Hamilton employee, and then switching to civil servant status in 1990. Prior to his TMIS life, he was at NSSDC leading the contractor's (then SAR's) development of the Pilot Land Data System. In his yet-earlier positions, he worked on computer
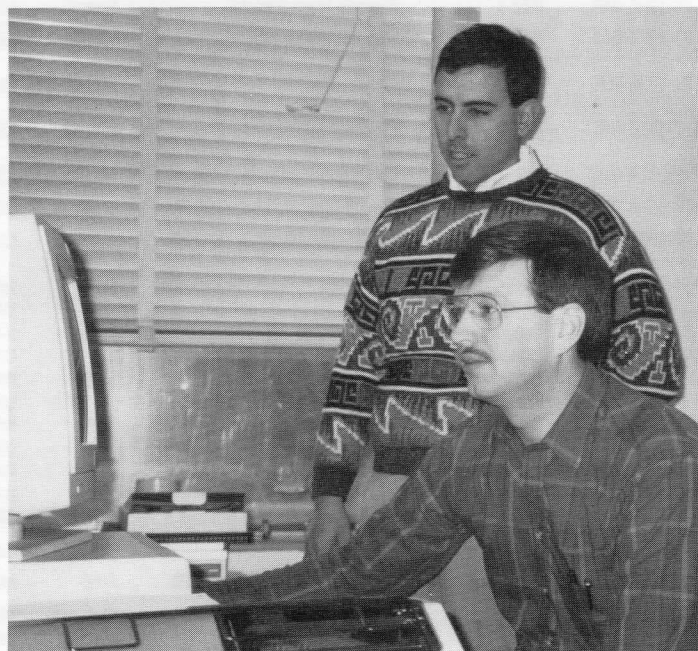

Bill (seated) and Greg (standing) specialize in software systems.

tomography imaging systems and blood analyzer systems.

Bill has a B.S. in biology from James Madison University and a Master of Engineering degree in biomedical engineering from the University of Virginia (1980). He is currently enrolled in the Master of Business Administration at the University of Maryland.

Kenneth Silberman

Progress Made Toward Establishment of NASA Space Physics Data System (SPDS)

Since the issuance of the SPDS "Concept Document" in February 1993, discussed in the *NSSDC News* at that time, several significant steps have been taken toward the definition and creation of a NASA Space Physics Data System.

In June 1993, an SPDS "Community Workshop" was held at Rice University to review the SPDS concept as proposed and to develop a more detailed set of recommendations in its functions, architecture, management, and priorities. The approximately 75 scientists were organized as four panels (Policy, Data Issues, Data Systems, and Software), and the resulting recommendations from these four panels are broadly consistent in the overall sense of an SPDS in areas of joint interest. The report from the workshop has now been issued (December 1993) and is available from the Space Physics Division (SPD, at NASA/HQ/SS) on request. A few key policy conclusions and recommendations from the workshop are summarized here:

- Creation of an SPDS would help fulfill the urgent data exchange requirements of new missions, as well as preserve and improve access to critically important data from past and present programs. The SPD should initiate the SPDS now, in spite of very limited funding.

- The five functional objectives identified in the SPDS Concept Document are appropriate. The most important SPDS objective should be to provide the scientific research community with access to high quality data products. Support for the dissemination of data analysis tools is important but of secondary priority.

- The workshop endorsed the Concept Document's emphasis on a distributed data system designed, developed, and operated by scientific users of space physics data. The SPDS should make maximum use of existing facilities, but with funding awarded competitively through peer review.

- Consistent with a philosophy of a grass-roots effort built from existing capabilities and operating as a community-distributed service, the SPDS should emphasize the concept of "coordination" and "coordinators" as a management approach.

Additional specific recommendations were made by each of the panels and are detailed in the report.

As one action in response to the workshop, the Space Physics Division issued a call for volunteers to act as "SPDS Coordinators." The selections have now been made and formally organized as a "Coordination Working Group" (SPDS/CWG) by George Withbroe, Director of the Division. The SPDS/CWG will act as a combined science fact-finding and management council to guide the definition and early evolution of the SPDS. The SPDS/CWG key responsibilities are:

- Define the prioritized data needs and desires of the NASA space physics community and of NASA researchers in each discipline.

- Carry forth a definition of appropriate, substantive, and feasible plans for an effective SPDS.

- Direct the initial overall implementation of SPDS.

- Act as a focus for SPDS-related information collection and dissemination.

The members of the SPDS/CWG are:

SPDS Project Scientist
    Bob McPherron, IGPP/UCLA

SPDS Lead Discipline Coordinators
    Cosmic and Heliospheric:
        Tom Garrard, Cal Tech

Ionospheric, Thermospheric, Mesospheric (ITM):
    Dave Winningham, SwRI
Magnetospheric:
    Dave Sibeck, APL/JHU
Solar:
    Rick Bogart, CSSA/Stanford

SPDS Project Co-Coordinators
    Bob McGuire, GSFC
    Mike Teague, USSCO/GSFC

SPD MO&DA Coordinator
    Jim Willett, USRA

In addition, each Lead Discipline Coordinator will head a Discipline Coordination Team (DCT) that is intended to operate as a community-based science advisory network to better ensure a close linkage of this effort to the real needs and interests of the science community.

