NSSDC
NATIONAL SPACE SCIENCE DATA CENTER

NEWS

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Workshop Focuses on CD-ROM Generation and Use

A CD-ROM (Compact Disk-Read Only Memory) optical disk workshop, sponsored by and held at NSSDC June 19-20, was attended by 50 scientists and technologists. The purpose of the workshop was to review the lessons learned from generating CD-ROMs in the NASA environment and to discuss the guidelines for use of the NSSDC CD-ROM premastering workstation by the NASA community.

The workshop included discussions of the two CD-ROMs premastered at NSSDC. Lee Brotzman (ADC-GSFC) spoke about one of these CD-ROMs, which holds 31 of the Astronomical Data Center's most frequently requested astronomical source catalogs. The other holds Comet Giacobini-Zinner data collected both in situ by the International Cometary Explorer spacecraft and remotely under the auspices of the International Halley Watch. It was discussed by Ed Grayzeck (NSSDC-GSFC), Archie Warnock (IHW-GSFC), and Mikael Aronsson (IHW-JPL).

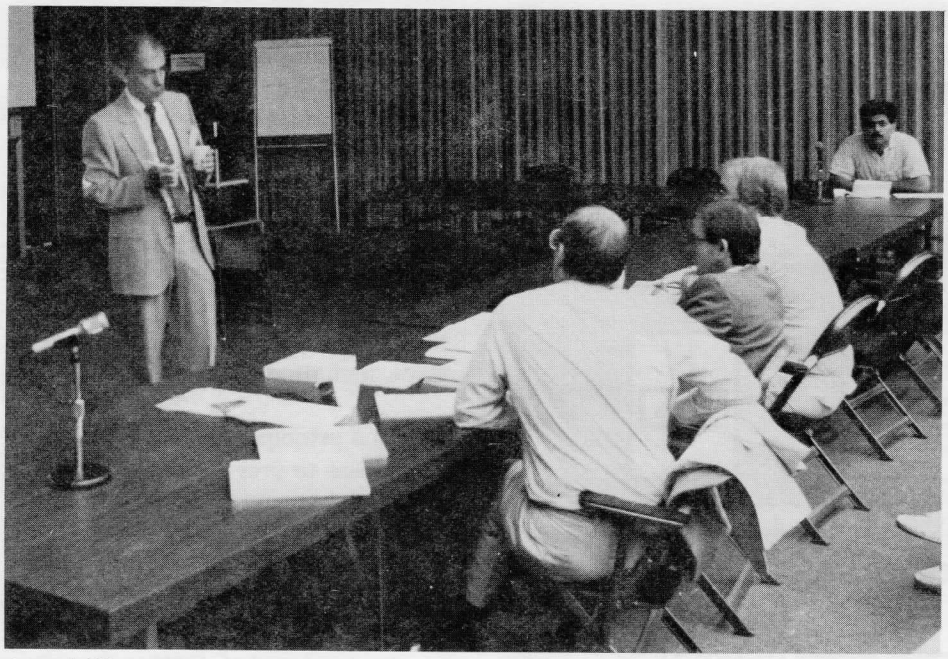


Photo by Jay Friedlander

Joseph King addresses participants at the CD-ROM workshop.

Other discussions focused on CDs that contain Voyager image data from the JPL Planetary Data System (Randy Davis/PDS-U. Colorado), Nimbus 7 CZCS West Coast Time Series data from the NASA Ocean Data System (Chris Finch/NODS-JPL), and the Space Telescope Guide Star Catalog (Helmut Jenkner and Robert Hanisch/STScI).

The progress of CD-ROM technology and usage is, in large part, a result of

see CD-ROM, *p. 4*

IN THIS ISSUE

Integration Begins for Data Base Management and User Interface Components of Astrophysics Data System

Since the two Astrophysics Data System (ADS) workshops held in August and November of 1987, NSSDC and the other ADS nodes have made great progress toward fully defining and implementing the first phase of the ADS: the establishment of the Astrophysics Data System Directory Service (ADS-DS).

Through the use of rapid prototyping, several key pieces in the system's architecture– the underlying data base management and user interface– have been tested and are in the process of integration.

The ADS-DS is the first tool required for the ADS to function. This tool will help astronomers locate and order astrophysical data. They will then be able to determine the data's relevance to specific research projects.

The basic purpose of the ADS-DS is to transform inquiries that are entered in a generalized scientific form into detailed requests for specific observations and data products. Other tools will also be provided by the ADS to aid in analysis and interpretation of observations and data products.

Noncentralization of data is paramount to the ADS design. This method allows the data to reside at sites of related expertise, where the data can be understood and used. Locating and correlating this information or data is the job of the ADS-DS.

Two primary goals of the ADS are to effectively coordinate multimission data sets and to foster multispectral research. Therefore, the ADS is making data archives more accessible, in both acquisition and interpretation, to the astronomical community.

