Digital Computer Laboratory
Massachusetts Institute of Technology
Cambridge, Massachusetts

SUBJECT: GROUP 61 BIWEEKLY REPORT, December 19, 1952

2.0 EQUIPMENT ENGINEERING

(N.N. Alperin)

The feasibility of reducing the size of the light gun by using 1P42 miniature phototube is now being investigated.

The new light gun is now available for use in Room 222.

Some tests were also made to determine the necessary steps to be taken to enable the new light gun to be used in the P-19 phosphor. It appears that a higher supply voltage for the photo multiplier will be needed.

(J.W. Forgie)

The reliability of the magnetic tape system has been good for the past few weeks. However, adequate marginal checking and maintenance schemes have not yet been worked out, with the result that there is no guarantee that the system will operate satisfactorily after a period of several days of disuse. In short, the magnetic tape system is not yet considered a part of the computer system and is consequently not checked out on a daily basis. The computer technicians are not equipped with test programs or maintenance information which would permit them either to check out or repair the tape system if it should fail to operate correctly. As a consequence, a programmer must at present use magnetic tape at his own risk unless he takes the trouble to check with a member of the group working on the tape system. If a programmer wishes to use magnetic tape, he should call J.W. Forgie, E.P. Farnsworth, S.B. Ginsburg, or A.X. Perry and arrange either to have one of the above present when the program is being run or to have the system checked out shortly before the scheduled operating time. The system can be fairly well checked out in five minutes if the programmer can spare that much time.

It is also requested that a notation be made in the computer log each time that the magnetic tape system is used. The number of the program run, the number of the tape unit (or units) used, and any comments concerning the operation should be recorded. In general, no changes should be made in the set up of the tape units without consulting one of the above-mentioned persons. In particular, no tapes should be changed or removed from the machines. If a programmer wishes to record a tape and take it away for future use, he should make arrangements to do so beforehand. In no case should the programmer take away a tape which was on the machine when he started operations.

2.0 EQUIPMENT ENGINEERING (CONTINUED)

(Jacobs & Jeffrey)

Studies of average single address order times for the IBM 701 Arithmetic Element in various programs (see E-509) indicate that it cannot meet WWII speed specifications without major changes in logic or circuit design. Therefore plans for building a four-digit A.E. (see E-513) to test the reliability of 701 logic and circuits have been dropped.

We have begun to investigate ways of implementing special orders useful in correlation and conversion, e.g. $\sqrt{\ }$ and sin.

(H.J. Kirshner)

The standby VHF equipment mentioned in previous reports has been delivered by Group 22 and will be installed as soon as remoting equipment is complete. The use of this equipment will release the telephone line to Bedford Airport now used in connection with our present standby radio facilities. It is anticipated that this cable will be used to provide direct wire service to Squadron and Group Operations at Bedford.

Group 22 has investigated the effects of long loops (over 1,000 miles) on S.D.V. transmission. On the particular loop investigated, K-carrier transmission equipment was used. This test indicated that although the signal was recognizable as S.D.V., the present demodulors would be incapable of detecting it. The distortion evidences itself as a continued phase shift of the S.D.V. signal, caused, it is thought, by K-carrier transmitting and receiving oscillators not being zero beat. Groups 22 and 24 will investigate remedies to the problem since a K-carrier transmission is used in the Chestnut Hill link.

(B. Morriss)

The operation of the Buffer Storage Drum was discussed with the representative from ERA who accompanied the Auxiliary Storage Drum. He was especially interested in the manner in which we intended to operate the two sections of the drum which handle data sequencially for slow, line-by-line input, and output units. The explanation of these two sections cleared up why it is necessary for some of the drum circuitry to operate in the previously prescribed manner.

Various scope display techniques have been discussed with several people to obtain a feeling for what is needed and how such displays might be obtained for both the near and distant future. A program written by Wes Clark which displays points in a "random" manner with varying display rates and intensities was observed. Intensity seemed to be as important as flicker rate in calling attention to certain points and in displays which were not flicker-free the varying intensity seemed to be much more distinctive.

