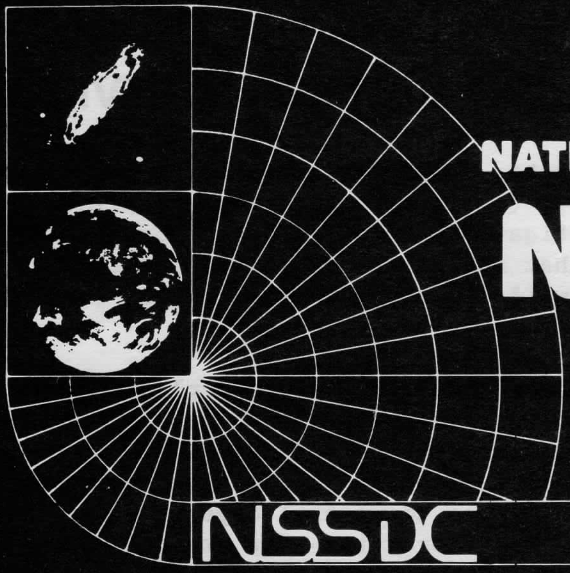
NATIONAL SPACE SCIENCE DATA CENTER

NEWSLETTER

NSSDC No. 4 October 1985

Vol. 1



NSSDC SUPPORTS HISTORY-MAKING COMET ENCOUNTER

On the morning of September 11th, amongst visuals and sound effects worthy of a Hollywood Sci-Fi feature, the long-awaited encounter of the International Cometary Explorer (ICE) spacecraft with the tail of the comet Giacobini-Zinner (G-Z) took place. A well-orchestrated series of displays, including a multi-colored power spectrum, quick-look data, and telescopic images of the comet itself as observed at Kitt's Peak Observatory, a Chilean observatory, and from the International Ultraviolet Explorer (IUE) spacecraft made scientific participants and support staff alike know that they were part of a significant, history-making event.

Soon after ICE exited the tail of G-Z, magnetic tapes containing the encounter data arrived at the NSSDC VAX 11-780 computer, and loading of the data was completed in just a couple of minutes. The three NSSDC-supported teams, which were also the three highest-priority instrument teams for the encounter, went to work. Data for the Jet Propulsion Laboratory (JPL) magnetometer were quickly retrieved at JPL utilizing the Space Physics Analysis Network (SPAN), analyzed using the extensive software residing there, and sent back to the JPL team at Goddard. The Los Alamos National Laboratory (LANL) solar wind plasma data were transmitted via SPAN, analyzed at that facility, and sent back to Goddard. The TRW plasma wave data were analyzed using software that had been moved to the NSSDC VAX computer for the encounter. Within a couple of hours of the event, the three NSSDC-supported teams were producing exciting graphic representations and discussing some immediate results, which would be presented at a press conference at noon. At that press conference, Drs. Samuel Bame, Frederick Scarf, and Edward Smith, representing LANL, TRW, and JPL, respectively, were ready to respond to the numerous inquiries of the eager international press corps.

NSSDC and SPAN missions accomplished! The encounter was an unquestioned success, exceeding all expectations, and NSSDC and SPAN worked perfectly to get the data to the Investigators quickly. NSSDC is proud of the role it has played in Goddard's first encounter and the world's first encounter of a comet. The comradery among the numerous Goddard Codes and Contractors working towards a common goal cannot go without mention. A pictorial of Encounter Week as seen at NSSDC is found in the centerfold.

E. Stemmer

Menu Access to NSSDC On-Line Data & Services

NSSDC intends to provide easy on-line access to selected data files and other services. Such access has been initiated in a simple, menu-driven system running on the NSSDC VAX-11/780 computer. This article briefly reviews how to access the system and what data and services are available.

The NSSDC VAX is reached by SET HOST NSSDC from any other Space Physics Analysis Network (SPAN) node. The USERID is "NSSDC." No password is required, because the system has been designed to prevent users from breaking out of the account. Dial-in information is available from the author of this article.

The principal elements now available are:

- prototype Central On-Line Data Directory (CODD)
- interim data set listing
- interplanetary medium hourly parameters for 1976-1984 with software
- SPAN personnel and hardware
- option for requesting off-line NSSDC data or services

These will be supplemented with other data services.

CODD is intended to provide information about the location, access procedures, and other characteristics of data sets in a broad range of space and Earth sciences. Queries are by data set source (e.g., IMP-8 magnetometer) or by discipline (e.g., interplanetary magnetic fields). CODD is in an early developmental stage, with information on a very small number of solar terrestrial and planetary data sets. Users are encouraged to suggest improvements in the CODD scope, information content, and interface.

The interim data set listing consists of one 80-character record for each of a few hundred NSSDC-held solar terrestrial data sets. The user specifies a character string (e.g., a spacecraft or principal investigator name). All records containing that string are displayed. This listing will be dropped when CODD reaches greater maturity.

The interplanetary field and plasma parameters are from several spacecraft and are as contained on the NSSDC "OMNITAPE." The user has the option of listing the parameters for one to several days or accessing a FORTRAN subroutine for reading hourly records that may be linked to a user's MAIN routine.

One SPAN sub-option enables a user to specify a person's last name and to be provided SPAN, Telemail, and U.S. mail addresses, as available, of persons in the file with that surname. Another sub-option enables persons to enter this information about themselves. It should be noted that no major effort has been mounted to systematically identify and insert all names that should be included. Finally, the results of a 1984 NSSDC survey of the hardware configurations at SPAN nodes is available. It is hoped that SPAN node managers will assist NSSDC in keeping the information in this file current.

User comments on the approach and contents of this menu-driven system are solicited. Use the system to leave comments, or contact the author of this article.

J. King

Note from the Editor:

Dear Reader:

In order to eliminate the repetitive defining of frequently-used acronyms, I have decided to incorporate a brief list in each issue that will not be spelled out in subsequent issues. Here are a few:

CDAW - Coordinated Data Analysis Workshop
PCDS - Pilot Climate Data System
PLDS - Pilot Land Data System
NSSDC - National Space Science Data Center
SPAN - Space Physics Analysis Network
WDC-A-R&S - World Data Center A for Rockets and Satellites

Animated Computer Graphics Models of Space & Earth Sciences Data Generated via the Massively Parallel Processor

As mentioned in the last issue of the Newsletter, Mr. Lloyd Treinish is a member of the newly-formed Massively Parallel Processor (MPP) Working Group by virtue of the acceptance of the above-titled proposal. Below, Mr. Treinish outlines the objectives of his research and accomplishments during the past year leading to the acceptance of his proposal. Progress will be updated in subsequent issues.

