

SSDOO Supports Solar-Terrestrial Event Study

By Mauricio Peredo

On January 6, 1997, instruments on the Solar and Heliospheric Observatory (SOHO) spacecraft observed a major solar eruption that seemed to have launched a large "plasma cloud" toward Earth. SOHO scientists predicted that this cloud would impact the Earth's magnetosphere on January 10, 1997, after its 93 million mile trip to Earth (and beyond). And, sure enough, the arrival of this cloud was registered by the WIND and Interplanetary Monitoring Platform (IMP) spacecraft on the predicted date.

The cloud compressed the Earth's magnetosphere's sunward bound-

ary from its typical geocentric distance of 10-12 Earth radii (Re) to less than 6.6 Re where geosynchronous spacecraft fly. Intense geomagnetic activity resulted. The estimate of power dissipated in northern and southern auroral regions at the peak of the geomagnetic event was about 1400 Gigawatts, double that of the electric power generating capacity of the United States.

Several International Solar-Terrestrial Physics (ISTP) and related spacecraft in various locations in the magnetosphere and just beyond observed nearly continuously the field, plasma, and energetic particle variations associated with this event. Scientists associated with

these spacecraft and others are in the early stages of intensive analysis of this event. A key motivator is to assess the extent to which disturbances observed at the Sun and/or in the solar wind outside the magnetosphere may be used to predict geomagnetic disturbances and associated mankind-affecting results (e.g., communications disruptions). This predictability underlies "space weather."

NSSDC and its partner, the Space Physics Data Facility, are contributing to this effort by making all the ISTP Key Parameter data easily browsable and retrievable from their CDAWeb system at <http://cdaweb.gsfc.nasa.gov>.

SSDOO Has New Associate Chief

By Joseph King

Ms. Nancy Laubenthal has joined the Space Science Data Operations Office (SSDOO), NSSDC's parent organization at Goddard, as its new associate chief. In this role she will be performing a series of important tasks in support of the SSDOO chief, Dr. James Green. Early on, assignments will focus on SSDOO changes associated with Goddard Information Technology reorganizations and with possible changes in NSSDC roles resulting from NASA/Office of Space Science realignment of its science data management and archiving environment.

Nancy comes to the SSDOO from Goddard's Laboratory for High Energy Astrophysics, where she had



Nancy Laubenthal is the new SSDOO associate chief.

been head of the Data Management and Programming Office for 14 years. She played a significant role as the software manager for the Gamma Ray Observatory's Energetic Gamma Ray Experiment Telescope (GRO/EGRET) instrument and data analysis software, and she has supported the High Energy Astrophysics Science Archive Research Center (HEASARC) through which many high energy astrophysics data are made publicly accessible. She has also been involved in a number of Goddard-level activities.

Nancy has a degree in computer science from Washington University, St. Louis, Missouri, and has been at Goddard for 20 years. We welcome her to the SSDOO and anticipate much benefit from her tenure here.



NSSDC Thirtieth Anniversary Reunion

By Joseph King

The National Space Science Data Center recently passed the thirtieth anniversary of its founding at Goddard Space Flight Center. To commemorate this, a reunion party has been scheduled for the Goddard Recreation Center, Saturday evening, May 17, 1997, starting at 5:00 p.m. Dinner will be served at about 7:00 p.m., and a short program of presentations will follow.

We have no easy way to determine how many people have worked at NSSDC over the years, but the estimate is close to 1,000. We want to find and include as many of these people as possible. If you are one of us, please contact Pat Ross at 301-286-7173, patross@nssdc.gsfc.nasa.gov, or Code 633, GSFC, Greenbelt, Maryland 20771.



NSSDC's last two and current (right) directors from left to right: Dr. James Vette, Dr. James Green, and Dr. Joseph King.

Privatization Status

By Joseph King

The wheels of change move slowly onwards. The Space Science Data System (SSDS) is the name given to the future NASA space science data management and archive environment.

There will be an open meeting at NASA Headquarters on March 27, 1997, to discuss the SSDS. Characteristics of this SSDS consist of a higher level of scientific community involvement and leadership, outsourcing of functions when feasible, and economy.