The SPDS/CWG will operate under chairmanship of the SPDS Project Scientist. Lead Discipline Coordinators are defined for the four major subdisciplines in the SPD, to represent the data concerns and interests of those NASA research communities. The Project Co-Coordinators will represent cross-disciplinary and multidisciplinary community interests as well as interests outside the NASA SPD umbrella. The Project Co-Coordinators also will work with the Discipline Coordinators to ensure coordination of development across the SPD disciplines and with work in other disciplines. The SPD MO&DA Coordinator represents SPD and NASA.

The CWG met informally over dinner during the Fall AGU. The first full meeting of the CWG is scheduled to take place in late February and will be hosted by APL/JHU. The ITM DCT has already met formally for the first time, and the magnetospheric DCT met informally at AGU.

Robert McGuire

NSSDC's Data Base Environment Evolves as Relevant New Technologies Emerge

Over the past ten years, the NSSDC has used a variety of commercial relational data base management systems (DBMSs) to manage its various data bases.

Brief History of NSSDC's Data Base Management

Software DBMS packages have included ORACLE, Ingres, SYBASE, and Smartstar. In addition to the various software packages, from 1986 through 1993, the NSSDC used a data base machine called the Britton-Lee IDM-500. Currently, the NSSDC is using only the ORACLE and SYBASE packages.

The data bases NSSDC has managed with these DBMS packages have all been informational or metadata data bases, i.e. information about NASA and other scientific spacecraft, experiments, data sets, etc. (None of the sensor-output data sets were managed as relational data bases.) In addition to ORACLE and SYBASE, the data center also uses a product called JAM, developed by JYACC Corp., to develop front-end interfaces to both the ORACLE and SYBASE data bases. JAM is portable across platforms and supports several DBMSs in addition to ORACLE and SYBASE.

NSSDC's DBMS Details

NSSDC has run its DBMS packages in a VAX/VMS environment, which today includes a VAX 9410 and three VAX 6410 computers. Five gigabytes of disk space have been devoted solely for data base applications and tables. It has been important to the NSSDC that over the years, SQL has emerged as a standard data base language used by most or all vendors of relational DBMS packages. This eases the migration of data bases from one DBMS to another. Open system standards associated with DBMSs gives NSSDC the option to readily switch from a VMS environment to a UNIX or other vendor-independent environment.

One example NSSDC's use of SYBASE on a VAX 6410 is the management of the inventory data base associated with the NDADS mass storage system. This data base is composed of approximately 120 tables, 55 triggers, and 26 procedures. Typical 'dayshift' usage of this data base application would be approximately 65 users daily. SYBASE supports an average of 650 queries daily on the NDADS data base.

NSSDC now uses ORACLE on a VAX 9410 for several other data base applications (NASA Master Directory, NSSDC Master Catalog, etc.). A major change was the retirement of the Britton-Lee data base machine in 1993. By 1993, it had been upgraded to an IDM-700, but it was no longer cost effective relative to other software approaches. So three Smartstar data bases, involving 245 tables, were converted to ORACLE. Much of the coding changes implemented functionality upgrades relevant to data entry screens, access menus, and reporting tools. Code was also changed from FORTRAN to C, containing embedded SQL, which allows for platform and data base independence. Typically, the ORACLE applications at the NSSDC accommodate 50 users daily, with peak hours between 7 a.m. and 6 p.m. on weekdays. (The Britton-Lee machine is available to interested federal government officials; please contact Jeanne Behnke at (301) 286-8340 if you are interested.)

Continued Growth

NSSDC's data bases will continue to grow significantly, particularly the inventory data bases with which online and "nearline" data files are managed. DBMS technology likewise will continue to evolve to provide more capabilities and capacities. To assure a continuing best match between evolving requirements and technology, NSSDC has formed a Data base Users' Group that holds monthly meetings of NSSDC staff and other local experts to share insights, discuss problems, and explore new data base frontiers. The staff has been testing DBMS tools for performance, ease of use, cost, resource manipulation, and documentation. Several vendors have been invited to demonstrate and discuss their new products and directions. Near-term plans at the NSSDC call for placement of both ORACLE and SYBASE software and all associated data bases on new VAX-clustered RAID disks.

Among the changes anticipated for DBMS systems for the immediate future are a drop in prices as DBMSs are tuned for the workstation environment, easier application software development environments, object-oriented features, and graphical user interfaces. DBMS tools will emerge that can run with multiple DBMS products (e.g., SYBASE and ORACLE) on multiple platforms (e.g., VMS and UNIX). While most future user access to NSSDC data bases is expected to be via networks—especially given the emergence of the World Wide Web (WWW) (please refer to detailed article on page 3)—it is possible that a common alternate mode of access will be via CD-ROMs containing both DBMS software, interface software, and data bases, which NSSDC disseminates through the postal system.

Future Developments

At a higher level, NSSDC must provide information management and access capabilities. We believe that traditional DBMS technology will continue as a key information management tool in the future. Clearly, front-end systems to finding data in the DBMS have changed in many aspects. Information finding through such means as WWW and related technologies (e.g., marked up documents) will highlight alternative approaches to traditional online information systems. The NSSDC plans to carefully watch all future developments in both DBMS and front-end technology.

For more information on the evolving NSSDC data base environment, please contact Jeanne Behnke (number above) or Brenda Wheatley at (301) 286-3980.

Brenda Wheatley
Jeanne Behnke

NSSDC Lends Support to STEP

The Solar-Terrestrial Energy Program (STEP), sponsored by SCOSTEP, is an international science program for the period 1990–1997 that was designed to study the complex interactions between the Sun and the Earth's environment. The program involves approximately 5000 scientists from 80 countries including the United States, Japan, Russia, and various European nations.

