RAMO-WOOLDRIDGE COR

LOS ANGELES 45. CALIFORNIA

INTEROFFICE CORRESPONDENCE

Col. C. H. Terhier ac. Col. R. Curtin

Col. H. L. Evans

W. B. Hebenstraff

R. F. Mettler

S. Ramo

BUGUECT: STL Responsibilities

in the 117L Program

This memorandum is written to outline my understanding of the STL responsibilities in the 117L program. This understanding is based upon the meetings which you and I had on this subject several months ago, following the extensive separate conversations which Dr. Mettler and Mr. Heberstreit had with Colonel Oder and Colonel Evans.

In general, it is my understanding that the decision was made to require Lockheed to carry out in full its role as the system engineering contractor for the 1171 flight vehicle, along with its role as the development and production contractor for the second stage of the 117L vehicle. As I recall, special meetings were to be held with Lockheed management to require them to draw from the total manpower resources of the Lockheed Corporation to properly perform their several tasks in the 117L program. It is, therefore, my impression that Lockheen's responsibilities include, but are not limited to, the following:

- a. System engineering for the two-stage flight vehicle, including complete dynamic analysis of the two-stage vehicle, trajectory avelysis, stability and control analysis, detailed system test planning, analysis of flight data, diagnosis of flight failures, etc.
- Development and testing of the second stage.
- Identification and specification to AFBMD of any modifications required in the standard Thor or Atlas boosters allocated by AFBMD to the 117L program, and identification and specification to AFBMD of any modifications required in GSE and facilities for launching 117L vehicles from AFMTC and/or Cooks Air Force Base.
- d. Assistance to AFBMD as required to verify that the modified booster when delivered does in fact meet the Lockheedspecified requirements, and assistance to AFBMD in contractually accepting the modified booster hardware.

TO: Col. C. H. Terhune SUBJ: STL Responsibilities in the 117L Program

GM01-630 Page 2 May 13, 1650

- e. Engineering lisison directly with Convair and Douglas as required to identify and specify to AFBMD changes needed in the boosters to satisfy the Lockheed system engineering requirements, to work out any interface problems on those missiles allocated to the LITL program, and to identify and specify to AFBMD all GSE and facility requirements for launching of 11TL vehicles.
- f. Technical test direction for the flight testing of all 1175, vehicles, both at AFMTC and Gooks Air Force Base, using Convair and Douglas as test conductors for the booster stages.
- g. Checkout and operation of the second stage for flight testing.

It is my understanding that STL has the following responsibilities in the 1271.

- A. Staff assistance to AFBMD, upon specific request, to assist in the allocation and scheduling of standard unmodified boosters for the 117L program.
- B. Staff assistance to AFBMD, upon specific request, to assist in evaluating certain special technical problems in the 117L program.
- C. System engineering for the standard booster as delivered to the Air Force for the Thor and Atlas weapon system programs, not including 117L modifications.
- D. Preparation of guidance equations for the Atlas ground guidance stations used for 117L launchings. (This part of the Atlas system is treated as a special case and differently from the Atlas missiles because, as fixed ground equipment, it must remain interchangeable for both standard Atlas and 1.7L launchings.)

It is my understanding that STL does not have any of the following responsibilities (except insofar as specific requests for staff assistance to ARBMD under Items A and B above overlap the items listed below):

1. Any system engineering responsibility for the two stage flight vehicles.

- 2. Any responsibility for the identification and/or specification of the medifications to the booster required for 1171, purposes.
- 3. Any responsibility for assisting AFRAGD in contractionally accepting the boosters allocated to the 117% programmater the Lockheed-specified modifications have been made to the boosters.
- 4. Any responsibility for the technical test direction of Li7L launchings, either at AFMTG or at Gooks Air Force Base.
- 5. Any responsibility for the specification and/or development of proper launching facilities for 117L vehicles at either AFMTC or Cooks Air Force Base.
- 6. Any responsibility for diagnosis of flight failures of 1171. This webicles or analysis of 1171. flight test data.

I would like to discuss the role of STL in the 117L program with you if the responsibilities outlined above for STL do not represent a mutual AFRMD/STL understanding.

LODIETMA

Lefais G. Dun

SUBJECT: Distribution of Reports for ES 117L

TO: Ramo-Wooldridge Corporation. 2ttn: Mr. F. A. Ford

1. The purpose of this letter is to formalize the report handling procedure in order to effect; a minimum transmittal time. WDD DOI 11-7 will be adhered to.

- within and/or for the Ramo-Rooldridge Corporation is 1171. Group will be distributed on a WID/R-W "A Priori" distribution list. It shall be required that prior to any reproduction of WS 1171 information as defined herein, coordination will be effected with wDSIT and WDTR. It is further requested that the "A Priori" distribution list become part of the document reproduced. All reproduced copies of WS 1171 information will be submitted to WDSIT. Those documents as specified in the distribution list for R-W will be sent to R-W by WDSIT as approved by WDTR. This procedure does not apply to R-W internal notes or memoranda, unless accompanied by an official letter of transmitted signed by someone who can certify that the information represents the Corporation's views.
- 3. Inclosure 1 includes the distribution required by NDTR. A standard distribution list for appropriate personnel within R-W who will receive all such reports, should be supplied to WDSIT through WDTR for approval.
- h. Reports, memoranda, and/or information from other Air Force centractors, but deemed applicable and of use to WS 117L by R-W shall be handled in the following manner:
- a. Soud a request to hDSIT; requesting that a given report (defined in sufficient detail in the request) be sent to Lockheed Aircraft Corporation, Missile Systems Division.
- b. WDSIT will get the required number of copies of the document and prepare for distribution to Lockheed.
- c. WDSIT will coordinate with WDTR for approval prior to transmission.