It is intended that with the input from the attendees at this workshop, plus other recent input as from the 1996 Linsky Committee, the NASA/Office of Space Sciences (OSS) will finalize plans for the SSDS evolution, and the future roles of NSSDC will then become clearer. Stay tuned!!

AMASE and ADC Services Shown at AAS

By James Gass

Members of the Astrophysics Data Facility (ADF) participated in the 189th Meeting of

the American Astronomical Society (AAS) held on January 12-16, 1997, in Toronto, Ontario, Canada. The ADF's participation included an exhibit booth, demonstrations of the Astrophysics Multispectral Archive Search Engine (AMASE) and Astronomical Data Center (ADC) Services, the sale of CD-ROMs from its Selected Astronomical Catalogs series, and free distribution of the Multiwavelength Milky Way poster.

New Web Interface Accesses NMC

By James Thieman

A new Web-based interface is available for quick access to the spacecraft, experiment, and data set information contained in the NSSDC Master Catalog (NMC). There are in excess of 5,200 spacecraft identified in the NMC. The NMC may be found at URL <http://nssdc.gsfc.nasa.gov/nmc/sc-query.html>.

This is a simple interface that provides three fields for searching for information: spacecraft name, spacecraft launch date or year, and discipline.

When the user clicks on an item from the list of spacecraft satisfying the search criteria, the information displayed often includes specific mission information, an image of the spacecraft, and hyperlinks to other information items and sources, including NMC experiment and data set information. There are often links to related Web pages in other organizations.

CDAWeb Popularity, Data Content on Rise

By Robert McGuire

The Coordinated Data Analysis (Workshop) Web (CDAWeb) system is a WWW-accessible service that provides graphical browsing and file downloading capabilities for a great deal of currently important space physics data from International Solar-Terrestrial Physics (ISTP) spacecraft and from other missions. It is based on NSSDC's Common Data Format (CDF) data structures and software.

Use of the CDAWeb system continues steady growth since its operational start in late May 1996. The number of CDAWeb plots created by users had reached about 3,000 per month by February 1997, approximately double that of six months earlier. The number of digital files downloaded in that time also doubled, to approximately 700.

The International Solar-Terrestrial Physics (ISTP) Key Parameters collection is a primary data base supported by CDAWeb and dominates the statistics. The ISTP Key Parameters include data from Geotail, the Solar and Heliospheric Observatory (SOHO), WIND, and Polar spacecraft plus others, and data are normally available to the world science community and the public in about one week.

CDAWeb is a joint effort among the Space Physics Data Facility (SPDF), NSSDC, and the ISTP project and its Science Planning and Operations Facility (SPOF). CDAWeb is most easily accessed at the URL <http://cdaweb.gsfc.nasa.gov/> or via that of SPDF (<http://spdf.gsfc.nasa.gov/>).

NSSDC NEWS: You'll find the complete articles on WWW at URL <http://nssdc.gsfc.nasa.gov/>

NSSDC Staff Rejoined on Goddard Campus

By George Abid

Goddard Space Flight Center's implementation of NASA's Strategies for the 21st Century contains a number of goals to be achieved, one of which describes the need "to maintain and upgrade Goddard's core infrastructure ..., with objectives to define facility requirements and to reduce the Center's overall infrastructure costs..." During the past year the NSSDC along with other parts of the Space Science Data Operations Office (SSDOO) was part of the center's Housing Implementation Plan to "backfill" space made available by moves of the Earth Observing System (EOS)-related people and facilities. The campaign involved 11 buildings, 33 moves, and nine months to complete. The timing for staff relocations was based on reorganizations, lease terminations, and contractual considerations, among other things.

The NSSDC/SSDOO part of this relocation was completed in January 1997, and now all NSSDC and other SSDOO government and contractor staffers, about 150 in all, are, for the first time since 1986, again fully located on the Goddard campus.

