

Inicios del Internet en México

Gloria Koenigsberger
Instituto de Ciencias Físicas
UNAM

ACLARACIONES

- Esta es una historia basada en experiencias propias.
- El material mostrado es, salvo algunas excepciones, el original.
- Trabajo de equipo
Enrique Pérez García, Federico Kuhlmann, Felipe Bracho, Alfonso Serrano, Susana Biro, José Fernando Barral, Elfego Ruiz, Edgar Sáenz, Víctor Guerra, José Sarruján, Jorge Carpizo,

Definición del *Internet*

- 1995 Octubre 24: Federal Networking Council:
 - ``*Internet* refers to the global information system that --- (I) is logically linked together by a globally unique address space based on the Internet Protocol (IP) or its subsequent extensions/follow-ons; (ii) is able to support communications using the Transmission Control Protocol/Internet Protocol (**TCP/IP**) suite...; and (iii) provides, uses or makes accessible, either publicly or privately, **high level services** layered on the communications and related infrastructure described herein.”

RESUMEN

- ``Pre-Historia'' 1957--1985
- Algunos documentos historicos 1985--1989
- Epilogo

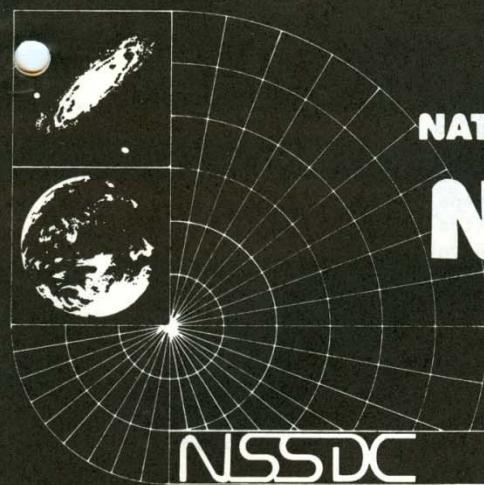
``Pre-Historia”

- **1957-1968**: DARPA comienza a estudiar técnicas para interconectar computadoras; (Advanced Research Projects Agency)
- **1968- 1979**: DARPA contrata a BBN (Boldt, Beranek & Newman) quienes desarrollan el método para interconectar computadoras (IMPs, modems y mensajería electrónica) e implementar el TCP/IP en UNIX.
- Request for Comment (RFC) Ver www.rfc-archive.org para toda la historia técnica, a partir de 1969 (RFC #1).

- 1979: Internet Control and Configuration Board (ICCB);
DARPA+NSF+U.Wisconsin==> CSNET
- 1983: separación de MILNET y ARPANET
==>libre flujo de información
- 1985: NSFnet para construir ``espina dorsal'' interconectando centros de super computo; NSF impone como estandard el TCP/IP.
- TCP/IP + UNIX bajo filosofía Open Source

Space Physics Analysis Network (SPAN)

- Información de misiones espaciales desperdigada en múltiples centros de la NASA, todos con formatos distintos (OSO-8, HEAO1 y 2, IUE, etc.)
- 1981: SPAN entra en operación y se crea el National Space Science Data Center para facilitar la diseminación de los datos y consolidar bases de datos, unificando formatos.
- Mundo astrofísico: VAX y DECnet



NATIONAL SPACE SCIENCE DATA CENTER
NEWSLETTER

No. 1

April 1985

NSSDC Looks Forward

To some of our readers, the National Space Science Data Center (NSSDC) needs no introduction. On behalf of the readers who are not familiar with the functioning of NSSDC, and for those who are not fully aware of its recently-expanded scope, we offer this overview. Many facets briefly mentioned in this overview are more fully described in other articles in this *Newsletter* or will be highlighted in subsequent issues.

NSSDC primarily exists to assure continuing accessibility and utility of data produced by NASA spaceflight missions. For most of its nearly 20-year history, data were primarily held off-line in the form of magnetic tapes, microforms, photographic film, and hardcopy. In this off-line environment, NSSDC typically acquired reduced and analyzed data from individual scientists, archived these data, retrieved data in response to requests with the aid of an automated information system, duplicated tapes or film, and mailed data along with a documentation package to requesters.

We have entered an era when data will be held and transmitted in both off-line and

on-line forms. For off-line data, NSSDC is beginning to move to higher density storage media, optical disks for digital data, and videodisks for analog images. With respect to on-line data and electronic data communications, NSSDC is bringing some of its archive on-line to allow access from remote terminals. Moreover, as a node on the DECnet-based Space Plasma Analysis Network (SPAN), some users will have computer-to-computer access to on-line data. NSSDC has recently assumed the role of providing a central Directory/Catalog service, whereby users can determine characteristics of data possibly relevant to their current needs, including data location and access procedures. Data described may be held on-line or off, at NSSDC or elsewhere.

