# NMFECC Foreign Networking Activities

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I mentioned the role of the ESnet Steering Committee in last month's *Buffer* article on NMFECC networking activities. One of the early networking requirements identified by the Steering Committee was to expand our foreign network connections to help facilitate a number of ongoing and current international collaborations. (A list of countries and sites is included at the end of this article.) We have since then given priority to the sites in Japan, Switzerland, and West Germany.

## Switzerland

The first new foreign site installed was CERN, the European Center for Nuclear Research (the acronym comes out right in French) near Geneva, Switzerland. This connection is satellite based, running at 64-kilobits-per-second, and became operational in early 1988. It connects in the U.S. at Fermi National Accelerator Laboratory (FNAL) near Chicago. This link was established primarily for the needs of the U.S. High Energy Physics (HEP) program and is used to provide DECnet connections between U.S. and European HEP sites. This link is connected to the X.25 backbone, which was established as an interim capability until ESnet can fully support X.25 (for more details about the X.25 backbone, see the November *Buffer* article, "NMFECC Networking Activities").

## West Germany

We were beginning to explore the issues of establishing one or more connections into West Germany when we were requested to provide communications support, on a priority basis, to the U.S. team of the International Thermonuclear Experimental Reactor (ITER) design project located near Munich, West Germany in late 1987.

The ITER project is a multinational project whose objective is to define the technical characteristics for the conceptual design of a major tokamak machine. The design is being done by teams from the four contributing partners, Europe, Japan, U.S., and the USSR. The teams meet jointly on a periodic basis in Garching, West Germany and then return home to continue with their individual assignments. We were asked to help the U.S. team communicate to the U.S. while working at the Munich center. Toward that end, we currently have an operational gateway at NMFECC that provides an initial level of communications support for several foreign sites, including Garching, as described below.

## European Networking

We have been working with the DFN (German Research Network) for nearly two years to formulate plans for establishing connections to ten research facilities in West Germany. Following installation of the 64-kilobits-per-second satellite link to the ITER design center, we will begin efforts to establish connections to the additional sites of interest. Initially, this will be accomplished using the West German public data network (DATEX-P) and during the last part of 1989, we will use the emerging "German Science Network"—a non-volume tariffed public data network supporting the West German research community.

## Japanese Networking

The Japanese at JAERI are considering installing a dedicated 9.6-kilobits-per-second link between JAERI and ESnet during the 1989 fiscal year. We are encouraging the sites of interest to establish a private X.25 network domestically. This will facilitate the later networking of the various sites over a high-speed satellite or fiber-optic connection. We may additionally upgrade some of the current data communication capability to OSI-compatible protocols.

## International Gateway VAX

The new gateway is a VMS micro-VAX II connected to MFEnet, TYMnet, and the ESnet private X.25 backbone (see Figure 1). The micro-VAX is named IGW (for International GateWay) on MFEnet. X.25 connections can be established to virtually any PDN (Public Data Network) connected host worldwide that supports the appropriate protocols.

Currently, we officially support two foreign sites: (1) Max Planck Institute for Plasma Physics, Garching, Germany and (2) JAERI, Japan. Other X.25 hosts within West Germany or Japan may also be easily accessed. Other countries can also be added relatively easily.

We give users access to sites on a per country basis. Thus you may be able to reach a host in Japan but not in Germany, for example.

The capabilities we currently support are: simple electronic mail, interactive terminal connection, and a very basic "file transport" capability. These all use Digital Equipment Corporation's implementation of DECnet PSI capabilities.

There is currently no automatic forwarding of electronic mail, terminal connections, or file transfers through IGW. That is to say, users must log onto IGW to access a foreign X.25 host from MFEnet or to access MFEnet from a foreign X.25 host.

You must be given a user account on IGW and authorization to use this gateway capability. Normally, you must also be given a user account on any target host as well, unless you intend to only send and receive mail from/at IGW. Authorization is currently given by Dan Hitchcock of the DOE/OER Office of Scientific Computing. Following approval, we will enter appropriate user accounts on IGW and give you more information on how to use the gateway.

## Future ITER Support

We are now planning the installation of a second 64-kilobits-per-second international satellite link. This link will be between Garching in Germany and FNAL in the U.S. The immediate use of this link is to enhance the communications support for the ITER project. Initially, the Germany link will support the current PSI capabilities. We also plan to bring up a VAX at Garching as an MFEnet II node to provide the services of MFEnet and better NMFECC and MFEnet II access.