2.0 EQUIPMENT ENGINEERING (CONTINUED)

(J.H. Newitt)

A run-down of the progress on the items of the WWI new equipment schedule shows that a number of these items are running behind the estimates that were given for them only a month ago. Some of the delays are due to poor PIU delivery. We instituted a procedure for reducing and eventually avoiding unreliable vendor actions at the last liaison period. I will try to devote more time in the future to the implementation of these procedures.

Two other items have contributed and are contributing to slowed progress. These are:

1. A tendency for our vendors and ourselves to gear our work to the relative progress of other scheduled items rather than to the absolute values of the schedule.

2. Repeated postponement of work that is considered to be non-critical at the time for which it is scheduled.

The obvious dangers of the latter items are that the first can lead to a "closed loop" condition where progress could conceivably slow down to zero while the second procedure is piling up a lot of odds and ends that threaten to become critical at just about the worst possible time in the forthcoming manpower picture.

The maintenance of a workable schedule is of vital importance to an undertaking of our complexity; everyone is urged to participate in its formulation, correction and implementation.

The air conditioning work is underway in 045; emergency air is being supplied to the drum console while the large unit is being installed. I have approved a control system worked out by Minneapolis-Honneywell for the automatic adjustment of the air conditioning system (for 156) to the equipment selection dictated in Test Control. We expect to tie the air conditioning system controls into duplicate contacts on relays K-105, K-106, and K-107 of WWI power. The control system revision was carried out in accordance with my outline and request in Supplement #2 of M-1572.

(F. Sandy)

The Filament Transformers for 17 racks of MITE equipment have been received and installed.

The rest of the Fuse Indication and Rack Interlock Panels have been received and installed, except one which is being modified to become the Power Bay Interlock Panel for MITE.

2.0 EQUIPMENT ENGINEERING (CONTINUED)

(F. Sandy) (Continued)

Gavitt Mfg. has delivered all cables for the MITE racks except the cables for the Transformer Primaries and those for connecting to the plug-in mounting panels. Enough plug-in mounting panels have been received to supply racks L1 and L15 of MITE.

The Auxiliary Drum arrived and all power and power supply control wiring has been made to it. The motor-generator set has not yet arrived. Raytheon supplies are being used until the M-G set gets here. The Star Kimball Co. of Bloomfield, N.J., has promised to ship it December 19. We should have it sometime next week.

(D. Remis, A. Heineck, I. Aronson)

Work has been started on developing design procedures for diode gating circuits for possible use in a 32-digit adder. Special attention is being paid to carry propagate time. Three days were spent studying and analysing H. Boyd's cathode follower and flip-flop.

(A.V. Shortell, Jr.)

Some time was spent studying the operation of the video mapper built by Fred Irish. This mapper uses a 931-A phototube driving a Schmidt circuit directly. This circuit operates well with a handpicked 931-A or a 1P21 and by introducing a cathode follower and amplifier could probably be made to operate with any 931-A. This possibility will be investigated during the next biweekly period.

Most of the past week has been spent supervising installation of the Teletalk system. At the present writing master stations have been installed in Room 156 and in Test Control and all speaker stations have been installed. A master station will be installed in Room 224 on Monday and master stations in 222 will be installed during the next biweekly period.

(G.A. Young)

A memorandum describing a computer program for testing the Auxiliary Drum is being written. Work has also been started on bringing the Block and Line Diagrams of the paper tape readers and recorders up-to-date.

(C.A. Zraket)

Some part of the past period was spent in making up a logical block diagram of the reading and writing circuits for Groups 0 and 1 of the Buffer Drum. I have been working with B. Morriss in an attempt to get a set of block diagrams drawn up for the Buffer Drum system in connection with thesis work and a memo Morriss is writing on the Buffer Drum.

3.0 BEDFORD EXPERIMENT

(D.R. Israel)

It now seems that the hill upon which the MEW radar is located will be removed during 1953. Our experiments with this radar will continue, it is hoped until June 1, 1953. After that time, further experiments of the type conducted with the MEW will be continued with data from the CPS6-B at North Truro.

