National Space Science Data Center

NSSDCNEWS

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XML Workshop Convened by NOST

By Donald Sawyer and John Garrett

Panel two of the Consultative Committee for Space Data Systems (CCSDS), in conjunction with the CCSDS-Technical Steering Group, sponsored a five-day eXtensible Markup Language (XML) workshop at the Raytheon facility in Landover, Maryland, beginning August 20, 2001. It was organized by the NASA/Science Office of Standards and Technologies (NOST) at NSSDC with support from other GSFC and JPL individuals.

Given the extraordinary momentum of XML developments and tools, it was felt that a look at their implications for the space domain was both appropriate and timely. The purpose of the workshop was to identify appropriate XML based techniques that can be promoted as standards in the near term and to do this in a way that would make substantial progress. The scope of the workshop covered all of the space domain, from on-board to deep archives.

The workshop issued an open invitation to participate, but attendance was limited by space and the need to make rapid progress. Ultimately 26 individuals from government, industry, and academia participated. Their expertise ran from onboard instruments, through mission operations, to long term archives. The workshop opened with a one-day plenary session with presentations from participants to set context and identify requirements. The plenary concluded the second morning and then broke into two working groups identified as "Data Description" (WG1), chaired by Peter Shames/JPL, and "Data Packaging" (WG2), chaired jointly by David Giaretta/British National Science Center (BNSC) and Lou Reich/CSC.

The Data Packaging need had previously been identified and draft requirements, both from past CCSDS packaging standards and from

continued on page 7

Genesis Mission and Archive Plan

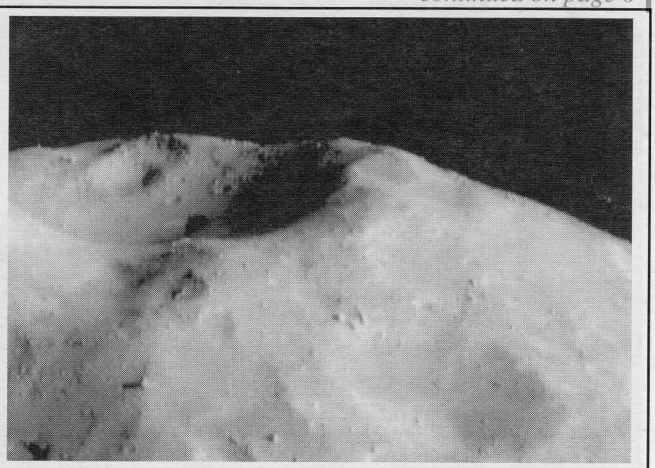
By Joseph King

NASA launched the Genesis spacecraft on August 8, 2001 to measure elemental and isotopic composition of solar wind plasma. Solar wind ions will be captured into silicon wafers during 29 months of in-space collection. The wafers will be then returned to Earth for analysis. From these analyses will come enhanced understanding of the sun and of the various domains and processes leading to various "types" of solar wind flows (coronal hole, coronal mass ejection, interstream.)

The Genesis mission is managed at the Jet Propulsion Laboratory. The Principal Investigator is Caltech's Dr. Don Burnett. Key instrumentation was built at Los Alamos National Laboratory (LANL) under Genesis Co-Investigator Dr. Roger Wiens. Included are not only the ion collector but also more traditional ion and electron spectrometers (Co-Investigator: Dr. Bruce Barraclough, LANL) whose outputs are telemetered to Earth and are used on-board to determine the time-varying type of solar wind enveloping the spacecraft. Deployable collectors appropriate to a given solar wind type are exposed while the spacecraft is enveloped by solar wind plasma of that type. Other collectors are continuously exposed.

The spacecraft will collect solar wind ions from an L1 orbit (about 1% the distance from Earth toward the sun, where a balancing of solar and terrestrial gravitational fields enable such an orbit) from about three months to 32 months past launch. The collectors, then riding in a special sample return capsule, will be captured by helicopter over Utah in September 2004.

continued on page 6



Pictured: 1 km crater on Eros asteroid. Image taken by NEAR from 37 km. See page 2 for data status.

IN THIS ISSUE

Asteroid Data NEARly Here

By David Williams

The NEAR-Shoemaker spacecraft may have ended its mission last February with a dramatic landing on asteroid 433 Eros, but the job of validating and archiving all the data and images returned by the mission is far from over. The first such data began arriving at NSSDC in September 2001.