5. Three (3) copies of documents referred to in paragraph & will be sent to Lockheed Aircraft Corporation, Missile Systems Division, Attn: Mr. Robert Salter, P.C. Box 50k, Sunnyvale, California

l Incl:
Distribution List
of R-W Reports
required by \DTR

# SIGNED

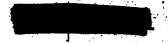
FREDERIC C. E. ODER Lt. Colonel, USAF Assistant for WS 117L Technical Operations MEMORANDUM TO DR. DUNN - STL

SUBJECT: Space Flight Program

- 1. During the past week it has become increasingly apparent that a more detailed definition of an astronautics program for the Air Force is needed to back up our initial work in this area for the Yates Board, the AFDAP Study, and the 117L Program. It is therefore requested that Space Technology Laboratories of R-W prepare such a development program to cover ten to fifteen years in the future.
- 2. It is expected that such a program will provide atimulus for many detailed R&D projects in the future and will outline the course of development in future weapon systems which should be followed in the Air Force. A first draft of this work should be ready for inclusion in the 2 December briefing to Hq ARDC this to be improved upon for the mid-December briefing to the Air Force Scientific Advisory Committée.
- 3. Subsequent to these two presentations it is believed essential to finalise the work in this area at the earliest possible time to provide necessary guidance to Hq USAY.

to Col Kly CHARLES H.

Cys to Col Ely Lt Col Bogert CHARLES H. TERRUME, JR. Colonel, USAF Deputy Commender, Weepon Systems Briefing on 16th to BAS on mgt philo re STL and control over lockheed



### BOTES ON VS-117L MANAGEMENT

8 April 1958

### 1. Steering Took Group

A reasonably complete treatment of this subject is contained in the attached memorandum. However, it is worth repeating that a Steering Tack Group is no substitute for detailed, daily, line direction of a program. It is a device for insuring that the top managers involved meet on a regular basis so as to insure current major problems are understood, recognised and under attack at the proper levels.

### 2. SIL Role

The extent to which STL participates in the program is to some extent dependent upon the setion following Mr. Douglas' current efforts with the principal officers of the corporations concerned. However, benefit can be derived from interim errangements which can be implemented immediately. In essence these would be to create within STL a group, presuntally small, attended directly to the MDT Program Office for the purpose of performing technical analyses and staff assistance. It would not seem to be politic to delegate to this group any "technical direction" powers of the kind normally energised by the B-W contingents in other programs. On the other hand, there some no reason why they should not be engaged in "systems engineering".

### 3. Program Records

In the past the program records, particularly schedules, have been notably skimpy - at least insofar as the operation of the Frogram Control Room and the related procedures are concerned. Inquiry reveals that a major re-work of Program Control Room data is commencing and that current plans visualize the conversion of the ballistic missile program into the new forest in advance of undertaking MS-117L data. It might be wise to reverse the order of these undertakings so that the -117L program becomes the first to be recorded under the new subsems. Particularly significant in the fact that the new program reservis will indicate in milestens-by-milestone facture.

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## 4. Lockhood Monthly Peotings

In view of the fact that the WS-LITE program as a whole will require amjor inputs from activities and sources other than Lockhood, it might be worthshile to consider moving the location of the mouthly meetings now held at Pale Alto to Inglewood where there is a possibility of presser participation by individuals in the complex.

### 5. TROR/-1171 Program

The reason for withholding N-W participation as full scale systems engineering and technical director participation in the . program has been their involvement in the data handling and infra-red systems. These systems are not involved in the THOM/-117L program. The possibility, therefore, exists that the THOM/-117L can be sufficiently divorced from the balance of the program so that R-W might play a more potent part.

# 6. Villigation of Be

Frivate inquiry reveals that admirable corporation and matual support exists between the Program Office and the BED contingent therein. Since the local management complex must handle through lockhood many of the things currently handled direct with associate contractors in other programs, it is important that this relationship be continued and that the full capabilities of the AEC be utilized so that the performance of subordinate tiere of sub-contractors and suppliers can be closely munitored and stimulated.

1 Incl
Cy Mann for Gen Schriever,
12 Mar 58, subj: Summary of
Findings of W8-117L Mont Prej
W/1 Incl

nineke in

MOO

12 March 1958

#### REPORABION FOR GENERAL SCHOLENBE

### SUBJECT: Summery of Findings of VS-117L Management Project

- I. The findings which follow are based upon a visit to Admiral Raborn's activity, reading of the development plan and other current -1171 documents, and general knowledge of the program content through past association. Since the MS-1171 Program Office is fully engaged at this time in a crash effort connected with the new development plan and fund requirements, it has not yet been possible to explore in detail either current precedures or possible future alterations in management procedures.
- 2. At the outset it is worth comparing the posture of the Atlan program when it was accelerated in 1954 with the ourrent posture of the WE-117L progress. In 1954 the ICBM progress (Atlas only at that time) enjoyed the full time attention of a number of souler officers and a growing number of juntor officers and civilians as well as substantial assistance from the R/W Corporation. In the main the specific help rendered by outside individuals such as Mr. Gardner, General Power, the Scientific Advisory Countties, etc., was positive and more or less continuous. The situation is considerably different relative to the 13-117L progress today. It may be that it has played second fiddle to other local programs so long that it will be difficult to get a proper degree of acceleration and attention. In any event the amount of attention devoted and devotable by senior individuals to the program will have a major influence in its success or lack thereof - both schedule-wise and qualitarively. I take such matters seriously because I personally believe that serviceable satellites broadly utilized will have a much more constructive and poverful influence on all aspects of world affairs then either ballistic missile or men-in-space programs. The U.S. should lead in title and the Air Porce must be its instrument.

