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## NCAR Acquires New CRAY X-MP/48 Supercomputer

**BOULDER, Colorado** --The National Center for Atmospheric Research (NCAR) took delivery of a CRAY X-MP/48 supercomputer today. The new machine, which can execute more than three-quarters of a billion instructions per second, will enable scientists at NCAR and universities across the nation to probe more deeply into the fundamental processes of the atmosphere related to such concerns as climate change, prediction and warnings of severe storms and acid rain.

NCAR, whose computing division provides services to nearly 900 university users at 73 institutions throughout the United States and Canada, is operated by the University Corporation for Atmospheric Research under the sponsorship of the National Science Foundation.

The CRAY X-MP/48, ordered because of its ultrahigh speed and large central memory, will allow atmospheric scientists and oceanographers to develop and use more realistic mathematical models of atmospheric processes and to handle the vast amounts of information generated by satellites, radars and other observing systems.

Among the mathematical models to be run on the CRAY X-MP/48 is the NCAR Community Climate Model, which the center and university scientists use to investigate the role of a wide range of physical processes on climate.

Acquisition of the X-MP/48 supercomputer will enable NCAR scientists to refine the model even more, adding the influence of the world's oceans on the behavior of the atmosphere.

Changes in the model itself give clues to what might happen if large-scale changes are induced in the earth's atmosphere--for example, a global increase in carbon dioxide may be programmed into the model to find out what variations in weather and climate result without "performing the experiment" in the atmosphere itself.

The X-MP/48 supercomputer will also be used to model the outer atmosphere, called the thermosphere, and its response to solar variability and auroral

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activity, to model trace gases from a global perspective, moisture interactions between the earth's soil, vegetation and the atmosphere, the gaseous solar corona, and regional thunderstorm systems that often produce high winds, hail, and occasionally, tornadoes.

### Specific Information on NCAR's CRAY Computers

#### **COMPUTER SPEED COMPARISONS:**

1. One second on a CRAY X-MP/48 = 40 years on an accounting machine.
2. One minute on a CRAY X-MP/48 = 1 and 1/2 weeks on an IBM PC
3. One hour on a CRAY X-MP/48 = 1 month on a VAX 11/780.

**PHYSICAL SIZE** - The CRAY X-MP/48 is composed of 12 vertical columns arranged in a 270 degree arc and requires just 64 square feet (6 square meters) of floor space.

**MEMORY** - The CRAY X-MP/48 consists of four identical central processing units with an 8 million-word memory (8 times the memory bandwidth of the CRAY-1A computer that NCAR originally installed in July 1977--the second one installed worldwide.) A sister CRAY-1A was acquired by NCAR in March 1983 and has since been removed to make room for the X-MP/48.

**COMPUTER SPEED** - Each CRAY-1A can produce between 10 and 147 million arithmetic results per second. The CRAY X-MP/48 can produce between 40 and 840 million results per second. Such speed is derived from extremely short wire lengths on the component module boards, the cooling of which requires state-of-the-art Freon refrigeration technology. The excess heat drawn from the two computers supplies 25 percent of NCAR's heating needs.

**STORAGE** - Information is stored in binary bits, characters (numbers, letters, or symbols such as < or >) and words. Eight binary bits are used to store each character. For a comparison of volume, there are about 3,600,000 characters in the King James version of the Bible. Information, which is stored on magnetic tape cartridges at the NCAR computing facility, would be equivalent to 560,000 Bibles.

For further information about interviews and photographs at NCAR, please contact me at (303) 497-8721 in Boulder.

Joan Vandiver Frisch, Manager, Media Relations and Information Services  
National Center for Atmospheric Research, P.O. Box 3000  
Boulder, Colorado 80307