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HARVEST Maintenance.

Director, Production

M PRO

12 Jan 59

O. Kirby/3321/ama

1. In anticipation of the delivery and installation of the high speed computer system HARVEST, the Office of Machine Processing has conducted a detailed study of maintenance requirements for HARVEST and of possible courses of action to meet these requirements.

2. The total HARVEST complex will consist of several major Agency-purchased components (e.g. computer, stream unit, TRACTOR tapes) plus the usual array of rented components (e.g. card reader, printer, Model 729 tape drives, etc). Maintenance of the latter devices will be provided by IBM as part of the rental contract; maintenance of Agency-owned units, however, is the responsibility of NSA. Partitioned maintenance responsibility for any one machine system frequently presents problems, even under the best conditions. Such problems would undoubtedly be more prevalent during the first operational year of a very complex, advanced-design system such as HARVEST.

3. It is estimated by NSA and IBM that sixteen to eighteen full time maintenance personnel will be required to keep the computing system in operation on a three shift basis (exclusive of the rented peripheral equipment and the tape handling portions of TRACTOR). The decision which NSA must make is whether this HARVEST maintenance should be performed by NSA engineering and maintenance personnel (specifically M PRO-4, the Engineering and Maintenance Division of the Office of Machine Processing) or by IBM under a maintenance contract. The present purchase description (or PD) for HARVEST provides six months contract maintenance by IBM for one shift only to become effective after the system is fully operational and acceptable to NSA. IBM proposes to assign ten maintenance personnel to provide this single shift coverage.

4. Under the existing schedule the HARVEST system will be delivered to NSA in September 1960. Assuming a three month period for final checkout, it is conceivable that HARVEST could become operational during December 1960 or January 1961, and that full responsibility for operational maintenance could devolve upon NSA on or about June 1961 at the expiration of the six months contract maintenance provided under the PD.

5. If M PRO should undertake to maintain HARVEST by June 1961, sixteen experienced engineering and maintenance personnel must be enrolled in an extensive training program by September 1960. It is not practical to train all of these men concurrently; the following suggested time schedule for phasing personnel into the training program was devised to be compatible with the equipment development schedule.

Sep 1958	5 engineers
Sep 1959	3 technicians
Mar 1960	3 technicians
Sep 1960	2 engineers and 3 technicians

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Deputy Associate Director for Policy and Records
on 13 Oct 2010 and by WLB

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The personnel for this program can be obtained in one of two ways.

a. By discontinuing currently operational Agency-owned equipment (e.g. ATLAS I and ATLAS II computers) as men are diverted into HARVEST training, or

b. By readjusting organizational billet structures to provide sixteen additional billets to MPRO-4 in order that new men can be hired and trained now to replace the more experienced personnel when they are diverted from present assignments to the HARVEST program.

6. The most apparent difficulties under these proposals for NSA maintenance are:

a. In the face of budget ceilings and reductions which limit rental of computer or EDM facilities, there is increased need to retain the computer and other analytic machine facilities which have been bought and paid for (including the ATLAS series of equipments) which have low yearly operating costs.

b. MPRO is already deficient in engineers to maintain existing and programmed equipment. In addition to the 16 billets required for HARVEST, there is an estimated requirement for 76 more engineering and maintenance personnel for the \$34,129,000 in new equipment now under procurement and due to arrive within the next 36 months.

7. An extension of contract maintenance beyond the six months provided under the HARVEST FD would probably require the negotiation of a separate contract. IBM has indicated commencement in the near future of recruitment and training of personnel for maintenance of the AEC version of HARVEST (known as SEARCH) and has asked that NSA determine its requirements (if any) for HARVEST contract maintenance, to insure that IBM can fulfill such requirements within the time framework of the program.

8. In consideration of the problems of providing and allocating NSA personnel to maintain HARVEST, together with the many and varied problems normally experienced in operating first models of highly complex equipment, it is felt that NSA should contract with IBM for HARVEST maintenance beyond the six month period provided under the FD. It is anticipated that the ATLAS series will be discontinued when HARVEST becomes fully operational, thereby freeing personnel who could then be trained to take over HARVEST maintenance at the end of the contract maintenance period.

9. MPRO has prepared the following comparative costs of maintaining the purchased components of HARVEST. IBM has not yet submitted any cost estimates in the maintenance area. Before listing the estimates, a brief word of explanation is in order. The potential capability of the HARVEST system depends, to a great extent, on satisfactory performance of the TRACTOR tape system. TRACTOR is a unique, one-of-a-kind device employing several new and advanced mechanical principles and using many non-standard, specially fabricated parts. It was decided at a very early date that a long history of operating experience, adjustments, parts replaced,

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etc. must be compiled before MPRO would attempt to assume maintenance responsibility for the mechanical tape handling portions of TRACTOR. Thus, the cost estimates below show TRACTOR maintenance separately. It is believed that MPRO's electronic specialists could eventually take over maintenance of TRACTOR; but if this task is assumed as early as the electronic maintenance is assumed by MPRO, separate mechanical specialists will have to be hired, thus making Agency maintenance more expensive.

Cost estimates of maintaining purchased components:

PLAN A. Contract entire system:

Electronic	\$ 384,000
TRACTOR mechanical	<u>144,000</u>
Total	\$ 528,000 per year

PLAN B. Combination Agency and Contract:

Electronic (Agency)	\$ 192,000
TRACTOR (Contract)	<u>144,000</u>
Total	\$ 336,000 per year

PLAN C. Agency maintain entire system:

Electronic	\$ 192,000
TRACTOR (Salaries of six mechanical specialists plus parts)	<u>72,000</u>
Total	\$ 264,000 per year

PLAN D. Agency maintain entire system:

Electronic	\$ 192,000
TRACTOR (Parts only; electronic specialists perform the maintenance)	<u>12,000</u>
Total	\$ 204,000 per year

10. MPRO recommends that the following phasing for maintaining the HARVEST system be approved:

- a. That Plan A of paragraph 9 be adopted for FY-62.
- b. That Plan B of paragraph 9 be adopted for FY-63.
- c. That Plan D of paragraph 9 be adopted for each fiscal year thereafter.

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11. If the above recommendations are approved, it is requested that MPRO be authorized to arrange for formal notification to IBM of this decision.

OLIVER R. KERRY
Chief, Office of Machine Processing

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