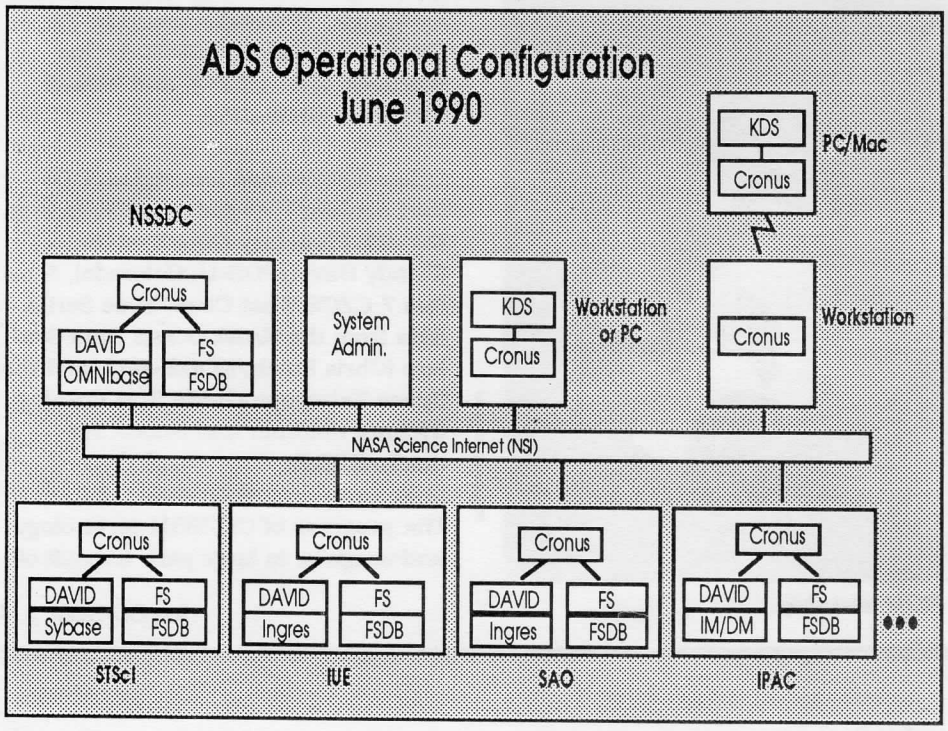
The design of the Astrophysics Data System is a response to the anticipated increase in data volume and complexity as well as the growth in the data management and computational requirements for interpreting these data. The ADS-DS is crucial to the structure and function of the overall ADS, as its initial information locator.

NSSDC is one of six primary nodes in the Astrophysics Data System. The other nodes are the Infrared Astronomical Satellite Infrared Processing and Analysis Center, the International Ultraviolet Explorer Regional Data Analysis Centers (with two facilities, at Goddard Space Flight Center and the University of Colorado), the Smithsonian Astrophysical Observatory, and the Space Telescope Science Institute.

NSSDC will support the ADS in many ways, including the following:

- As a principal center, providing access to over 400 machine-readable source catalogs at the Astronomical Data Center and archived data for several astronomical missions.
- As developer of DAVID (Distributed Access View Integrated Database), the underlying heterogenous distributed data base system.
- As one network gateway into the ADS for users on Internet, SPAN/HEPNET, Telenet, and modems

see Astrophysics, *p. 12*



The typical astronomer would gain access to the ADS via the Knowledge Dictionary Service (KDS) user interface. Access to all of the ADS nodes is through the NASA Science Internet (NSI) and the Cronus online transaction processing service. Users may search the online text documentation in the Factor Space Data Base (FSDB) for useful information using the Factor Space (FS) component of the ADS-DS. DAVID is used to query the traditional data bases.

New Book Surveys Ionospheric Data

The new guidebook *The Worldwide Ionospheric Data Base* is a first step toward an ionospheric data directory within the framework of NSSDC's Master Directory. This central document has recently been published by NSSDC as publication no. 89-03.

About 100 pages in length, the document surveys and describes the different sources of information about the ionosphere, including ground-based, satellite, and rocket data; empirical and theoretical models; journals; books; and prediction services. It explains how and from where the data, software codes, and information materials can be obtained.

The book is intended for anybody, novice or expert, who needs information about the ionospheric plasma. It pulls together all the strings that lead to the worldwide ionospheric data banks. Data holdings explained in this document include the satellite data base of NSSDC, the ionosonde data base of the National Geophysical Data Center (NGDC)/World Data Center A for Solar-Terrestrial Physics (WDC-A-STP) and the other WDCs, the incoherent scatter data base of the National Center for Atmospheric Research (NCAR), and many more. Several figures, tables, and listings help to locate measurements of a particular parameter for a particular time and location.

The book begins with a general introduction to the ionosphere and to measurement techniques used in monitoring the ionospheric plasma. The introduction is followed by chapters on ground-based measurements (ionosonde, incoherent scatter, absorption) and on spacecraft measurements (beacon, in situ, topside sounder, rockets). The reader is informed about the temporal and spatial resolution of different data holdings, storage media, and accessibility via computer networks.

Numerous tables and figures summarize the global and temporal extent of the different data bases. One figure shows the altitude ranges and time periods for which data are available from ionospheric sets. Information about all satellites that measured ionospheric parameters is contained in a 30-page listing of orbit characteristics, experiments, and available data sets. World maps show the locations of all ionosonde stations and of the new network of automated ionosondes (digisonde).

A chapter discussing data set comparisons and their compatibility assists readers in evaluating the reliability and dependability of different instruments and experiments.

The document also discusses the state of art in modeling the ionosphere. (Empirical models can help in first-order assessments of ionospheric effects and influences, while theoretical modeling can assist in extrapolating ionospheric parameters to regions and times not covered by the worldwide data holdings.)

The book lists the most advanced empirical models and theoretical simulations of the ionosphere, atmosphere, and magnetosphere. Software packages related to these models are named in a discipline-oriented listing of computer programs (and indices) for solar-terrestrial physics.

Expressions of interest in similar documents for other disciplines are invited.

Dieter Bilitza

Letter to the Editors

Dear Editors:

NSSDC News is quite informative and illustrative for obtaining information on NASA activities. But certainly some queries will remain in the reader's mind for almost each issue published, for which a user's column would . . . become helpful as a regular feature . . . .