STEP Bulletin Board on the NSSDC/NODIS account. Sardi Parthasarathy provides support from the Satellite Situation Center for determining campaign periods such as the International Auroral Study for late 1994 and early 1995. Among other NSSDC staff, Dieter Bilitza leads a project to document STEP-related models, Pat Ross maintains several distribution lists for STEP publications (such as

Contributors to the STEP effort include (left to right), in the front row, Natasha Papitashvili, Sardi Parthasarathy, Lynda Williams, and Pat Ross; in the back row, Dieter Bilitza, Mike Teague, Jim Green, Nathan James, and Joe King.

In order to meet its objectives, STEP has established an infrastructure that includes an international Steering Committee (chaired by Gordon Rostoker from the University of Alberta), an international coordinator (Juan Roederer from the University of Alaska), a series of Working Groups and Projects to study specific science tasks within the overall STEP mission, and a number of national coordination offices. The U.S. STEP Coordination Office (USSCO) is co-located with NSSDC and directed by U.S. STEP Coordinator Michael Teague of the Universities Space Research Association. The Assistant U.S. STEP Coordinator is Lynda Williams of the Hughes STX Corporation.

Several NSSDC staff members participate in STEP. SSDOO Head Jim Green is a member of a STEP project designed to coordinate ground-based observations with spacecraft observations during the Inter-Agency Consultative Group's important campaigns to study the Earth's magnetotail in 1994 and 1995. Joe King and Nathan James have implemented the

STEP International) and Natasha Papitashvili has generated software for the STEP Ground-Based Magnetometer CD-ROM. Future NSSDC involvement is likely to be even more significant and includes the possibility of STEP-related CDAWs.

Within USCCO, the author is responsible for producing the monthly *STEP International* newsletter, tracking and documenting the many STEP-related campaigns and special periods, identifying and documenting all data acquisition efforts within the international community, and collecting, documenting, and maintaining all distribution information and electronic mail addresses for STEP participants.

If you would like more information on STEP or are interested in receiving our monthly publication, STEP International, please contact the author by E-mail at NSSDCA::LYNDA or by telephone at (301) 286-5569.

Lynda Williams

January IACG Workshop Held

An Inter-Agency Consultative Group (IACG) Science Campaign Workshop was held in Easton, MD, on January 27–29, 1994. The workshop, organized by Miriam Forman (Space Physics Division, NASA Headquarters), was designed to plan out coordinated multispacecraft observations for understanding "Solar Sources of Heliospheric Structure Observed Out of the Ecliptic."

Workshop participants identified the following three campaign intervals:

1. **Middle 1994 extending into Fall 1994,** during the Ulysses solar south-pole passage (Ulysses will be at its highest heliocentric latitude of -80.2 degrees on September 13)

2. **March 1995,** when the Ulysses spacecraft will rapidly traverse from southern to northern hemisphere through the ecliptic

3. **Middle to late 1995**, during the solar north-pole passage.

The workshop identified several major science topics for investigation by the international solar and heliospheric fleet of spacecraft: topology of the heliospheric current sheet, the boundaries and properties of streamer regions, the topology and evolution of coronal holes, and physical characteristics and processes in the solar wind. In all of these, the major new focus of the campaign would be the mapping of structure, evolution, and physical mechanisms from the Sun into the heliosphere in three dimensions.

A draft report was completed before the end of the workshop that provides a coordinated plan of observation from both spacecraft and ground-based instruments. The final report may available by April. A Ulysses-sponsored workshop on data from the Ulysses south polar pass will take place September 12–16, 1994, in Europe. For more information about the IACG, please contact Robert McGuire at (301) 286-7794.

Robert McGuire
James Green

CD-Recordable System Arrives

NSSDC has taken delivery of a system with which it will create compact disks (CDs) locally, one at a time. Until now, NSSDC created CD-ROMs by organizing data onto media (usually tapes) and sending the media to a commercial "factory" for mastering and replication. The locally generated CDs (alternately referred to as CD-R, for CD-Recordable; CD-WO, for CD-Write Once; or even CD-ROM, for CD Read Only Memory) adhere to the same format standards as mass-replicated CD-ROMs, and may be played in the same drives. This capability will allow NSSDC to:

◆ move data to CD-R for permanent, relatively high density (650 MB/disk) archiving

◆ create a few disks for beta testing prior to mastering and mass replication of wide-interest data sets on CD-ROM

◆ offer customers the option to receive CDs for data sets whose request volume does not justify the cost of mastering and mass replication

The system NSSDC has procured consists of a JVC Rommaker (hardware and software), a 486 DOS PC, and 4-mm and 8-mm tape drives. Elements of the system are joined by SCSI links. The system will also be on the Internet, so electronic transfer of data files to the system in the disk creation process will be possible.

On the first CD it creates, NSSDC plans to record .5-sec resolution MAGSAT magnetic field data. Several CDs will be subsequently generated, including some holding COBE data and DE-2 electric and magnetic data.

NSSDC staffer members responsible for the acquisition, testing, and management of the new system are Richard Chu and Nathan James.