Digital Ionograms Now Retrievable

By Dieter Bilitza

NSSDC is now receiving digital International Satellite for Ionosphere Studies (ISIS) ionograms on a regular basis and is making them available for retrieval through its NASA Data Archive and Distribution Service (NDADS)/Space Physics Catalog (SPyCAT) system at <http://nssdc.gsfc.nasa.gov/space/ndads/spycat.html>. Included are the full resolution ionograms (8-bit receiver-amplitude values collected at a 40 kHz rate) and the averaged ionograms (averages of each four successive 40 kHz 8-bit values). At NSSDC the average ionograms are converted from their original binary to Common Data Format (CDF) and are being made available for retrieval, in binary or CDF, through NDADS/SPyCAT and for viewing through the NSSDC/Space Physics Data Facility's CDaWeb graphics system at http://cdaweb.gsfc.nasa.gov/cdaweb/sp_test/. First time users of the CDaWeb/ISIS system are encouraged to consult http://nssdc.gsfc.nasa.gov/space/isis/cdaweb_comments.html.

nssdc.gsfc.nasa.gov/space/isis/cdaweb_comments.html.

The ionograms are the result of a data restoration effort headed by Robert Benson of Goddard's Laboratory for Extraterrestrial Physics. His team is converting ISIS 2 topside sounder ionograms from the original analog telemetry tapes to a digital format. The plan is to perform a similar conversion for ISIS 1 and Alouette 2 ionograms. The Alouette and ISIS topside sounders have produced the only global mapping of the topside ionosphere over more than an entire solar cycle.

NSSDC Eliminates Optimum WORMs

By Ralph Post

During the last few months NSSDC has been copying data currently stored on Optimum 12S Write Once Read Many (WORM) optical disks to Digital Linear Tape (DLT). This migrating of data to a more modern medium is required by the imminent obsolescence of the Optimum drives.

The data currently being moved to DLT consist of approximately 60 platters of Dynamics Explorer (DE) and International Sun-Earth Explorer (ISEE) data. The data on the 60 2-GB platters will all reside, uncompressed, on nine DLT tapes. One last group of platters is being reviewed for possible inclusion into this migration effort as well. This group contains a few hundred platters holding DE telemetry data owned by the DE Project. Other science teams believed to have Optimum drives who are regular data providers to the data center have been surveyed as to their having any additional data to submit. NSSDC expects to receive no further data on this medium. Another chapter in NASA data management draws to a close!

ARCAD Data Newly Archived at NSSDC

By Natalia Papitashvili

The Aureol 3 spacecraft carried the French-Russian ARCAD project's instruments into a low-altitude, near-polar orbit in 1981. ARCAD had auroral electrodynamics instrumentation and objectives similar to NASA's pair of Dynamics Explorer (DE) spacecraft,

which were contemporaneous with ARCAD. Very little joint ARCAD/DE analyses have been performed because of the relative inaccessibility of ARCAD data.

NSSDC has just ingested full-resolution ARCAD magnetic field, precipitating particle, and VLF wave data from Y. Galperin of the Space Research Institute of Moscow. The data, in ASCII, were initially written to a pair of CD-ROMs at NSSDC and are also FTP-accessible from the directory ARCAD on the computer nssdc.gsfc.nasa.gov. Because the data files for each experiment have a complex structure, NSSDC has provided a software package ARCAD.EXE for MS-DOS and source code ARCAD.C for any other platforms. These new CDs can be ordered as Write-Once CDs from NSSDC at request@nssdc.gsfc.nasa.gov.

IMAGE OPS Center Developing within SSDOO

By Richard Burley

The Imager for Magnetopause to Aurora Global Exploration (IMAGE) mission successfully conducted its Confirmation Review over the days of February 25-27, 1997. IMAGE is the first of the new series of the mid-sized explorer project called Medium-Class Explorers (MIDEX) and is currently scheduled for launch in January 2000. Its capped MO&DA budget has forced its mission team to examine and adopt operations concepts that are atypical of missions at Goddard Space Flight Center. The most critical concept is the consolidation of mission operations and science operations into a single facility, called the Science and Mission Operations Center (SMOC). Co-locating all of the operations functions minimizes the number of interfaces within the system and allows the consolidation and minimization of operations staff. Because no proprietary data period exists for any IMAGE data product, no redundant, intermediate data handling facility is required to protect the data. Instead, these products will be immediately forwarded to the NSSDC, their ultimate destination, for immediate public display and distribution. Development of the IMAGE ground system is being led by this author, of the Space Physics Data Facility within the Space Science Data Operations Office.