In addition to these activities oriented toward data accessibility, NSSDC pursues other activities. For instance, NSSDC personnel have developed systems to facilitate the use of data, including the Coordinated Data Analysis Workshop (CDAW) and Pilot Climate Data System (PCDS) software packages. Value-added data sets have been created by appropriately synthesizing
(Continued on page 9)



NATIONAL
SPACE
SCIENCE
DATA
CENTER

WORLD DATA CENTER A for ROCKETS AND SATELLITES

INTRODUCTION TO THE
SPACE PHYSICS ANALYSIS NETWORK
(SPAN)

JAMES L. GREEN
VALERIE L. THOMAS
NATIONAL SPACE SCIENCE DATA CENTER
GREENBELT, MD 20771

BRIAN LOPEZ-SWAFFORD
SCIENCE APPLICATIONS RESEARCH
LANHAM, MD. 20706

LINDA Z. PORTER
SPACE SCIENCE LABORATORY
HUNTSVILLE, AL 35812

JANUARY 1987

SECOND EDITION
NSSDC TECHNICAL REPORT



National Aeronautics and
Space Administration

Goddard Space Flight Center

FOREWORD

This second edition replaces the original NASA technical manuscript the "Introduction to the Space Physics Analysis Network (SPAN)" by the Data Systems Users Working Group, edited by Green and Peters, 1985. Over two thousand copies of that manuscript have been issued in the last year and one half. The need for accurate up-to-date information on, NASA's only correlative space and Earth science network, is enormous prompting this much revised Second Edition. The first edition of the Introduction to SPAN served not only as a document of information about the network's capabilities but as a user's guide to a system of special network nodes of value to everyone. This philosophy is still carried on here, although the authors immediately recognize that it is only a brief attempt to describe the status of the system at a given time while it is constantly growing.

Now that SPAN has grown so large and has cut across all science discipline boundaries that NASA supports this Second Edition is not nearly enough. In fact, the Second Edition only contains information which would be considered generic. It will be in conjunction with the Data Systems Users Working Group that SPAN management will begin to document science discipline specific capabilities which SPAN currently supports. In fact, two such documents, one covering Astrophysics and Astronomy and the other on Oceans research, are now in preparation. As these documents become available, they should begin to fill the gap that this second edition has intentionally left. It is hoped that the Introduction to SPAN would only need to be revised every two or three years, while the discipline specific SPAN documents might need yearly review and revision.

It is truly gratifying to have been a part of the rapid development in networking as a tool to do space science research. It is my opinion that SPAN has been the seed for the telescience concept (telecommunications to conduct science from remote locations: see Schmerling, 1985) that will be used extensively in the Space Station era. I have taken advantage of networking capabilities for many years now (perhaps more than most) and find it to be indispensable for facilitating my space plasma physics research activities. SPAN is providing a basic tool or service for NASA space and Earth science research that should foster a basic understanding on what scientists need as a data analysis networking ground system in order to achieve all proposed scientific objectives for future NASA missions.

James Lauer Green

January 1987

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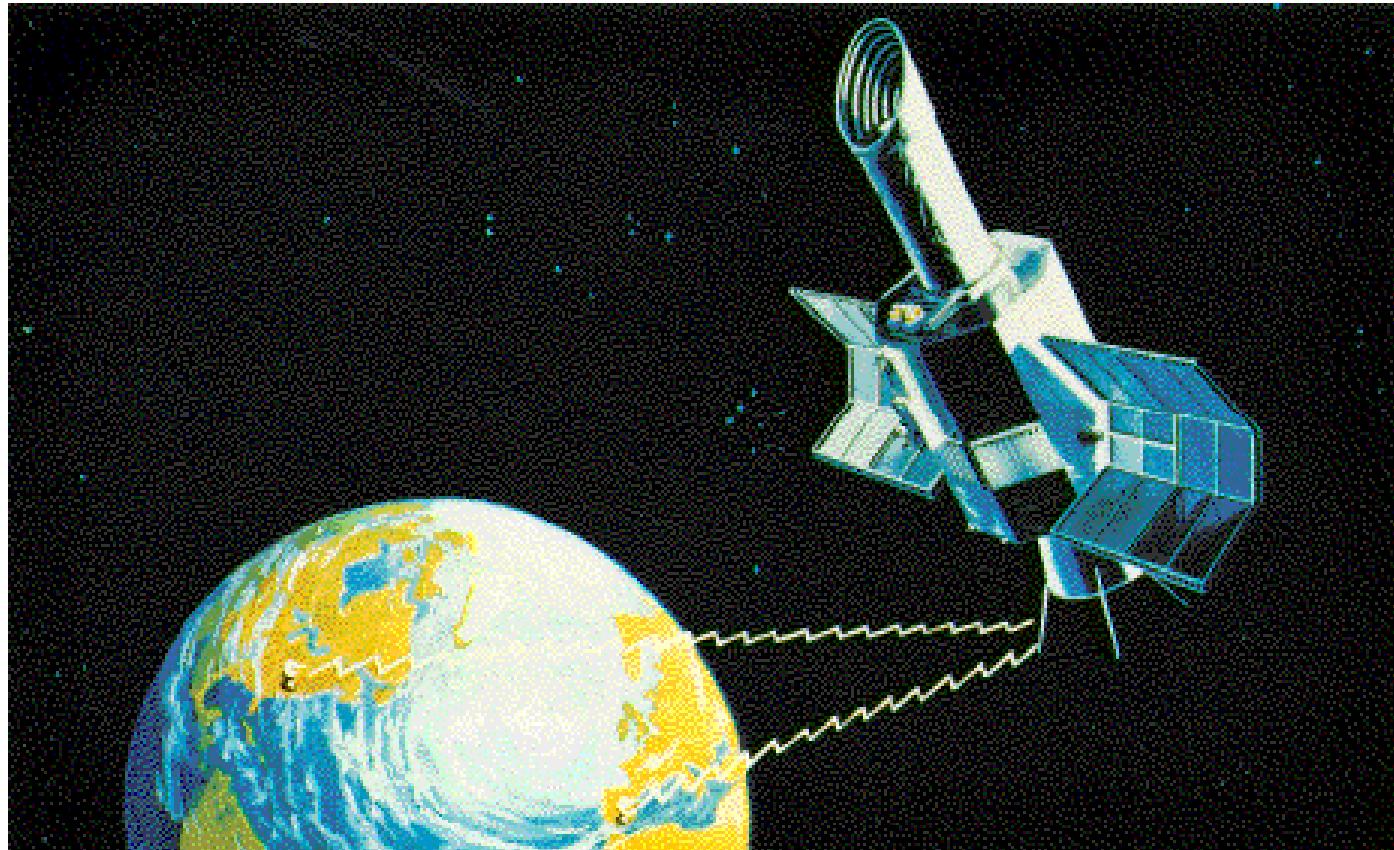
James Lauer Green