The NEAR (Near-Earth Asteroid Rendezvous) Shoemaker spacecraft orbited the 13 x 13 x 33 km asteroid Eros for one year. This was the first spacecraft ever to orbit an asteroid and also the first to land on an asteroid. It returned a total of over 160,000 images along with data from other onboard instruments: a near-infrared spectrograph, an X-ray/gamma-ray spectrometer, a magnetometer, and a laser rangefinder, as well as radio science data.

The first data to be validated and released will be the "level 1B" uncalibrated raw data. These data were produced as CD-Write Once (CD-WO) volumes at Applied Physics Laboratory of the Johns Hopkins University and submitted to the Small Bodies Node (SBN) of the Planetary Data System for distribution. Public electronic access to NEAR data will be from the SBN Web site at http://pdssbn.astro.umd.edu/.

A total of 157 CD volumes of these raw data are expected. The CDs are sorted by instrument and time for a given instrument. Not surprisingly, the bulk of these CDs (116 volumes) are devoted to the byte-intensive imaging data returned by the spacecraft. A larger set of calibrated data (roughly 400 CDs) should start arriving at NSSDC in October 2001.

New SEC Advisory Group

By Joseph King and Robert McGuire

In order to ensure that the services built and evolved by the National Space Science Data Center and its partner, the Space Physics Data Facility, are those most needed by the NASA and international space physics ("Sun Earth Connection" - SEC) communities, we are in the process of forming a new SEC Advisory Group. This group initially will be led by Dr. Dave Sibeck of the Johns Hopkins University Applied Physics Laboratory. The full membership was still being defined as this article was being written. However, the group will consist of scientists from the cosmic and heliospheric (C&H), magnetospheric, and ionosphere/atmosphere/mesosphere (ITM) areas of space physics. We believe input from this group will be of major benefit in defining the optimal use of limited resources.

Maximal use of the internet and of telephone conferences will be made in order to minimize the time required of the group's participants. An initial teleconference was anticipated for late September 2001. One key early issue on which NSSDC/SPDF will solicit feedback is the diversity of interfaces (CDAWeb, OMNIWeb, ftp, etc.) to its data. The NSSDC/space physics Web page at http://nssdc.gsfc.nasa.gov/space/ leads to all these interfaces.

As always, NSSDC and SPDF welcome feedback from all actual and potential users of NSSDC/SPDF data and services. Most, if not all, of our interfaces have feedback options. Direct communications to joseph.king@gsfc.nasa.gov and/or to robert.mcguire@gsfc.nasa.gov are also welcome.

New Data Available

Since the last NSSDC Newsletter, the following data sets have become newly electronically available from NSSDC or have had their availability enhanced. "Simple" timespan-extensions of electronically accessible data sets are not identified in this article; many data sets from many missions (IMP, Wind, etc.) are continually being extended.

Data sets newly accessible from ftp://nssdcftp.gsfc.nasa.gov/spacecraft_data/ include the following data migrated from the newly retired NSSDC Data Archive and Distribution System (NDADS) system:

Dynamics Explorer 1:
- Auroral image data from SAI
- Magnetic field data from MAG-A
- Plasma data from RIMS
- Waves data from PWI
- Energetic particle data from HAPI and from EICS

Dynamics Explorer 2:
- Electric field data from VEFI
- Magnetic field data from MAG-B
- Neutral gas data from WATS
- Energetic particle data from LAPI
- Plasma data from IDM, LANL and RPA

ISEE 3: 1-min magnetic field data and 168-s and 1-hr electron-based solar wind plasma moments
SAMPEX: 30-s and polar-cap-averaged count rates and fluxes
IRAS: a variety of infrared astronomical data sets
Several additional data sets are expected to be added to this same ftp site in the coming weeks and months.

Data sets newly accessible for graphical or numeric display and/or retrieval of data subsets from Ftphelper at http://nssdc.gsfc.nasa.gov/ftphelper/:
IMP 8: 15-s magnetometer data, ~min-resolution plasma data from MIT and from LANL
Magsat: magnetic field data previously placed on CD-ROM at NSSDC
DE2: 1/2-s electric and magnetic field data previously placed on CD-ROM at NSSDC

A great many data sets are available from NSSDC's multiple systems and interfaces. All such systems and interfaces are linked from http://nssdc.gsfc.nasa.gov/space/.