An example given here regarding the inquiry columns of *NSSDC News* (Vol. 4, Nos. 3/4, Fall/Winter 1988) may clarify the points. In page 7, a list of the data sets available from NASA's Climate Data System is given. Subjectwise, I am more interested in knowing the details of NOAA Heat Budget from SR on NOAA 2, 3, 4, and 5, and AVHRR on NOAA 6, 7, 9, and 10 as well as Seasat Altimeter Gridded Elevation Data (p. 10). In addition, I am also interested in knowing the pioneering activities currently going on in these fields using the above mentioned data sets as well as whether any application activities have been taken up by NASA Scientists for detailed studies over the Indian Subcontinent. Also, whether joint studies are possible in a particular field as given above and if so, then whom to contact. Probably, an inquiry column [would] help in achieving my interest as a user . . . .

T. J. Majumdar
Space Applications Centre
Ahmedabad, India

Thank you for your interest in and comments about our newsletter. All readers are encouraged to respond to articles in this publication.

NSSDC issues data catalogs, builds online information systems, and provides a user support office through which potential users can learn more about specific data sets. Periodically, NSSDC News *describes individual data sets of special interest. However, the newsletter is not intended to discuss scientific research activities that are more appropriately reported in scientific journals. —Ed.*

Photo by Jay Friedlander

CD-ROM workshop participants, from left to right. Front row: Don Sawyer, Ed Hurley, Young Woon Kang, Al Schultz, Pat Guimaraes, Ann Raugh, Ian Jordan, Jim DeYoung, Sharlene Rhodes, Ed Grayzeck, Carolyn Ng, Helmut Jenkner. Middle row: Randy Davis, Lee Brotzman, Mikael Aronsson, Uri Carsenty, Tony Ferro, Barbara Lowrey, Bob Norton, Archie Warnock, Mike Martin, Sumant Krishnaswamy, Doug Caprette. Back row: Ed Esfandiari, Rich McPeters, Mike Prather, Mal Niedner, Mike A'Hearn, Dan Klinglesmith, Dana Swift, Jerry McFaul, Chris Finch, Joe King, Gary Gregorich, Ron Blitstein.

CD-ROM, *from p. 1*

the availability of a standard (ISO-9660) for file organization on the disks, as well as underlying physical standards. A key feature of the workshop was to propose and discuss higher level standards in order to further promote the management and usability of data on CDs. These standards include structures of volume identifiers and types, contents, and labeling of data and metadata files.

At the conference, Jerry McFaul (USGS), Mike Martin (JPL), and Don Sawyer (NSSDC) discussed the CD-ROM environment and higher level standards; Archie Warnock (IHW-GSFC) discussed data compression and decompression; and Dan Klinglesmith (IHW-GSFC) provided a summary wrap-up. In addition, demonstrations of various disks, on various computers (IBM PC/AT, Apple Macintosh II, 386 machine), were provided during the closing hours of the workshop.

Some of the focal points of the discussions included ASCII vs. binary coding, attribution of CDs to persons for journal referencing purposes, assignment of Library of Congress numbers (or equivalent) to disks, disk distribution mechanisms, emplacement by NSSDC of an open-ended contract with a vendor to create the disks from the media (presently reel tapes only) output by the premastering workstation, and quality assurance of disks.

With the premastering workstation at NSSDC and the expectation that this workstation will be used by various groups throughout NASA, the Data Center is in a position to set reasonable requirements involving higher level standards. A document outlining an initial specification of these standards should be issued shortly.

NSSDC has been receiving requests for disks from many amateurs and PC buffs. The use of disks is increasing in educational circles, even down to the junior high school level.

Joseph King

New System Aids ROSAT Planning

NSSDC's Jeanne Behnke and Carey Noll have been working as part of a team to develop the ROSAT Science Data Center (RSDC) Mission Information and Planning System (MIPS). Since 1985, the group has been designing, writing, and implementing data entry software for entering proposal information into a ROSAT mission planning data base.

ROSAT, an X-ray satellite, will first carry out a six-month, all-sky survey and will then execute a program of pointed observations for the duration of the mission. The purpose of MIPS is to assist scientists in preparing ROSAT proposals for the pointed observation period in response to the NASA Research Announcement of Opportunity (AO).

During the first ROSAT AO period of March 15 though May 15 this year, 151 users logged into the ROSAT MIPS. They accessed MIPS a total of 3100 times during this period. The MIPS staff responded to many questions about both the system and proposal preparation. A users' guide was written to provide assistance.

Proposal target information forms were included originally in the ROSAT AO for submission along with the actual ROSAT proposals. These forms (which were developed by the ROSAT International Committee for use by the United States, West Germany, and the United Kingdom) included space for investigator address, proposal title, category, abstract, and target information.

On May 18, the MIPS staff received copies of 354 ROSAT proposals and completed entering the required information into the data base by May 25. Reports based on the proposal information (i.e., lists of investigators organized by category for use in selecting a review panel chair) were then generated from the data base for NASA Headquarters and the U.S. ROSAT Review Committee.

Of 354 proposals entered in the data base, 1527 targets were proposed for examination during the first six-month pointing phase. This represents an oversubscription of about three to one for the available pointing on ROSAT.

In July, the U.S. ROSAT Review Committee assembled to select the proposals for ROSAT pointing sessions. The MIPS staff assisted this effort by providing relevant online ROSAT proposal information to the review committee such as reports of target conflicts and exposure times.

Following the proposal selection, the targets were put into the ROSAT Observation Request (ROR) format and submitted to the ROSAT International Committee. This committee will review the proposals and meet in September to finalize its decisions. The approved RORs from the United States, West Germany, and the United Kingdom will be assembled into the target plan for the pointing session.