The objective of this research is to develop the capability of rapidly producing visual representations of large, complex, multi-dimensional space and earth science data sets via the implementation of computer graphics and modeling techniques on the MPP by employing techniques recently developed for typically non-scientific applications. Such capabilities would provide a new and valuable tool for the understanding of complex scientific data and a new application of parallel computing via the MPP. The following outlines major accomplishments of the past year:

. An analysis of how to extend conventional two- and three-dimensional graphics within the NSSDC Pilot Climate Data System (PCDS) data-independent environment to that of true multi-dimensional representations, including animation, was completed. Software to establish this environment is being built and will be completed early next year. Tests showing these principles have been demonstrated via output of a three-dimensional model from MOVIE.BYU through TEMPLATE. This approach has permitted some work to proceed prior to the ability to perform actual computations on the MPP.

. An analysis of typical geometric rendering algorithms has been done in light of the single instruction multiple datastream architecture of the MPP. Some simple graphics algorithms have been developed for the MPP, such as a ray tracing.

. An extensive survey of the advanced computer graphics workstation market was conducted, including several hands-on demonstrations with different vendors. The results of these efforts were very detailed specifications and a competitive procurement package for the acquisition of appropriate equipment to support the display of the geometric models developed as a result of this research, with an expected delivery in January 1986. In the interim, some PCDS equipment have been augmented in software and hardware to accommodate these applications.

. An analysis of the communications to support this effort was completed. The approach is to have the computer graphics workstation become part of the NSSDC Computer Facility (NCF) via its local area network and then take advantage of the entire Code 600 Space and Earth Sciences Network (SESNET), which should be available in the same timeframe as the workstation would be operational. Large data volumes would be handled through conventional high-density magnetic tapes.

. Several generic data representation methodologies have been developed for the display of complex, geophysical data sets.

. A plan has been developed to integrate the software on the MPP and NSSDC VAXs with the workstation environment, transparently via the PCDS, to permit a user of such graphics to easily access and work with data of interest that are too complex for the NCF to represent.

. Extensive correspondence with industrial developers of solid modeling and animation software has taken place. However, only two of these companies had the potential for offering appropriate tools or techniques for this work. One was willing to work with GSFC to create a demonstration film with candidate data sets.

. A paper on this work was presented, by invitation, to the Second Annual TEMPLATE User Network Conference.

. Some candidate data sets have been identified for the generation of complex graphics models.

L. Treinish

The Evolution of the Dynamics Explorer

The Dynamics Explorer (DE) ground system has a long and varied history that has paralleled, and continues to parallel, the trends in ground systems. Consequently, the DE project has, through its evolution, served as a test bed for the implementation of various philosophies in mission ground systems.

The DE program is designed to study the coupling of energy, electric currents, electric fields, and plasmas between the atmosphere, ionosphere, and magnetosphere. The program is composed of two polar-orbiting satellites, ground operations, and data handling systems that have been used to acquire, process, and make available to the scientists of the program the data sets necessary for analysis to accomplish the sciences objectives.

The two satellites were launched into coplanar elliptical orbits on August 3, 1981. DE 1, which had an initial apogee of 23,000 km and perigiee of 600 km, is still operating. DE 2, which had an initial apogee of 1,000 km and perigee of 300 km, reentered the atmosphere in February 1983. The configuration allowed for extensive conjunctive studies of fields and plasma properties at two points along the same magnetic field lines. These magnetic conjunctions were supplied, predictively, by NSSDC's Satellite Situation Center as part of the NSSDC Science Operations Planning support for the DE project. (See Satellite Situation Center article on page 10.) The higher-orbiting DE 1 supports six instruments: Magnetometer, plasma wave instrument, spin-scan auroral imager, retarding ion mass spectrometer, high-altitude plasma instrument, and energetic ion mass spectrometer. The nine instruments aboard the lower-orbiting DE 2 were: Magnetometer, vector electric field instrument, neutral atmospheric composition spectrometer, wind and temperature spectrometer, Fabry-Perot interferometer, ion drift meter, retarding potential analyzer, Langmuir probe, and low-altitude plasma instrument. The key aspect of the analysis of the data from these instruments is the ability to intercompare the data and derive conclusions based on these correlative studies. Consequently, the ability of the ground system to facilitate comparative studies is crucial.

As a cost-saving measure, the initial concept of the ground system (see Figure 1) was centered on a Xerox (now Honeywell) Sigma-9 computer that was inherited from the Atmospheric Explorer project along with considerable software. This computer was intended to handle the input processing of telemetry, as well as to provide the computational power for routine and customized scientific processing. Included in the routine scientific processing was the generation of summary plot microfiche, which contained quick-look parameters calculated directly from the telemetry for most instruments and plotted to a common time scale. This enabled quick identification of events of interest to promote correlative studies as well as instrument health and safety information. However, the summary plots were not in a production mode until over a year after launch.

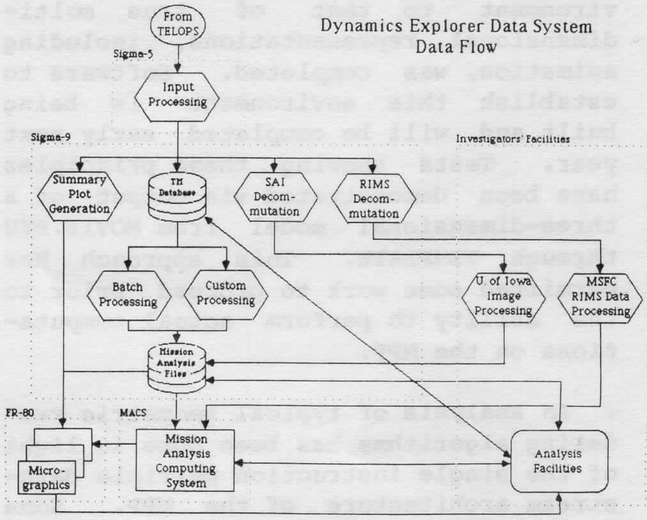


Figure 1. *The Dynamics Explorer Ground System as originally conceived.*

Ground Data System

General scientific analysis could be done on the Sigma-9 from terminals located at the experimenters' home institutions and connected through dedicated telephone lines. Processed data were to be stored in the Mission Analysis Files (MAFs) according to a common format to facilitate data comparison. The spin-scan auroral imager and retarding ion mass spectrometer experiments required specialized processing and, consequently, the data for these experiments were separated from the rest and sent directly to the experimenters' institutions for individual processing. Other than this aberration, the concept of a centralized ground system based on a mainframe computer was consistent with the emphasis on large computers in the 1970s.

Early in the project planning, it was clear that the Sigma-9 would not be sufficient to provide all of the computational power that would be needed. For that reason, a smaller Sigma-5 computer was acquired to perform the input processing task for the DE 1 spacecraft. In additon to this, an IBM 4341 computer, called the Mission Analysis Computing Systems (MACS), was procured and connected to the Sigma-9 for use in scientific analysis. The concept of a centralized computational facility was still preserved with these additions.