Joseph King

NOST notes
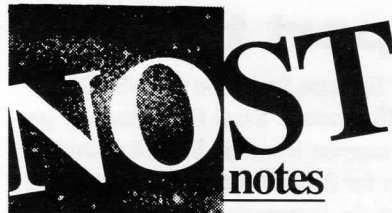
The formal review of a draft international standard is underway within the international space agencies. The NASA/Science Office of Standards and Technology (NOST) is supporting NASA's formal review of the Consultative Committee for Space Data Systems (CCSDS) Panel 2 draft Recommendation (Red Book) entitled, *SFDU—Control Authority Data Structures.*

This document provides additional standardization in support of the registration and dissemination of data descriptions. It does this by specifying an overall packaging structure for data description material as well as the format and meaning of a set of attributes that are to accompany the data description.

In actual use, data descriptions are packaged according to this standard and are sent to a Control Authority (CA) Office (e.g., a local archive that has agreed to perform CA services) for registration and safekeeping. The CA Office can perform nearly automated cataloging based on the content of the attributes. When the CA Office receives a request for the data description, the description is packaged according to the standard and is provided to the requester. The standard package allows the requester to also do highly automated cataloging and to parse the description into various meaningful components.

The documents for review were distributed to the NASA field centers in mid-February. Each field center conducts its own review, and consolidated center comments are expected by late April. If you would like a copy for review, please contact the NOST by E-mail via Internet at NOST@nssdca.gsfc.nasa.gov, or by telephone at (301) 286-3575.

Donald Sawyer

NSSDC Emphasizes Education

NASA has declared a new emphasis on supporting the nation's education endeavor. NSSDC will be a significant participant in NASA's support of education.

On February 2, 1994, NASA's Teacher-in-Space astronaut candidate Barbara Morgan and Pam Bacon of NASA's Education Affairs Office visited NSSDC and enjoyed seeing many of the data center's education-related assets, such as the CD-ROM browse facility and a variety of planetary and other images on NSSDC's CD-ROMs, 3D views of Skylab X-ray images using a hand-held stereoscope, and World Wide Web access to NSSDC's information and data sets. Both Morgan and Bacon were very enthusiastic about the potential use of these products in the classroom.

For several years, NSSDC staffers and others of NSSDC's host organization at Goddard, the Space Science Data Operations Office (SSDOO), have shared their expertise with students of all ages through career days, seminars, tours, demonstrations, summer internships, etc. About three years ago, NSSDC played the key NASA role in the multiagency creation of the first three Joint Education Initiative (JEDI) CD-ROMs that contain data sets from NASA, NOAA, and USGS space and Earth science missions, accompanied by lesson plans created by collaboration junior and senior high school teachers. Many school teachers have requested and received NSSDC CD-ROMS containing Voyager and Magellan planetary images, as well as other data.

There is a formal emphasis within GSFC's Space Science Directorate (which is SSDOO's host organization) on transferring space science technology to education initiatives. An education committee has been established with SSDOO to review its current activities and to develop new ways to apply our science assets to the field of education. NSSDC plans to be a major contributor to this effort. New education initiatives will be reported in this newsletter as they are implemented.

Valerie L. Thomas

NSSDC Booth Draws Visitors at AAS Meeting

photo by NSSDC Photo Lab

NSSDC staff members who participated in January's AAS meeting are, in front, Nancy Oliverson, Nancy Roman, Gail Schneider, and Karin Eckhardt. In the back row are Paul Kuin, Sudha Vaidyanathan, Syed Towheed, Jim Gass, and Edward Kemper.

NSSDC, the Space Science Data Operations Office (SSDOO), and Goddard were well represented at the 183rd meeting of the American Astronomical Society, which was held in Crystal City, VA, on January 12–15, 1994.

Members of the staff of the NSSDC's Coordinated Request and User Support Office (CRUSO), the Astronomical Data Center (ADC), and the STELAR project gave demonstrations of networked services, including the STELAR hypertext scientific journal collection and abstract searching system, the Astronomical Data Center's (ADC's) Online Information System, NSSDC's World Wide Web hypertext pages, NODIS, and the NASA Master Directory.

Among the numerous documents distributed were more than 250 copies of the ADC's new *Astronomical Catalog Desk Reference.* The attending staff demonstrated several scientific CD-ROMs that are now available from the NSSDC, and copies of several CD-ROM titles, including the EINSTEIN CDs, were distributed. SSDOO personnel at the exhibit tables answered various questions, including numerous queries about how to access the World Wide Web and Wide Area Information Servers (turn to page 3 for an article answering the same questions about WWW and WAIS).

COBE was the focus of three SSDOO contributions. In collaboration with the Laboratory for Astronomy and Solar Physics (LASP), and with generous support from the NSSDC photo lab, we prepared a display that featured color all-sky images depicting data from each of the three COBE instruments, a list of major scientific achievements, and two handouts: a bibliography of COBE Team publications, which can be used to request reprints, and instructions on how to obtain the released data. Synergy between the SSDOO and the LASP was also in evidence in the form of a poster paper entitled "COBE Observations of the H II Region IC 1848," with authors D. Leisawitz, M. Mitra, and M. Hauser. The third SSDOO contribution featuring COBE data was the premier of a World Wide Web interface to the NSSDC's astrophysics data archive. NSSDC's display booth visitors at the meeting were treated to a novel way—that is, by using MOSAIC software—to learn about COBE and obtain the publicly available COBE data.

Several SSDOO staff members gave presentations at the meeting:

◆ Archie Warnock gave an oral presentation entitled, "Networked Information Discovery and Retrieval."

◆ Edward Kemper presented a poster paper entitled, "Modernizing the OSO-8 High-Energy Celestial X-Ray Data Set."

◆ David Batchelor presented a poster called, "Analyzing the Skylab Solar X-Ray Images in Digitized Form with Image Enhancement and Quasi-stereoscopic Techniques."