January 1987

1986 Diciembre: ~1200 computadoras conectadas

Necesidades de conexión en el Instituto de Astronomía 1985

- Observaciones y transferencia datos del VLA (L. F. Rodríguez)
- Cálculos de transiciones atómicas en Harvard (V. Escalante)
- Experimentos numéricos de hidrodinámica del medio interestelar en Alemania (J. Franco)
- Estudios numéricos de interacción de n-cuerpos en supercomputadora de EUA (L. Aguilar).
- Observaciones y análisis de datos del IUE en NASA/GSFC (G. Koenigsberger, S. Torres-Peimbert)



International Ultraviolet Explorer
1978--1999
Espectroscopia en el UV lejano

Procesamiento de datos en GSFC/NASA;
IDL=interactive data language

Observatorio Astronómico Nacional en San Pedro Mártir

Ciudad Universitaria

Ensenada

OAN/SPM

Socios extranjeros:

- U. Massachussets Amherst
- Italia (Grupo de Brera)



Necesidades en otras dependencias

- Red Sismológica Nacional (IGF-UNAM): enlace al USGS (G. Suárez)
- Interacción Sol-Tierra y estudios de rayos Cósmicos (IGF-UNAM) requerían acceso a bases de datos de la NASA (R. Gall, R. Perez, J. Valdez)
- Colaboración con colegas en EUA (IA, IF, IA, IGF, IM)
- CINVESTAV: Depto. Ciencias de Computación deseaba conexión a CSNET

Intentos infructuosos

- TYMENET
- TELEPAC

Sin posibilidad de acceso a SPAN

IV-100 17000-17 December 1986

CENTRAL COMPUTER SERVICES

NOAO and Computer Networks

Over the past few months, we have solidified our commitment to wide-ranging computer networks throughout the astronomical community. Our experience with networks has demonstrated the real advantages of electronic mail and file transfer for scientific collaboration on papers and observing proposals, for support of IRAF and for general communication.

In collaboration with ST ScI, NRAO and a number of other institutions, we are participating in an effort to fulfill this commitment by facilitating astronomical computer networking. As the first part of this "Astronet", leased data lines were recently installed from ST ScI in Baltimore to NOAO-Tucson and NRAO-Charlottesville. Another line connects ST ScI to the Ballistic Research Laboratory in Maryland where it is tied into the DARPA-Internet system. Thus, we will soon be able to use the ARPAnet for computer mail.

We are also involved in networking in the Tucson area to try to tie together the numerous astronomical groups in the vicinity. As a first step, we are joining the University of Arizona campus network and we plan to serve as a mail gateway from the "Astronet" to the astronomical computers on the U of A campus.

A further benefit of the U.A. network connection will be a direct connection to the BITNET; we expect to become a BITNET node early in 1987. By the end of 1986, we should also be connected to the SPAN (Space Physics and Analysis Network) sponsored by NASA. Since we are already an active member of the UUCP network, we should soon be able to exchange electronic mail with virtually any network-capable computer in the world.

The next few months will certainly be hectic as we implement these network links and tie together various computer mail systems. Unfortunately, our addresses on all these networks are mostly unknown (and previously listed addresses are probably defunct by the time you read this). Until things settle down, and the definitive newsletter article can be written, please contact Steve Grandi (602-325-9228) for the latest details.