M-1765, "Summary of Group 61 Flight Test Activities, April 1952-November 1952" describes and lists all those flight tests conducted with the MEW and the Rockport and Scituate radars. It is presently being multilithed.

From data collected for the Summary Report, the following figures were obtained:

For the period August 15, 1952 to November 30, 1952

Aircraft Hours Scheduled: (including rescheduled flights)	321	
Aircraft Hours Flown:	133	(41%)
Aircraft Hours Cancelled:	188	(59%)

The 60% cancellation figure is now being used in our future flight test scheduling. Scheduling for January 1952 has indicated that the desired number of tests must be cut down to match the available computer time. This curtailment is necessitated by the loss of two days per week for installation work. The situation is made somewhat more critical due to expected bad weather during January.

(M. Brand)

Aided Tracking Aided tracking was tested in conjunction with the interception program T-2104. Due to some trouble now experienced either with 2104 or the equipment, the runs, were inconclusive. On the whole, however, the results were favorable.

Beacon Response The rewritten Beacon Program operated successfully. A still newer and shorter one has been written and will be tested.

(C. Gaudette)

The Two Aircraft Interception Program (2187) is not operating satisfactorily. The program has been used for several successful runs, but recently, the recorded runs can not be reproduced correctly. In conjunction with this, a new program to check the MEW data has been written, and will be used as soon as possible.

3.0 BEDFORD EXPERIEMNT (Continued)

(F. Heart)

Work was resumed on the four-pair interception program. S. Knapp and A. Ward have nearly completed initial programming. A first trial should be made within a month.

Some time was spent (with Israel, Gaudette and Zraket) considering plans for future tests.

Three days were spent at the AIEE-IRE-ACM Computer Conference.

(S. Knapp, A. Ward)

The Two-on-One Interception Program has been checked out on recorded data and is waiting for a flight test to be scheduled.

Several conferences have been attended on the identification and operations problems for the September system. A trip to the Quick Fix Center at North Truro was taken to observe the work done there on identification.

Work on the Four Pair Intercept Program continues as time permits.

(F.M. Garth)

A feeling has arisen that Tape 2187 is smoothing more than once within a search sector. To help in the diagnosis I have written a program which at critical times will store desired information and then, when the antenna is at south, record this information in Flexo-writer character from a magnetic tape.

Basic planning has begun to determine the computer's functional part in Weapon Assignment. See C. Gaudette's report for the particulars.

Nearing completion is a parameter to Tape 2187 which will permit display of various sizes on various scope lines.

(C. Grandy)

Final Phase Interception Several days were spent working on an improvement in programming the final turn which makes possible a considerable saving of storage in this program. This saving together with others has reduced the final turn calculations by about 50 orders; this is a significant saving of storage in the Complete Intercept Program under revision.

3.0 BEDFORD EXPERIMENT (Continued)

(C. Grandy) (Continued)

Interceptor Reattack An analysis of the limitations on the pairs of angles, attack and reattack, that are possible has been made. Nothing of particular importance was disclosed since the limitations are only those which common sense would impose in any tactical situation.

(G. Rawling)

The flow diagram for the height finding phase of the Sixteen Aircraft Initiation and Tracking Program, along with patrol programming was transferred to A. Ward and S. Knapp.

My future time will be devoted to Whirlwind II Associated Studies.

(C. Zraket)

The major portion of the past biweekly period has been spent in aiding in the formulation of duties, equipment needs, and programming requirements for the Weapons Assigner and the Intercept Monitor in the proposed Cape Cod System for September, 1952.

A final-turn interception was conducted on December 19, using two B-26 from the Instrumentation Laboratory, one of which was equipped with a camera and served as the interceptor. Although the first run was fairly successful, the last two runs were inconclusive due to erratic operation of the program at the time turn instructions were to be given. It is believed that this is due to faulty radar data which affected the tracking program, or to anomalies within the correlation section of the tracking program which generates large velocity components. The latter would tend to affect the calculations in an adverse manner.