### 3. Application of Rularis Management Sectoriques.

a. It seems an obvious fact that for MS-117L we cannot at this time gather into our hands in the local complex the same kind of systems management and terbuical direction as has existed in the missile programs since activities like Home ADC and Lockheed subcontractors cannot be directly controlled by a line arrangement using R/W. Therefore it idght be well to adopt a technique applied successfully by Admiral Riborn's people. This is the specific

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identification of responsible offices or people down to a significantly lower level of action and milestones than we do currently. In essence this would elaborate the current AFBM technique of assigning responsibilities through office functional descriptions and through signature blocks on large groups of milestones assembled on charts.

b. There would be a not benefit in adopting at least as an interim measure Admiral Haborn's technique of creating a "Steering Task Group" chairmanned by an AFRE individual and having representation from the interested contractors, military elements and others who contribute to the program.

follows: (1) Admiral Saborn's Steering Task Group is composed as

Special Projects (Chairman) Capt. L. Smith Bepresents Admiral Office SP 20

Lockheed Missile System Division

Bureau of Ships (Code \$20)

Chief of Mayel Operations (OP-515)

Chief of Neval Operations (CP-311)

Massachusetts Institute
of Technology

Atomic Energy Commission (UCRL)

Maval Ordnance Laboratory

General Electric

Aerojet-General Corporation

Westinghouse Electric

Sparry Cyroscope Co.

Mr. W. Mankins

Cadr.P.H.Backus Chief of Ballistic Missile Activities under Admiral Clerk

Capt. F. V. Walker Chief of Submarine Warfare Branch under the CHO

Dr.C.S. Draper

Dr. H. Brown

Dr.P.M. Sye

Mr. H. C. Berendsen

Mr.R.Qeckler

Dr.G.H. Mechlin

Dr. W. L. Barrow

(2) A comparative set of titles for the WS-117L program might be as follows:

Chairman

Represents General Schrlever

lockheed representative

Convair representative .

Douglas representative

Rano-Hooldridge representative on the data processing system

Rome ADC representative

Cambridge Research Center representative

(t)\_

Mosver can represent the communications system involved

Intelligence representative

Meteorological representative,

It should be noted that the representative on Admiral Raborn's committee is fairly high level. The afficecy of such an arrangement depends upon this fact. He discussed the operation of the Group with Admiral Raborn and with his people. His working elements viewed the Group as a body of people the assembled every six weeks or so to solve important problems. Admiral Raborn second to view the same Group as a method for keeping the various agencies participating in his program happy through the device of frequent ecoperative meetings at which they discover or discuss mutual problems. Admiral Dabora has a "board of directors" composed of himself and three or four key staff members who meet together when required to decide important issues. It is true that the situation with which Admiral Raborn has to deal in the Mary is different from the usual Air Borco situation in that the bureaus are more tradition-bound and jealous of their prerogatives than comparable hir Force institutions. So the the Steering That Group; plus Admiral. Reborn's level of assignment; plus the priority of the program; plus the fact that many Naval personnel now see the end of surface warships has succeeded in keeping all the essential elements of the Polaris program pulling essentially in the same direction.

- c. While not a sunagement technique per se, there is a point of view relative to management held by Admiral Raborn and well propagated through his staff which is worth attention. It is represented by the attached diagram and its description. The "centers of authority" of concern to the Polaris offert are such institutions as Buships, the AEC, Mavy contractors, Bushirds and Doobs, Bushipsly and Accounts, etc. Now contractors, Bushirds and Doobs, Bushipsly and Accounts, etc. When asked how they would draw their own set of circles relative to such institutions, their reply was that they had the authority to direct any activity in the Mavy within the scope of their project.
- 4. The Polaris progress has not yet not with very many of the problems attending the enset of testing nor those attaining the commencement of operational use. However, participation by the user elements of the Nevy as well as logistic and training elements some to have been heavy and continuous. They are represented on the Steering Task Group. Heny of Admiral Raborn's local staff here been drawn from much activities. A substantial Report office related to the Bureau of Fersonnel is in the process of being erected. I mention this for the following reason. While SAC/MINE has done some preliminary planning relative to the concepts of employment, it is not entirely clear that the mudane, somewhat unattractive but revertbeless difficult problems of establishing and operating field activities are being identified and the initial implementing actions put underway soon enough to meet the requirements of the accelerated progress. This may be an unjust remark since I've really not yet been able to delve particularly deep into these aspects. Admiral Endorm's Steering Tank Group plus the backgrounds of the individuals selected for his activity seems to have given him an early start on these problems. On the other hand, both the Polaris office and the bureaus are dealing with relatively familiar objects while the MB-117L field operations have no particular precedents.
- Task Group' user-representation is worth some thought. Current planning is that the Strategic Air Command will operate the system. There are some pitfalls commented with this course of action in that SAC in no instance that I can recessor has ever furnished a service to anybody except themselved. The ABS system in its daily operation is essentially a service activity which will furnish many kinds of data to many kinds of consumers most of whom are not in SAC. It is conceded that SAC can devolop the ABS operation so that it will furnish very fine strategic reconsciseance information to Beadquarters SAC. I question whether that command is psychologically adapted to furnishing an equal quality of service to other possible consumers. For example,

communication usages and nateorological usages might be heavily underplayed. In fact these kinds of weeges might be the very ones that we would want to accept as a matter of national policy as opposed to strictly secret intelligence uses sixed at a var-like purpose. The reason for bringing this up is that user representation, if possible, should cover all probable aspects of MS-117L utilization.

### 6. Recommendations.

- a. That the Stearing Task Group approach with technical, logistic and user representation be strongly considered for application to the WE-117L program provided that high enough level of representation is possible. This may be depocially important from a "system engineering and technical direction" point of view since we may not be shie to solve the B/W-STL problem for some mouths.
- b. That specific assignment of responsibilities be made at somewhat lower level of sculon in the WS-117L progress as compared to our bellistic missile programs. This would compensate for the fact that the current situation prevents us from having as firs a control of the ARS progrem as we have of the ballistic missile progrems.