The IACG Selects New Initiatives

By James L. Green

The 16th Inter-Agency Consultative Group (IACG) meeting was held December 10-11, 1996, at Cape Canaveral, Florida, to provide updates on the First, Second, and Third Campaigns. The IACG also created a new working group structure to carry out its current and future space science coordination activities. The restructured working groups and panels are as follows: WG-1 is the Solar System Exploration Working Group, WG-2 the Solar Terrestrial-Heliospheric Working Group, WG-3 the Data Archiving Working Group, Panel 1 the High Energy Astrophysics Panel, and Panel 2 the Infrared/Submm Astronomy Panel. WG-1 will include future solar and planetary missions. WG-2 will ensure that the present IACG space science campaigns will be brought to successful completion and the campaign results preserved in data bases available to the science community. WG-3 will make the space science campaign data sets available to the entire scientific community.

The international collaborative effort that has produced such a powerful fleet of missions has been carried out during solar minimum. The next solar maximum will start well within the expected lifetimes of most of the current solar-terrestrial missions fleet, providing an unprecedented opportunity for studying solar variability and its effects on the heliosphere and geospace environment.

Workshop Inspires Outreach Efforts

By James Thieman and Louis Mayo

James Thieman, co-chair of the Code 630 Education and Outreach committee, and Louis Mayo, chair of the Hughes STX Education and Outreach committee, attended the Pre-College Education Workshop held by the Space Science Institute (SSI) on February 23-26, 1997, in Boulder, Colorado. The workshop was designed to educate space science researchers in how they could support and reform science education in elementary and secondary schools and school districts.

The conference highlighted the work being done in hands-on, inquiry-based education as a method of reforming the way science is being taught in American schools with a particular emphasis on

space science education. Workshop attendees visited a Boulder Valley elementary school in which inquiry-based science activity kits were being used to teach science concepts to all grades. The kits are called Full Option Science System (FOSS) kits and contain all the materials needed to do multiple activities within a single subject area such as variables, magnetic fields and electricity, measurements, etc. The kits include a manual and video tape for the teacher and are easily adapted for use.

NOST NEWS

By John Garrett

The NOST office has participated in the creation of five final CCSDS and/or ISO Recommendations, three agency review draft Recommendations, and one early draft Recommendation, namely:

Recommendations

CCSDS 620.0-B-2

Standard Formatted Data Units - Structure and Construction Rules
(Note: See also Technical Corrigendum 1, November 1996)
May 1992
ISO 12175:1994

CCSDS 630.0-B-1

Standard Formatted Data Units - Control Authority Procedures
June 1993
ISO 13764:1996

CCSDS 632.0-B-1

Standard Formatted Data Units - Control Authority Data Structures
November 1994
ISO/DIS 15395

CCSDS 641.0-B-1

Parameter Value Language Specification (CCSD0006)
May 1992
ISO/FDIS 14961

CCSDS 643.0-B-1

ASCII Encoded English
November 1992
ISO/FDIS 14962

Draft Recommendations

CCSDS 622.0-R-1

Standard Formatted Data Units - Referencing Environment
November 1995

CCSDS 644.0-R-1

The Data Description Language EAST Specification
November 1995

CCSDS 647.0-R-1

Data Entity Dictionary Specification Language (DEDSL)(CCSD0011/CCSD0012)
November 1996

Open Archival Information System

Reference Model
January 1997

Copies of a recommendation or report can be accessed at http://bolero.gsfc.nasa.gov/ccsds/ccsds_publications.html.

NOST is also actively soliciting participation in development of the CCSDS and ISO Archiving Standards. More information on that process is available starting at <http://bolero.gsfc.nasa.gov/nost/isoas/>.



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