NSSDC Assesses IUE Data Retention

By Beth Brown and Joseph King

During the 1978-1996 years of active International Ultraviolet Explorer (IUE) operations, NSSDC accumulated 2000 9-track magnetic tapes holding raw IUE data, plus data processed through various versions of the "IUESIPS" software. The processed data include the highest level product (the "extracted spectra" files) plus certain intermediate products. The data tapes are from both NASA and its European Space Agency (ESA) partner at Vilspa, Spain, and cover 107,000 independent observations made by IUE over its life.

As reported previously, the IUE project did a uniform and final processing of all the IUE data through a software package called NEWSIPS. Raw IUE data, all NEWSIPS data and most IUESIPS data (including the extracted spectra data) are presently held on modern media at the Multimission Archive at Space Telescope Science Institute (MAST) for IUE active archiving (providing e-access, etc.) and at NSSDC for permanent archiving. Only a few intermediate IUESIPS file types of marginal scientific value reside uniquely on the original 2000 magnetic tapes.

As capturing these intermediate file types from many of the 2000 tapes will involve a cost which may outweigh the potential scientific value of the files, NSSDC is soliciting input on their value from representative members of the community.

A discussion of the data files in question and of the estimated cost to recover them is at http://nssdc.gsfc.nasa.gov/astro/iuepaper.html. We welcome comments from all potential users. NSSDC will release the 2000 tapes and their backups unless arguments against such action warrant a re-evaluation.

Archive Plan Available

The latest 3-year NSSDC Archive Plan is now accessible at http://nssdc.gsfc.nasa.gov/nssdc/arch_plan/2001.html.

This plan specifies the data volumes NSSDC expects to receive during each of the three years from 2001 through 2003 from each of many spacecraft. All the data are for permanent archiving at NSSDC. Some data, not supported (made network-accessible) by extra-NSSDC active archives such as the astrophysics High Energy Astrophysics Research Center (HEASARC) and Multi-Mission Archive (MAST) facilities or the Planetary Data System, will also be made network-accessible from NSSDC by one or more access pathways (e.g., by CDAWeb and/or by simple FTP).

The plan shows anticipated data inflows to NSSDC of 2.9-3.8 TB annually, with about 460-560 GB to be made network-accessible annually from magnetic disk.

NDADS and SPyCAT Retired

By Joseph King

Final turnoff of the NSSDC Data Archive and Dissemination System (NDADS) occurred on September 14, 2001. NDADS was a VMS-based mass storage system with a pair of 12-inch WORM optical disk jukeboxes having a total capacity of about 2 TB.

NDADS and its E-mail-based Automated Retrieval Mail System (ARMS) interface were initially created at NSSDC ten years ago by a team led by Michael Van Steenberg to support electronic access to data from the IUE mission. Gradually data from more astrophysics and space physics missions were added to NDADS.

In recent years, with the emergence of the HEASARC and MAST as NASA's primary sites for the electronic access of astrophysics data in wavelengths from gamma rays through visible light, NDADS became mainly a tool for the online dissemination of data from space physics missions such as Interplanetary Monitoring Platform (IMP 8), International Sun-Earth Explorer (ISEE 3), Dynamics Explorer and International Solar Terrestrial Physics (ISTP).

To facilitate access to space physics data, the Web-accessible SPyCAT interface was developed allowing users to specify a mission, a data set, and the time span for which data were desired.

Over its 10-year life more than 2.1 million data files were downloaded from NDADS by users, with an annual maximum of 460,000 files in 1997. A gradual decline ensued as many of the data files become more conveniently and immediately accessible through other interfaces at NSSDC (e.g., CDAWeb, COHOWeb) and elsewhere (e.g., HEASARC, MAST).

Most of the space physics data previously network-accessible from NDADS are now FTP accessible from ftp://nssdcftp.gsfc.nasa.gov/spacecraft_data/. The logic of our FTP hierarchy, our readme files and the use of time coverage in data file names will enable users to find and retrieve needed data files without the aid of a SPyCAT-like interface. User comments on this point are welcome.

The only astrophysics data uniquely supported through NDADS by 2001 were from the Infrared Astronomy Satellite (IRAS) launched in 1983. These data were primarily accessed through an IRAS-specific Web interface at http://space.gsfc.nasa.gov/astro/iras/iras_home.html. The data were moved to nssdcftp/spacecraft_data/iras and are accessible through the same Web page as well as by ftp://nssdcftp.gsfc.nasa.gov/spacecraft_data/iras calls.