4.0 DATA SCREENING

(W.S. Attridge, Jr.)

J. Ishihara and I have written the part concerning MTP#2 of the data screening section of the LSR. As a part of this report we have defined a new term which will be used henceforth in our work. In the Bedford experiment the radar antenna position has been used as a timing reference and one antenna scan as a basic time interval for all calculations. In the Cape Cod System, however, several radars will be used having asynchronous scan rates, so it is more convenient to use some real time clock as a timing reference. In the Cape Cod System we now define the basic time interval as the radar frame.

4.0 DATA SCREENING (Continued)

(W.S. Attridge, Jr.) (Continued)

If an extremely large amount of data is received from a radar set in one radar frame (more than 3 times average), it is reasonable to assume that something is wrong with the data, in particular that there is a very large amount of noise. Such a condition would seriously disrupt operation of MTP#2 for a few scans at least; one reason is that an excessive amount of data would need to be processed by the correlation program and secondarily that automatic initiation would saturate storage. It would be much better to reject all the data (which could be accomplished quite easily in MTP#2) or stop automatic initiation for this radar set during this radar frame.

MTP = Muldar Tracking Program

LSR = Lincoln Summary Report

(W.A. Clark)

The Overlap Analysis appearing in the November 21 Biweekly Report is that of a system of twelve 35 X 5 radars instead of twelve 32 X 5 radars as reported.

An analysis of a system of twelve 32 X 0 radars has been completed and the results follow:

Total Coverage: 16,606 sq. miles

33%	is	covered	by	1	radar
27%	"	"	"	2	"
21%	"	"	"	3	"
12%	"	"	"	4	"
6%	"	"	"	5	"
.5%	"	"	"	6	"

The utilization of the system is 0.430 .

(D. Goldenberg)

Optimum Search Area Whereas most of my previous work on determining the optimum search area for tracking was carried out for tracks isolated from others, my present investigations are focused upon the problems arising from intersecting or nearly intersecting and splitting tracks. In such conditions, the search areas about the predicted positions will overlap and decisions must be made as to which of the targets that lie in the area of overlap are to be associated with which of the tracks. The system of logical decision will be based

4.0 DATA SCREENING (Continued)

(D. Goldenberg) (Continued)

upon one of three methods:

a) Associating targets with those tracks for which a "best fit" with the predicted positions is obtained and then averaging all positions correlated in this way.

b) Associating all targets within the search area about the predicted position for a particular track and averaging all of the positions.

c) A combination of each of the previous methods wherein a "best fit" is the basis of association for all targets within the large search area, but outside a smaller area, within which averaging of all targets is carried out.

The efficiency of each of these systems is being evaluated with respect to how each is effected by the following characteristics:

a) The dimensions of the search area as a function of accuracy of the predicted position, the quantizations errors and the probability that a track will turn.

b) The probability of occurrence of targets in the overlapping area.

c) The size of the break-point used in the smoothing formulae.

d) The frequency of "misses".

e) The effect on smoothing and prediction of averaging in a number of pieces of data from a nearby track with the data for a given track.

(J. Ishihara)

Estimated time requirements for correlation in the Cape Cod System using the methods of Muldar Tracking Program #2 (MTP#2) were calculated for several idealized situations. All indications are that the total time required will not exceed the seven seconds estimated for MTP#1 (Muldar Tracking Program #1) correlation. The additional time required by the more complicated and comprehensive correlation scheme was offset by the reduction in the number of tracks (by quadrantal track-out) that a piece of return must be checked against. Worked with W. Attridge in writing up a description (including flow diagram) of MTP#2 (Muldar Tracking Program #2).

(H.H. Seward)

A parameter for checking Ishihara's track sorting section of Muldar Tracking Problem #2 was completed and operated with favorable results. A more comprehensive checking parameter for the section has been completed and awaits computer time.

4.0 DATA SCREENING (Continued)

(J. Levenson)

During this biweekly period, some time was spent writing a display program for Muldar Tracking Program #2 (MTP#2). It will display numerical results in tabular form on the scope to be photographed. This will save considerable time over typing out results.

