1 May 1959

As a result of discussions of the problem of preparing the Agency for operation of HARVEST, between the undersigned and Mr. S. S. Snyder, Chief ANEQ-1, who coordinates NEA HARVEST activities, three meetings of interested personnel were called. Representatives of REMP, ANEQ, PROD, and MPRO attended the meetings, 20 and 27 April and 4 May 1959 (minutes attached), and the recommendations of the accompanying report summarize the feeling of the group.

1 May 1959

1. There is growing evidence that the task of providing programming procedures for use with HARVEST is falling seriously behind schedule. In part this seems to be due to an underestimate of the difficulty of this part of the effort; it appears that too small a percentage of the total resources for HARVEST was allocated for the development of programming techniques. In any case, it now seems necessary to accelerate this aspect of the work.

2. The complexity of the HARVEST logic, as well as its great speed, make it essential that a relatively advanced autoprogramming system be available. A good deal of work, both within the Agency and by contractors, has served mainly to point up the magnitude of the problem. The scope of the NSA requirement is far greater than recent commercial projects filling the same function in mathematical and computing applications. Based on several available commercial automatic programming systems, it is considered that an effort of the order of 100 man-years will be required. Because of the pioneering nature of the work which is largely "NSA-peculiar", it is estimated that not more than half of this requirement can be met by outside contract support. Since the HARVEST equipment is expected to become operational by March 1961, a minimum system which programmers can start using in operational jobs should be available by Sept 1960. Preliminary test operational programs, and acceptance test programs, will have been prepared by the equivalent of hand-coding procedures.

3. To construct a suitable autoprogramming system, projects at three different levels must be fully coordinated. A formulation - level language, suitable for use by analysts without any knowledge of

the machine logic, must be developed; this language must incorporate both cryptologic and data-handling elements. Next, a macroprogramming language is required so that the programmers can cope with the intricacies of the HARVEST logic. Third, the macro-instructions must be coded in machine language. In doing this, the operational requirements of "multiprogramming" must be considered; this term refers to the need for HARVEST to run several jobs simultaneously, in order that the arithmetical and logical capability not be geared down to the much slower input - output capability. Finally, all of this must be tested out and debugged, and people must be trained in the use of the procedures, before beginning to write the battery of programs for operational application of the machine.

4. Work on the various levels has been proceeding, but the progress to date is not impressive. At the formulation level, almost nothing has been accomplished. Some preliminary developments have been carried out on a macroprogramming system called TRANSCRYPT. At the machine language level, familiarization of a group of people with the HARVEST logic is proceeding, and work has started on service routines and assembly programs.

5. If a programming system is to be completed on time, this effort must be coordinated and focussed. A complete plan must be drawn up for the project, the various tasks spelled out, target dates set, and required resources estimated. When this has been done, one person should be given responsibility for deploying all available resources for getting the job done on schedule.

6. It is accordingly recommended that:

a. A task force of four to six people, representing MPRO, PROD-03, ANEQ, REMP, and any other offices immediately involved, be

set up to prepare a specific plan of action as indicated in paragraph 5. This task force should be allowed approximately four weeks, and should begin work by 15 May 1959.

b. When this plan has been prepared and approved, all resources available within the Agency for work on the problem should be detailed to the R/D element where responsibility for the development of the HARVEST programming system belongs.

c. One individual should have full responsibility and appropriate authority for the effort, including coordination of all contract work specifically related to the project.

28 April 1959

MEMORANDUM FOR RECORD:

TO: Mr. S. S. Snyder

FROM: Mr. J. M. Willard

SUBJECT: Conference on CORN CRIB, 20 April 1959

Representatives:

H. H. Campaigne, REMP	P. Reimers, R/D-04
Mr. Jacobs, REMP	A. Sinkov, PROD
W. Blankenship, REMP-1	P. Oyer, PROD-03
D. L. Hogan, REMP-14	B. Peters, PRDD-03
C. Blair, REMP-14	J. Powers, MPRO-1
S. S. Snyder, ANEQ-1	J. Blum, MPRO-103
J. M. Willard, ANEQ-1	J. O'Hara, MPRO-03
J. A. Pederson, ANEQ-1	W. Cherry, MPRO-103

1. Dr. Campaigne described automatic programming in general. Mr. Snyder described the relationship of CORN CRIB to the FARM BOY contract with IBM. Mr.Hogan described the current assignment of Mr. Roberts at General Kinetics.