Because of a number of factors, such as delay in acquiring the hardware and in the development of the software, incompatibility with an interactive processing environment, difficulty in MAF file transfer from the Sigma-9, software conversion problems, etc., the MACS was never widely used by the scientists associated with the project. Also, computer technology had advanced to the point that each experiment team could acquire or obtain access to a low-cost minicomputer that had sufficient power to perform their scientific analysis at their own institution. This had the advantage of allowing each experiment team to control its own activities and resources and be independent of centralized hardware problems. For all these reasons, the reality of the centralized system never materialized. Thus, the DE ground system has evolved into the distributed system (see Figure 2) that is the trend of the 1980s.

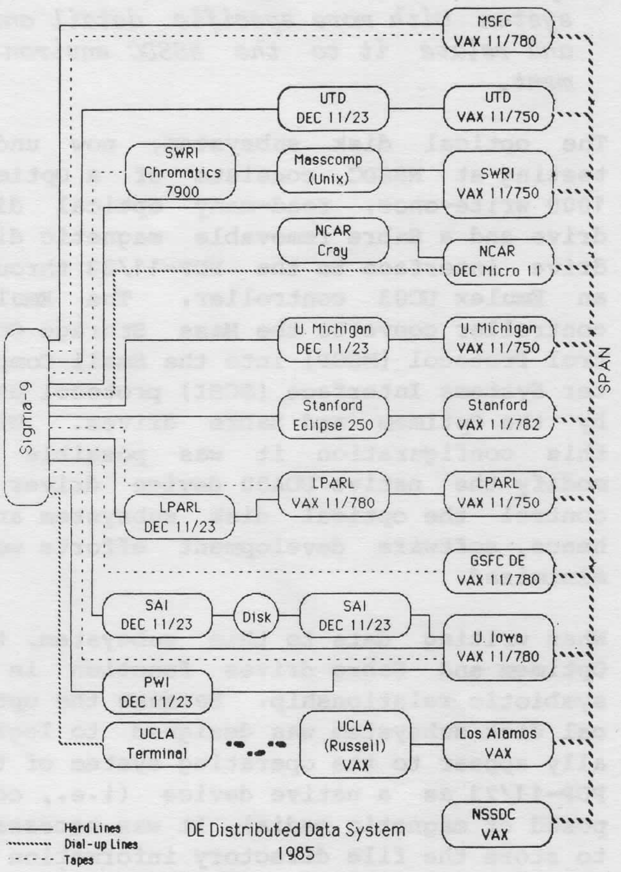


Figure 2. *The DE Distributed Data System that evolved post-launch.*

Good communications are necessary if the goal of comparative studies is to be fulfilled in a distributed data system. Fortunately, the development of computer networking technology has provided the required communications capability. The Space Physics Analysis Network (SPAN), developed at Marshall Space Flight Center, has always been closely associated with the solar terrestrial community and, in particular, with the DE project. As the distributed DE data system developed, nearly all of the investigator teams opted to have their computers connected as nodes on SPAN, which uses the Digital Equipment Corporation Decnet system. Nearly all of the investigators had DEC Computers, pro-

(Continued on page 7)

NSSDC Optical Disk System: a progress report

Previous articles in the Newsletter *have described, in general, the Optimem Optical Disk System. The purpose of this article is to describe this system with more specific detail and and relate it to the NSSDC environment.*

The optical disk subsystem, now under testing at NSSDC, consists of a Optimem 1000 write-once, read-many optical disk drive and a Sabre removable magnetic disk drive interface to the PDP-11/23 through an Emulex UC03 controller. The Emulex controller converts the Mass Storage Control Protocol (MSCP) into the Small Computer Systems Interface (SCSI) protocol used by the Optimem and Sabre drives. With this configuration it was possible to modify the native UDA50 device driver to control the optical disk subsystem and, hence, software development efforts were minimized.

When writing data to this subsystem, the Optimem and Sabre drives function in a symbiotic relationship. Because the optical disk subsystem was designed to logically appear to the operating system of the PDP-11/23 as a native device (i.e., composed of magnetic media), it was necessary to store the file directory information on the Sabre magnetic disk. Once the disk is filled with data and the directory information is not expected to change, the information on the magnetic disk is copied to a preallocated space on the optical disk. The optical disk is then free of its dependence on the magnetic cartridge. In fact, the completed disk can be mounted and accessed on any PDP/RSX or VAX/VMS system that has an Optimem 1000 attached to it through the appropriate controller.

Currently, when writing to the optical disk, it is necessary to have the modified UDA50 device driver resident. Also, because the physical block size on the optical disk is 1024 bytes and DEC assumes a block size of 512 bytes, a program is supplied for writing to the disk that stores two 512-byte blocks in a buffer and then writes a complete 1024-byte block to the optical disk. When reading from the optical disk, no special or modified software is needed. The standard UDA50 device driver controls the disk in this instance.

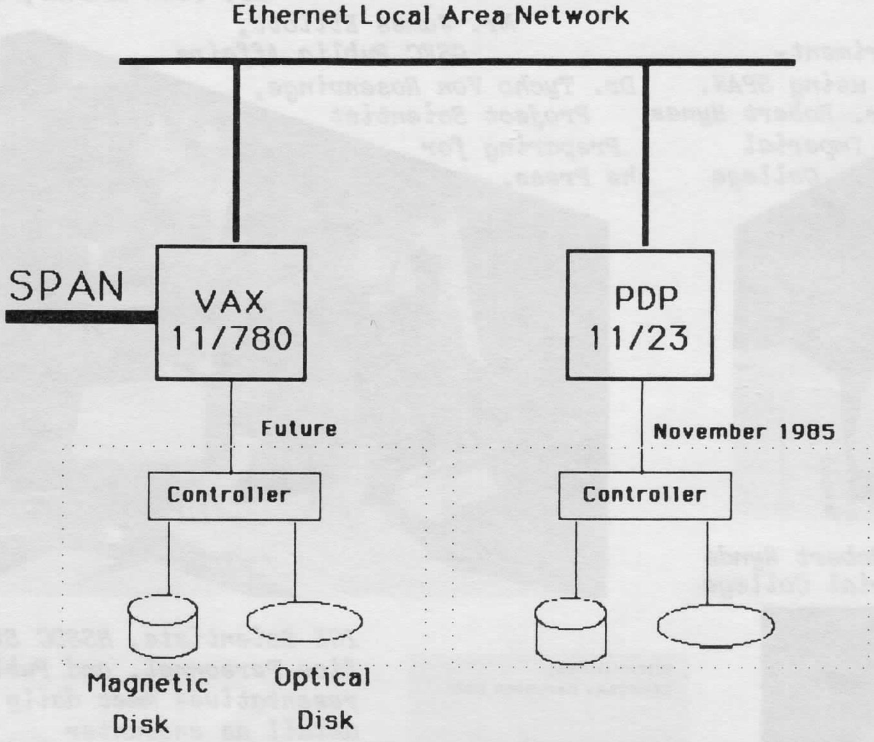
This optical disk subsystem is particularly attractive to NSSDC, because the specialized software associated with it is small and straightforward, making the software easy to maintain and update when new versions of the RSX and VMS operating systems are released. NSSDC expects delivery on the VMS interface in the Spring of 1986.

