2210-31

SECRET

Memorandum L-154

Copy No. 2 of 10 copies

Division 6 - Lincoln Laboratory
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

SUBJECT: CONFERENCE REGARDING PROPOSED MODIFICATION TO DELIVERY SCHEDULE FOR AN/FSQ-7 DUPLEX CENTRALS -- June 9 and 10, 1954

To: Messrs. R. R. Everett and Jay W. Forrester

From: A. P. Kromer

Date: June 11, 1954

Meeting was held starting Wednesday, June 9, 1954 at 120 Broadway, New York. This meeting was called by the AMC Joint Progress Office headed by Colonel R. Osgood. Those present at the meeting are as indicated on the attached list.

Colonel Osgood opened the meeting by referring to a conference held on Saturday, June 5 at the Pentagon, Washington where representatives from the various commands of the Air Force, from the ADES organization and Doctor Hill from Lincoln were present. Colonel Osgood stated that this meeting resulted in the conclusion by all present that the schedule for the AN/FSQ-7 Duplex Centrals should be altered so as to have a relatively low, early rate of production followed by a field evaluation trial for the System and, subsequently, to have production at a higher rate than previously contemplated so as to provide the total quantity of equipments for the country at approximately the same termination date as the present schedule would provide.

It was indicated that if the presently contemplated schedule is followed, by the time that the first two or three Direction Centers were installed, commitments would have been made by the Air Force for 25 such Direction Centers. This sum of money was estimated to be $550,000,000 of commitments. It was further stated that of this sum, approximately $350,000,000 would probably have been actually spent for material, labor, services, etc., and only at this time would field operation experience start to be gained on the initial systems. The ADES people indicated that they did not believe the XD-1 System would provide operational experience under conditions which were close enough to field-operating conditions to provide any significant data regarding the performance of the overall system. They acknowledged that performance of the electronics of the computer, and other pieces within the FSQ-7, could be studied on XD-1 and that some benefits would be gained in this particular area.

The System, as it is referred to here, is called the Semi-automatic Direction Center System, and it includes not only the FSQ-7 hardware located within the Direction Center building but the Data Processing system, including equipment at the radars, the transmission lines between the radars and the centrals, and also the Data Processing equipment and transmission lines for Outputs from the Direction Central to the points which connect to ground/air links for weapons. The ADES people continually indicated their concern was with the System as a whole, as mentioned above, and with the question of the ability of typical Air Force type personnel to do the jobs required in all phases of this entire System so as to provide an Air Defense capability of the

SECRET

SECURITY INFORMATION

type which the country needs at the earliest practical moment.

Colonel Osgood continued by outlining the purpose of the conference as being to establish a new overall schedule for design, manufacture and installation of equipment and associated buildings for Direction Centers based on sound principles and experience so as to provide a workable Defense capability for the Air Defense Command. He continued -- that after a plan is evolved through the discussions of the persons present at the meeting and subsequent considerations, the JPO would coordinate it through the various Air Force Commands to obtain agreement. After this -- the new plan, whatever it might be, would become the binding program for everyone involved in the Project to work to.

To provide an agenda for the discussion of the meeting, the following questions were developed:

1. Field Trials for Performance Evaluation Test under Field Conditions:

   a. What are the objectives of the field trial?

   b. Who will outline the test plan?

   c. Who will make recommendations upon completion of test?

2. Field Trial Facilities:

   a. What is the minimum amount of equipment requirement for an adequate field trial?

   b. What can be gained from XD-1 and XD-2 operation?

   c. What is the earliest date that equipment for field trial can be made available? Particularly, Combat Center?

   d. Where should trial be conducted?

3. Interim Production Effort:

   a. What is the minimum production rate to retain a potential for large scale production by all suppliers?

   b. Are there any other limiting factors which effect the determination of interim rate?

4. Large Scale Production:

   a. What level of large scale production can be achieved recognizing ability of ADC to absorb equipment from a manpower standpoint, to finance procurement -- i.e., dollars per fiscal year, etc?