Steve Grandi

IRAF Update

The release of IRAF Version 2.3 started in late August. This release of IRAF was intended to mostly support the first release of the SDAS software by the Space Telescope Science Institute. This release included a package reorganization to isolate the NOAO optical astronomy software from the IRAF system software, a change to the image i/o interface that permits use of IRAF with

**``Contact Steve
Grandi....''**

Primeros Contactos

1986: Newsletter #44 NOAO: Steve Grandi;

1987: Febrero 19: telefonema a Peter Shames
(STSCI; desarrollo de IRAF).

Febrero 24: SN 1987A.....



Top left is NE. Width of each image is about 8 arc min

Roll mouse over picture to see precursor star

Image and text © 1989-2002, Anglo-Australian Observatory, photograph by David Malin.

Cerro Tololo Interamerican Observatory (CTIO)

- Cintas magnéticas desde Tololo a La Serena;
- La Serena ---> Santiago ---> EUA

Marzo 2: Llamada de Peter Shames:

- ``huella'' Morelos ?
- contactar a Steve Wolff (Director Redes y Telecom NSF).

Marzo 6: visita SCT (S. Landeros)

Marzo 10: Llamada de Steve Wolff;

- 1) UNAM tendría acceso al Internet ==> enviar solicitud oficial.
- 2) enlace a Cerro Tololo ?
- 3) enlace banda C a San Diego ?



UNIVERSIDAD NACIONAL AUTONOMA DE MEXICO
INSTITUTO DE ASTRONOMIA
OBSERVATORIO ASTRONOMICO NACIONAL
CIRCUITO EXTERIOR

Dr. G. Fleegsager

UNIVERSIDAD NACIONAL
AVPNMA DE MEXICO

March 17, 1987

DR. S. WOLFF
NSF, Room 533
1800 G Street NW
Washington, D.C. 20550
U.S.A.

Dear Doctor Wolff:

Several members of the Institute of Astronomy of the National Autonomous University of Mexico (UNAM) have expressed their desire and need to have access to data banks in the U.S.A., such as those of the International Ultraviolet Explorer, and remote access to computers where they have usercodes. In addition, it would be highly desirable for us to be able to communicate in an efficient manner with our collaborators at U.S.A. institutions. Thus, we are very interested in joining the NSF network.

We are currently investigating all the possible ways in which access to the NSF network, via a U.S. institution, may be achieved. One of the options is the use of the Morelos communications satellite, although our current funding is a strong limitation in terms of the land stations. Another possibility is a phone connection between our Observatory offices in Ensenada, B.C. and a nearby host institution such as the University of California, San Diego. In principle, we should be able to achieve communication with Ensenada from Mexico City at 9600 Bauds, using TELEPAC, the Mexican network operated by the Communications and Transport Secretariat (SCT) of Mexico. If you have any other suggestions, these would be most welcome.

We thank you very much for your assistance and interest.

Sincerely,

A. Serrano
DR. ALFONSO SERRANO
Director

ASPG/gcp

APARTADO POSTAL 70-264
CIUDAD UNIVERSITARIA
MEXICO 20. MEXICO

TELS. 548-3712 548-5306
548-45-37
550-5215 EXT. 5923



UNIVERSIDAD NACIONAL AUTONOMA DE MEXICO
INSTITUTO DE ASTRONOMIA
OBSERVATORIO ASTRONOMICO NACIONAL
CIRCUITO EXTERIOR

UNIVERSIDAD NACIONAL
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We are currently investigating all the possibilities of access to the NSF network, via a U.S. institution. One of the options is the use of a communications satellite, although our current strong limitation in terms of the land stations is a phone connection between our offices in Ensenada, B.C. and a nearby station as the University of California, San Diego. We should be able to achieve communication with Mexico City at 9600 Bauds, using TELEPAC, operated by the Communications and Transmissions of Mexico. If you have any other suggestions, most welcome.

We thank you very much for your assistance.

Sincerely,
A. Serrano
DR. ALFONSO SERRANO
Director

ASPG/gcp

APARTADO POSTAL 70-264
CIUDAD UNIVERSITARIA
MEXICO 20. MEXICO

July 23, 1987.

Dr. S. Wolff
NSF, Room 533
1800 G. Street N W
Washington, D.C. 20550
U. S. A.

Dear Dr. Wolff:

We are in the process of writing a proposal requesting financial support for the purchase of the communications hardware required by our PRIME 550 computer. We will attempt obtaining these funds via a Scientific-Technological cooperation agreement which exists between the U.S. and Mexico. For this, we would need to show that the funding we require indeed involves cooperation between our two countries. Specifically, there must be a U.S. institution involved. Last March, over the telephone, you told me that our Institute would be allowed to join the NSF network, and our Director, Dr. Alfonso Serrano, formally requested this.

I would like to ask you the following: Would it be alright if we use joining the NSF network to justify our request for this funding? If it is alright, would you write a letter to Dr. Serrano stating that the Institute of Astronomy will be allowed to join the network? We would present this letter with our funding request.