The optical disk subsystem is currently undergoing testing to determine its performance characteristics as well as its reliability. The performance tests will consist of reading large amounts of data from the optical disk, while keeping extensive statistics. A peak transfer rate will be determined and compared with the transfer rate from magnetic disk. The OMNI data set (a compilation of solar wind data from multiple spacecraft) will be used for test purposes. Approximately 5 MB will be transferred, proofed, and then made accessible to the community through the NSSDC automated services account. (See article on page 2.)

NSSDC is working on a plan whereby a number of these subsystems would be distributed to various investigators. In return, the investigators would write appropriate analyzed data to optical disks that would be copied and added to the NSSDC holdings. The data may be written to disk in a common data format (CDF) using the CDF interface package being developed at NSSDC. Dynamics Explorer (DE) particle data (EICS) from Lockheed and auroral image data (SAI) from University of Iowa have been loaded to the optical disk, the latter in CDF format. The generation of on-line data catalogs will be facilitated by the use of the optical disk to hold very large data volumes. Header records from the optical disk will be assembled into these catalogs. The benefits to the scientific user community will be tremendous as NSSDC takes the leadership role in the full application of the optical disk technology.

B. Lopez-Swafford

NSSDC OPTICAL DISK CONFIGURATION



The Evolution of the Dynamics Explorer Ground Data System

(Continued from page 5)

vided by he SPAN project, which were compatible with this protocol. SPAN has proven to be useful for project communications and multi-author publication development. Its increasing use for remote data manipulation or data and plot file transfer will critically depend on the planned expansion of SPAN, which is now managed by NSSDC, onto higher-speed communications links.

One other aspect of the DE data system is particularly important to NSSDC and the general scientific community. How will the data be archived and distributed? DE is one of the first projects to be incorporated into the NSSDC On-line Data Catalog System (NODCS) now being developed as part of an overall plan at the Data Center to expand and modernize data access services. (An article about the on-line directory and catalogs appeared in Issue 1, and a more extensive article on NODCS will be given in a future *Newsletter* issue.) In NODCS, a person who wished to obtain information about DE data could dial in or access, via network, the NSSDC Central On-Line Data Directory (CODD). The user could then find out which data sets are of interest and the availability of access by specifying spacecraft experiment, investigator names, or by keyword searches. CODD would provide information about the contents of the data set, accessibility, whom to contact, etc. CODD is currently in development and should be available for demonstration in November.

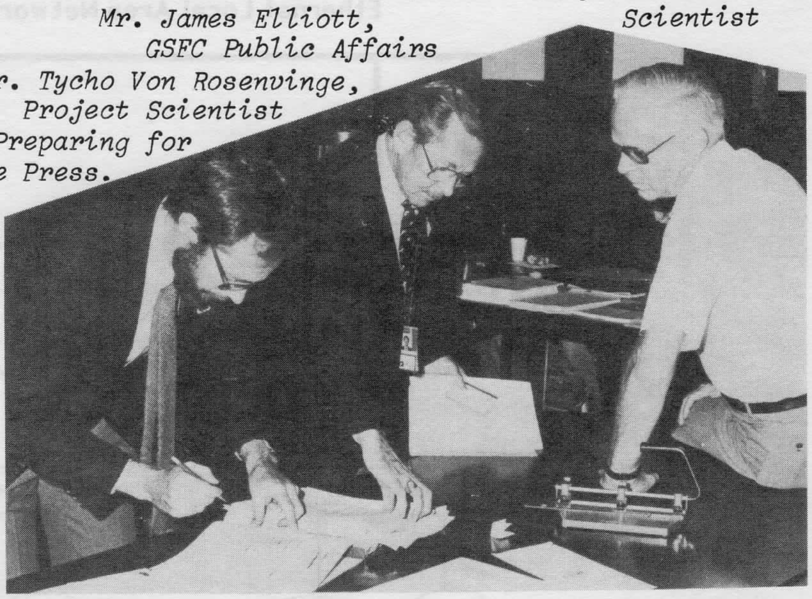
The NODCS system will allow earlier and faster access to project data, while it is still in active usage by the investigator teams. Once the data sets have become static, or funds are no longer available for maintenance and storage of the data sets by the experimenters, then the data sets and their associated catalogs will be transferred and made available at NSSDC. NSSDC is currently working with the DE investigators to develop catalogs and optical disk-based archives that will be useful for the entire scientific community. Not only has DE evolved into a distributed data system, but it will be among the first to test the concept of a distributed, active archive.

J. Thieman

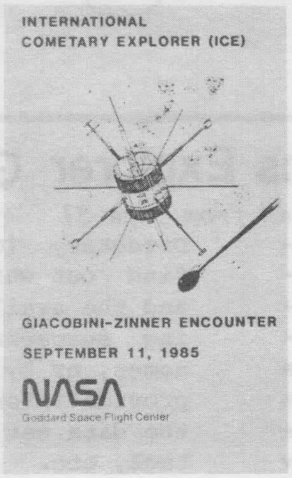
SCIENTISTS GATHER AT NSSDC

Energetic Proton Experiment-
NSSDC to ESA and back using SPAN.
Dr. Peter Wenzel ESA/ESTEC
Dr. Robert Hynes Imperial College

Mr. James Elliott, GSFC Public Affairs
Dr. John Brandt, Comet Scientist
Dr. Tycho Von Rosenvinge, Project Scientist Preparing for the Press.



Ms. Pat Astill NSSDC
Dr. Robert Hynds Imperial College



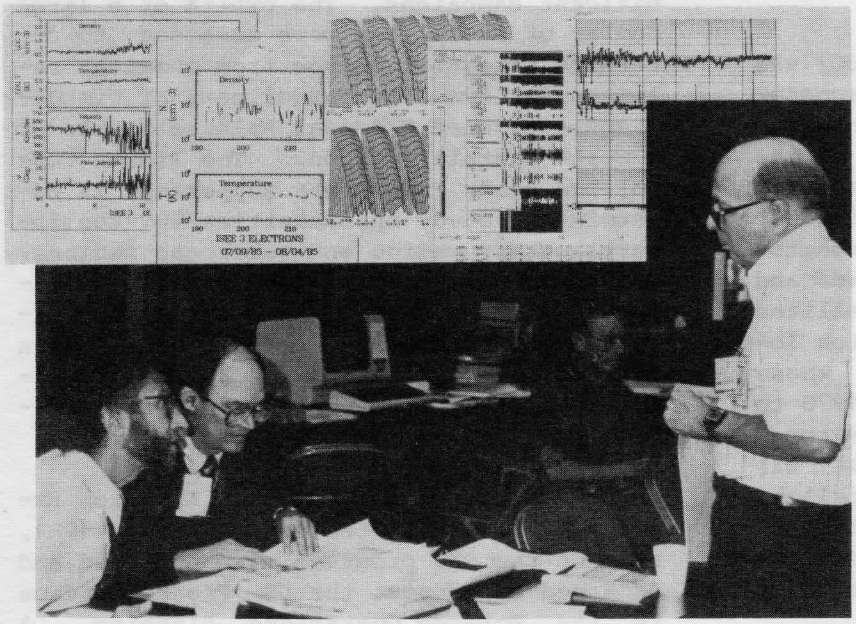
ICE Scientists, NSSDC Staff, Project Office Personnel, and Public Affairs Representatives meet daily to review every detail as encounter approaches.