SECEF

By James Thieman

The Sun-Earth Connection Education Forum (SECEF - http://sunearth.gsfc.nasa.gov/) had a very rewarding summer -literally. SECEF, a partnership between GSFC and the University of California Space Sciences Laboratory at Berkeley, is managed at GSFC from within the NSSDC. Several members of the team worked together with members of the Origins Education Forum (http://origins.stsci.edu) to develop a Space Science Education Resource directory (http://teachspacescience.org/). The development team received a NASA Group Achievement Award for development of this directory. The directory has been very well-received by the education community and contains information about many of the exemplary space science education resources that NASA has to offer. Products meeting particular educator needs can be quickly found and accessed via the Web or through distribution sites nearby such as the Educator Resource Centers located in every state (http://spacelink.nasa.gov/Educational.Services/How.to.Access.Information/erc_state.html). Products can also be ordered through NASA's Central Operation of Resources for Educators (CORE) (http://spacelink.nasa.gov/Educational.Services/How.to.Access.Information/core.html.) The directory grows each year as new products are added, so give it a try to see what might be useful to you!

The SECEF team - top step (l to r): W. Taylor, N. James, S. Pompea, J. Thieman, R. Vondrak, T. Cline, 2nd step: L. Mayo, G. Schultz, E. Lewis, I. Hawkins; 1st step: I. Ruderman, K. Hauck; ground level: D. Kisich, S. Odenwald, C. Ng.

The entire SECEF team received a NASA Group Achievement award in August 2001. The citation read "In recognition of your superior efforts in making NASA's Sun-Earth Connection science known and understood nationally both in the classroom and to the general public." Over the four years of SECEF's existence there have been more than thirty people directly involved, full-time or part-time, in the activities both at Berkeley and at Goddard. In addition, the team has worked together with many other members of the overall NASA education support network, who also deserve recognition for bringing NASA science to the community. These include educators, technicians and scientists involved directly with NASA missions; managers; summer interns; outside businesses and many interested individuals. The recognition should go to all.

NSSDC and IMP 8 Fare Differently in SEC Senior Review

By Joseph King

The NASA Office of Space Science (OSS) held a Senior Review earlier this year to assess the continuing benefit of operating each of 14 active Sun Earth Connection (SEC) spacecraft and 3 data centers. The review was held in the context of budget shortfalls making it impossible to continue support for all missions and centers.

The Senior Review Panel of eight SEC scientists from the community read proposals and heard oral presentations from each mission and center and made cost/benefit-based recommendations to NASA/OSS which played these against its budget constraints. The final report of the Senior Review Panel is at http://spacescience.nasa.gov/admin/divisions/ss/SEC_Senior_Review_2001.pdf

The space physics (SEC) activities of NSSDC were reviewed as one of the three relevant data centers. The panel judged that NSSDC and its Space Physics Data Facility partner were providing very good value to the SEC research enterprise. NASA/OSS funding for these activities will be continued at a level unchanged but for inflation increases.

In the spaceflight mission area, the decision was made to terminate operations of the 1973-launched IMP 8 spacecraft. The IMP magnetometer failure in June 2000 was a significant factor in the decision. The IMP 8 spacecraft was the last of the IMP spacecraft series, the first was launched some 38 years ago. IMP 8 has yielded an extraordinarily valuable data set of solar wind magnetic field and plasma data and of cosmic ray and other energetic particle data. About one-third of IMP data were taken in the Earth's magnetotail. Otherwise the data were taken in the solar wind in the Earth's general vicinity. Extensive holdings of IMP data are at and conveniently accessible from NSSDC. IMP 8 has been the single most significant contributor to the 38-year NSSDC-maintained OMNI data set (whose earliest data are from IMP 1).

Some other missions or programs were adversely affected. For instance, NASA expects to limit the 1994-launched Wind spacecraft to special campaigns and to a role as a "hot spare" to ACE as solar wind monitor. Intended phasedown epochs for SAMPEX and FAST were given as late FY02 and FY03 respectively.

For FY02, there will be a fleet of six geospace NASA and NASA-collaborative spacecraft (Cluster, IMAGE, Polar, FAST, Geotail and SAMPEX) and six solar-heliospheric spacecraft (SOHO, ACE, Voyager, Ulysses, TRACE and Yohkoh). In addition, the geospace TIMED and solar HESSI missions will be launched during 2002.