5. Revised Schedule

Discussion of the above questions resulted in the following answers:

Item 1

a. The objectives of a performance evaluation test under field conditions is to ascertain that the system (including the combination of people working with equipment) will do the Defense job adequately, both from a military operations aspect and from an equipment performance and reliability aspect.

b. The responsibility to draw up a proper test plan and coordinate all aspects of this test will lay primarily with ADES, with ADES using such assistance as may be required from other organizations, such as Lincoln and ADC.

c. The answer to "b" above, placing responsibility on ADES for the entire plan, includes recommendations resulting from the test itself.

Item 2

a. The conferees generally agreed that the minimum amount of equipment to accomplish the desired field trial or performance evaluation test would be two Direction Center systems and one Combat Center system, properly tied in together so that the operational work in each of these systems as well as the interrelation, crosstelling and command functions between them could be performed under what would be typical field conditions.

b. This question was not directly answered, but other discussions throughout the conference indicated that ADES feels that XD-1 will indicate performance of the electronics, but will not provide for proper or adequate evaluation of the system capability, particularly from military operations and the combination of personnel with equipment.

c. Air Force people and ADES indicated they would like to have the two Direction Centers and the COC as soon as possible. In any event, they would like to have IBM provide whatever equipment is needed for a Combat Center on the basis of the present schedule for the No. 3 Direction center, that is, to have it available no later than two months after the No. 2 Duplex Central is available.

d. Location for this field trial was not answered. Colonel Halley stated that it very likely would be advisable

not to place these Direction Centers in any strategic area, such as the New York -- Boston vicinity, since conducting the evaluation test would present a drain to the Air Defense Command capacity to do real defense work and that adding this into a critical area would affect the defense capability and might require duplication of a considerable amount of facilities: whereas, if the systems to be tested were located in a less strategic area, a calculated risk could be taken and certain personnel, equipment and other facilities diverted for use of the test at the expense of reducing the current Air Defense capability in that particular area for the test period.

Item 3

a. The earliest date that the ADES people felt that production could be resumed and reflect any significant experience from the field evaluation test was felt to be December of 1957 or a period six months after the start of this test. (Note: Later in the discussion the following day, this date was modified to be October of 1957 so as to be more compatible with Fiscal Year Funding considerations.)

b. Another factor which might affect the subsequent production date following the field trial is the budget cycle required for public works monies for buildings. This matter was discussed at some length, but no conclusions reached.

c. The answer to the minimum production effort during a waiting period between completion of the two Direction Centers and one Combat Center and the resumption of production after field test experience was left unanswered. This question was to be given to IBM with the request that they make a proposal.

Item 4

a. Eventual production rate following field test experience was also left for IBM to present as proposals. The Air Force pointed out, however, that they did not feel they could possibly absorb systems at a rate any greater than three per month, because the question of manning and provision of funds for even this rate are very serious problems. It was stated that something between one and two systems per month represented a more practical level at which the Air Force could handle new equipment.

Item 5

The Revised Schedule was unanswered at this time with the thought that it might be worked out the following day, but most likely would have to depend on the results of the study of the problem made by IBM, and proposals which they would offer following their considerations.

Discussion regarding whether or not the proposed new schedule would represent a delay in providing equipment for the Air Defense Command resulted in a statement by Mr. Bagnall of Western Electric that they felt that this would not represent any delay, but would, in fact, provide better equipment as soon, and perhaps sooner, than the present program, since the Bell System experience indicates that equipment of this type if it is placed into production and installed without adequate system field experience results in a very extensive field modification period to eliminate all of the "bugs" and problems which arise as the equipment starts to be used by the eventual customer -- in this case the Air Force. Mr. Bagnall said that they felt this period for modification would be approximately equal to the time period which the revised schedule would introduce into the program. No charts were available to show the specific periods involved, but later in the conference Mr. Bagnall further indicated that, in his opinion, this modification period would be something in the order of a couple of years for the early systems and might taper down to approximately one year for the systems installed at the tail end of the program. Refer to Chart I.