NSSDC Staffers gather around communications terminals.

Dr. Jean-Louis Steinberg Paris Observatory
Dr. Joseph Fainberg NASA/GSFC

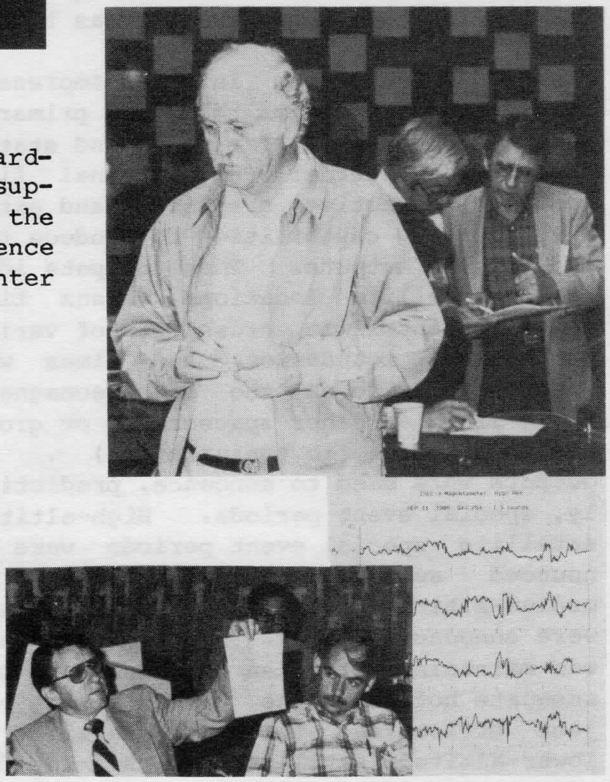
Discussing their radio mapping experiment.

FOR ICE COMET ENCOUNTER

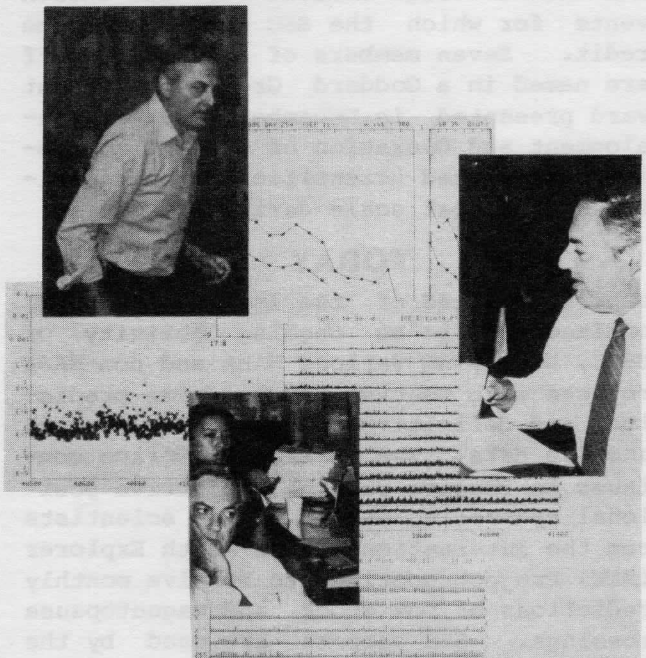


(Left)
The solar wind plasma instrument team from Los Alamos National Laboratory, headed by principal investigator Dr. Samuel Bame (on the far right), study outputs that were retrieved using SPAN.

(Below)
Dr. Ed Smith, principal investigator for the magnetometer, discusses the data (retrieved using SPAN) with colleagues from JPL and with Dr. Joseph King, Head of the NSSDC Central Data Services Facility.



NSSDC provided varying degrees of computer hardware, software, communications, and logistics support to all instrument teams participating in the ICE mission. The Building 26/Room 205 conference area, staffed by NSSDC personnel, was the center of the encounter week activities.



(Left)
Dr. Fred Scarf, principal investigator for the plasma wave instrument team from TRW, studies graphics outputs from data loaded, analyzed, and retrieved from the NSSDC VAX computer.

SSC Promotes Collaborative Data Acquisition

YESTERDAY

The Satellite Situation Center (SSC) was an outgrowth of the International Magnetospheric Study (IMS), which was an international program under the auspices of the Scientific Committee for Solar Terrestrial Physics (SCOSTEP) in which a coordinated effort was made to understand magnetospheric processes. Numerous countries and agencies representing over 50 satellites and numerous ground-based observation locations participated in the IMS, whose data acquisition phase ran from 1976 to 1979. In 1971, NSSDC/World Data Center A for Rockets and Satellites (WDC-A-R&S) was proposed as the location for a centralized facility with computer capabilities to facilitate coordinated data acquisition for the IMS and, thus, the SSC was born.

The SSC quickly grew into an impressive collection of programs that used primarily satellite ephemeris data, ground station locations, internal and external field models, interactive graphics, and extensive querying capabilities to produce text and graphic outputs. These outputs identified satellite locations versus time, times of satellite crossings of various geophysical boundaries, and times when spacecraft were on the same geomagnetic field line as other spacecraft or ground stations (magnetic conjunctions) . The outputs were used to announce, predictively, special event periods. High-altitude satellite special event periods were announced semi-annually, while low- and medium-altitude satellite special periods were announced weekly. A delicate balance was maintained between the need to give adequate notice to the participating project offices and the predictability of lower-altitude satellite orbits. In addition to routine predictions, publications containing tables of pertinent information and various graphics outputs were published, and numerous special purpose requests were satisfied. Definitive calculations of magnetic conjunctions were also routinely performed.

During this same time period, NSSDC utilized the facilities of the SSC to contribute to several significant campaigns. The orbits of a large number of satellites were assessed to determine potential damage from chemical releases for the Cameo experiment of Nimbus-G and a planned Chemical Release Module of a Space Shuttle mission. The Plasma Turbulence study group was supported in determining study opportunities in the interplanetary medium and polar cap regions. Using software modules specifically developed for deep space missions, a significant contribution was made by the SSC in the determination of the Study of Traveling Interplanetary Phenomena (STIP) Intervals.