SIGNED

1 Incl Dynamics of Sp Ment Staff Work

KILLIAN A. SHEPPARD Colonel, USAF Assistant for IQC

### MEMORANEUM FOR GENERAL RITLAND

SUBJECT: Exclusion of Hardware Clause in the R-W Contract

1. Reference our conversation this morning, the "Exclusion of Hardware" clause in the current R-W contract reads as follows:

"The Contractor agrees that due to its unique position in the administration and supervision of the Program contemplated hereunder, the Ramo-Wooldridge Corporation will not engage in the physical development or production of any components for the use in the ICHM and IRBM contemplated herein, except with the express approval of the Assistant Secretary of the Air Force (Materiel) or his authorized representative."

These words are first found in a letter from General Schriever to ARDC in October 1954 and were compiled as a result of the 3 September meeting in Mr. Lewis' office. They were placed in the R-W contract in Supplement #4, dated 16 September 1955.

2. Incidental to the hardware exclusion problem, Max Golden is giving EMO a hard time on the removal of ARS from this exclusion clause (ARS got in by accident about 18 months ago). You mentioned wanting to increase the scope of effort on 117L to include systems engineering. The timing would seem inappropriate to add the words "systems engineering" in conjunction with 117L. It seems reasonable at this point that R-W will get the contract from Rome for the infra-red job. I am sure that Max Golden will interpret this as hardware production and would then consider that giving R-W systems engineering on 117L would create a conflict of interests. Personally, I don't think that such a conflict would exist in reality; however, I am bringing this matter to your attention only so that you and General Schriever can be made aware of the fact that we should probably clean up the present problem with Max Golden before starting a potential second one.

J. D. BOGERT

Lt Colonel, UBAF

Chief, Programs & Procedures Office Weapon Systems



WDTR

10 Sep 56

SUBJECT: R-W Responsibility in Connection with the

WS 117L Program

TO:

Ramo-Wooldridge Corporation

ATIN: Dr. Ramo

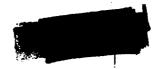
- 1. For some time, the obligation undertaken by the Ramo-Wooldridge Corporation on behalf of the Western Development Division has included certain tasks in support of USAF interest in satellite vehicles. The purpose of this letter is to define further the specific future duties seen for the Ramo-Wooldridge Corporation in connection with the recently approved Weapons System 117L (Advanced Recomnaissance System (ARS), management responsibility for which has been assigned to the Western Development Division. The following guidance is to enable continued planning by your company to provide these services. Separate action is currently being taken to revise the work statement of Contract AF 18(600)-1190 to properly include the requirements of this letter.
- 2. In general, the WS 117L program encompasses a system development contract plus supporting technical development a number of ARDC centers. The Air Force plans to contract with the Lockheed Aircraft Corporation for the development of the ARS. Lockheed will be the prime systems contractor and have overall systems responsibility.
- 3. A part of the ARS program involves very close interaction with the WS 107A program. Also, it is important that the WS 117L program be carried out with minimum interference to the WS 107A program and maximum mutual support between the two programs. In those areas of interaction between WS 107A and WS 117L, in particular, the integration of the powered orbiting vehicle with the ICBM vehicle from both the development and testing point of view, the Ramo-Wooldridge Corporation will provide technical advice and studies, as needed, to the Assistant for WS 117L, Technical Operations, WDD, for assistance in his direction of the program. Ramo-Wooldridge will also be responsible for furnishing similar technical support on the problems of the ICBM-ARS integration to other participants in the ARS program as requested by the Assistant for WS 117L.

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WDTR, WDD (ARDC), Subj: R-W Responsibility in Connection with the WS 117L Program

- 4. An additional area in which the assistance of the Ramo-Wooldridge Corporation is desired is in conducting, on request of the Western Development Division, such additional systems studies, review and criticisms of various reports, proposals, and technical work statements, and operational research studies as may be required to permit the Western Development Division to intelligently guide the efforts of the prime systems contractor and the related technical development program.
- 5. It is felt that the above functions could best be performed by a nucleus of permanent Ramo-Wooldridge personnel who would become intimately familiar with ARS, problems, usupplemented from time to time by other specialists as the problems at hand may require. For planning purposes, it is estimated that for the balance of FY 1957 the engineering manpower required of the Ramo-Wooldridge Corporation for the WS 117L program will be about six full time engineers or scientists.
- 6. The security factor of your participation in the ARS program will require special consideration. Particularly high security sensitivity is associated with the ARS as a national reconnaissance effort since compromise or premature disclosure of this endeavor could result in serious national embarrassment and possible subsequent loss in the operational utility of the system and the resulting intelligence. For example, the very fact that the USAF has an approved satellite program is, in itself, classified as SECRET information.

/s/ O. J. Ritland Q. J. RITIAND Colonel, USAF Commander

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DOD DIR 5200.10



LOS ANGELES 45. CALIFORNIA

INTEROFFICE CORRESPONDENCE

To: Col. O. J. Ritland

cc: Col. C. A Terhune Lt. Col. F. C. Oder

DATE: 11 Oct. 56

L. G. Dunn J. C. Fletcher

Susject: R-W Responsibility

FROM: Simon Ramo

in MS 117L Program

REF: Letter from Col. O. J. Ritland to S. Ramo

dtd 9/7/56, Subject as above.

