

# A NATIONAL NET LINKS COMPUTERS

Research Projects Agency of  
The Defense Department  
Uses New Technology

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WASHINGTON, April 14—A computer on the East Coast can query one on the West Coast in only a tenth of a second in an experimental network that may help bring to realization a new era in scientific computation.

The network, developed by the Department of Defense's Advanced Research Projects Agency, has excited interest because of the technology that allows computers of different types, and as far apart as Massachusetts Institute of Technology and the University of California, Los Angeles, to talk to each other with great flexibility and speed.

In a progress report here, Dr. Lawrence G. Roberts, the agency director for information processing techniques, said the network was expanding rapidly. From a beginning of four computer facilities in California and Salt Lake City in 1969, it has expanded to a current roster of roughly 22 from coast to coast and is expected to go beyond 30 this summer.

All the users must be involved in Government funded programs. Many are using the computer network in scientific research projects funded by the research projects agency. Dr. Roberts said that about \$10-million in research and development money had been spent on the network and its technology to date.

### Technology Important

It is the technology that has been developed for the network that experts consider particularly important.

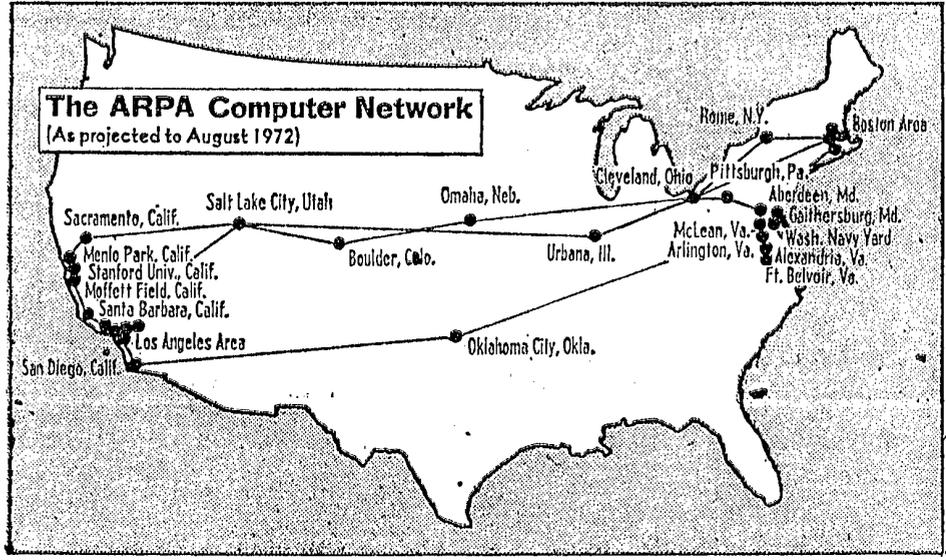
Key items in this technology are computer units called IMPS (Interface Message Processors) and TIPS (Terminal Interface Processors). Each computer facility in the network has an IMP and these control the network. The IMP accepts a message, breaks it down into thousand-bit packets and sends each packet to its destination by whatever route is open at the time. This makes efficient use of the lines between the network's computers and avoids long delays.

The IMPS also process the messages so that they can be received by the computer to which they addressed. An expert at the National Bureau of Standards said this so-called "handshaking function" was extremely important because it allowed diverse computers to talk to each other.

The TIPS are arrays of equipment that allow a research group to become a part of the network without actually owning a major computer.

Participants in the network use it for whatever computation or data-searching needs it can provide for the research projects that are in progress. This includes research on air traffic control and a study of global climate in which the network allows major research centers to pool resources, so to speak, at long distance.

The computers are linked by a network of high-quality leased telephone lines.



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The Advanced Research Projects Agency (ARPA), a Defense Department research unit, hopes to have some 30 computer data centers operating in its nationwide network by fall. Usage is limited to university-related projects sponsored by Federal Government.