Thank you very much.

Sincerely,

Gloria Koenigsberger

C.C.- Dr. A. Serrano.

GK/roe.

NATIONAL SCIENCE FOUNDATION
Division of Networking and Communications
Research and Infrastructure
Washington, D.C. 20550
(202) 357-9717
dncr@note.nsf.gov



August 24, 1987

Dr. A. Serrano
Instituto de Astronomia
Observatorio Astronomico Nacional
Apartado Postal 70-264
CD. Universitaria
04510 Mexico, D.F.

Dear Dr. Serrano:

The National Science Foundation is pleased to offer the Institute for Astronomy connection to NSFNET in order to expand the exchange of scientific information and facilitate other forms of collaboration among scientists in our two countries.

At the NSF, the responsible person will be:

Jane Caviness
Program Director for Networking
National Science Foundation
1800 G ST., NW
Washington, DC 20550

She will work with whomever you designate to make the necessary administrative, technical, and financial arrangements for the connection.

Yours very truly,

Stephen S. Wolff,
Division Director

NATIONAL SCIENCE FOUNDATION
Division of Networking and Communications
Research and Infrastructure
Washington, D.C. 20550
(202) 357-9717
dncr@note.nsf.gov

DII

August 24, 198

Dr. A. Serrano
Instituto de Astronomía
Observatorio Astronómico Nacional
Apartado Postal 70-264
CD. Universitaria
04510 Mexico, D.F.

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Washington, DC 20550

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Yours very truly

Stephen S. Wolff

Stephen S. Wolff,
Division Director

GIA

PROUESTA DE INGRESO DE LA UNAM A LA RED CIENTIFICA NSFNET

INTRODUCCION

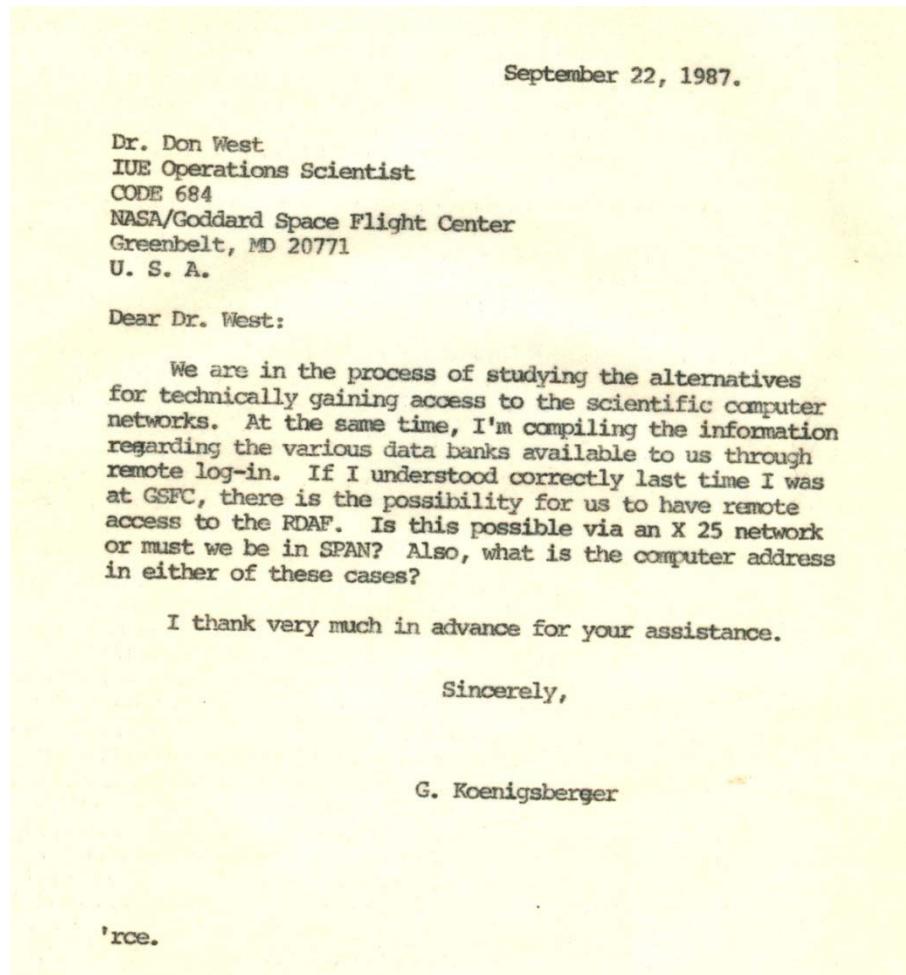
Los desarrollos más recientes en sistemas de teleinformática han permitido estrechar los lazos de unión entre científicos a nivel mundial. En particular, el evento de supernova que impactó a la comunidad de Físicos y Astrónomos a principios de 1987, hizo patente la necesidad de emplear los recursos que existen para agilizar la comunicación y la transferencia de datos y así generar avances importantes dentro de la Ciencia. Es decir, a pesar de que la tecnología de la teleinformática a principios de 1987 estaba ampliamente desarrollada como para permitir un flujo continuo de información desde los observatorios en el hemisferio Sur hacia los grandes centros de reducción y análisis de datos en el hemisferio Norte, no se habían implementado estos desarrollos. Actualmente, existe un enlace vía satélite entre el observatorio de Cerro Tololo, en Chile, y la red SPAN (Space Physics Analysis Network) de la NASA.