- 1. The referenced letter is believed to make clear R-W's present responsibilities in this program and makes possible R-W planning as to organization and manpower assignments.
- 2. R-W desires to be an eligible competitor for certain hardware aspects of WS 117L; namely, in communications, computers, and specialized control subsystems, as well as in any form of electronics instrumentation for testing out the system in stationary facilities or in connection with flight testing. We should also like to be considered for any new developments that may be required in the field of tracking subsystems. We do not expect to be interested in airframe, propulsion, nuclear power supply, or stable platform aspects.
- The amount of effort allowed to R-W during fiscal '57 is quite limited (six man years according to the referenced letter). It is desirable that this budget be spent as judiciously as possible on those aspects of the. program which can be of greatest assistance to WDD in directing the program. We suggest that great care be exercised in the assignment of task to avoid any routine or minor engineering, engineering liaison, or data and record searching or listing functions, since these could probably be more easily obtained in other ways. We believe that the unusual technical staff assembled in R-W can be particularly useful if confined to the more difficult types of technical investigations, or on issues involving major system judgments and interactions with the ICBM program. For virtually any study, it is necessary to insure proper technical and program coordination of the conclusions by assignment of some part-time effort by our top directorial staff. Also, practically any technical investigation requires some competent technical staff assignment for such supporting purposes as computer programming, library research, and the like. When these items are added to the main analytical effort of those individuals assigned full time to a specific study, the year's budget of six man years could be quickly used up. It is thus necessary that R-W avoid any additional and unnecessary expenditures in administrative and managerial assignments relating to this program. Accordingly, some changes in our organizational structure relative to the handling of our work in this field are presently being made. Specifically, we have had in the past a "Program Director's Office" similar to what has been set up for the 5, 68, and 75 programs. The previously contemplated

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TO: Col. C. J. Ritland

Subj: R-W Responsibility in WS 117L Program

11 Oct 56 Pa;e 2

assignment of individuals to such a Program Office to handle a technical-executive role seems now unwarranted in view of the small amount of effort expected from R-W, and especially in view of the fact that this effort must come from the most highly technically specialized experts in the Company. We are accordingly abolishing this special program director's office, and instead setting up a special assistant to Dr. Dunn, the Director of the Guided Missile Research Division. This assistant will be responsible for liaison with your office and for arranging the assignment to the appropriate specialists of the specific tasks which you call upon R-W to carry out.

4. This special assistant will be Mr. F. A. Ford. Mr. Ford is an experienced scientist and engineer with over 20 years of pertinent background. He has held responsible positions in frontier problems at the RAND Corporation, then in charge of preliminary missile design work at North American Aviation, and later as Deputy Chief Engineer of Northrop. In the latter capacity, Mr. Ford was in charge of a large part of Northrop's entire engineering effort, including their advanced projects, their guided missile projects, and their research and operational studies. His experience and background with us has confirmed that he is an appropriate person to handle well the direct liaison with Wol. Oder's office, and the direct arrangements, as an assistant to Dr. Dunn, necessary with the various technical staffs of R-W who will actually perform the studies. Dr. Fletcher, who on a part time basis has been heading the previous Program Director's Office, with Ford as his assistant, will confine now his attentions to the directing of the Electronics Staff. In that capacity we feel that he will be used to the greater advantage of all of WDD's programs, including WS 117L.

5. Should WS 117L develop in such a way that the R-W role is altered, we shall, of course, be ready at any time to make appropriate organizational changes so as to meet our contractual obligations.

Original Signed
Simon Ramo

\$R:rm

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WD 56-04243

# THE KAMO WOULDRINGE CORPUR

LOS ANGELES 48, DALIFORNIA

INTEROFFICE CORRESPONDENCE

Co. Butte Com. B. L. F. Col. H. T. Morrie Maria Cara and Maria

SUBJECT, Role of Raw in Research and in

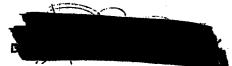
Repertmental Work on Goutract 1199

FROM: MARIE

Reference: Mamo to Dr. Reme from General Substance, some subject 18 July 1954

- 1. Your memo referenced above appears to be an adequate statument of the current policy contemplated by WDD in conjunction with R-W's role in research and experimental work on Contract 1190, and removes previous misunderstandings, with the exception of the three items disenseed below.
- 2. Your memorandup introduces the word "superimentation" and sudines the procedure which you would like to have followed in connection with R-W's obtaining approval to carry on research and experimentation under Contract 1190. It is not clear whether these words apply to both new and sentiming studies in anieting laboratories; as two emamples, we might consider the work which has been carried on in our se-called Analog Computer Laboratary during the pest year or two, and the work which will be done in the Emps Reduction and Analysis Camber. In such cases we stearly are duing inhorntory work to pursuit of our technical avainations and systems engineering assignment, and it has certainly not been our practice to call out each specific study task shood of time and to chiain prior approval to carry it out. To subject each new study in unisting inheresories to the prior approval todisique would obviewsly constitute a major despress toward completing our analyses in a timely inchico and a major departure from what has been the practice.

in view of previous approvals which much possible such facilities, and the complete awareness by WDD of the presise may in which these studies are carried out in our laboratorion, we are necessing that your memorandum: in the are of tim words "versareb and supermentation" is not intended to apply to these tasks. Accordingly, unless you should indicate by further shipperston of your ments that we have the wrong interpretation, we shall assume henceforth that once the Air Force has efficielly determined that the Aregram requires the establishment of a given laboratory operation and incility of a particular scape for a defined purpose, it will not be necessary for formal review to be made of the individual studies and investigations which would constitute the dry-to-dry sparation of the laboratory.



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Foregraph 5 of your memorandum paggests a policy that any secence, at expectamental work which will assend a \$5,000 total expenditure or \$300 morth of special equipment, or three memoranths of affect should receive prior proposals by R-W and prior approval before proceeding. At the same time, your memorandum indicates that it is not your intention to restrict R-W accomplishments under 1190 in the role of research and experimentation, and that R-W will be given the same consideration on such experimental work as other potential operator.

I enhant that a realistic consideration of the limitations imposed by this suggested policy are such as to precime for all practical purposes our corrying on such preliminary experimental investigations. Any experimental investigations undertaken by R-W has so strong a chance of exceeding either three men-mouths, or \$5,000 total expenditure, and/or requiring \$500 in special equipment, that to guard against being in violation of the contrast ( would certainly have to inoue instructions that no such investigation be started without going through the prior justification and graphed route.