As part of our agreement with the DFN (German Research Network) to install and pay for half of the satellite circuit, we are to support ISO-OSI (International Standards Organization Open Systems Interconnect) protocols over the satellite link. We are planning to install X.400 electronic mail; this will be available for (at least) U.S. and German sites using the link. Following that and pending the availability of commercial FTAM (File Transfer, Access, and Management), we plan to install OSI file transport capability.

## Foreign Sites of Interest

### Germany

Deutshes Elektron-Synchrotron, Hamburg
Max-Planck-Institute, Munchen
University of Wuppertal, Wuppertal
Albert-Ludwigs-University, Freiburg
European Molecular Biology Laboratory, Heidelberg
KFA Juelich, Juelich
University of Stuttgart, Stuttgart
KFA Karlsruhe, Karlsruhe
Berlin Electron Synchrotron Light Source, Berlin
Gesellschaft für Schwerionenforschung, Darmstadt

### England

JET, Culham
Culham Laboratory, Culham
Rutherford Appleton Laboratory

### France

Cadarache - CEN

### Italy

Frascati Energy Research Center, ENEA
Padova - IGICGR - ENEA
Gran Sasso Lab

### Austria

IAEA Headquarters, Vienna

### Switzerland

CRPP, EPFL, Lausanne
CERN, Geneva
SIN, Villigen

### Japan

Kyoto Univ, Uji, Kyoto
IPP, Nagoya
JAERI, Naka
JAERI, Tokai
KEK National Laboratory for High Energy Physics,Tsukuba
National Institute of Genetics, Misima, Sizuoka-Ken

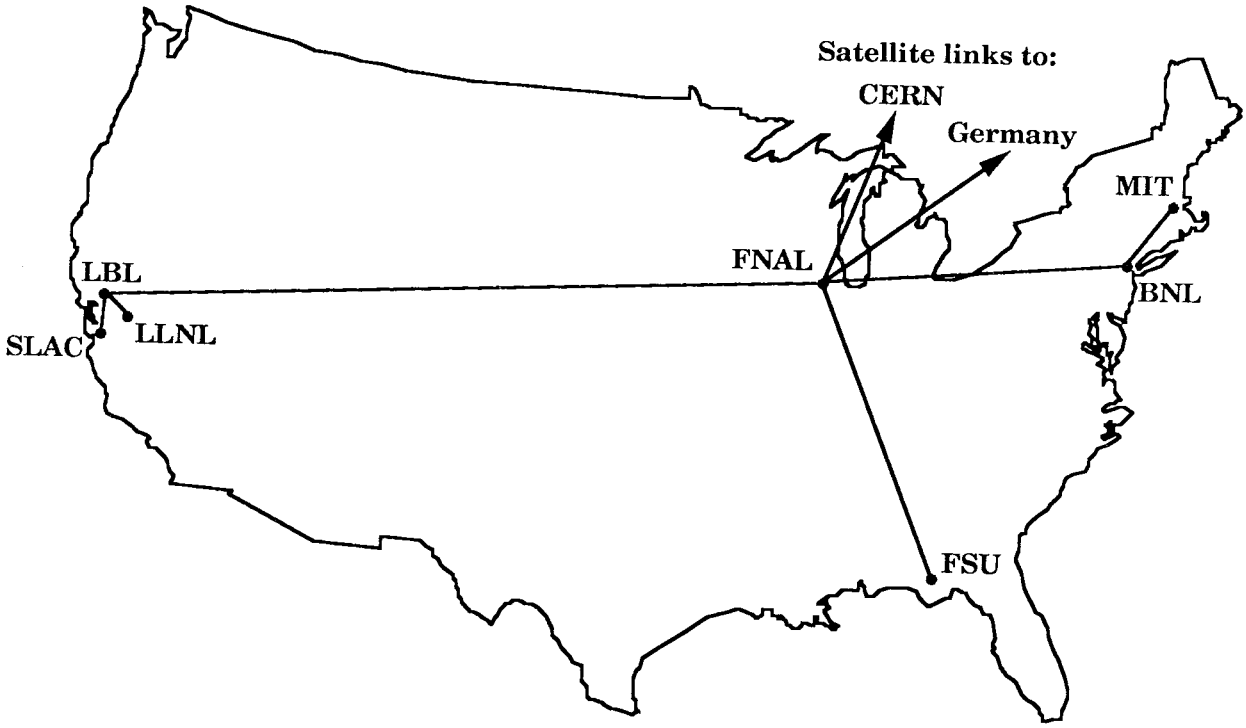


**Figure 1. ESnet X.25 backbone.**