I wrote an interoffice memo on an "ordering" scheme of correlation in which both radar returns and track positions are each arranged in order of x magnitude. The correlation is simply a matter of meshing the two ordered sets. This method was found to be lengthier than existing methods and will probably not be considered further.

Testing of Muldar Tracking Program #2 (MTP#2) has advanced and the correlation and print-out sections are checked out.

(H. Peterson)

During the past two weeks I have worked on the following things: checked program for my program to enlarge any section of a display by a factor of 4 and center about any point.

In a discussion with W. Attridge, we considered the problems involved in magnetic storage and checked through my tape again. The possibility of error due to saturation was discussed and we considered rejecting all data from a radar if it saturated on one scan.

I also spent time on graphing discrepancies in path, due to altitude, as observed from two radars.

(N.S. Potter)

After two previous attempts which were unsuccessful because of difficulties with the light gun and the computer, the program testing an approximation to the interception heading angle ran properly. However, the typewriter providing direct print-out from the magnetic tape equipment has been removed for repairs so that the results are not available as yet. In all probability the program will be rerun as soon as possible, with a modification to obtain a print-out from ES.

The approximation in question is designed to provide satisfactory estimates with one-fifth the operating time and half the storage of the present method.

5.0 TRACKING AND CONTROL

(M. Frazier)

The common-velocity separate-track program using simulated data from two radars is operating.

Attention is again being turned to semi-real time programming with an immediate goal of two aircraft tracking by Bedford, Rockport, and Scituate.

(J. Hayase)

Completed flow diagram for the problem of tracking a single aircraft with two radars.

(W. Lone)

I have been continuing to write the program mentioned in the last biweekly report, i.e., attempt to keep fixed on a track when another aircraft crosses its flight path.

(A. Mathiasen)

A new set of simulated data tapes has been prepared. With these data was obtained using a single radar tracking program (to be used as the "control") and using a two radar tracking program, which in effect treats the two radars as one in correlation. With the "debugging" of a simulation program of M. Frazier's and the partial checkout of one of B. Stahl's during the last biweekly period, this phase of the work should end soon.

A live data tracking program was used in a flight test on Thursday, December 18. Although, judging from the scope display, both radars consistently saw the target aircraft, Rockport failed to correlate. This condition later cleared up with no changes having been made in the program. The disease and the remission remain a mystery. In an attempt to further diagnose the trouble (and, incidentally, to provide R. Krepps of Group 22 with asked-for information) the program will be rerun with the recorded data and the data will be further analysed with a single radar tracking program.

Since the knowledge does not seem to be universal, it may be of some interest to programmers that an arithmetic check alarm can occur after an slr order following the multiplication of two numbers (with hold). An example is 0.56427 mh'ed by 0.52531 followed by slr 16.

(B. Stahl)

Two parameters have been written for Nolan's calibration program. Neither is working. Two-Radar Single-Aircraft Tracking, Single Position, Best Fit (TRASACT 1p BF) has been checked out and should work after a few minor modifications.

6.0 AIR DEFENSE CENTER OPERATIONS

(D.R. Israel)

The majority of this biweekly period has been devoted to the preparation of a definite proposal for implementing the non-TWS functions of a transition Cape Cod System operating without the use of a buffer drum. This proposal is expected to be definite in all details, particularly in the specification of scopes, switches, displays, room layouts, etc. Work on this proposal is roughly 80% completed; it will be finished as quickly as possible and distributed for reading. Following completion of the proposal, a revision will be written to indicate the changes made possible by use of a buffer drum.

The existing rough draft sections of the above proposal have been hectographed and are available for reading and suggestions. The completed sections are:

1) Identification
2) Height Finding
3) Weapon Assigner
4) Enemy Raid Director
5) Interceptor Tote
6) Track Numbers
7) AAA

In connection with the above work, Brand, Cioffi, Knapp and Ward visited North Truro to become acquainted with the efforts of Group 21.