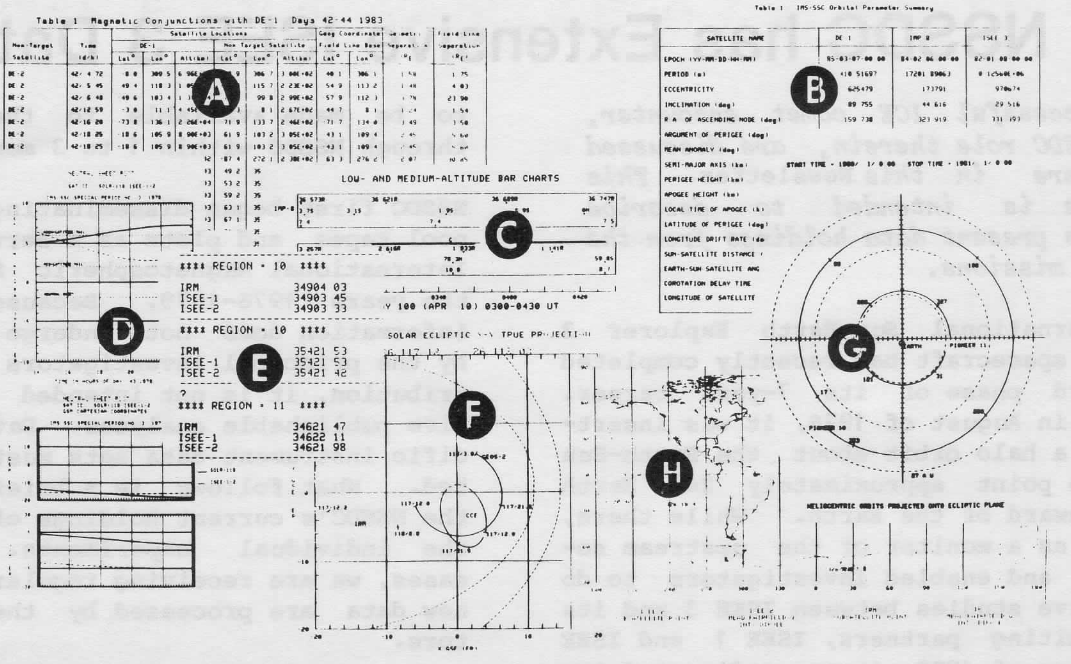
Prior to the launch of the Dynamics Explorer (DE) satellites in August of 1981, some of the SSC programs were modified and expanded to support the DE Project Office in the Science Operations Planning. A primary goal of DE was the acquisition of simultaneous data including magnetic conjunctions. Routine support has been given to this project since launch.

The success of the SSC support for IMS became apparent when events were chosen for study at Coordinated Data Analysis Workshops (CDAWs) during the IMS data analysis phase. (See article in Issue 3.) Excellent data coverage existed for the chosen events for which the SSC can claim some credit. Seven members of the NSSDC staff were named in a Goddard Group Achievement Award presented in December 1979 for Development and Operation of the SSC to provide coordinated scientific data acquisition on a global scale during the IMS.

TODAY

Despite the end of the IMS era, the SSC continues to be an ongoing activity of NSSDC, supplying various NASA and non-NASA projects with routine and one-time predictive and definitive positional and conjunctive data. The DE Project Office continues to receive routine predictive positional ephemeris data, while scientists from the International Sun-Earth Explorer (ISEE) Project continue to receive monthly predictions of bow shock and magnetopause crossings. SSC outputs are used by the event selection panels for CDAWs to determine interesting configurations for study.

SATELLITE SITUATION CENTER OUTPUTS



(A) Table of Magnetic Conjunctions; (B) Orbital Parameters; (C) Low-Altitude Bar Charts; (D) Neutral Sheet Plots; (E) Region/Boundary Query Output; (F) Geocentric Solar Ecliptic Plot; (G) Heliocentric Plot; (H) World Map Trajectory

Other SSC graphic outputs and definitive ephemerides on microfiche are typically prepared to support the conduct of CDAWs.

The SSC has begun its support of the Polar Regions and Outer Magnetosphere International Study (PROMIS) with the preparation of sample outputs. PROMIS will focus on the period March through May of 1986, when a number of satellites will be located in positions ideal for the study of auroras and their associated geomagnetic and ionospheric effects. The next issue of the *Newsletter* will feature an article on PROMIS.

TOMORROW

NSSDC plans to move the SSC software from its current environment on the MODCOMP Classic computer to the NSSDC VAX 11/780 where it will become integrated with all the existing and planned facilities of the NSSDC Computer Facility (NFC). These plans call for a variety of capabilities, including the SSC and CDAW, to become accessible to remote users via modem or the Space Physics Analysis Network (SPAN) and other international networks. It is anticipated that the SSC will be used extensively in upcoming spacecraft missions, such as the International Solar Terrestrial Physics (ISTP) project, for the coordination of acquisition of simultaneous data from the multiple satellites that comprise the mission, with other satellite programs, and with ground stations. Additionally, this facility would allow for the remote user and/or spacecraft project access to extensive query and magnetic conjunction capabilities on an as-needed basis.

These plans require updating current software, adding new software, adding a user-friendly front end, and providing adequate user documentation. This is a major undertaking for NSSDC, but it is considered to be an important part of the overall NSSDC commitment to promote collaborative data acquisition and analysis and to provide greater access to the scientific user community.

Suggested reading for further information on the development of the SSC and activities during the IMS data acquisition phase is, "The Satellite Situation Center," M.J. Teague, D.M. Sawyer, and J.I. Vette, *The IMS Source Book*, C. Russell and D. Southwood, editors; 1982 by the American Geophysical Union. This reprint is available from NSSDC upon request.

E. Stemmer

NSSDC has Extensive ISEE 3 Data

The successful ICE comet encounter, and NSSDC role therein, are discussed elsewhere in this Newsletter. *This article is intended to describe NSSDC's present data holdings from the ISEE 3 missions.*

The International Sun-Earth Explorer 3 (ISEE 3) spacecraft has recently completed the third phase of its 7-year career. Launched in August of 1978, it was inserted into a halo orbit about the Earth-Sun libration point approximately 240 Earth radii sunward of the Earth. While there, it acted as a monitor of the upstream solar wind and enabled investigators to do correlative studies between ISEE 3 and its Earth-orbiting partners, ISEE 1 and ISEE 2. In June of 1982, it was redirected into the Earth's geotail through a series of elaborate maneuvers involving four lunar swingbys. Having completed the first survey ever of the deep tail, it crossed the Earth's bow shock for the last time in October of 1983, made a fifth close lunar pass, and headed into a heliocentric orbit for its next mission: The interception of comet Giacobini-Zinner. Officially renamed the International Cometary Explorer (ICE), this third phase of its mission culminated on September 11, 1985, when ICE successfully passed through the tail of Giacobini-Zinner. For the next several years, ICE may provide low data rate information on in-ecliptic, 1 AU fields, plasma, and particles.

There are currently 12 active experiments aboard ISEE 3. The experiment names and principal investigators are listed in the table opposite. NSSDC currently archives subsets of data from most of these instruments. The ISEE 3 data pool plots display data from six instruments (marked by asterisks in table opposite). Data pool plots are useful for determining data availability and identifying interesting intervals. A sample data pool plot from the magnetometer is shown in the accompanying figure. The ISEE 3 data pool is also stored on magnetic tape. The speed at which the telemetry data is processed for data pool purposes allows this data set to be made available to the community through NSSDC within 1 to 3 months.