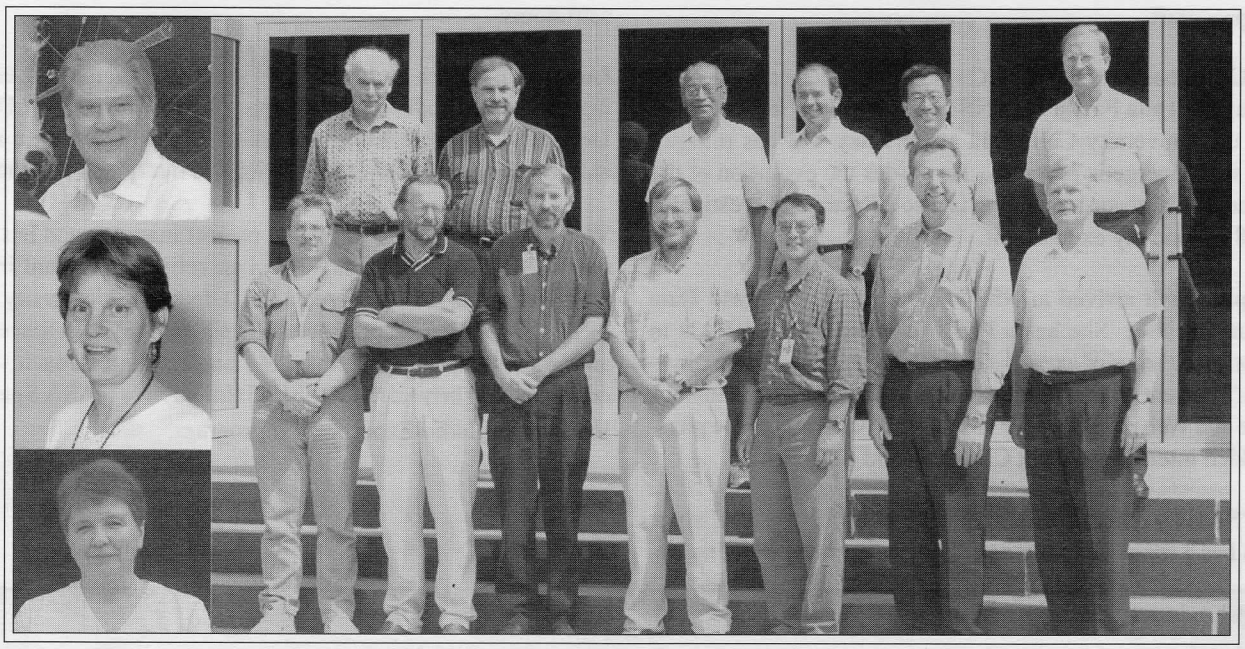
NSSDC's Space Physicists

By Natalie Barnes

Over its 35-year history NSSDC has included on its management and working level staffs many space physicists who have enabled NSSDC to better understand NSSDC-resident data and the data and services needs of its space physics user community. These understandings have led to the definition and implementation of quality checking of NSSDC-inflowing data, value added data products and geophysical models, access and display pathways to sensor data, trajectory data and geophysical models, and better user support than would have been otherwise possible.

This article is intended to introduce our current space physicists. These include NSSDC civil servants, others civil servants within the closely aligned Space Physics Data Facility and others employed by Raytheon, NSSDC's onsite support contractor.

The scientists identified below have all been publishing scientists, and several continue to publish the results of their own research. However, given the service role of NSSDC, none has as his/her primary job scientific research and publication. Note that of the 16 persons identified below, 13 have Ph.D.s and three have Masters degrees. The duration of their service to NSSDC ranges between five and 27 years, with a mean value about 14 years.



Pictured left (top to bottom): William Taylor, Ramona Kessel, and Natalia Papitashvili.
Pictured right (top row from left): Joseph King, Robert McGuire, Sardi Parthasarathy, Donald Sawyer, Lun Tan, and James Thieman (bottom rown left to right): Edwin Bell, Dieter Bilitza, Robert Candey, John Cooper, Shing Fung, James Green, and Kent Hills.

Ed Bell is a leader in NSSDC's Information System development area and has been with the NSSDC for 11 years. Ed received a Ph.D. in Physics from the University of Kansas in 1990. His primary area of expertise is magnetospheric physics, specifically, charged particle interaction with natural satellites.

Dieter Bilitza has worked at the NSSDC since 1985 and is the leader of the international effort to improve the International Reference Ionosphere. Dieter's current NSSDC responsibilities include acquisition, archiving and documentation of ionospheric and atmospheric data, and maintaining and evolving the NSSDC models archive. He received his Ph.D. in Physics from Albert-Ludwigs University, Freiburg, Germany in 1984.

