MEETING OR CONTACT REPORT

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Project: STRETCH presentation MPD presentation and description of ORO problem requirements	Department: 749
	Follow-up Date:

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The meeting consisted of three parts: (1) a description of the STRETCH Computer system by Dr. Kolsky, (2) a description of the activities of IBM Military Products Division by Mr. Orzano, and (3) an unclassified description of the present and future needs of ORO for computing equipment by Dr. Smith and others.

A. STRETCH Presentation

The standard Los Alamos configuration was described emphasizing its logical and variable field power. There were a number of questions concerning details of operation codes and performance. All questions concerning price and delivery were sidestepped. The total presentation lasted about 2 hours , with the discussion continuing through the lunch hour.

B. Military Products Presentation

The interest of the MPD in computers was defined as largely those associated with special purpose, real time-closed loop operations .

Three areas were described briefly:

(1) the magnetic core logic computers, whose rugged characteristic and reliability make them ideal for military management control and data coordination,
(2) the RTA development. A high speed transistorized system of modular design was described briefly. An 18 months delivery time was mentioned.
(3) Cryogenics research. The possibility of very small circuits operating in the millimicrosecond range was described. The present plan is to furnish cryogenic memories on a "retrofit" basis in about three years for the RTA machines.

C. The Requirements of Operations Research problems

The general problem of Operations Simulations and Control for the Army bares considerable resemblance to the concept of the AirForce's SAGE system. The similarity ends when one begins to discuss details. The large number and variety of weapons, targets, and tactical constraints make ground warfare a much harder problem to simulate on a large scale than air defense.

At the present time ORO has used a great deal of machine time (mostly on the UNIVAC 1103), in solving various simple war games. They are a long way from anything resembling a SAGE system simulator.

I Types of War Game Simulations

There are two basic types of operations simulators:

(1) The Monte Carlo simulator by which sample histories are tried with pre-set rules. Examples of this type of game which have been done at ORO are:

- (a) Tank squad operations
- (b) Aircraft, surface to air missles
- (c) Defense of continental U. S. against a pre-planned attack. testing various simple models.
- (d) Flow of material through Army Depots, reorder procedure, etc.

Most of the calculations to date have been of type b and c.

(2) The "free play" simulators in which doctrines but not rigid rules fed in. The players must decide when they should deviate from the doctrine during the game. An example: there may be a doctrine that a certain unit must maintain between 5 and 30 days supply of gasoline at all times. Under heavy attack, however, the unit commander can ignore this doctrine and use all his gasoline if necessary to avoid being destroyed.

II Input-Output Equipment required

This type of simulator ties Naturally into the need for input-output equipment of the "Gestalt Translator" type. The requirements for effective war game simulation are essentially identical to those needed by Army commanders to display intelligence and control actual operations.

The requirements for better communication between the computer and man; displays, graphs, tables, maps, descriptions of terrain, etc., all become more and more a necessity, not a luxury. Similarly the commander must be able to address orders to the computer in his terms not in computer language.

Transmission of data from remote sites without human handling is also very important in troop exercises.

III Future calculations

To solve the large dimensional non-linear dynamic programs required to describe a large tactical situation in detail will certainly require a computer of tremendous power. The main requirement, however, is to perfect numerical techniques to be able to solve such problems. Computers are necessary to feel one's way along in perfecting these techniques.

Tremendous amounts of information must be kept and referred to in such problems. For example, one stock control problem which ORO studied would require 43 tapes full of 705 information, to be processed repeatedly.

The most advanced way of looking at the operations simulation problem is to consider the situation at a given time as being a large logical expression given by many millions of bits. The calculations which are done consist of performing relatively simple logical operations such as sorting on these bits to give a new set of bits which represents the new operational situation. Many of these operations could be done in parallel.

General Comments:

1. The visit at ORO was very pleasant. In spite of the fact that they presently have a UNIVAC 1103A, there seemed to be no antagonism toward IBM equipment.

2. The present state of the art of simulating military operations at ORO does not seem to require more than the one 1103 which they have. However, if they can continue their present development of numerical procedures (and can convince the Army that they need it), they will certainly be able to use a computer of STRETCH capabilities in 3 or 4 years.

3. The remark that IBM should spend "more effort on numerical procedures and less on hardware" was heard again.

4. Display and analog input equipment of the SAGE type should be considered seriously for attachment to STRETCH.

5. The item which struck me most forcibly came during the description of solving future problems by using logical operations on huge streams of bits. The method described was almost identical to that for which the HARVEST system is being devised.

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