México, y en particular, la UNAM, cuenta con grupos de investigación en problemas de frontera y cuyas contribuciones hacia el avance de la Ciencia son de relevancia a nivel internacional. Así mismo, numerosos investigadores y profesores cuentan con colegas en el extranjero, con quienes llevan a cabo proyectos importantes. Por otro lado, existen recursos, principalmente en los E.E.U.U., tanto de equipo de cómputo como de bancos de datos sumamente especializados, los cuales están a la disposición de numerosos investigadores Mexicanos. El problema fundamental para hacer uso de estos recursos, al igual que para colaborar con colegas extranjeros, es el problema de la comunicación. Este problema existe a pesar de que México cuenta con los desarrollos tecnológicos necesarios para resolverlo.

El propósito de este documento es detallar las necesidades de la comunidad científica en el renglón de la comunicación, y presentar una solución óptima, la cual consiste en la utilización del Sistema de Satélites Morelos para ingresar a la red científica-académica NSFNET. Este enlace internacional podría concebirse como la semilla engendradora de una red nacional académica, vía satélite, la cual permitiese fomentar el crecimiento de centros de investigación en las instituciones de educación superior en el interior de la República, compartir recursos de cómputo, facilitar la comunicación, y elevar el nivel académico en el país.

A continuación se presentan, en forma de resumen, los detalles de esta propuesta.

Contactos con NASA



- 1987 Oct. 26
Telefonema Tony
Villa señor:
 - 1) \$ de la NASA
 - 2) Entrar por
NSF
 - 3) USAN==>Joe
Choy

Finaliza 1987

1987 diciembre 7: telefonema Ed Krol

- 1) TCP/IP es imprescindible;
- 2) Equipo SUN lo tiene intrínseco;
- 3) NSF y NASA compartirán los costos del lado de EUA;
- 4) Ha habido contacto del ITESM (José Ramón Ortiz)

Reunión de Monterrey

1988 enero 21

- 1) ITESM: José Ramón Ertze
- 2) UNAM: Gloria Koenigsberger
- 3) NSF+NASA: Joe Choy
- 4) VITALINK

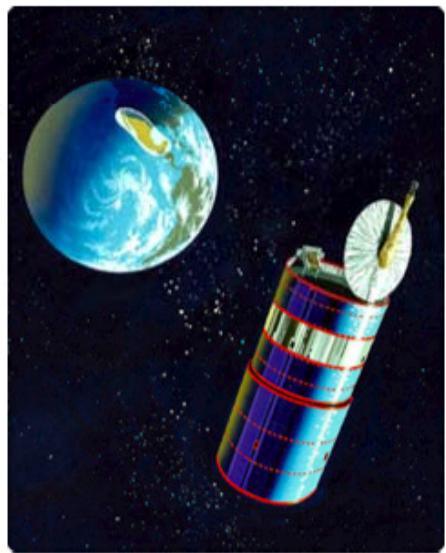
Acuerdos de la Reunión de Monterrey

- 1) Se utilizara el satélite Morelos (I)
- 2) Participantes de cada país serán responsables de financiar, instalar y operar su parte correspondiente de la conexión al Internet. La NASA financiara el equipo a ser instalado en Boulder.
- 3) En Boulder, la operación del enlace estará a cargo SCD/NCAR (USAN).
- 4) El uso del enlace será exclusivamente con propósitos de investigación científica y otras actividades académicas.



Morelos

Mexico's First National Satellites



STOWED

Diameter	2.16 m (7 ft 1 in)
Height stowed	2.85 m (9 ft 4 in)

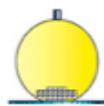
IN ORBIT

Height deployed	6.62 m (21 ft 8 in)
Weight in orbit	646.5 kg (1422 lb) beginning of life

In November 1982, Mexico, in a major step toward unifying the rural and urban areas of the nation, ordered its first domestic communications satellite system from Hughes Aircraft Company, known today as Satellite Development Center. The two satellites are versions of the Hughes 376 and were launched on the space shuttle June 17 and November 27, 1985.

The Morelos system is owned by the governmental agency Telecommunicaciones de Mexico (Telecomm) and provides advanced telecommunications to even the most remote parts of the nation. Educational television, commercial programs over the national television network, telephone and facsimile services, and data and business transmissions are carried by the satellites. Morelos allows live television programming to originate in at least 12 principal cities. Cultural, educational, and athletic events in and around these cities can be televised nationwide, thereby featuring regional accomplishments.