After the initial pointing session, observations will be sent to the RSDC, where they will be processed into standard ROSAT data products by a VAX 8820 at Goddard Space Flight Center. Next, the observations will be matched with the proposals in the Mission Planning proposal data base, and the data will be sent to investigators. Plans are being prepared for the eventual archive of the ROSAT standard data products at NSSDC.

Jeanne Behnke and Douglas Bennett

Compact IUE Subset Offers Preview

The Uniform Low Dispersion Archive (ULDA) is a compacted subset of the International Ultraviolet Explorer (IUE) archive that is accessible via SPAN from within the captive NODIS account (SET HOST NSSDCA; USERNAME = NSSDC). Its purpose is to allow people to capture and view these data at their home node to see if their research criteria would be met before requesting the complete spectral image. This option is intended to offer a "quick-look" at selected data.

NSSDC is the United States host for users within the U.S. and is also a temporary host to astronomers in other countries that do not have an established national site. NSSDC runs ULDA version 2.0, which contains 37,236 low resolution spectra taken before January 1, 1987. These images were not reprocessed with the latest version of IUE-SIPS (Spectral Image Processing System), but some corrections have been applied.

ULDA users do not need the IUE/ULDA coordinator to intercede to access the data or search routines. Even first-time users may register a unique ID without prior approval.

Through a series of search and save file menus, users can initiate a new search for data or recover a previous file that may not have been successfully downlinked to their node. The search menus start with a specific search target and regress to a wider, more general search window with each new menu display. A "?" in any search display may yield examples and/or clarification of what is expected within that particular panel.

To view the images selected, the user's institute needs to have a copy of a program called UNSPL on its computer to unscramble the compacted files retrieved by the user. The UNSPL program and ULDA User's Guide are available by contacting the NSSDC ULDA manager at (301) 286-2899 or via SPAN at NCF::ULDA.

Charleen Perry

New Publications Are Available From NSSDC

Since last summer's edition of *NSSDC News* (Vol. 4, No. 2), the Data Center has published these documents:

Refereed Publications

"Striated Spectral Activity in Jovian and Saturnian Radio Emission," J.R. Thieman, J.K. Alexander, T.A. Arias, and D.H. Staelin, *Journal of Geophysics Research*, vol. 93, no. A9, pp. 9597-9605, September 1, 1988.

"The Second Generation Intelligent User Interface for the Crustal Dynamics Data Information System," N.M. Short, Jr., and S.L. Wattawa, *Telematics and Informatics*, vol. 5, no. 3, pp. 253-268, December 1988.

"Automated Cataloging and Characterization of Space-Derived Data," W.J. Campbell, L. Roelofs, and M. Goldberg, *Telematics and Informatics*, vol. 5, no. 3, pp. 279-288, December 1988.

"The Advice Taker/Inquirer, a System for High-Level Acquisition of Expert Knowledge," R.F. Cromp, *Telematics and Informatics*, vol. 5, no. 3, pp. 297-312, December 1988.

"Adding Intelligence to Scientific Data Management," W.J. Campbell, N.M. Short, Jr., and L.A. Treinish, *Computers in Physics*, vol. 3, no. 3, May/June 1989.

"An Interactive, Discipline-Independent Data Visualization System," L.A. Treinish, *Computers in Physics*, vol. 3, no. 4, July 1989.

"Interplanetary Energetic Ions and Polar Radio Wave Absorption," T.P. Armstrong, C.M. Laird, D. Venkatesan, S. Krishnaswamy, and T.J. Rosenberg, *Journal of Geophysics Research*, vol. 94, no. 4A, pp. 3543-3554, April 1989.

"Ionospheric Mapping—An Update of foF2 Coefficients," C. Rush, M. Fox, D. Bilitza, K. Davies, L. McNamara, F. Stewart, and M. Pokempner, *Telecommunications Journal*, vol. 56, no. 3, pp. 179-182, March 1989.

Proceedings of Conferences

"Climate Data System Supports FIRE," L.M. Olsen, D. Iascone, and M.G. Reph, *Proceedings of the FIRE Science Team Workshop*, Vail, Colorado, July 1988.

"Observational Data for Atmospheric Ozone Research at NASA's National Space Science Data Center," K. Klenk, P.K. Bhartia, L. Olsen, and C. Ng, International Ozone Symposium, Goettingen, West Germany, August 1988.

"Discipline-Independent Data Visualization—An Overview," L.A. Treinish, SIGGRAPH '88, Course #19: Visualization Techniques in the Physical Sciences, August 1988.

"An Information and Data Management System for Land Science, the Pilot Land Data System," R. Dorsey and B. Meeson, *Proceedings of the International Geographic Information Systems (IGIS) Symposium*, March 1989.

"Generic Data Visualization Issues," L.A. Treinish, National Computer Graphics Association 1989 Scientific Visualization Track, April 1989.

"The Utilization of Neural Nets in Populating an Object-Oriented Database," W.J. Campbell, S.E. Hill, and R.F. Cromp, *1989 Goddard Conference on Space Applications of Artificial Intelligence*, NASA Conference Publication 3033, May 1989.

"An Intelligent User Interface for Browsing Satellite Data Catalogs," R.F. Cromp and S. Crook, *1989 Goddard Conference on Space Applications of Artificial Intelligence*, NASA Conference Publication 3033, May 1989.

"Development of an Intelligent Interface for Adding Spatial Objects to a Knowledge-Based Geographic Information System," W.J. Campbell and C. Goettsche, *1989 Goddard Conference on Space Applications of Artificial Intelligence*, NASA Conference Publication 3033, May 1989.