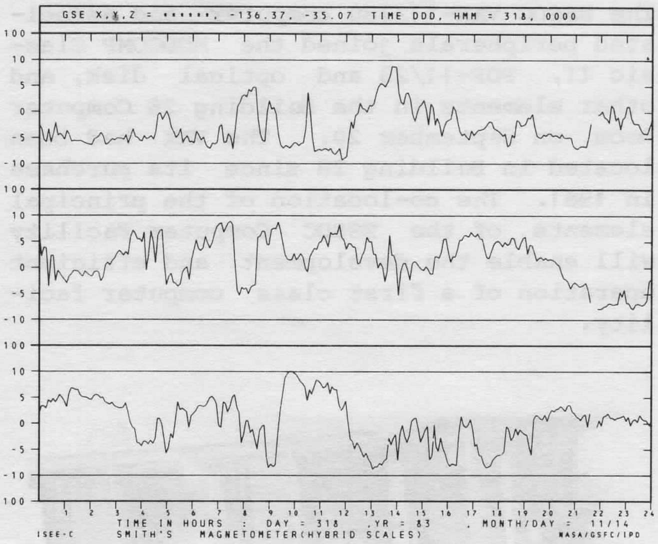
NSSDC first began disseminating ISEE data pool tapes and plots as a service of the International Magnetospheric Study during the years 1976-1979. Because data pool information does not undergo examination by the principal investigators before distribution, it is not intended for definitive publishable analyses. Data from specific instrument data sets must be consulted. What follows is a brief summary of the NSSDC's current holdings of data from the individual experiments. In many cases, we are receiving regular updates as new data are processed by the investigators.

From the plasma experiment (Bame), 5-minute resolution, ion-based data are available on magnetic tape from launch until February of 1980, at which time the ion portion of the instrument failed. Also available are 1-hour resolution electron-based plasma parameters for solar wind intervals from launch until October of 1982. Additionally, color spectrograms of electrons in the Earth's geotail are displayed on 35-mm slides.

NSSDC's holdings from the ISEE 3 magnetometer (Smith) include 1-min, hourly, and daily averages of field components and statistical parameters on magnetic tape for all solar wind intervals up until the end of 1983. A tape containing 5-min averaged field components and magnitude and a tape containing just the hourly and daily parameters extracted from the PI-supplied tapes, have recently been created by the NSSDC staff.

X-Ray Spectrometer	K. A. Anderson
*Solar Wind Plasma	S. J. Bame
*Low-Energy Cosmic Rays	D. K. Hovestadt
Energetic Protons	R. J. Hynds
*Cosmic-Ray Electrons and Nuclei	P. Meyer
Solar Wind Ion Composition	K. W. Ogilvie
*Plasma Waves	F. L. Scarf
*Magnetic Fields	E. J. Smith
Radio Mapping	J. L. Steinberg
High-Energy Cosmic Rays	E. C. Stone
Gamma-Ray Bursts	B. J. Teegarden
*Medium Energy Cosmic Rays	T. T. Von Rosenvinge
High Energy Cosmic Rays	M. E. Wiedenbeck

Available for Distribution



A Sample ISEE 3 Data Pool Plot

On magetic tape are 512-s average count rates from the low-energy cosmic ray experiment (Hovestadt) for energies of 30 KeV to 20 MeV for 1980 and 1981.

A set of 24-hour summary plots of plasma wave data (Scarf) are currently available on microfiche from launch until the end of 1984. On these plots are displayed electric field channels ranging from 17.8 Hz to 100 kHz and 8 magnetic field channels ranging from 17.8 Hz to 1.0 kHz.

Available on magnetic tape are 256-s averaged fluxes of energetic protons (Hynds) for three energy channels spanning 35 keV to 620 keV for 1978.

NSSDC has a complete set of 8-hour summary plots from Anderson's electron experiment (which failed in November, 1979). Displayed on the plots are 10 energy channels ranging from 2 keV to 1 MeV.

NSSDC holds a set of 90-min and 24-hour survey plots from the radio mapping experiment (Steinberg). These plots are on microfiche and cover launch to April 1984. Receiver output signals from 30 to 1000 kHz are included.

From Stone's high-energy cosmic ray experiment, 15-min average fluxes for hydrogen, helium, and heavier nuclei in five energy channels ranging from 2 MeV/nucleon to 45 MeV/nucleon are available on tape for most of 1978. Additional 1-hour resolution data cover the interval from late 1978 to the beginning of 1981.

Plots and listings of 32-sec average data from the X-ray burst experiment (Anderson) on microfiche cover the time interval from launch until May 1983. Four energy channels ranging from 8 keV to 72 keV are displayed.

Gamma ray burst events from Teegarden's experiment covering November 1978 to December 1980 are recorded on magnetic tape. For each event, the time duration and energy spectrum from 50 keV to 6.5 MeV are included.

Additional high time resolution data from several ISEE 3 experiments utilized by past Coordinated Data Analysis Workshops (CDAWs) are also housed at NSSDC. Note also that much of the hourly-averaged magnetic field and plasma data from ISEE 3 have been incorporated into the NSSDC Interplanetary Medium Data Book series.

D. Couzens, H.K. Hills

IN THE NEXT ISSUE:

- PLDS
- NODCS
- PROMIS
- ISTP Ground System
- IUE Data Availability
- A Message from the Director: Elements of a Data Center

...and more

NEWSBRIEFS...NEWSBRIEFS...NEWSBRIEFS...

Second Review of PLDS

The second review of the Pilot Land Data System (PLDS) program by the Science Steering Group (SSG) and sponsored by NASA Headquarters Code EI took place at Goddard on September 17 and 18. PLDS, established to develop a prototype state-of-the-art data and information system to support research in the land-related sciences, asked the SSG to provide guidance in setting priorities for the near-term needs of the land science community. Because of severe FY86 budget constraints, only half of the PLDS tasks originally planned can be funded, and the Project wants to insure that correct task choices are made.

The SSG recommended that the PLDS Project initially limit its efforts to the development of two key parts of a complete system: An electronic data directory and catalog system and a data information network. The six-member group, whose charter is to insure that PLDS meets the needs of the land science community, congratulated the entire multi-center project team for their excellent efforts in designing and planning for a complete Land Data System.

CODMAC Meets at MSFC

On September 23 and 24, the Committee on Data Management and Computation (CODMAC) met at Marshall Space Flight Center (MSFC) in Huntsville, Alabama. The main thrust of the meeting was the examination of major MSFC projects such as shuttle-attached payloads, MSFC payload operations control center, and the on-line archival mass storage device being developed by RCA. Of particular importance to CODMAC was the new Cray XMP and the associated front end and network that will be in operation sometime next year.

Dr. James Green, Director of NSSDC, gave the review presentation on the Space Physics Analysis Network (SPAN). Dr. Green discussed the International Cometary Explorer (ICE) encounter usage of SPAN and the future of the network as a long-term communications network for space scientists.