Mexico was the first customer to use the Hughes 376 as a hybrid satellite operating in two frequency bands (C and Ku) simultaneously. It also was the first Latin American country where Hughes Space and Communications Company is the



Transmisión solo en territorio nacional

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH
Scientific Computing Division/Distributed Computing Section
P. O. Box 3000 • Boulder, Colorado • 80307
Telephone: (303) 497-1222 • Telex: 989 764

February 5, 1988

Lic. Jose Ramon Ertze, Director
Direccion de Informatica
Campus Estado de Mexico, ITESM
APDO. Postal 214
53100 Ciudad Satelite, Estado de Mexico
Mexico

Tony Villasenor
Program Manager, Information Systems
NASA Headquarters - EI
Washington, D.C. 20546
U.S.A.

Dra. Gloria S. Koenigsberger-Avena
Instituto de Astronomia
UNAM
APDO. Postal 70-264
Mexico, D.F. 04510
Mexico

Steve Wolff
Director, DNCRI
National Science Foundation
1800 G. Street, NW
Washington, D.C. 20550

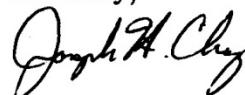
Dear Colleagues:

Enclosed you will find the current overview of the plan to implement an internet link between Mexico and the United States. Please review it and send comments to me as soon as you can. There is a meeting planned for February 24, 1988 at the Universidad Nacional Autonoma de Mexico, Mexico City Campus to discuss and finalize the plans as well as to check the progress of obtaining approvals and funding.

Please pay close attention to section III of the proposal (Responsibilities of Involved Individuals). The basic concept is that the respective organizations in the United States and Mexico will be responsible for funding the equipment, installation, maintenance, and ongoing operation which is in their country. If you concur, you need to sent a letter to the other three addressees of this letter indicating your support. Please also send a copy to me.

I look forward to seeing you all in Mexico City.

Sincerely,



Joseph H. Choy
Manager, Distributed Computing



**INSTITUTO DE ASTRONOMÍA
OBSERVATORIO ASTRONÓMICO NACIONAL**

Apartado Postal 70-264 Cd. Universitaria
04510 Mexico, D.F.
Tels.: 548-3712 548-5303 548-4537

February 17, 1988.

LIC. JOSE RAMON ERTZE
Director
Direccion de Informatica
Campus Estado de Mexico, ITESM
Apartado Postal 214
53100 Ciudad Satelite
Estado de Mexico
MEXICO

STEVE WOLFF
Director, DNCRI
National Science Foundation
1800 G. Street, NW
Washington, D.C. 20550
U. S. A.

TONY VILLASENOR
Program Manager,
Information System
NASA Headquarters - EI
Washington, D.C. 20546
U. S. A.

JOSEPH H. CHOY
Manager, Distributed Computing
Scientific Computing Division
NCAR
P.O. Box 3000
Boulder, Co. 80307
U. S. A.

Dear Colleagues:

This is in reply to Joe Choy's letter of February 5, 1988. We have reviewed the draft of the current plan to implement an internet link between Mexico and the United States and find it satisfactory. We agree with the conditions stated in Section III (Responsibilities of Involved Individuals), although we are still in the process of searching for the funding.

I'm looking forward to our meeting in Mexico City.

Sincerely,

Gloria Koenigsberger

LETTER OF AGREEMENT FOR THE COLLABORATION BETWEEN THE SCIENCE NETWORKS PROGRAM OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) AND THE UNIVERSIDAD NACIONAL AUTONOMA DE MEXICO (UNAM) IN THE ESTABLISHMENT AND OPERATION OF AN INTERNET LINK.

The purpose of this agreement is to provide for the establishment and operation of an international link between computer networks of educational and research organizations in the United States and Mexico, for academic purposes. Both parties, NASA and UNAM, are very interested in such an internet link in order to enable scientists and engineers at their respective research and educational institutions to collaborate with their colleagues.

The Mexican satellite system Morelos is suitable for the link and will be used for this purpose.

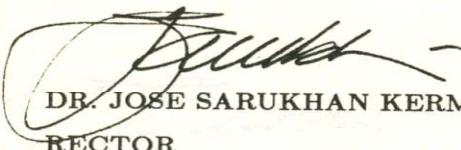
The participants in both countries will be responsible for the funding, installation and operation of that part of the internet link which lies in their respective countries. Specifically, NASA will provide initial funding for the satellite dish and associated equipment needed to connect their facilities at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado, to the link. NASA will also initially sponsor the ongoing maintenance cost for the satellite dish and associated equipment in the United States at NCAR, as well as the access to the network from NCAR.

In the United States, the project to establish an internet link with Mexico via the Morelos satellite system is and will be coordinated through the Scientific Computing Division (SCD) at NCAR, due to its experience with the Transmission Control Protocol (TCP), Internet Protocol (IP) and ARPANET application protocols over a KU and VSAT satellite networks, known as the University Satellite Network (USAN).