These statements are not to be construed as indicative of the fact that R-w isein that it requires a complete free hand to do whatever isheratory work it decrea necessary, with whatever amount of charging of special equipment to the contract it believes to be required for a specific experimental task. Sather, it is my point that the proposed limitations are not so stringently as to handicap our best effects. I agree that some kind of prior approval mechanism is both necessary and desirable, and that we should work together to prepare a joint instruction setting forth a reasonable framework for his Total review, R-W accomplishment and reporting of such research and experimentation.

In attempting to set a limit on the amount of such tasks in general terms in and conventional) method used is to cover such tasks in general terms in the most nearestant, to estimate their total scope and cost for the contract pertest, and not require individual prior approval on specific expanditures within that actimate. If, however, this is not acceptable, R-W is willing to constitute no alternative approach which would be limiting but not constitute; and individual of control as a substitute for prior approvals of individual reasons, been that an parely non-laboratory study effects, we could not persion of individual prior approvals were required before each task (and we have their store, never attempted such a procedure). The chief difference which is but have to be the amount of special equipment which is perchance that appears to be the amount of special equipment which is perchance that appears.

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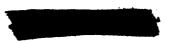


It transposes alone, the privilege of proposity charging to a contrast, once a distance of work has been agreed upon to cortainty of the most fender mental nature and in completely established both on this and other contrasts to a necessary proceedative of the contractor's technical judgment to ender to earry out the work to which he has consulted himself. The director of to program each as this must have freedom of choice in the day-to-day direction of the effects of his research team. If you agree with these remarks, then it comes to me that the practical technique for central of laboratory work is by prior approval of the special equipment.

Repeating the above recommendation for clarity. I would suggest that you allow R.-W complete freedom to perform inheretory work on Contract 1190 without prior approval, so long as the individual took done set require new equipment involving more than \$10,000 in cost to be charged directly to the contract. If there is a concern that there may be too large a number of special tooks, as compared with an estimate made at the beginning of the contract paried, then you could not a further limitations namely, that without prior approval during the contract period there can be no more than a total of \$100,000 of equipment to be charged to the contract which does not have special additional prior appowed before the expenditure.

- 4. Pleasity, I would propose that we make a clear distinction between the policy and precedure applying to (a) especimental work directed toward achieving a suitable meapon at the earliest pseable time, versus (b) research, whather theosetical or especimental, directed toward advancing the state of the ballistic missile art. In case (a), Paragraph I would apply. In case (b), a completely detailed polar approval mechanism is acceptable because there is not the same danger of impeding progress toward operational capability. Therefore, I engagest a separate joint procedure on this latter subject, which must indeed call for individual task approval prior to our enderwhing any investigation missibut theoretical or especial equipment visioners.
- 3. As migrationed in my earlier means of April 16, we aspect that WDD and while will be gained by their usual policies in judging what lacility items the continuous should be espected to own and what items are to be regarded as appeared for the particular project. I believe thus it is proper for R. We describe approximately general purpose inheratory symposism of the type had in quantities which will probably be of continuing use to the Company of the equipment in particular to the work under General 1190 as to type or us to quantity, it means proper for the Air Purce to formick R, either as a direct charge to the contract or major the existing facilities contract. I believe this philosophy

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To: Maj. Gon. B. A. Anhetever Sabji Raio of R.-W in Research and in Experimental Work on Gentral 1290

July 35, 1964 Page 4

in consistent with Air Pures policy.

6. Your easily consideration of the speaking policies emiliand in Paragraphs 3 and 4 above to existing since such policies are particulated in definitioning of the contract which we, WHO, and Bhill are now attempting to complete at the easilest possible date.

Marie Barre

SELITOR.

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SUBJECT: WS 117L Procedures

TO: Ramo-Wooldridge Corporation Attn: Dr. L. G. Dunn

- L. Reference is made to Remo-Wooldridge Corporation letter of 15 July 1956 on the subject of WS 117L procedures. In transmitting reports and other information generated by one government contractor to another, the Air Force endeavors to protect the legitimate proprietary interests of such contractor and avoid giving one firm an unfair advantage over snother. Subject to this and any specific contractual limitation, the government always reserves the right to use information gathered on government contract as it sees fit. Therefore, the Western Development Division cannot subject its decisions on dissemination of such information to approval by any contractor.
- 2. The Western Development Division will make arrangements within its own organization to insure that information it may transmit from Ramo-Wooldridge Corporation to WS 117L contractors, with respect to the WS 107A or WS 315A programs, is in conformance with overall Western Development plans and policies, unless the information is forwarded with appropriate qualifications.
- 3. The Western Development Division will not forward to other contractors any Ramo-Wooldridge Corporation internal memoranda or other informal information relative to WS 117L without specific concurrence of the Ramo-Wooldridge Corporation WS 117L Program Director or any other person that the Ramo-Wooldridge Corporation may designate. Conversely however, the Western Development Division will assume that any communication transmitted officially from Ramo-Wooldridge Corporation to Western Development Division is factual and consistent with Ramo-Wooldridge Corporation policies and plans. How the Ramo-Wooldridge Corporation insures that its outgoing correspondence meets these conditions is a matter for its own internal administration. The Western Development Division will cooperate with the Ramo-Wooldridge Corporation in any procedure the latter chooses to adopt.

### WDD (HQ ARDC) Subject: WS 117L Procedures

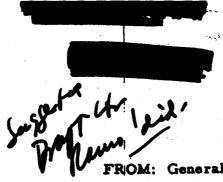
h. With respect to procedures for meetings and visits, minutes of meetings and incoming reports, the Western Development Division concurs with the recommendations of referenced letter.