The conference next turned to some discussion of the question of whether a complete pause in production following the initial three systems, or a slow rate of production following the initial three seemed to be desirable. The possibility of constructing four or five systems during this interval and placing the finished tested electronics into storage was discussed. Another alternative of building these systems and placing them into Direction Center buildings, but in portions of the country not regarded as critical sectors, was also discussed. It was felt that this latter consideration might provide these centers as available facilities for training of manpower to be placed at Direction Centers which would be installed at a later date. Still another alternative expressed was the possibility of building only part of the FSQ-7 System, i.e., those items which it was mutually felt would be least likely to have design changes introduced into them as a result of the field evaluation test. The objective of maintaining some level of production, instead of a complete stoppage, was to provide a nucleus of manpower and equipment at the factory in operating condition to serve as the basis for a rapid acceleration to a much higher level of production at a subsequent time.

On Thursday morning, June 10 representatives from IBM Company -- namely, Messrs. Zollinger, Fraser and Whelan, joined the conference. Mr. Wimer, who was serving as chairman of the meeting in the absence of Colonel Osgood, reviewed the previous day's discussion for the benefit of the IBM people, and posed the following

three questions for IBM to study and prepare reply and proposals for the JPO:

1. What is the very best delivery that IBM can provide for No. 1 and 2 Duplex FSQ-7's and for a Combat Center set of equipment in place of No. 3 FSQ-7 Duplex, as it is now programmed? Can the schedule shown on the present program be improved in any manner?

2. Assuming a complete stoppage of production following the first two Direction Centers and one Combat Center, and authorization to initiate production with suitable contractual coverage in October 1957, what is the best schedule rate that IBM could achieve thereafter? This rate was not to be limited to two systems per month if IBM could possibly produce at any higher level, although it was felt that two per month appears to be a practical limitation regarding the ability of the Air Force to absorb and man equipments.

3. Assume that a modest low level production rate would be continued after the first two Direction Centers and one Combat Center, and authorization with suitable contractual coverage for full-scale production again issued in October 1957, what level of production in the interim would IBM feel is necessary to maintain a nucleus of production capability in their plant and in their vendors' and subcontractors' during the interim period, and what is the best possible production rate subsequent to the authorization for full-scale production in October of 1957?

Mr. Wimer also stated that if in the study of these three points, IBM felt that there were any other alternatives which seemed to fit the intent of the conference, the JPO would be happy to have additional proposals, if IBM cared to offer them.

Mr. Wimer asked that the replies from IBM be made available as early as possible, and suggested June 25 as a completion date for their study. Mr. Zollinger indicated that they would make every effort to complete the work by this time, but that a few days longer may be required.

Mr. Zollinger stated that he was very surprised to encounter a proposal of the type presently being discussed. His past contact with the program for a period of two years had led him to feel that everyone in the Air Force was anxious to have an improved Air Defense system as early as possible and that they had mutually agreed that the Lincoln Transition System was a big step forward in achieving this desired increase in capability. He further stated that the current discussion leads him to feel that somewhere the fundamental concept of the Lincoln Transition System is now felt to be wrong and that the ability to improve air defense on a piecemeal basis by adding equipment as rapidly as it can be made available is now felt to be an unsatisfactory or undesirable approach to the problem. Mr. Zollinger also stated that the apparent concern regarding system operation could, in his opinion, be best resolved by having those persons who are doubtful about the operation of any portion of the system, either equipment performance or operational aspects, place the

points of concern out on the table for frank and open consideration by all parties involved in the program. Zollinger felt this would be the most successful way to overcome any difficulties which exist, and provide Air Defense at the earliest possible time. He continued further by stating that it also appeared that the previous feelings regarding the value of a single AN/FSQ-7 Duplex Central as a primary building block for Air Defense -- and the benefits that could be gained by installing each of these units and bringing them into the System at an early date -- is now minimized, or discounted completely. He referred to previous discussions where a single FSQ-7 Central serving a subsector, including four or five long range radars and associated gap fillers, was felt to be a forward step and an improvement in Air Defense (at this point Mr. Bagnall indicated that it was thought that the installation of a single FSQ-7 of this type might in reality be a handicap). Mr. Zollinger indicated that further consideration or review of this previous attitude certainly seemed warranted to determine whether this was not of some real value to the Air Defense Command. Mr. Zollinger concluded by indicating that IBM would study seriously the three questions given to them by the JPO, and would provide reply as expeditiously as possible. He said that their immediate off-hand reaction was that significant number of serious problems had arised in either of the alternatives mentioned in Items 2 or 3: question of company policy regarding personnel, investment in plant and equipment, relations with vendors and subcontractors, maintenance of morale, and the manufacturing and engineering organizations' increased costs were some of the points that immediately come to mind, but that the entire matter would be reviewed thoroughly, and all aspects of it presented for consideration by the JPO.