Preparations are being made for the writing and demonstration of a new simulated demonstration program. This program will be aimed at demonstrating certain techniques in connection with the use of the light gun, scopes, etc.

A telephone line to Flight Test Operations at the Bedford Airport has been requested.

(M. Brand)

I began work in conjunction with P. Cioffi and A. Ward on the identification phase of the September Cape Cod System. The above mentioned, S. Knapp, and myself flew down to Truro to visit Project Lincoln's "Quick Fix" installation. While there we had talks with R. Davis of that group who briefed us on presently-used and future-desired methods of identification.

On the basis of these talks and observations, A. Ward, S. Knapp, and I had a series of conferences which culminated in the preparation of three outlines for a Cape Cod identification system. The first method provides merely partial mechanization of the Air Force's present identification method. The third method provides for a highly sophisticated future scheme. The second method

6.0 AIR DEFENSE CENTER OPERATIONS (CONTINUED)

(M. Brand) (Continued)

represents a compromise between the two and is the one for which we will plan.

A. Ward and I have started plans for testing phone inputs to such a system.

(P.O. Cioffi)

The memorandum promised recently on the problem of identification in an air defense system and air traffic control is now abandoned. This work will be combined with and reported by the joint effort of A. Ward and M. Brand who have been assigned to this task. The activity of this group got underway this period by making a visit to the "Quick Fix" installation at N. Truro.

The second week was spent on vacation.

(J.J. Cahill, Jr.)

A program has been written to do Automatic Target and Battery Evaluation and Assignment (AAA), using flip-flop data. Its main purpose is to check computation methods used in adapting the Evaluation and Assignment criterion presently being considered by the Army. (See "A Criterion for Assigning Target to Batteries in an AA System," M-1625.) Some cases will be worked out by hand to check against the computer's results.

No AA Guidance Flight Tests have been run during this period. A Height Finder Calibration Test was run, but results were unsatisfactory because of what was either program trouble or radar trouble or both. Work is progressing in an attempt to find the source of difficulty.

(C. Grandy)

Some time has been spent studying TM 20 in preparation for further work on the use of WWII in the proposed Air Defense System.

(F. Heart)

Several days were spent in preparing summary records of recent flight test activity for the Summary Report, and for other reports. A standard form was prepared for use in A. Hill's biweekly flight test report. In addition, A. Hill and P. Dolan have prepared summaries of flight test activity over the past one and one-half years. Other Other records were prepared summarizing recent jet coverage tests and including "blip-scan" ratios.

6.0 AIR DEFENSE CENTER OPERATIONS (CONTINUED)

(F. Heart) (Continued)

Efforts have continued towards showing members of the Bedford Squadron the scope of Group 61 activities.

(F.A. Webster)

Together with Goldenberg, some consideration has been given to the theory of equalizing price and value of events in an air defense calculation system. Some equalization, of course, is always included in any workable tracking process. The problem is: can it be applied in ways that give greater efficiency? In tracking under the Ground Observer system, several caluclation-hierarchies are implied. (See GOSACT flow diagram by M. Brand and unissued report on manual tracking by F. Webster.) One weeds out input data at each stage with the minimum possible calculation, and one doesn't look at any data in any more detail than the nature of the data and the overall situation require. Ideally, decisions should not be made with any more certainty or accuracy (where these are bought with storage and operations) than the expected decision-value indicates. For example, suppose that the system is approaching a condition of overload, and it seems best to economize on interception calculations and instructions. Wells has pointed out that, while target and interceptor are widely separated, relatively little value is gained by detailed calculation of best course for interception. Mere knowledge of the sign of closure (i.e., whether the interceptor is approaching -- above a certain threshold value -- rather than receding) might be all the information worth using. Though simplifying the calculations, such methods would, of course, complicate the program. Also, the problem might be dwarfed by the requirements of correlation. The problem is closely related to certain mechanisms of learning processes and will be discussed subsequently.

7.0 ASSOCIATED STUDIES

(E.J. Craig)

The two week period brought to an end the study of descent methods. No neat correlation between systems and convergence of equations is in the offing at present.