Robert Candey has been with the NSSDC since 1991 and is presently responsible for long range computer systems planning. He received a Master of Science degree in Computer Science in 1990 from Johns Hopkins University. Bob was previously part of the Goddard Dynamics Explorer science team.

John Cooper joined NSSDC in 1990. His current responsibilities include data acquisition from Ulysses, ACE, Voyager and other interplanetary missions, as well as data analysis and modeling for Galileo Orbiter energetic particle data. John received a Ph.D. in Physics from the University of Chicago in 1983. His areas of expertise include magnetospheric and heliospheric space physics.

Shing F. Fung has worked for the NSSDC for nine years. His responsibilities include GSFC trapped radiation modeling, research as an IMAGE team member, and service on the Living With a Star (LWS) Data System working group. Shing holds a University of Maryland Ph.D. awarded in 1985. His expertise is in space plasma and magnetospheric physics.

James L. Green arrived at the NSSDC in 1985 as its second Director. He became Chief of the Space Science Data Operations Office (SSDOO) in 1992 and has stayed active in the affairs of NSSDC, an element of SSDOO. In addition, Jim is a co-investigator on IMAGE. He received his Ph.D. in Space Physics from the University of Iowa in 1979. Jim's area of expertise is magnetospheric physics, especially plasma-wave interactions.

continued on page 6

Space Physicists

continued from page 5

Kent Hills is currently the leader for data acquisition and value-added services and has been at the NSSDC since 1978. He received a Ph.D. from the University of Iowa in 1967. His primary areas of expertise are charged particles in the earth's magnetosphere, in interplanetary space and at the lunar surface.

Ramona Kessel has been at the NSSDC for ten years and is currently responsible for ISTP data acquisition, overseeing the Space Science Visualization Lab, and for research using ISTP and Cluster satellite data. Mona holds a University of Kansas Ph.D., awarded in 1986. Her area of expertise is shocks in collisionless plasmas, particularly the Earth's bow shock .

Joseph King has been at the NSSDC since 1969, except for a 5-year stint at Goddard's Laboratory for Extraterrestrial Physics. He received his Ph.D. in 1966 from Boston College. Joe's expertise is in solar wind physics and solar wind-magnetosphere coupling. He conceived, created and continues to evolve the OMNI data set. Presently Joe's roles are as Director of NSSDC and Project Scientist for the IMP 8 spacecraft.

Robert McGuire has been at NSSDC since 1985 and is now head of the Space Physics Data Facility (an NSSDC partner). He has a 1976 Ph.D. from the University California at Berkeley and has primary expertise in solar energetic particles. He guides the evolution of the CDAWeb and SSCWeb systems. Bob is also a Principal Investigator for an IMP 8 cosmic ray experiment.

Natalia Papitashvili arrived at NSSDC in 1992 from World Data Center B2 in Moscow. She has a Ph.D. awarded by IZMIRAN in 1981. Her primary areas of expertise are geophysics and space physics. Natasha's current responsibilities include OMNI data extensions and software and Web interfaces for virtually all NSSDC's space physics value-added interfaces except CDAWeb and SSCWeb.

Raghav ("Sardi") Parthasarathy has been at the NSSDC since 1984. Sardi has a special expertise in coordinate systems and trajectory calculations. He plays the principal role for NSSDC's World Data Center responsibility (creating launch announcements and Spacewarn Bulletins). He received a Masters degree in Physics from Annamalai University in India in 1952 and is a Professor of Physics (Emeritus) at the University of Alaska.

Donald Sawyer arrived at NSSDC in 1971 and received a Ph.D. Candidate Certificate from the University of Minnesota in 1973. Don's discipline expertise includes magnetospherically trapped particle populations (Van Allen belts) and cosmic ray geomagnetic cutoffs. His current activities focus on data management standards. He is a key person in CCSDS Panel 2 and GSFC-wide standards activities and leads the Formats Evolution Process.

James Thieman has been at the NSSDC since 1985. He has management responsibility in NSSDC information systems and in the Sun-Earth Connection Education Forum. Jim is a graduate of the University of Florida, where he received his Ph.D. in Physics with research in Astrophysics in 1977. His specialty is planetary radio astronomy.

Lun Tan has been at the NSSDC since 1994 and is currently working on trapped radiation modeling. Lun received a Ph.D. from the University of Hong Kong in 1883. His expertise is in interstellar antiproton spectra and energetic ions in interplanetary shocks.