Mr. Whalen of IBM asked if anyone could provide an opinion as to whether or not the equipment which would be placed into production, following some systems evaluation tests, would contain many changes from the first three systems. It was stated by various persons that there undoubtedly would be a number of changes. It was impractical to determine the extent of them or the significance of these changes. The simple fact that a relatively long time period would have elapsed might bring forth some newdevelopment in the art, which should be introduced into the subsequent production even if the field evaluation did not bring forth significant changes.

Mr. Schwartz in a sense replied to some of Mr. Zollinger's comments by indicating that the concern regarding system performance had more to do with other portions of the System than it did with the AN/FSQ-7 hardware, itself. But ADES felt that one of the big questions to be determined by a field evaluation test is the capability of man and equipment to function in a manner which provides adequate Air Defense capability. Also, that they feel the XD-1 is primarily a laboratory tool and should be left available for use by the laboratory development group to reflect changes and new ideas into it and to be under the control of the engineering groups. To achieve this advantage, the System cannot be made available for operation and evaluation under an operating atmosphere which will be encountered by systems later on under Air Force tactical use.

It appeared to the writer that the contractual discussions between ADES and the Air Force have brought strongly to the ADES mind their responsibility as an organization for the success of the overall System as an operational tool for Air Defense. In view of this, they seem unwilling to extrapolate from Cape Cod System and XD-1 System performance. Also, they seem to be looking towards something approximating 100 per cent of the eventual capability of the equipment, rather than looking toward increasing the present Air Defense capability in a succession of steps. A review of

~~SECRET~~

the increased capability over present-day Air Defense, which will be possible when FSQ-7 Direction Centers are available, even if other portions of the System -- such as ground-to-air data links, etc., are not available, should be made for Air Force and ADES consideration.

Mr. Wimer, Major Gordon and Major Mertley, Mr. Rader, and some ADES personnel remained to convene on Friday, June 11 to prepare a written report of the discussions of the two preceding days' conferences, which will be issued to all organizations concerned.

APK:meo
attach't.

A. P. Kromer

cc: N. H. Taylor
G. E. Valley

Dictated but not read

~~SECRET~~

ATTENDANCE LIST

*	Col. R. Osgood	Hdgrs. ARDC
	A. G. Wimer	" "
**	Col. O. T. Halley	Hdgrs. ADC
	Maj. K. W. Gordon	" "
	Maj. W. Mertley	" "
	R. M. Paulson	RAFD
	W. J. Smith	AFCRC
	A. P. Kromer	MIT - Lincoln
	R. E. Rader	" "
	C. A. Smith	BTL
****	V. B. Bagnall	WE Co.
	S. P. Schwartz	" "
	J. H. Moore	" "
	M. L. Taliaferro	" "
	W. P. H. Stevens	" "
	T. N. Pook	" "
***	J. E. Zollinger	IBM
	J. Fraser	"
	R. Whalen	"

- - - - - - - - - - - - - - - -

* Wednesday A.M. only

** Wednesday only

*** Thursday only

**** Wed. A.M. & Thurs. A.M. only

CHART I RELATIVE TIME PROGRAMS

#1
#2
#3

OCT 1957
DATE FOR CONTRACT COVERAGE FOR FIRST AROD SYSTEM

COMPL. OF INSTALLATION OF 1ST AROD SYSTEM

APPROX AVAIL DATES IF PROD. AFTER FIELD EVALUATION TEST PROVIDES EQUIP AT RATE OF

3 per mo.
2 per mo
1½ per mo
1 per mo

#48
#49

APPROX. TIME AVAIL. FOR AIR DEFENSE USE ALLOWING FOR MODIF. ADES ANTICIPATES

PRESENT PROGRAM FOR INSTALLED FSQ-7's

1954 1955 1956 1957 1958 1959 1960 1961 1962 1963