◆ Nancy Oliversen presented the poster, "White Dwarfs in Astrometric Binaries?"

David Leisawitz
Jim Gass

Astronomical Catalog Desk Reference Now Available

The Astronomical Data Center (ADC) at NSSDC has put together a new publication to help astronomers find catalogs of interest in our data holdings. The new book, dubbed the *Astronomical Catalog Desk Reference – 1994 Edition,* contains a comprehensive abbreviated title list of the more than 700 catalogs at the ADC, a collection of descriptions of over 300 of those catalogs, and indices arranged by subject keywords and by author names. It also contains information on ADC services, how to submit data to the ADC, and a list of alternative sources of astronomical catalogs.
If this publication proves to be a useful reference tool for members of the astronomical community, future updates may be made available in both paper and electronic (hypertext) forms.

For a nominal handling and shipping charge, the *Astronomical Catalog Desk Reference* is available by request from the NSSDC Coordinated Request and User Support Office (please refer to the back page for details).

Jim Gass and Gail Schneider

Looking at the Aurora:

DE-1 Images Are at Your Fingertips

With the arrival of the auroral images from the Dynamics Explorer 1 (DE-1) Scanning Auroral Imager (SAI) to the NSSDC Data Archive and Distribution Service (NDADS), it is now easy to get a real picture—literally—of the aurora at times of interest. All the pieces for retrieving and displaying the images are now available online for the interested investigator.

The process of obtaining an auroral image consists of requesting the desired image files from NDADS or NSSDC's Request Office, converting the data into the Common Data Format (CDF), and then displaying it with NSSDC's imaging and mapping program, CXIT.

NDADS

The NDADS Automated Retrieval Mail System (ARMS) permits a requester with Internet or DECnet access to electronically receive an average-size data request within minutes. To obtain the *ARMS Users' Guide,* with full instructions, send an E-mail message to archives@ndadsa. gsfc.nasa.gov or to NDADSA::ARCHIVES, with the subject "Manual." Leave the body of the message blank. The manual user guide, in LaTEX format, will be E-mailed to you. For a list of the data holdings, enter the subject "Holdings" (followed optionally by DE, if you want to get only the DE holdings).

The DE-1 SAI images can be requested singly, as in the example below, or for an hour's worth of data per request. Since the holdings listing is only an overview and states only that images are available between various start dates and stop dates, users may have to experiment through some trial and error to determine whether images exist for the specific time desired. To request a single image, the entry on the subject line would look like this:
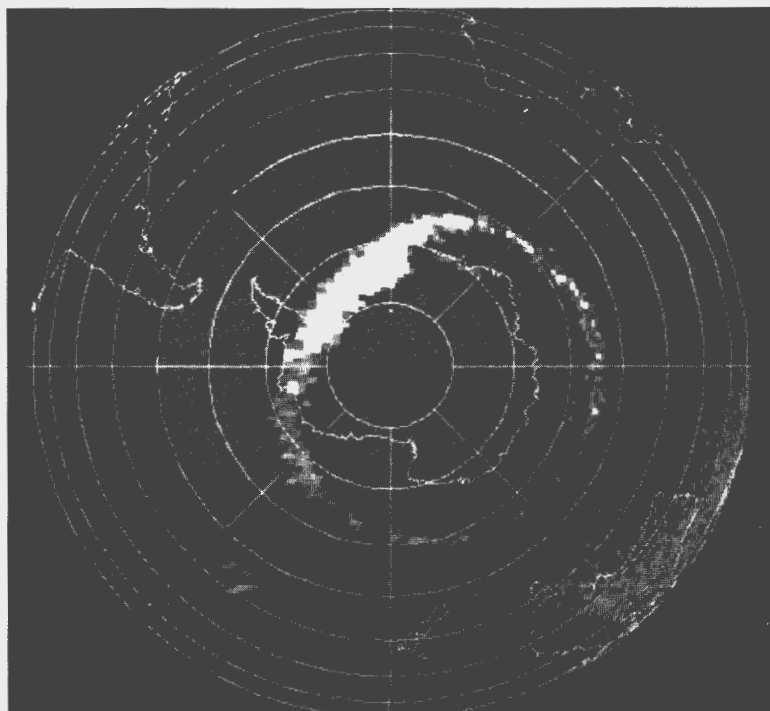
Subject: REQUEST DE SAI

In the body of the message, put the desired time in the form yyddhhmmss, where yyddd is the date (e.g., 83032 rep-

Here are two geographic projections of a DE-1 auroral image taken in May 1986.

This view shows the full oval in a south ortho-geographic projection as produced by the CXIT tool.

(The view at right is explained in its accompanying caption.)

resents February 1, 1983) and hhmmss is the time of the image (e.g., 103245 for 10:32:45). Omit the mmss portion to obtain all of the files with start times within that hour. Additional data may be requested on separate lines in the body of the message. As of December 1993, data between 81266 and 87028 are available on NDADS. Data exist up to 1991, and more may be added to the archive if more funding becomes available.

The requested image files will be placed in a temporary storage directory, named NDADSA::ANON_DIR:[DATA_DIST.DE], from which they may be copied. Or, use anonymous FTP to log on to ndads.gsfc.nasa.gov and change directory to anon_dir:[data_dist.de]. An E-mail message will be sent to the requester with the directory and filename information. It is also possible to get the output sent directly to your account, as explained in the user guide.