"The Pilot Land Data System Providing Access to the National Aeronautical and Space Administration's Land Science Data," B.W. Meeson, R. Dorsey, and S. Wharton, *28th International Geological Congress Abstracts*, vol. 2, July 1989.

Miscellaneous Publications

Results from Alouette 1, Explorer 20, Alouette 2, and Explorer 31, J.E. Jackson, NSSDC 88-10, July 1988.

Directory Interchange Format Manual, Version 1.0, NSSDC 88-19, July 13, 1988.

NSSDC CDF Implementer's Guide (DEC VAX/VMS), Version 1.1, M.L. Gough, G.W. Goucher, and L.A. Treinish, NSSDC 89-17, August 1988.

SOAR Users Guide, Version 3.0, N. Vaidya and B. Lowrey, NSSDC 88-18, August 1988.

The National Space Science Data Center, NSSDC 88-26, November 1988.

The Worldwide Ionospheric Data Base, D. Bilitza, NSSDC 89-03, April 1989.

Crustal Dynamics Project: Catalogue of Site Information, Crustal Dynamics Staff, May 1989.

NASA's Climate Data System Primer, Version 1.2, J.W. Closs, M.G. Reph, and L. Olsen, NSSDC 89-07, May 1989.

Interplanetary Medium Data Book—Supplement 4, 1985-1988, J.H. King, NSSDC 89-17, September, 1989.

Space Physics Analysis Network Node Directory (The Yellow Pages), 4th edition, D.J. Peters, P.L. Sisson, J.L. Green, and V.L. Thomas, NSSDC 89-14, August 1989.

NCDS Strives To Make Important Climate Data Available

"The questions we hear most often from users are 'Do you have these data?' or 'How can I use NCDS to obtain these data?'" says project head Lola Olsen. "If we're not being asked those two things more than anything else, then it could be an indication that emphasis is being placed on the system instead of on the science."

Whatever the climate, the NASA Climate Data System (NCDS) staff strives to provide a system for locating, accessing, manipulating, and displaying world climate data that is of interest to its NASA-funded research community.

The broad focus of NCDS is on atmospheric constituent data, radiation and cloud data, general climatologies and oceanographic data, and solar irradiance data. The system allows researchers to log on remotely from all over the world. To help users become familiar with NCDS, the project recently published *NASA's Climate Data System Primer (Version 1.2)*, which offers a sample session for acquiring data as well as the essential facts for successfully operating within the system. (Scientists may contact the Support Office staff at 301-286-3209 during office hours or through SPAN electronic mail at NCF::NCDSUSO to request a copy of this document.)

How the System Works

NCDS currently uses two VAX computers (11/780 and 8650) running VMS operating systems. Oracle software manages data bases, and the Template software package is used to generate required graphics. For data manipulation, the Interactive Data Language (IDL) is used, and the Transportable Applications Executive (TAE) software handles the user interface. Another software package was developed at NSSDC by Mike Gough and Lloyd Treinish so that all incoming data could be consistently classified and formatted; this important software structure is referred to as the Common Data Format (CDF).

When a new version of any one of these software components is released, the changes can have a significant impact on the rest of the system. NCDS personnel meticulously test, evaluate, and coordinate update installations and their resulting modifications so that users are inconvenienced as little as possible.

For data sets to become part of NCDS, they are first identified for user interest and utility. Then they are brought into NSSDC/NCDS, archived, and later converted to CDF so that they can be used by NCDS.

According to Olsen, "The producers of the original data sets are the best judges of our work because they understand what they expect to see and know if we have properly interpreted their data. These producers are interested in the entire process of seeing their data cataloged, inventoried, accessed, and plotted. It's gratifying to meet with them and show them what we have done. They see how their data sets fit in with the others."

In the Beginning . . .

NCDS began in 1982 as the Pilot Climate Data System, which offered an initial catalog, an inventory, and data accessibility. The following year brought data manipulation utilities and graphics tools that improved the system's functionality.

During the next few years support activities expanded so that, by 1986, a transition was planned: "Pilot" data system development was phased out as the "operational" research support phase took over. Last year the cli-

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Photo by Jay Friedlander

NCDS staff, from left to right. Front: Joe Brown, Lola Olsen, David Lee. Back: James Closs, Hank Griffioen, John Vanderpool, Elizabeth Ramey, Ke-Jun Sun, Fred Tajalli.

continued from previous page
mate system dropped its "pilot" designation and officially became NCDS. The system has shifted its main focus from computer system development to its ultimate objective— that of accessing climate data.

NCDS continues to test ideas for improving the system, while continuing support for specific science user groups and projects including universities, NASA, NASA-supported researchers, the International Satellite Cloud Climatology Project (ISSCP), and the First ISCCP Regional Experiment (FIRE).

Meet the Staff

Lola Olsen is the NCDS senior scientist and NSSDC/SAR task leader for the project. She had her head in the clouds when she became interested in the atmosphere: as an airplane pilot, Olsen was intrigued with climate science. Over three years ago, she came to NSSDC after a teaching career at the University of North Carolina in Charlotte. She holds a B.S. in biology and an M.A. in geography, and she has continued her studies toward a Ph.D. in climatology. Olsen envisioned the existence of a system such as NCDS while contemplating a dissertation topic.

David Lee came to NCDS with a background in meteorology and oceanography. He has almost 10 years' experience in climate data set production, including many of the Nimbus satellite data sets (such as the Ozone-S and Gridded TOMS sets). Lee implements data sets into the project's Common Data Format. His recent implementations include ISCCP-C1, ISCCP-TOVS, and ERBE-S4.

