1961
Kobitz

For release:
A. M. 's, Wednesday
April 19, 1961

From

IBM

International Business Machines Corporation
Data Processing Division
112 East Post Road
White Plains, N. Y.

Arnold Lerner
WHite Plains 9-1900

WORLD'S MOST POWERFUL COMPUTER
SHIPPED TO NUCLEAR RESEARCH CENTER

POUGHKEEPSIE, N. Y., April 19 . . . . STRETCH, the most powerful computer in the world, is on its way to one of the nation's key nuclear research centers --- Los Alamos Scientific Laboratory in New Mexico.

At Los Alamos, the IBM STRETCH system will be put to work on the complex and critical projects for which the laboratory has become a focal point in the free world: research and development in nuclear and thermonuclear energy. The laboratory is operated by the University of California for the U. S. Atomic Energy Commission.

The first elements of STRETCH will arrive at Los Alamos today by truck, with the remainder of the system expected to complete its 2,000-mile journey from Poughkeepsie late this week. In a week, about the time the six STRETCH shipment trucks will be on the road, the computer is capable of completing more than 250 billion computations. During that period, STRETCH would be able to simulate---within itself---a complete hydrogen weapon test.

-more-

It could analyze the propagation of shock waves and their effects; determine the intensity of radiation and examine the resulting fallout, taking into account varying meteorological conditions during the hypothetical detonation. Less than a week of STRETCH computation on this type of total weapons problem would require several months of effort with the conventional large-scale computing equipment which has been in operation for the past few years at Los Alamos. The system's high-speed capabilities will permit nuclear scientists to work with far more realistic weapons simulations than in the past.

Shipment of STRETCH --- which was under development for five years --- from the Poughkeepsie plant of International Business Machines Corporation began last weekend. The computer's destination is a pine-forested plateau on which Los Alamos Scientific Laboratory is located, high in the Jemez Mountains, thirty-five miles northwest of Santa Fe, N. M.

NUCLEAR ROCKET PROPULSION

In addition to its use in weapons studies, STRETCH will play an important role in Project Rover, development of a nuclear-powered rocket engine for space exploration. Analysis of the vast amounts of data gathered during three previous tests of nuclear rocket propulsion reactors will be supplemented by the use of STRETCH to help design more efficient reactors.

Project Sherwood, in which Los Alamos scientists are attempting to produce controlled power from the thermonuclear fusion process, will create mathematical equations of unparalleled complexity. The power of STRETCH will enable laboratory physicists to work with equations representing magnetohydrodynamic phenomena.

Many of these are so advanced they have not yet been expressed mathematically. The new system will assist the laboratory in exploring and solving these problems.

STRETCH also will expand the pioneering work done at Los Alamos in the design of nuclear reactors with high-speed digital computers. Already being prepared are three-dimensional methods of designing a reactor within the STRETCH system. The new programs will permit more realistic study of how neutrons will behave within a proposed reactor. This makes possible preliminary experimentation without the time and expense of building a reactor while its design still is subject to change.

MEDICAL RESEARCH TO BENEFIT

In the field of biomedical research, STRETCH's speed will make possible a greater scope of data processing activities in the study of radioactive fallout effects. Other important medical studies at Los Alamos Scientific Laboratory, including an exploration of the effects of radiation on man based on experiments with animals, also will make use of the powerful system as greater volumes of data are collected.

The immense mathematical problems involved in projects such as those under way at Los Alamos gave rise to the concept and construction of a completely solid-state computer of STRETCH's power.

In "stretching" existing computer technology, IBM engineers have developed a system which makes use of ultra-fast circuits, transistors and circuit components. Perhaps most important, however, are new concepts in simultaneous operation. STRETCH operates on an assembly-line basis with vast amounts of data---each part completing a task and passing on the work to another machine element. Work on another task then can begin while succeeding elements complete their work on the previous job.

NEW DISK STORAGE

Six magnetic core memory units overlap in operation to increase tremendously the flow of data. The equivalent of more than 1,500,000 decimal digits of data can be stored in these units, with data retrieved from any unit in little more than two-millionths of a second. A small, extremely high-speed index register memory makes data available in six-tenths of one-millionth of a second to speed the accessibility of information used in repetitive programs.

Since STRETCH is organized to operate several of its storage units at the same time, a continuous flow of more than a million words a second can take place, with a peak flow rate capability of about three million words a second.

With the system using up data at this enormous rate, a remarkable magnetic disk file has been developed to feed information into the computer. In one second, 1,200,000 digits of information can be transferred from the file to the STRETCH core storage units. The file's entire vocabulary of 2,097,152 words may be read to or from core storage in less than half-a-minute.

A Look-Ahead device anticipates instruction and data requirements of the system, greatly boosting the effective memory speed. This unit acts as a reservoir, lining up instructions and information to be processed a fraction of a second before they are needed to provide a flow of information to arithmetic and logic units.

STRETCH also can put aside what it is doing and turn to special tasks requiring immediate attention. For example, the computer could interrupt work on a total weapons simulation to process data from a Project Rover reactor test. It could give priority to the test calculations, while other parallel functions in the system continue without pause.

# # #