CDF

The next step is to obtain the CDF software package, currently available for the VAX, UNIX, and PC platforms. Hopefully, the software will eventually be ported to the Macintosh platform as well. For instructions on how to copy the CDF package and build the software, read the file CDF.RELEASE from the NSSDC

anonymous directory ANON_DIR:[SPDS.DE_SAI].

Converting the DE-1 SAI Data into CDFs

To use the CXIT viewing program, you must put all of the SAI image data into CDFs. The software to do this is contained in NSSDC's anonymous directory ANON_DIR:[SPDS.DE_SAI], including ReadMe files describing how to build the software and supplying sample files. You need to copy all of the files in this directory.

First, you construct a list of files (see SAIYYDDD.FILES for an example), and alter the CDF skeleton, SAIYYDDD.SKT, for the desired CDF name, title, dates, and so on. Two programs are involved in making CDFs of the images. The first, MAFCRD, constructs two coordinate files for each image file ('MAF' file) in the file list. The second, SAI2CDF, puts the data into the CDF file. Each CDF can hold as many images as desired. A command file called SAI_CDF.COM is provided for use on the VAX, and it accomplishes all of this.

CXIT

CXIT is an imaging and mapping program initially based on NCSA Image. The ability to project the image onto a standard mapping (azimuthal, ortho-
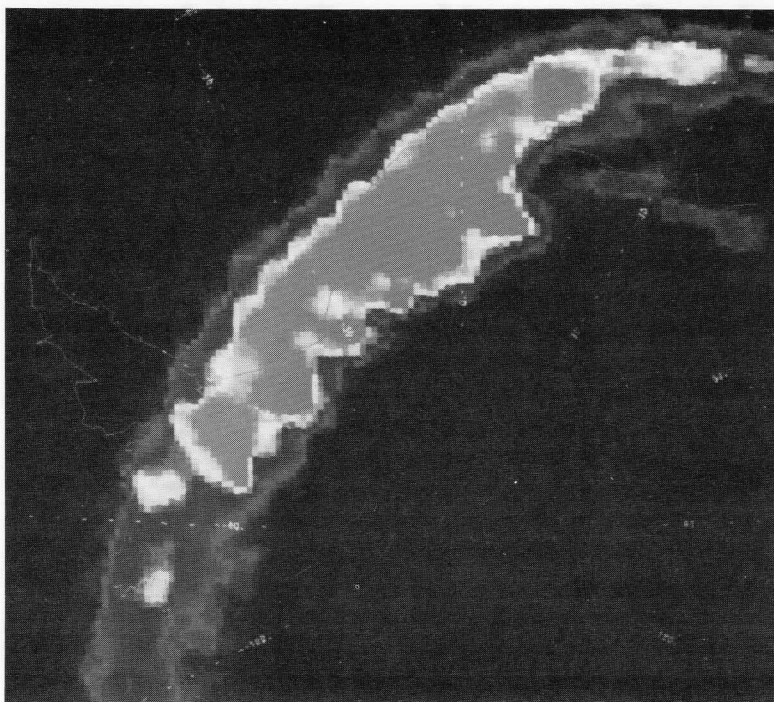
This image presents an expanded and rendered view of the specified region of active aurora produced by the CDAW 9 online graphics system.

The original images are in color.

graphic, and Mollwiede are now supported) makes this program unique. Users may choose the center point of the projection and the scale and superimpose geographic coastlines and coordinate grids with labels as desired.

Ground station locations are available as well in the X-windows version. Several color palettes are included. In addition to the raw bitmap and the pixel-by-pixel mapping, a smoothed image is available. The values at points selected by a mouse click may be saved to a file. The data sets containing the images must be in CDF format, with the image and the mapping coordinates each in an array variable.

Three platforms are currently supported. The X-windows version, using Athena, is available via anonymous FTP as a TAR formatted file. Documentation is included. The archive is located on ncgl.gsfc. nasa.gov at NSSDC in the directory ~ftp/pub/cxit/.

The Macintosh and PC versions, both in "beta" (i.e., some bugs may exist, since these programs are in progress), may be obtained from the NSSDC's Coordinated Request and User Support Office (refer to the back page for details).

Susan Kayser

New Editions of Einstein CD-ROMS Produced

The NSSDC in collaboration with the Einstein Data Center (EDC) at Harvard/Smithsonian Astrophysical Observatory, produced new editions of two Einstein CD-ROM sets. The third edition of the Catalog of IPC X-Ray Sources CD-ROM contains recomputed hardness ratios to correct for a bug in the IPC Rev-1 processing system. The Slew Survey (Version 1.1) CD-ROM incorporates changes to conform to the FITS BINTABLE standard, improvements in source detection, and additions to source identifications. The EDC premastered the CD-ROM and the NSSDC managed the production process. These CD-ROMs were distributed at the 183rd AAS meeting in January.

Cynthia Cheung

Public Access OK'd for CDAW 9 Data Base

The Coordinated Data Analysis Workshop (CDAW) Steering Committee has decided to release to the CDAW 9 data base for public access (effective December 1, 1993). Access to this data base is supported electronically using the same mechanism used in June 1993 for the older CDAW 6, 7, and 8 data bases—namely, as an option under the Space Physics menu of the NSSDC Online Data and Information Services (NODIS) no-password guest account.

The data base and system may be alternatively accessed via a demonstration "captive" account interfacing to the Space Physics Data System (SPDS) as a World Wide Web (WWW) node. The CDAW 9 data base is also available via copies of the existing CDAW 9 prototype CD-ROM that was distributed to workshop participants last year.