William Taylor is the Raytheon project manager and has been with the NSSDC for five years. He is an active participant in IMAGE-based research. Bill received a Ph.D. from the University of Iowa in 1973. His prime area of expertise is plasma waves in space. Another area of his expertise is education and public outreach. He is the creative force behind the INSPIRE (Interactive NASA Space Physics Ionosphere Radio Experiments) program.

Genesis Mission and Archive Plan

continued from page 1

The material will be transported to and managed from a new Class 10 Clean Room at Johnson Space Center (JSC) under the leadership of Dr. Eileen Stansbery. About 30% of the material will be used on early analyses by Genesis-funded investigators. The balance of the material will be archived at JSC for additional analyses by other members of the research community. Pathways for obtaining samples of the material will be similar to those for returned lunar material, described at http://www-curator.jsc.nasa.gov/curator/lunar/lunar.htm.

Data from the LANL ion and electron spectrometers (2.5-min-resolution proton flow speeds and directions, densities, and temperatures, alpha particle densities, and a measure of electron bidirectional flow) will be archived at the National Space Science Data Center as part of its extensive holdings of network-accessible solar wind magnetic field and plasma data taken over the past 40 years. It is especially noteworthy that JPL's Dr. Marcia Neugebauer played a key role in NSSDC's earliest solar wind data (from the 1962-launched Mariner 2 mission to Venus) and also in this Genesis mission.

Further details on the Genesis mission can be found at http://genesismission.jpl.nasa.gov/ and in the July 2001 issue of the Discovery newsletter at http://discovery.jpl.nasa.gov/newsletters_archive.html.

It should be noted that the Genesis mission has developed significant "education and public outreach" Web pages and products accessible from the mission Web page referenced above.

Summer Interns and Visitors

By George Fleming

In 2001 the SSDOO was the temporary home for a stellar group of interns and Fellows from a large number of programs. Again, as in 1999 and in 2000, one of our SSDOO interns was given the *Rashaan Jackson Presentation Award* for an outstanding presentation. Here are our interns and their projects this year:

Maretta Cameron (Jim Green, mentor): Produced a movie simulating the environment around a black hole.

Art Congdon (Shing Fung, mentor): *Application of Extreme Value Statistics to Geomagnetic Storms.*

Pictured: A few of NSSDC's 2001 Summer Interns.

Nicole Forrester (Elaine Lewis, mentor): *Having a Solar Blast for NASA Connect.*

Andrew Mitchell (Kirk Borne, mentor): *Java to C Conversion of XDF Classes.*

Greg Pierce (Jim Green, mentor): Helped develop a proposal entitled "*Cultivating Better Internet Citizens Through Student Education.*"

Francis Qian (Shing Fung, mentor): Received the Rashaan Jackson Presentation Award for "*Development of a New Model for Predicting the Fluxes of Belt Particles.*" Congratulations!

Mayra Tovar (Terry Kucera, mentor): *Observations of Solar Prominences in the Ultraviolet.*

Aaron Williams (John Cooper, mentor): *Charged Particles in Planetary Magnetic Fields.*

The SSDOO was the host for **Dr. Jacob Adeniyi** of Nigeria and **Dr. Olivier Obrou** of the Ivory Coast, two National Science Foundation (NSF) Fellows. They were here to help further improve the International Reference Ionosphere (IRI) model.

Other guests this year included **Amber Shaw** (Elaine Lewis, mentor); **Dan Guldin** (Greg Goucher, mentor); **Nathan Kelley** (a Meyerhoff Fellow); **Lee Mundy** on a University of Maryland Sabbatical; **Brendon O'Shea** (Shing Fung, mentor); **Stephen Rinehart,** an NRC Post Doc; **Kali Grooms** (Dave Williams, mentor); and **Cheung Tzehing** (Greg Goucher, mentor). And last but not least, reappearing this year were **Bill Pine, Sue Higley, Anne DiMarco** (Sten Odenwald, mentor), **Chuck Higgins,** and new this year **Paul Lombardo** (Jim Thieman, mentor), who developed educational materials on the IMAGE/POETRY Web site.

XML Workshop/NOST

continued from page 1

a W3C working group, were distributed prior to the workshop. The draft was reviewed and updated based on known and expected packaging needs associated with ground distribution and storage of information in both mission operations and archiving scenarios. Several on-going XML based data packaging efforts in non-space specific domains were examined to see what could be adopted or adapted. These included IMS, MPEG21, and METS. While these efforts will continue to be tracked, a very preliminary XML schema definition of a packaging approach was developed and this included the option of a package form using ZIP to hold binary files. While substantial progress was made, much more work needs to be done to complete this effort and those willing to contribute should make themselves known to the authors.