Elizabeth Ramey joined NCDS in January 1985, after two years as the tape librarian and coordinator of requests for the Visible and Infrared Spin-Scan Radiometer (VISSR) and the Off-line Data Ingest System (ODIS) projects. Ramey is responsible for maintaining the NCDS tape library, which entails receiving, labeling, and filing NCDS data tapes. She updates the archive and inventory data bases and fills all incoming data requests.

The challenges of keeping all the parts of such a complex system operating present a real opportunity.

With B.S. and M.S. degrees in computer science, Ke-Jun Sun is responsible for the implementation of FIRE data sets. He has recently completed the implementation of four such data sets. When not providing support for FIRE, Sun assists in the implementation of other NCDS data sets.

James Closs is primarily responsible for NCDS user support services. He is sometimes the first point of contact for researchers interested in the system and has been with the project for almost three years. Besides assisting NCDS users and giving demonstrations, Closs is involved in implementation of data sets, enhancement of the user interface, and management of project computer accounts.

A graduate of the University of Maryland in computer science, John Vanderpool came to NCDS as part of an experiment to support the oceans group at Goddard. The experiment has been extremely successful. Presently, Vanderpool is also helping with configuration control. Before coming to NCDS, he spent two years at Goddard preparing the raw Earth Radiation Budget Experiment (ERBE) data, which is sent to Langley Research Center for further processing. Now he sees the data again in a further processed state, after their return to Goddard from Langley.

Hank Griffioen holds a B.S. in computer science and joined NCDS in January 1989. He previously worked as a programmer and lab technician for the University of Maryland's Horn Point Laboratory, where he also served as a summer intern in the Physical Oceanography Department. He has recently ingested several data sets for NCDS, such as the Levitus Mixed Layer Depth and the Hellerman Wind Stress sets. Griffioen maintains the inventory systems and aids users in accessing data through the system.

Joseph Brown recently joined the project after serving on the operations staff of NSSDC. His energetic contributions in many areas include his present work as a liaison between the operations staff and the science support group.

Fred Tajalli is the newest NCDS staff member. He is knowledgeable in creating scientific software systems and designing and developing data base management system software. Tajalli hopes to combine his past experience to meet the project's present needs for system enhancements and possible redesign.

Steady Increases Projected

NCDS's forecast calls for more available data (both on and off line), more users, more use of optical disks, and a new CDF design for more operating systems. Olsen remarks that "the challenges of keeping all the parts of such a complex system operating present a real opportunity."

While the system presently offers more than 40 data sets on line and off line (over 500 gigabytes total), users can expect to see these numbers steadily rise. The goal for NCDS will remain the same: to bring into the system as much useful data as possible, so that this vital information can be reliably and easily distributed to the worldwide scientific community.

Carol Kanga

Southwest Data Display and Archival System Offers Easy Accessibility

Several approaches to data management and utilization, developed and implemented at sites throughout the space and earth science community, are of potential interest to scientists beyond those sites. This article is the first in a series discussing those approaches. Developers of similar widely accessible systems are invited to contact the editors of this newsletter about including descriptions of their systems in future issues.—Ed.

Background

After collecting a large amount of data from the particle instruments on board the Dynamics Explorer (DE) spacecraft, it became apparent to the scientists faced with the analysis of these data that a new approach to routine data analysis and display was necessary: a stable, easy-to-access archive of the data—something that was missing from the days of searching through tapes. There was a need to be able to browse catalogs of data as well as to browse the actual data.

Experiences from previous missions had highlighted the undesirable traits to avoid: numerous special purpose programs (sometimes poorly understood) needed for analysis, the inability to show another scientist the exact data plot from which one worked, and inadequate computer performance. By divorcing the conceptual design of this system from the more orthodox approaches, it became possible to produce a flexible system based upon an "open" operating system (UNIX) and cost effective workstation hardware.

After making a large portion of the science data from the DE High Altitude Plasma Instrument (HAPI) and Low Altitude Plasma Instrument (LAPI) equipment accessible through this system, it became apparent that a broader service could be provided to the scientific community. This system has proven to be a valuable testbed from which to derive a kernel of clear requirements and design objectives to support future missions, particularly the Upper Atmosphere Research Satellite (UARS) and Tethered Satellite System (TSS).

The original design goals behind the Southwest Data Display and Archival System (SDDAS) were threefold:

- Provide color graphics displays of the data without writing programs.
- Provide multi-instrument and multispacecraft data comparison and analysis.
- Make the archive accessible without human intervention.

These goals were achieved in the first release of the SDDAS. The design of the system has been expanded to encompass these additional goals:

- Provide remote services over available networks and through the NASA Master Directory at NSSDC.
- Provide electronic data distribution for small subsets of the HAPI, LAPI, and Orbit/Attitude (OA) data.
- Establish a pool of supported graphics display devices to make the system useful to as much of the scientific community as possible.

Underlying all of these goals are the general precepts of utilizing recognized standards (Transmission Control Protocol/Internet Protocol, or TCP/IP, for example) whenever possible and using as many "off-the-shelf" building blocks as feasible. The SDDAS as described here incorporates the second set of goals, hence it is labeled release 2.0 of the software. The next phase of development, which will achieve greater portability and support a distributed computing environment, is now in progress.