The CDAW program is an ongoing effort to support "large-scale" collaborative scientific research, in anticipation of the needs of NASA and international space physics flight programs of the 1990s. The most recent workshop series, CDAW 9, focused on problems of dynamic magnetospheric structure, the physics of substorms, and the study of conjugate polar phenomena. Five specific event periods in April–May 1986 during the Polar Regions Outer Magnetosphere International Study (PROMIS) data collection campaign are the basis of the data collection, which is drawn from 14 spacecraft plus ground data and 74 distinct investigations/data submitters.

Robert McGuire

Data Management and Information Services Work Is Behind NSSDC's Customer Service

If you've requested data from or sent data to NSSDC, you are probably familiar with our Coordinated Request and User Support Office (CRUSO) team. They're the ones that take your phone calls and E-mail requests for data. You may also have dealt with one of our acquisition scientists regarding technical and scientific issues. But you probably don't know the people who actually process and mail your requests or ingest and archive your data. These are staff members of NSSDC's Data Management and Information Services (DMIS) group.

Twenty-four of the 31 DMIS group members gathered in front of NSSDC for this shot. In the front row (left to right): Jordan Gottlieb, Ralph Post, Dennis Kemp, Chee-Ming Wong, Greg Bimson, Barbara Thomas, LaDonna Earl, Laurie Batchelor, and Lou Mayo (manager). Because the remaining upper rows are mixed on three steps, they're named in left to right order only: Cathy Sowa, John Bonk, Anu Pahwa, Natalie Anderson, Dave Guell, Ron Buck, Barbara Queen, Vanessa Davis, Walter Cook, Marie Dowling, James Robinson, Liz Ramey, Rodney Raney, Sharlene Rhodes, and Barbara Rowland. (Not pictured: Linda Parker, Sabrina Cook, Allison Lopez, Nelson Cheung, Tony Dunston, Tracey Ebb, and Matt Jewett.)

The DMIS group is responsible for archiving a broad spectrum of data, ingesting data into our NDADS system, restoring our space science data tapes, and filling and shipping all of your requests for tapes, CDs, floppy disks, and documentation. This group quietly operates in the background to make sure you promptly get the data you requested—yet its work is the heart of the data center. Employees in the department have worked a combined total of more than 185 person-years for the NSSDC!

The DMIS request processing group, located in Goddard's Building 28, works closely with the CRUSO team to process your requests for off-line data. The staff copies the data onto the media you need as well as reformat data to your specifications, and then they package and ship it to you. Did you request any documentation and/or software? They'll make sure it's included if you asked for it. DMIS personnel also provide walk-in assistance to requesters and the NSSDC science

staff for research on photographic media and documents.

The DMIS archive and data restoration group, also located in Building 28, is responsible for receiving, cataloging, storing, and managing the tapes and CDs as well as documents and software you send us. They currently manage more than 110,000 tapes and other data volumes stored in four physically separate locations around and within Goddard. Additionally, the archive and data restoration group is hard at work restoring old data sets onto new magnetic tape volumes. This is no easy task, since some of the data tapes are over 20 years old and have deteriorated appreciably because of oxidation, etc. To date the archive and data restoration group has restored over 622 mission science data sets from 26,967 tapes. This activity runs two shifts per day and should be completed in about a year.

Another group within the DMIS is our near-line ingest group. This team takes your data and makes them available to the research community by populating the NDADS data base. NDADS currently ingests about 15 GBytes of data per month and contains data from 20 NASA missions. As NSSDC moves toward a more online-intensive environment, the near-line ingest group is playing an important role in defining the technologies and procedures we will need.

So, the next time you request data from the NSSDC and magically receive them in the medium and format you requested or find them in our near-line system, you'll know it's not magic: it's the Data Management Information Services group.

Lou Mayo — Manager, DMIS

(See the facing for an article about Lou and a poem he wrote about Voyager.)

CDF news

Version 2.4 of the Common Data Format (CDF) library, toolkit, and documentation was released on January 31. Among the changes in this version are enhanced support for "Z-variables" and support for several new platforms. CDF V2.4 release notes detailing these and all of the other V2.4 upgrades are available from the CDF support office at cdfsupport@nssdca.gsfc.nasa.gov or (301) 286-9884.

A new CDF tool, "MakeCDF," has been developed by Rick Burley of the Space Physics Data Facility as a windows-based package that can run on all CDF-supported platforms. It is designed to enable users to dynamically create a complete CDF file, data and metadata, from almost any flat input data file, ASCII or binary. Built to support the ISTP 's data management needs, it produces CDFs adhering to ISTP CDF standards. These constrain the generality of CDF, particularly regarding metadata fields and their values. Contact Rick at burley@nssdca.gsfc. nasa.gov or (301) 286-2864 if you need to create CDFs and would like to participate in MakeCDF beta-testing.

NOAA's Space Environment Laboratory (SEL) has adopted the CDF for the management of magnetic field, energetic particle, and X-ray data from NOAA's TIROS and GOES spacecraft. The CDF-based data management will be part of the new SEL Retrieval and Analysis of Scientific (SELRAS) data system. IDL-based tools to catalog, locate, and analyze data sets in CDF are being developed at SEL under the direction of NOAA/SEL's Howard Singer.

Greg Goucher participated in a Visualization'93 panel, chaired by former NSSDC employee and key CDF creator Lloyd Treinish, on limitations of current visualization systems and directions for future development. Position statements and background information are published in the Visualization '93 meeting proceedings.