NSSDC VAX Relocated

The NSSDC VAX-11/780 computer and associated peripherals joined the MODCOMP Classic II, PDP-11/23 and optical disk, and other elements in the Building 26 Computer Room on September 20. The VAX had been located in Building 28 since its purchase in 1981. The co-location of the principal elements of the NSSDC Computer Facility will enable the development and efficient operation of a first class computer facility.

Workmen prepare the Building 26 Computer Room for the addition of the VAX-11/780 and associated peripherals.

The move of the VAX was completed in 1 day by the Goddard movers. The VAX was unavailable to local users for exactly 1 week. NSSDC appreciates the efforts of everyone involved in keeping these times to a minimum. Unfortunately, various communication line problems prevented reestablishment of external SPAN links in a timely fashion, but SPAN is now up.

...NEWSBRIEFS...NEWSBRIEFS...NEWSBRIEFS

Astrophysics Data Workshop

An Astrophysics Data Operations Workshop was held at Goddard on September 17-19. The agenda contained many items of interest to NSSDC including centralization versus decentralization, archives, standardization, and the impact of new technology. Representatives of past and current astrophysical missions discussed what has been learned from their experiences, and a panel discussion was held with representatives of future missions.

Dr. James Green, Director of NSSDC, gave a presentation of current and future NSSDC facilities with an emphasis on the future of astronomy and astrophysics at NSSDC. Dr. Green outlined remote access capabilities; network data, information, and software; access through additional SPAN and NPSS/Telenet discipline nodes; network assisted coordinated data analysis workshops; and international networking. He discussed the new integrated approach for NSSDC, the enhanced space science community participation with NSSDC, new NSSDC data management activities, the development of a new space data systems environment, and the importance of early project/NSSDC involvement in the design of the total data system.

New Catalog in Series Published

Volume 4A of the *Data Catalog Series for Space Science and Applications Flight Missions* has been published. *Descriptions of Meteorological and Terrestrial Applications Spacecraft and Investigations*, NSSDC/WDC-A-R&S 85-03 is available for distribution. When the series is complete, each of five major disciplines will be represented with two volumes: Volume A containing spacecraft and experiment descriptions, and Volume B containing data set descriptions. An eleventh volume containing summary and index information is also planned. Thusfar, an "A" volume has been published for the following catagories: Planetary and Heliocentric; Meteorological and Terrestrial Applications; Geostationary and High-Altitude Scientific; and Low- and Medium-Altitude Scientific.

Pilot Land Access Demonstrated

On August 30, the Pilot Land Data System (PLDS) Project initiated its first demonstration to show how a remote scientific user would access PLDS capabilities at a major NASA node. The University of Maryland cooperated as the remote user, and Goddard was the major node. The purpose of the demonstration was to determine the communication protocols and physical links needed to allow a remote user access to various computer facilities at Goddard as well as to provide guidance as to what technical areas need addressing or development in FY86.

The demonstration proceeded as follows. A University of Maryland graduate student needed a landcover scene for a hydrology model, which was not locally available. He decided to access the PLDS Central Directory on the NSSDC VAX-11/780 using an IBM/PC and a 4800-baud communications line. He located a Landsat Thermatic Mapper (TM) data set that could provide the information required to continue the model. He then transferred and logged onto the Massively Parallel Processor (MPP) via Decnet to initiate a classification procedure on a subset of the TM scene. He then transferred the classified data to the Land Analysis System (LAS) computer, over Decnet, for further processing. The data were resampled to the required resolution and transferred back over the dial-up line and entered into his workstation database, thereby allowing the continuation of his model.

This demonstration utilized several elements of the overall organizational structure of PLDS including networking and communications (Decnet; 4800-baud modems), data management (Central Directory; inventory subsystems), system access capabilities (TAE; VMS), and land analysis software (classification; subsetting). The entire process took 2 hours of clock time as opposed to the estimated 2 days using local computer resources.

A second generation demonstration is planned for next summer when the concept would be expanded to include additional university and NASA nodes.

Calendar of Upcoming Events

November 4-5	Astronomy/Relativity Management Operations Working Group meeting at Goddard Space Flight Center.
November 7-8	Stellar Data Center meeting at the Strasbourg Observatory. Topic of the meeting is "The Astronomical Data Network."
November 14-15	First meeting of members and organization representatives of the Satellite Ocean Data System Science Working Group (SODSSWG) at the Jet Propulsion Laboratory (JPL).
November 19-20	National Academy of Sciences, Space Science Board, Committee on Earth Sciences (CES) meeting at the Joseph Henry Building, Washington, D.C.
January 29-30	Second Pilot Climate Data System (PCDS) Workshop at Goddard Space Flight Center. Call (301) 344-5876 for further information. Note the new date.

REQUESTING DATA, PUBLICATIONS, OR SERVICES

The services provided by NSSDC are available to any individual or organization resident in the United States and to researchers outside the United States through the World Data Center A for Rockets and Satellites (WDC-A-R&S).

For information on availability, costs, and ordering procedures, researchers residing in the U.S. should contact:

National Space Science Data Center
Code 633.4
Goddard Space Flight Center
Greenbelt, Maryland 20771
Telephone: (301) 344-6695
Telex No.: 89675 NASCOM GBLT
TWX No. : 7108289716

Researchers who reside outside the United States should contact:

World Data Center A for Rockets and Satellites
Code 630.2
Goddard Space Flight Center
Greenbelt, Maryland 20771 U.S.A.
Telephone: (301) 344-6695
Telex No.: 89675 NASCOM GBLT
TWX No. : 7108289716

SUBMITTING DATA TO NSSDC

NSSDC invites members of the scientific community involved in spaceflight investigations to submit data to the Data Center or to provide information about data sets that they prefer to handle directly. The Data Center assigns a discipline specialist to work with each Investigator or Science Working Team to determine the forms of data that are likely to be most useful to the community of users that obtain data from NSSDC.

The formats of data submitted to NSSDC are flexible, and usually no special processing is required.

For information on submitting data to the Data Center, please contact:

Dr. H. K. Hills
National Space Science Data Center
Code 633.8
Goddard Space Flight Center
Greenbelt, Maryland 20771
Telephone: (301) 344-8105

Researchers residing outside the U.S. may write to Dr. James I. Vette using the address of WDC-A-R&S given on left.

OBJECTIVES OF THE NSSDC NEWSLETTER

The primary objective of this *Newsletter* is to inform and expand our user community. Through regular columns and special features, the reader may become acquainted with the various data analysis systems at NSSDC, our computer facilities and services, popular and new data acquisitions, and major scientific satellite systems.

We will not only feature what is available at NSSDC, but will explore some systems and data that are available elsewhere that might be of interest to our readers.

Each issue will contain a calendar of upcoming events and a profile of some of the people who work at NSSDC. Information about requesting data from NSSDC and submitting data to NSSDC will be contained in every issue.

We welcome all comments and suggestion that you might have. Please forward them to the Editor:

Ellen Stemmer
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