The Data Description (WG1) agenda was much less tightly defined prior to the workshop, and this lent itself to looking at broader issues associated with the use of XML in the space domain. They looked at XML and non-XML based description languages targeted at different, but overlapping, domains of the space environment, including instrument data description, telemetry and telecommand, and archival data. They looked at the need for establishing overarching models, a glossary, and data dictionaries to improve cost-effective handling and usage of data. They also came to the view that CCSDS was the right forum to pursue this standardization, and they developed a plan calling for the establishment of a CCSDS Technical Working Group to continue the XML based standards effort.

Coordination between WG1 and WG2 was accomplished by exchanges between the chairs at the end of each day, and by an impromtu plenary session held Thursday morning. The final plenary was held Friday morning where it was clear there was strong support for continuing this effort. A "CCSDS XML" Web site has been set up to provide a focus for the effort. Presentations from this workshop and draft materials are available, as well as a preliminary report. You will also be able to make your interest in participating known through this site at http://www.ccsds.org/xml/.

For further information please send E-mail to Donald Sawyer at Donald.Sawyer@gsfc.nasa.gov or John Garrett at John.Garrett@gsfc.nasa.gov.

Telescopes in Education, SSDOO and NSSDC

By Lou Mayo

The Telescopes in Education (TIE) project will team with Goddard's Space Science Data Operations Office (SSDOO), the University of Maryland/Baltimore Campus (UMBC) and the Goddard Education Office to develop a world-wide network of over 20 research grade observatories for use by K-12 students using virtual data system concepts. This effort will be made possible through a recently funded two-year NSF grant which seeks to link current TIE observatories together through the Web and gives teachers and students unprecedented access to astronomical research facilities, which can be remotely accessed and controlled in the classroom. Co-I Lou Mayo of Raytheon and SSDOO will work with Susan Hoban of UMBC (Principal Investigator for the NSF grant), Gil Clark (TIE Foundation), and other education, technology and research partners. NSSDC will play an important role as the central archive site for all TIE observations and data products. Other capabilities to be developed will include a smart user interface to assist with selection and operation of the observatories, an on-line peer-reviewed professional journal for students to publish their research results, new astronomy curriculum modules, and student projects, as well as new analysis tools.

Students with telescope at the Mount Wilson Observatory in California.

Howard University, through its Physics and Astronomy Department, has provided the latest entry into the TIE program with a 30-inch Cassegrain reflector located in Beltsville, Maryland, near Goddard. Dr. Demetrius Venable (Department Chair), along with telescope technician and researcher Dr. Fred Marsh and telescope automation guru Tom Melsheimer (Meridian Controls), have been working with Lou and the TIE project over the past six months to refurbish the telescope and add internet based command, control, and imaging capabilities. First light festivities for the remodeled telescope are expected to occur around the end of the year.

Another exciting element of the program is TIE's partnership with the Astronomical League (AL). AL, in cooperation with Boeing, is planning to put a 14-inch Cassegrain and H-alpha solar telescope aboard the International Space Station (called ISS-AT) for use by amateur astronomers and K-12 education. Once in place, ISS-AT along with its ground based operational prototype system will become members of the TIE global network.

Signs of Martian Life at NSSDC

By David Williams

A recent New York Times feature article announced, "Data collected 25 years ago on Mars by NASA's two Viking Landers show evidence of life, a scientist contends." The article described the discovery of a circadian rhythm in data returned from the Labeled Release Experiments (Principal Investigator: Dr. Gil Levin) on the Viking Landers, a rhythm which was interpreted as an indication of extant microbial life in the samples scooped up from the Martian surface.

Much of the data on which this study was based came from microfilm archived here at NSSDC since the late 1970s. The recent interest has resulted in an effort by NSSDC and the Planetary Data System to digitize the microfilm as well as paper listings still held by the original Co-Investigator, Dr. Pat Straat, as described in an earlier Newsletter article at http://nssdc.gsfc.nasa.gov/nssdc_news/sept00/viking_lander.html.

An early portion of the digitized data was used by a scientist on the data set review panel to come up with these remarkable, albeit still very controversial, findings. The data are now almost fully digitized and validated. A preliminary version was posted in mid-August 2001 at http://wufs.wustl.edu/missions/vlander/lr.html.

Over the next few months more data will be added to this collection. It is expected the later data set data will be used for detailed analyses in the near future to verify the claims of evidence for life on Mars in the preliminary data.

NSSDCNEWS

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