An idea is germinating in connection with the solution of non-linear problems in n unknowns by an iteration procedure based on the Newton-Raphelson method.

8.0 COMPUTER OPERATIONS

(M. Brand)

The following is a summary of scheduled computer time used by Group 61 during the past biweekly period.

MEW Tracking and Control	
Flights Tests	5.75 hrs
Magnetic Tape	7.33
Data Screening	3.17
Multiple Radar Tracking and Control	19.91
Air Defense Center Operations	0.17
Library of Subroutines	0.41
Indoctrination Programs	4.67
Calibration	0.91
Equipment Characteristics	3.50
Equipment	0.50
Visitors	1.00
Total Time Used	47.32
Time Lost Due To Computer	8.50
Time Not Used	1.18
Total Assigned Time	57.00 hrs

DATE	TIME	SCHEDULED TEST A/C	SCHEDULED TEST Description	TEST ACTUALLY RUN A/C	TEST ACTUALLY RUN Description	REASONS FOR CHANGES OR COMMENTS
12/9	1000-1200	T-33 F-80	Automatic Take-off Initiation	-	Cancelled	Weather
	1400-1600	B-25	Three Radar Coverage	-	Cancelled	Aircraft Radio
12/11	1000-1200	B-25 B-25	Height Finder	-	Cancelled	Weather
	1400-1600	F-3B	Navy Jet Coverage	-	Cancelled	Weather
12/12	1000-1200	B-26	Final Phase Intercepts	-	Cancelled	Weather
12/16	1000-1200	T-33 F-80	Automatic Take-off Initiation	-	Cancelled	Weather
12/18	1000-1200	F-51 F-80 B-25	Two-On-One Intercepts	B-17	Three Radar Coverage	Two-On-One Program not ready
	1400-1600	F3D	Navy Jet Coverage	-	Cancelled	Aircraft Radio
12/19	1000-1200	B-17 C-47	Height Finder	B-17 C-47	As Scheduled	See Section By J.J. Cahill, Jr.
	1400-1600	B-26 B-26	Final Phase Interceptors	B-26 B-26	As Scheduled	See Section by Charles Zraket

* Added to schedule during week of test

10.0 PUBLICATIONS

(M.R. Susskind)

LABORATORY REPORTS

1. "Group 61 Biweekly Report, November 21, 1952," M-1742, pp. 1-20.

   CONFIDENTIAL

2. "Group 61 Biweekly Report, December 5, 1952," M-1748, pp. 1-18.

   CONFIDENTIAL

TECHNICAL REPORTS

1. "An Investigation of Missile Guidance Techniques as Applied to Interceptor Aircraft Guidance," Ryon, J.C., Hodgson, W.C., Naval Research Laboratory, Report 4063, October 27, 1952, Lib. No. 287/S.

   SECRET

2. Lincoln Laboratory Document Room, Accessions Lists, November 10, 1952, Lib. No. 288/S.

   SECRET

3. "The Integrated Electronic and Control System," Project MX-1179, Progress Report, Research and Development Laboratories, Hughes Aircraft Company, April 1, 1952, Lib. No. 289/S.

   SECRET

4. Quarterly Progress Report, Division 3-Communications and Components, Lincoln Laboratory, M.I.T., September 30, 1952, Lib. No. 290/S.

   SECRET

5. "A New Method of Teletype Modulation," Gray, D.J., Lincoln Laboratory, M.I.T., September 22, 1952, Lib. No. 291/S.

   SECRET

6. "Propagation Phenomena and Their Effects on the Errors in F-M Phase Ranging Systems," Pullen, K.A.,Jr., Report No. 827, Ballistic Research Laboratories, Aberdeen Proving Ground, Maryland, Lib. No. 2184R.

   RESTRICTED

7. "Results of Ground-Clutter-Elimination Experiments," Baker,R.H., Elliott,H.M., Research Laboratory of Electronics, & Lincoln Laboratory, M.I.T. June 30, 1952, Lib. No. 2194C.

   CONFIDENTIAL