SIGNED
HAROLD W. NORTON
Colonel, USAF
Assistant Deputy Commander
Technical Operations

WOTR R.O. TRUAY DH

TO: Dr. Ramo

SUBJ: R-W Responsibility in the ARS Program

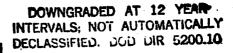


per de de la TRES

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FROM: General B. A. Schriever

- 1. For some time the obligation undertaken by R-W on behalf of WDD has included certain tasks in connection with the USAF Satellite program. The purpose of this letter is to define further the specific future duties seen for The Ramo-Wooldridge Corporation in this area. The following guidance is regarded as sufficient to enable continued planning by your company to provide these services, and to make the estimates necessary for budgeting and contractual arrangements to cover such tasks.
- 2. In general, the ARS program covers a broad system development, including activities at a number of centers of ARDC and a number of centractors. A part of this program involves very close interaction with the ICBM program. Also, it is important that the ARS program be carried out with minimum interference to the ICBM program and maximum mutual support between the two programs. Accordingly, it will be necessary to organize for the management of that portion of the ARS program that interacts closely with the ICBM in a manner somewhat different from the detailed organization required for the rest of the total ARS program.
- 3. More specifically, the first phase of the ARS program from the vehicle standpoint will involve, as you already know, the design of an orbiting powered nose cone to be launched from a standard ICBM "understructure." This phase of the program will have a twofold objective: (a) as a first step in the total ARS vehicle program, it will provide initial orbiting experience, and (b) it will serve as a backup for the International Geophysical Year Satellite Program. In order to meet the scheduled dates and to insure a minimum of potential interference to the ICBM program, this portion of the program will be handled in precisely the same manner as applies to the ICBM program. That is, a separate contract or contracts will be issued to industry to provide the orbiting test vehicle, with The Ramo-Wooldridge Corporation furnishing technical direction over the contractors, including the supervision of the integration of this orbiting, powered nose cone with the Convair ICBM vehicle and the launchings at AFMTC. While the technical direction clause in the contract and the technical direction procedures being used by WDD/R-W will apply, the words "systems engineering responsibility" will obviously not apply because this phase of the total ARS program does not involve a complete systems operation. It will, however, be



### DOUGH DRAFT

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Subj: R-W Responsibility in the ARS Program

the responsibility of The Ramo-Wooldridge Corporation to assure that all aspects of the planning and execution of this phase of the ARS program is done with technical soundness. In short, all matters connected with this specific first phase of the ARS program will be handled by the normal procedures for the setting up of R&D plans and schedules, work statements, technical direction meetings, etc., that are used on the CBM and IRBM programs.

- 4. The total ARS program involves the application of the vehicle to a complete intelligence and reconnaiss are system using satellites, with the corollary development of airborne and ground based equipment for sensing, communication, data handling, control, etc. WDD will establish a project office for the supervision of this total ARS program. In this connection, R-W's GMRD will be expected to act as a technical staff. This staff will not have systems responsibility, nor will it direct the technical activities of all the contractors of the program. However, the staff must be of such size and nature that it can provide to the WDD project office the following specific services:
  - a. System analyses of the operation of the complete system to a sufficient extent to advise intelligently on compatibility of military requirements, objectives, and state of the technical art.
  - b. Study and advice in the creation of an over-all R&D plan.
  - c. Technical evaluation of proposals.
  - d. Study and criticism of technical work statements in contracts.
  - e. Study and criticism of techrical reports.
  - f. Aid in cost estimating for technical apparatus of the complete system.
  - g. Operational research studies.

Col Tam happy to

I am happy to

agree with the general.

I recommend this as

the heat solution.

Heat.

# HEADQUARTERS AIR RESEARCH AND DEVELOPMENT COMMAND P. O. Box 242 Inglowed, California

DATE 19 Man 1956

MEMORANDUM FOR: Col Terline.

This is ensutially what I have in mind reRow role in ARS.
Pls. brok it over and
give me your comments or
on currence- If latter propose
letter for my rig. to Row.

B. A. SCHRIEVER Brigadier Geperel, USAF Commander

# THE RAMO-WOOLDRIDGE CORPORATION

LOS ANSELES 45. CALIFORNIA

# INTEROFFICE CORRESPONDENCE

To: General B. A. Schriever

SUBJECT R-W Responsibility

in the ARS Program

CC: Col. C. H. Terhune

DATE: March 16, 1956

L. G. Dunn

J. C. Fletcher

F. W. Hesse

R. F. Mettler

FROM: Simon Ramo

I believe that it is necessary that R-W receive from you some additional definition on the above subject for several reasons. As an indication of what I believe to be needed, I have dictated the attached rough draft of a letter that I would appreciate your looking over. If this document or one something like it should be somewhere near your own thinking on this subject, then I think it would be very helpful for R-W to receive it at an early date.

SR:rm

Attachment

# WOOLDRINGE CORPURAT

INTEROFFICE CORRESPONDENCE

Tu: General B. A. Schriever

cc. Col. C. H. Terhune

DATE: November 22, 1955

Cy i of 9

Pg 1 of 3

Col. H. W. Norton

L. G. Dunn

B. D. Fried

R. F. Mettler SUBJECT ARS Program

FRUM: Simon Ramo

A. K. Thiel

The following is a summary of R-W thinking on the above program written on the assumption that WDD is to take over responsibility for conduct of this program permanently, and that the problems before us include: (a) choice of date and extent to which WDD takes control from WADC where it is now centered, and (b) the early actions which should be taken by WDD when such control is accepted.

### R-W thinking is based on the following major concepts:

- 1. The ARS program should be prosecuted vigorously but must not interfere with either ICBM or MRBM early capability.
- 2. First ARS satellite launchings should be confined to use of the then available ICBM vehicles, with only the substitution of a new powered satellite orbiting nose cone for the ICBM instrumented re-entry nose cone.
- 3. The many detailed subsystem techniques peculiar to a good intelligence and reconnaissance satellite, namely, data sensing equipment, data storage equipment, long life satellite-borne power supply, intelligence data handling equipment, communication links, and virtually all other apsects of the system, require substantial state of the art development. Equally important, the optimum combination of these techniques into a versatile intelligence and reconnaissance satellite represents a major systems engineering job, which it is premature to do at this time, without further development of the subsystem techniques.
- 4. This does not preclude having a highly limited intelligence or reconnaissance satellite as an early first step.