In Mexico, UNAM will be responsible for assuring the approval, funding, installation and operation of the satellite dish and associated equipment to connect it to its network using the TCP/IP protocols. The UNAM will also provide for the ongoing maintenance cost for the satellite dish and associated equipment at its campuses in Mexico, as well as the satellite transponder space used for the internet link in the Morelos satellite system.

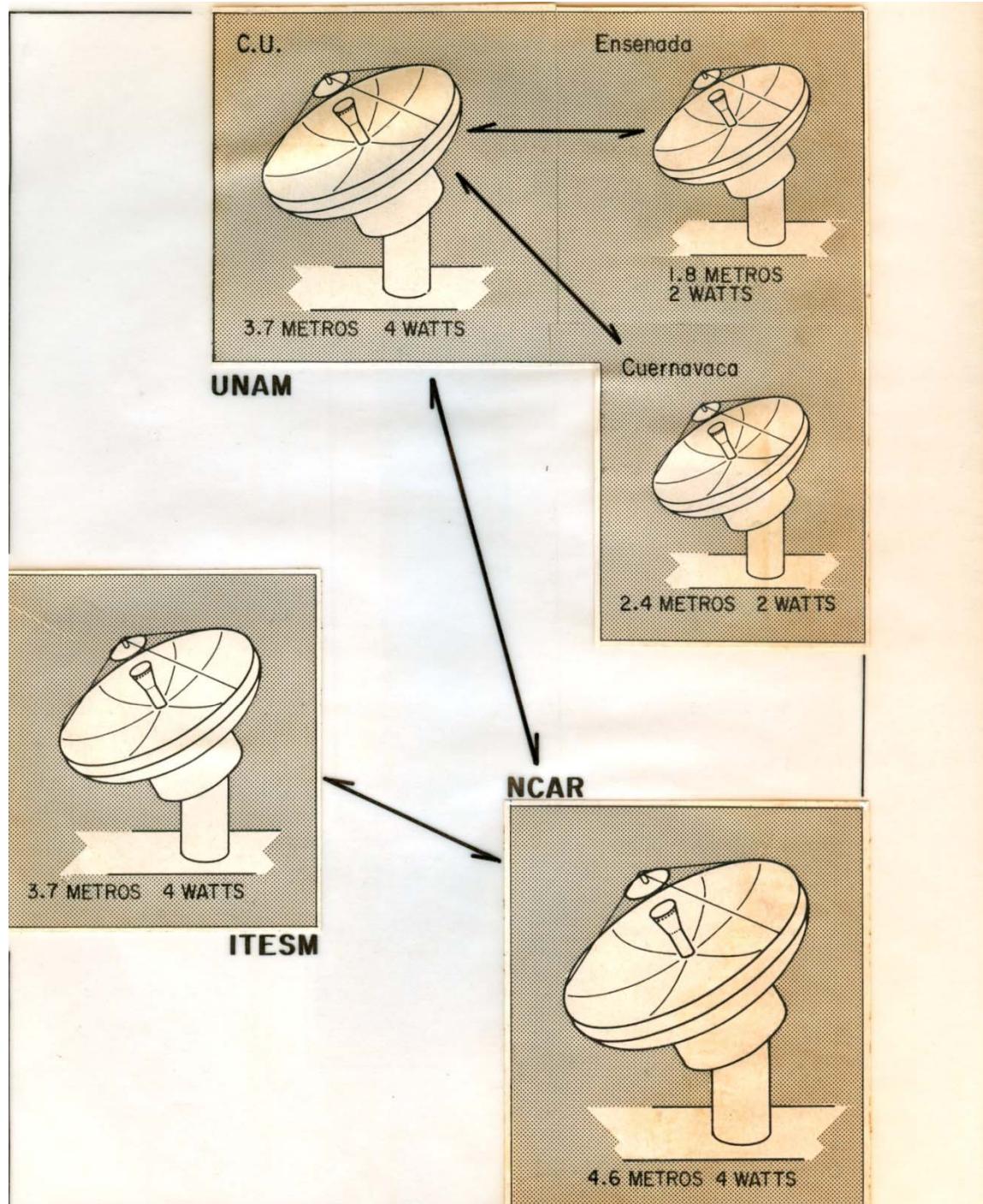
Both parties agree that the internet link will be used exclusively to support scientific research and other scholarly activities.

Los dos actores que manejan el servicio Internet serán utilizados exclusivamente para fines de investigación científica y a otras actividades académicas.



DR. JOSE SARUKHAN KERMEZ
RECTOR

UNIVERSIDAD NACIONAL
AUTONOMA DE MEXICO



Dibujo de Alberto
García (c.1988)





Epílogo

- Primera conexión de México se inauguró en 1989 septiembre.
- Resultado de necesidades de investigación científica básica.
- El satélite utilizado fue el Morelos I, en banda Ku, y transmitiendo fuera de las fronteras de México.
- La UNAM y el ITESM compartieron el mismo canal de 128 kbps.
- Fuimos el primer país no-desarrollado en tener Internet.
- Tremendos problemas de infraestructura nacional en telecom impidió un uso amplio hasta muchos años después.