Greg Goucher

CI/NSI Workshop, April 13-15

The second annual Catalog Interoperability/NASA Science Internet Workshop will be held in April at the Doubletree Hotel in Arlington, VA. The meeting provides an international forum to advance the interconnection and interoperability of Earth and space science data and information systems.

All are invited to attend. The registration fee is $120 before March 10 and $140 thereafter. For more information and registration materials, contact Angelia Bland by telephone at (301) 441-4299, or by E-mail on Internet at BLAND@NSSDCA.GSFC.NASA.GOV.

Lou Mayo Heads DMIS Group

Louis Mayo recently joined NSSDC contractor Hughes STX as manager of the Data Management and Information Services group at NSSDC. Lou brings a mix of science, systems, management, and poetry experience to this position. He is the first published scientist in this position in NSSDC's history, which bodes well for NSSDC's support of its scientist-customers.

In addition to other past positions, Lou has supported a number of groups at Goddard over the years. He supported E. G. Stassinopoulos for several years while "Stass" was affiliated with NSSDC and was applying NSSDC-developed magnetospherically trapped particle models to spacecraft orbits. Lou supported the planetary atmospheres group in Goddard's Laboratory for Extraterrestrial Physics in the modeling and analysis, calibration, and data processing of Voyager IRIS infrared atmospheric investigations of the outer planets.

During this time, Lou studied and published findings on the thermal opacity of Titan's North Polar Hood as well as authored a number of Goddard publications describing the Voyager IRIS data. Lou also has supported a number of other space and Earth science programs, including Cassini/CIRS development and ground system alternative architecture review, Mariner 9 IRIS, Earth stratospheric balloon interferometry studies, and EOSDIS requirements analysis and ground system architecture definition.

Lou has degrees in astrophysics and in counseling/organizational effectiveness. His article on page 14 discusses the roles played by the DMIS group.

Joe King

Ode to Voyager

From fiery ball to icy worlds
sailed my hopes and dreams
To reach into the cosmic void
and grasp the stellar beams
To peer out from my covers
from the planet I call home
And challenge my greatest fear
that I may truly be alone
To know that there is order
and something larger still
To understand the limits
that are placed upon my will.

I entrusted you, my Voyager
with my most sacred of desires
To feel the pulse of the universe
and touch the celestial fires
And on you went and on and on
to worlds of swirling gas
To satellites of rock and ice
and rings of colored glass
You showed me things I'd never dreamed
existed out in space
You showed me just how special is
my planetary place.

And on you went and on and on
past clouds of red and green
You flew my eyes past amber skies
'til nothing more was seen
I'll think of you each time I chance
to gaze into the night
And wish you peace among the stars
on your visionary flight.

—Lou Mayo
Voyager IRIS Team member

When You Request Photos . . .

Photographic images are some of the most spectacular data available from NSSDC. Over the years, NSSDC has accumulated more than 100,000 images from numerous NASA missions, including the Lunar Orbiters, the Apollo missions, the Viking Orbiters at Mars, the Voyagers, the Magellan Venus mission, and others.

Upon request, photographic images are available on film or as prints made from the film to interested researchers and the general public. With the advent of digital data products, particularly CD-ROMs, NSSDC receives fewer requests than before from the research community for analog photographic data. However, the general public continues to ask us for images—usually photos that appeared in popular astronomical literature.

It is often challenging for NSSDC to satisfy these photographic requests because of multiple existing identification numbering systems. While NSSDC uses a uniform system for assigning identification numbers to our imagery data sets (as well as all other data sets), we do not assign one number to each individual image. Our image data sets come to us from a variety of sources, each of whom has its own convention for identifying each frame within data sets. Some imagery data sets travel from one NASA organization to another before coming to us for archiving. Therefore, it is conceivable that an image may have multiple identification numbers from NASA Headquarters, US Geological Survey, the spaceflight project office, and others who may have been involved.

Given this multiplicity of image ID schemes and the broad spectrum of requesters asking for images, NSSDC needs your help in identifying the exact frame you'd like to have. Here's what we need to know from you:

- your full name, address, telephone number (and your E-mail address, if available)
- NASA mission name
- any photographic identification or frame number; if you don't have an identification/frame number, please ask for one from the publisher of the magazine or author of the article where you saw it
- a copy, if possible, of the identified image (if the photograph is indeed available from the NSSDC, we will be able to retrieve it using the mission name and frame numbers)
- deadline date, if any
- desired format for the images:
      black and white, or color?
      film (positives or negatives)?
      paper (glossy or matte)?
- size
- whether or not you need a data block
- intended use of the images:
      publication?
      scientific research?
      education?

When we have compiled all necessary information to research the availability of the photographic images, we will conduct a search of our archive. If we have the images, we will contact you with a price quote, and if you approve, the request will be sent to the photo laboratory, where it will be processed and shipped when ready.

After your request is completed, it is checked by a technician and by quality control personnel before we ship it to you. If you are not satisfied with any photographic products you have requested, the photographic laboratory would like to know. Our photo lab strives to provide its customers with the best quality photographic imagery available to the scientific and educational communities as well as to the general public.

If you have questions, requests, or comments regarding NSSDC's analog imagery, please contact our Coordinated Request and User Support Office (refer to the box above for details).

Karinn Eckhardt
Robert Tice

Here's How To Get NSSDC Data or 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
  NSSDC, Code 633
  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 online-services (NODIS), log on:**

  TELNET:　　　　128.183.36.23
  Username:　　　　NODIS

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