Technical Overview

The server host is a Masscomp MC500 computer running UNIX,

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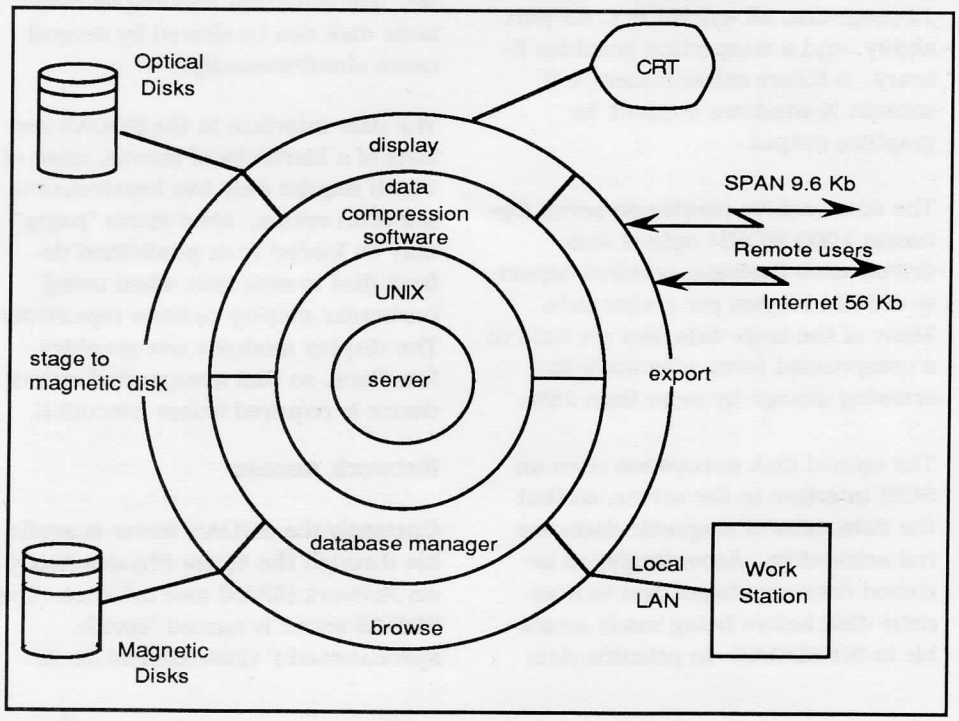

NEWSBRIEFS-NEWSBR

SPAN Hosts First Worldwide DECnet Internet Meeting

The management of the Space Physics Analysis Network (SPAN) recently convened and hosted the first meeting of representatives from DECnet networks that make up the worldwide DECnet Internet. The meeting was hosted by European Space Agency (ESA) SPAN Management at the European Space Research Institute (ESRIN), located in Frascati, Italy, a suburb of Rome.

Representatives attended from each of the four largest DECnet networks, which form the core of the DECnet Internet: US-SPAN was represented by GSFC; European SPAN, by European Space Operations Centre (ESOC); US-HEPNET, by Fermi National Accelerator Laboratory (FNAL); and European-HEPNET, by the European Organization for Nuclear Research (CERN).

The theme of the meeting was "Keeping the World DECnet Internet Functioning through Cooperation." Issues discussed included the current DECnet Internet architecture, internetwork traffic routing, distribution and allocation of DECnet area numbers, network security procedures and policies, future expansion, and further interconnections between the constituent networks.

A charter for the group was discussed and agreed upon along with a number of resolutions covering a range of DECnet Internet topics. The newly named "HEP-SPAN DECnet Coordination Group" will hold its next meeting sometime late this year in the United States.

David Peters and James Green

GGS/ISTP Data Committee Meets To Discuss Data Media and Formats

At a meeting of the Global Geoscience System/ISTP Data Committee on July 17, NSSDC personnel contributed significantly to ongoing planning activities in the areas of data media and data formats.

A presentation by Dr. Robert McGuire (NSSDC) addressed various formatting options and urged that GGS/ISTP

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which is scheduled to be upgraded to a Sun SPARCserver 330 this September. The SDDAS software consists of 12 programs, all written in C for portability, and a supporting graphics library. A future enhancement will contain X-windows support for graphics output.

The data archive resides on seven Optimem 1000 WORM optical disk drives, each having a nominal capacity of 1024 Mbytes per platter side. Many of the large data files are held in a compressed form, effectively increasing storage by more than 25%.

The optical disk subsystem uses an SCSI interface to the server, so that the data rates of magnetic disks are not achievable. Accordingly, all archived data are staged first to magnetic disk before being made available to the SDDAS. In practice, data staging is done as a "background" process so that the next data set is brought to the high speed disk while analysis proceeds on another data set. The data files residing on magnetic disk can be shared by several users simultaneously.

The user interface to the SDDAS consists of a hierarchy of menus, most of which require only two keystrokes to select an option. Most menu "pages" may be loaded from predefined default files to save time when using particular display options repeatedly. The display modules use graphics functions, so that a supported output device is required before execution.

Network Access

Currently the SDDAS server is available through the Space Physics Analysis Network (SPAN) and Internet. The SDDAS server is named "swride.space.swri.edu" (129.162.150.3). Access is also available transparently through the NSSDC Master Directory.

Interoperability with the NSSDC Master Directory was a crucial milestone because it is the starting point for many space science data requests. A "pseudo" TELNET interface that does not require a username or password was developed to provide the same degree of transparency as the more common DECnet interface. Much of the testing credit goes to NSSDC's Jim Thieman and Prem Ramamurthy. This effort illustrates that voluntary cooperation between SwRI and NSSDC can synergistically produce new tools for space scientists.

To request a user's guide, contact David Winningham via SPAN at SWRI::DAVID or via Internet at david@pemrac.space.swri.edu.

Richard Murphy

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adopt, as a first step, the use of Standard Formatted Data Units (SFDU) that have been evolved by the International Consultative Committee on Space Data Systems. The recommendation was accepted by ISTP's data committee and the full ISTP Science Working Team.