2. Dr. Blum described the TRANSCRYPT procedural language. He assumed

a. Cannot define all of C. A. language now

b. Long range research is necessary in a C. A. language

c. An intermediate procedural language can be define (TRANSCRYPT)

The TRANSCRYPT language is not complete. Its major needs are:

a. Experimental programming

b. Data specification system

Dr. Campaigne discussed the requirement that the agency has for a high level language. There is also the problem of implementation of the language. Mr. Snyder said that TRANSCRYPT should be continued.

3. Recommendations will be made at a meeting of the same group on Monday, 27 April 1959 on the following areas:

Objectives	W. Jacobs
1. Problem Formulation	
2. Data Specification and other lacks	J. Blum
3. Implementation	J. Willard

SECRET

1 May 1959

MEMORANDUM FOR FILE:

TO: Mr. S. S. Snyder

FROM: Mr. J. M. Willard

SUBJECT: Meeting on CORN CRIB, 27 April 1959

Representatives:

P. Reimers, R/D-04	J. Powers, MPRO-1
H. Campaigne, REMP	J. O'Hara, MPRO-03
W. Blankenship, REMP-1	S. Pincus, MPRO-03
C. Blair, REMP-14	W. Cherry, MPRO-103
S. Snyder, ANEQ-1	J. Blum, MPRO-103
J. Willard, ANEQ-1	B. Peters, PROD-03
J. Pederson, ANEQ-1	P. Oyer, PROD-03

1. Dr. Jacobs described an approach to "Problem Formulation". He suggested that a modest approach he followed by two people for one year. A "decipher compiler" could be started by studying a code decipherment process, a hand decipherment process, and a machine decipherment process. Input information would consist of:

Message input;

Cryptosystem description;

Key information;

Output treatment.

A second problem is the routine conversion of input data to machinable form ("Traffic editing and processing").

2. Dr. Blum described the work that is necessary to complete TRANSCRYPT.

(1) Design a complete data specification system
(2) Design a set of fundamental cryptologic functions
(3) Design a set of fundamental data processing functions
(4) Logically complete the programming system
(5) Develop standards (programming notation and system)

Dr. Blum estimated that three people working 3-6 months could determine how much additional effort was necessary.

3. Mr. Willard described problems in connection with implementing the programming systems for HARVEST. He raised the question of implementing it for other machine also.

SECRET

4. Mr. Pederson described some work that is going into study of the problems involved in implementing an automatic programming system on HARVEST. One major problem is in multiprogramming. This includes input-output, scheduling program segmentation and data segmentation.

5. Dr. Campaigne appointed a committee to write up a proposal:

Mr. S. S. Snyder, ANEQ-1, Chairman
Dr. J. Blum, MPRO-03
Dr. W. Jacobs, REMP-1
Mr. P. Oyer, PROD-03

This proposal is to list problem and the resources needed. The proposal will be reviewed at a meeting on 4 May 1959, at 0900 in the REMP-1 conference room.

JAMES M. WILLARD

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO : S. S. Snyder

DATE: 4 May 1959

FROM : J. A. Pederson

SUBJECT: Report of Meeting on Automatic Programming Effort for HARVEST. Held Monday, May 4, 1959

Members present were:

Snyder	Reimers	Pincus	Campaigne
Willard	Hyduke	O'Hara	Blair
Pederson	Current	Cherry	Jacobs
	Oyer	Nichols	

Mr. Snyder presented the committee report on establishing a task force to implement auto programming for HARVEST.

Mr. Reimers felt the proposal was too limited in only pointing toward a system to be used in HARVEST. He stated that our real need is for developing a "high level" analyst language. This need is ever more important as a way of evaluating and using the 466 L system.

Mr. Hyduke also echoed this opinion. Mr. Blair made an alternate proposal that the task be divided into a research and a development task with the research performed locally and the development done by a contractor.

Mr. Pederson read the IBM proposal on auto programming which showed that IBM will produce a "machine level" coding system and do work on an intermediate or "methods man's" coding system.

Further discussion lead to the conclusion that the Agency should work on the "analyst's" language and the intermediate system and a contractor could handle the "machine level" system.

The final decision was that Dr. Campaigne will write a letter to R/D and PROD stating in "strong" language the problem. He will hand carry the letter, including the committee report to the appropriate officials.

James A. Pederson
JAMES A. PEDERSON