1989

NASA/ASEE SUMMER FACULTY FELLOWSHIP PROGRAM

MARSHALL SPACE FLIGHT CENTER
THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

AUGMENTING AND UPDATING

NASA SPACELINK ELECTRONIC INFORMATION SYSTEM

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ABSTRACT

I was privileged to participate in the development of
Spacelink during the periods of its gestation, birth,
infancy, and childhood. In addition to compiling and
developing more material for implementation in Spacelink,
Summer 1989 was spent scanning the insignias of the various
manned missions into Spacelink.

Material for the above was extracted from existing NASA
publications, documents and photographs.

1. Introduction

The National Aeronautics and Space Administration offers educators a wide range of educational services including speakers, publications, audiovisual materials, software, advanced educational technology, curriculum assistance, electronic communications, in-school satellite programs, student programs and training opportunities. One of its relatively new offerings is Spacelink, an Electronic Information System for Educators, operated by the Marshall Space Flight Center. (See Appendix A.)

I was privileged to participate in the development of Spacelink during the periods of its gestation, birth, infancy, and childhood. In addition to compiling and developing more material for implementation in Spacelink, Summer 1989 was spent scanning the insignias of the various manned missions into Spacelink.

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2. The Process

The material entered into Spacelink consisted of photographs and text documents. The photographs were scanned through the Abaton scanner into the Macintosh using the software C Scan 1.5. Each photograph was then sent to Spacelink via an Xmodem transfer (See Appendix B).

Most of the text was on Macintosh disks. It was necessary to convert each document set up in a Macintosh format to a form that would conform to the Data General format. Each document was then sent to Spacelink via an Xmodem transfer from whence it was imported into the Data General where the editing process took place. The rest of the text was first edited and/or compiled on the Data General. Each edited document was then exported to a simulated version of the Spacelink program where it was tested and refined. Thereafter, it was sent to Spacelink ready to be used by its users.

The following is a list of some of the material included:

1. Astronaut Biographical Data

2. Gemini Program Summary

3. NASA 1989 Long Range Program Plans

4. Software for Aerospace Education

5. Macintosh Graphics of Manned Mission Logos

CONCLUSIONS and RECOMMENDATIONS

Now that the computer has become the basic underpinning of
the space program and society, it is important that this
vital resource be maximized in keeping classroom
instruction relevant and current. The material prepared
for Spacelink has found widespread use by teachers and
others across the nation, and is being used to stimulate
students in their quest for excellence. A review of the
summary of Spacelink's use, testifies to the fact that NASA
is making a very worthwhile investment in this endeavor, an
investment which should be continued.

REFERENCES

1. Biographical Data, Lyndon B. Johnson Space Center, Houston, Texas 77058, NASA 1989

2. Crew Insignias, Lyndon B. Johnson Space Center, Houston, Texas 77058

3. Gemini Program Summary, A NASA Publication

4. 1989 Long-Range Program Plan, NASA, National Aeronautics and Space Administration, Washington, D.C. 20546

5. Mission Facts Summary, NASA, U.S. Government Printing Office

6. NASA Spacelink, Marshall Space Flight Center, Huntsville, Alabama 35812

7. Software for Aerospace Education, NASA, National Aeronautics and Space Administration, Washington, D.C. 20546

"NASA Spacelink is a collection of NASA information and educational materials stored on a computer at the Marshall Space Flight Center in Huntsville, Alabama. It is designed to communicate with a wide variety of computers and modems, especially those most commonly found in classrooms and homes. The system may be accessed over regular telephone lines. NASA Spacelink is free" except for the cost of long distance calls.

It provides information on:
> Current NASA News
> Aeronautics
> Space Exploration Before the Shuttle
> Space Exploration Beyond the Shuttle
> Nasa and Its Centers
> NASA Educational Services
> Classroom Materials
> Space Program Spinoffs

"NASA Spacelink runs on a Data General ECLIPSE MV-7800 minicomputer located at the George C. Marshall Space Flight Center in Huntsville, Alabama. NASA Spacelink software was developed and donated to NASA by the Data General Corporation of Westboro, Massachusetts. The system has a main memory of 14 megabytes (14 million characters), disk storage space for 708 megabytes, and can communicate with eight callers simultaneously at 300, 1200, or 2400 baud. The data word format is 8 data bits, no parity, and 1 stop bit. NASA Spacelink is a dynamic system that changes and expands daily. It was made available to the public in February, 1988.

Initial funding for NASA Spacelink was provided by the Educational Affairs Division at NASA Headquarters. The NASA Spacelink data base is maintained by the Public Services and Education Branch of the Marshall Space Flight Center Public Affairs Office. Operational support is provided by the Information Systems Office at the Marshall Center. Information on NASA scientific projects and educational programs is provided to NASA Spacelink by education specialists at NASA Headquarters and the NASA field centers.

While NASA understands that people from a wide variety of backgrounds will use NASA Spacelink, the system is specifically designed for teachers. The data base is arranged to provide easy access to current and historical information on NASA aeronautics and space research. Also included are suggested classroom activities that

incorporate information on NASA projects to teach a number
of scientific principles. Unlike bulletin board systems,
NASA Spacelink does not provide for interaction between
callers. However, it does allow teachers and other callers
to leave questions and comments for NASA."

APPENDIX B

"An Explanation of XMODEM

A public domain file transfer protocol created by Ward
Christensen in 1977, XMODEM allows information to be
transferred rapidly from one computer to another with 99%
accuracy. Also known as the Christensen Protocol, XMODEM
is found in many communications packages and may be run on
a wide range of computers. The XMODEM option was installed
on NASA Spacelink in May 1988.

The XMODEM protocol sends files in 128-byte sequentially
numbered blocks of information with a checksum appended to
each block. The receiving computer, which must have XMODEM
capable software, receives a block of data, calculates a
checksum, and then compares it to the checksum contained in
the data received. If the checksums match, the receiving
computer acknowledges the data and the next block is sent
and checked. If an error occurs in transmission, the
checksums will not match, and the receiving computer will
ask for the block to be sent again. If more than a
predetermined number of consecutive errors occur, the
transfer will be aborted. Most communications programs do
not display actual information as it is received during an
XMODEM transfer. Instead, a count of the blocks will be
displayed.

Just before an XMODEM transfer begins, NASA Spacelink
displays the number of 128-byte blocks in the file to be
transferred. With this information a caller can calculate
the approximate transfer time for a file. At 300 baud,
each block is transferred in about 4.5 seconds. At 1200
baud, each block is transferred in about 1.1 seconds, and
at 2400 baud, each block is transferred in about 0.5
seconds."