NSSDC is working with the data committee and GGS/ISTP scientists, the project, and the Central Data Handling Facility/Data Distribution Facility design teams to help define details of an SFDU implementation to meet GGS/ISTP data management requirements. Additional recommendations and possible approaches to definition of a "common format" for higher-level GGS/ISTP data products, such as key parameters, were also presented and discussed.

A subgroup was established to identify products (from both experimenters and theorists/modelers) that should be generated and made available to the general ISTP community and products that should be archived for long-term preservation and accessibility. NSSDC's Dr. Joseph King was asked to chair this committee.

Robert McGuire, Donald Sawyer, and Joseph King

First Meeting of Combined Networking Groups Scheduled for November

The Data Systems Users Working Group (DSUWG), which is SPAN's users group, is undergoing a major transformation. Because there is a large overlap of SPAN and NASA Science Network (NSN) users, the two user groups made the decision to combine into one NASA Science Internet (NSI) Users Working Group. This new group, which is still too new to have a formal name, will hold its first meeting November 13-15 at Goddard. The meeting will convene in lieu of the DSUWG meeting that would have been at that time. SPAN and NSN scientists and developers are urged to attend this meeting.

Valerie Thomas

SFDU Workshop Participants Reach Consensus

NSSDC participated in the Consultative Committee for Space Data Systems Panel 2 international workshop, held on May 8-12 at Space Station facilities in Reston, VA, to further the development of the Standard Formatted Data Unit (SFDU) approach to space information interchange.

From five countries and the European Space Agency (ESA), 29 participants attended the workshop. The keynote speaker was Ray Arnold, chief of the communications division at NASA Headquarters. The NASA delegation, headed by NSSDC's Don Sawyer, consisted of seven members from GSFC and five from JPL. The meeting was chaired by Manfred Drexler (DLR), and the subpanel chairs were Don Sawyer, Fred Billingsley (JPL), and Mike Jones (ESA).

A consensus was reached on a wide range of issues, the major result of which was the expectation of the following three new recommendations for formal review by the participating agencies within the next six months: *Control Authority Procedures* — services provided in the registration and dissemination of data description information; *SFDU Structure and Construction Rules* — extended techniques to classify and delimit data; and *Parameter Equals Value Language* — a standard syntax for this commonly used information representation technique.

Donald Sawyer

CALENDAR

September 20-22, 1989
NASA's Climate Data System Workshop
Goddard Space Flight Center
Greenbelt, Maryland

November 13-15, 1989
NSI Users Working Group
(joint Data System Users Working Group- NASA Science Network Users meeting)
Goddard Space Flight Center
Greenbelt, Maryland

December 10-12, 1989
Coordinated Data Analysis Workshop 9.2
Stanford University
Los Angeles, California

Week of January 8, 1990
Fifth Catalog Interoperability Workshop
(Exact dates and location to be determined)

Astrophysics, *from p. 2*

(TCP/IP, DECnet, X.25, and dial-in lines, respectively).

- As a bulk data distribution service on multiple or unusual media (9-track tape, WORM optical disk, CD-ROM, and network now available; other media to be added in the future).
- As the primary center for the NASA Master Directory (MD), the cross-discipline master directory that allows access to nonastronomical data set information and other data systems.
- As provider of traditional NSSDC support activities, including archive and data base management and general data visualization software.
- As the connection to Goddard Space Flight Center's Space Data and Computing division—the home of the GSFC super computers for analysis of NASA space data.
- As the Flexible Image Transport System (FITS) Support Office, which provides information about FITS and tests data and data formats for conformance to FITS standards.

The current plan for implementation, test, and evaluation provides for the system to be publicly available in June 1990. Partial implementations will become available through the initial centers much sooner.

For more information about NSSDC astrophysics activities, contact Michael Van Steenberg via SPAN at either NCF::MEV or 6277::MEV; via Internet at mev@nssdca.gsfc.nasa.gov; or by telephone at (301) 286-7876.

Michael E. Van Steenberg

NSSDC NEWS

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NSSDC Would Like Your Assistance

As indicated in the previous issue of the *NSSDC News*, the Data Center's Interactive Request Activity and Name Directory (IRAND) data base contains more than 32,000 names of individuals and institutions who have been involved with NSSDC over the years.

NSSDC would like your help in keeping this information as up to date as possible. You are encouraged to access NSSDC's Personnel Information Management System (PIMS) option of the NODIS account to review and update the records.

To access NODIS from SPAN, do the following:

(prompt) $ SET HOST NSSDCA

Username: NODIS

No password is required. After identifying yourself, you will be provided with the NODIS menu options. PIMS is option 2.

How To Use NSSDC Services

Researchers can obtain information about NSSDC's data archive—how to contribute to it or how to request data from it (including cost and availability concerns)—by addressing their questions as follows:

INSIDE UNITED STATES

Data Submissions

Dr. H. K. Hills
NSSDC/Code 633.8
Goddard Space Flight Center
Greenbelt, MD 20771
Telephone: (301) 286-4106
SPAN: NCF::HILLS

Data Requests

NSSDC/Code 633.4
Goddard Space Flight Center
Greenbelt, MD 20771
Telephone: (301) 286-6695
Telex: 89675 NASCOM GBLT
TWX: 7108289716
SPAN: NCF::REQUEST

OUTSIDE UNITED STATES

Data Submissions

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Telephone: (301) 286-7354
Telex: 89675 NASCOM GBLT
TWX: 7108289716
SPAN: NCF::GREEN

Data Requests

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Telephone: (301) 286-6695
Telex: 89675 NASCOM GBLT
TWX: 7108289716
SPAN: NCF::REQUEST