With the above general concepts in mind, we note that the present program on ARS can be conveniently divided into two aspects. One part of the program is a series of tasks on subsystem, component, or technique state of the art development. These include some dozen relatively small study and

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ARS Program

November 22, 1955

hardware experimentations on orbiting attitude control, nuclear power supply, radio spectrum sensing, optical pick-ups, communication, etc. The other work presently being sponsored consists of three systems planning projects.

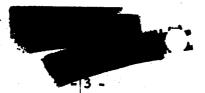
It would be our strong recommendation that the first action that is needed, and this should be taken as soon as possible, is to announce continuation of the first set of tasks on component state of the art development, and simultaneously to drastically alter the tasks of the second group conducting systems studies. This group has been asked to prepare a complete R&D plan for a sophisticated and major satellite system, a task which is considered to be premature, and which requires for its carrying out that the three contractor teams seek a great deal of information from ICBM contractors—a substantial interference to the ICBM project.

The redirection of these studies should, we believe, be as follows. They should be given by WDD/R-W a brief and succinct description of the ICBM vehicle below the nose cone and told to eliminate completely from their studies any other investigations of this vehicle understructure, boost, and trajectory. They then should be asked to prepare preliminary designs of a powered nose cone to be available for launching in the latter half of 1958 on present ICBM understructures and boost-trajectory. The purpose of this first series of flights would be merely to obtain orbiting experience, These first nose cones would contain an absolute minimum of instrumentation, except that associated with the control and tracking of the satellite to assure proper orbiting. The general weight of nose cone would be in the region of, say, three to ten thousand pounds and their studies would, of course, cover the complete package, including the additional rocket power and path control into the orbit, attitude control of the nose cone after reaching orbit, and the satellite-borne portion of the tracking instrumentation.

An additional task these three contractors should be asked to consider is what should be done as the next phase to alter the nature and complexity of the instrumentation carried in the satellite to where it has some minimum usefulness for reconnaissance or intelligence purposes.

Attacked in this way, the satellite program assures the development of techniques that will ultimately make possible the design of more sophisticated and versatile satellite systems. It will give the earliest possible flying experience (even conceivably making possible a backup for the IGY satellite if required), and probably even making possible the earliest possible attainment of some minimum militarily useful satellite.

To implement this program with the greatest of clarity and direction, while assuring the least assignment to WDD of what could be carried by others, it is recommended that WDD take control only of the systems study programs



ARS Program

November 22, 1955

and immediately effect this redirection, leaving the component development program under its present management for the time being. This latter program should, however, come under increasing scrutiny by WDD/R-W because it may require substantial later modifications or extensions, and the background to effect these should be sought as early as possible.

Simon Ramo

(dictated but not read)

SR:rm

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WS 117L "Sensitive Aspects" Poster

WDSI

WDTR

550 23 1956 eh/1343

For your information, inclosed herewith is revised copy of W3 117L "Sensitive Aspects" Roster.

UNED

I Incl
WS 117L "Sensitive Aspects"
Roster

FREDERIC C. E. ODER Lt Colonel, USAF Assistant for WS 117L Technical Operations 1. The following personnel are listed as requiring complete knowledge of the "Sensitive Aspects" of WS 117L.

### Western Development Division

- a. Major General Bernard A. Schriever
- b. Brigadier General Osmond J. Ritland
- c. Colonel Charles H. Terhune, Jr.
- d. Colonel Harold W. Norton
- e. Colonel Robert D. Bowers
- f. Colonel William A. Sheppard
- g. Lt Colonel J. B. Hudson
- h. Lt Colonel Frederic C. E. Oder
- i. Commander Robert C. Truax
- j. Lt Colonel Quenten A. Riepe
- k. Major George E. Austin
- 1. Major Raymond E. Zelenka
- m. Captain Edward J. Commay
- n. Captain James S. Coolbaugh
- o. Captain William O. Troetschel
- p. 1/Lieutenant John C. Herther

### Ballistic Missile Office (AMC)

- a. Brigadier General B. I. Funk
- b. Colonel H. T. Morris
- c. Major R. G. Rowland
- d. Mr. Eugene C. Silberman

### Air Force Cambridge Research Center

- a. Colonel J. G. Gillespie
- b. Lt Colonel George P. Jones
- c. Mr. Milton Greenberg

### Wright Air Development Center

- a. Brigidier General Victor H. Haugen
- b. Mr. Leroy Bell

### Rome Air Development Center

- a. Major General S. P. Wright
- b. Golonel James W. Anderson, Jr.
- c. It Colonel Milton E. Wills
- d. Major Harold F. Wienberg
- e. Mr. Milton R. Rosenberg
- f. Mr. Richard L. Libby

### 20 Nov 56

# Headquarters - Air Research and Development Command

- a. Lieutenant General Thomas S. Power
- b. Brigadier General Kurt M. Landon
- c. Brigadier General Don R. Ostrander d. Brigadier General Marvin C. Demler
- e. Lt Colenel Paul E. Werthman f. Lt Colenel Victor M. Genes

### 4 Dec 56

# Lookheed Aircraft Corporation - AF Plant Representative

- a. Colonel Clifford E. Cole
- b. Major Harold R. Meadews
- c. Mr. John H. McLachlin

2. The following individuals are listed as requiring only that knowledge of the "Sensitive Aspects" of WS 117L as is necessary to provide proper planning support and formulation of appropriate technical recommendations to Western Development Division in the subsystem areas.

## Western Development Division

- Colonel William W. Leonhard
- b. Lt Colonel Edwin A. Swanke
- c. Major Samuel H. Schiavo
- d. Lt Colonel Richard K. Jacobson
- Major Prentice B. Peabody

# Air Force Cambridge Research Center

a. Dr. Alan M. Gerlach

# Wright Air Development Center

- a. Captain Ralph S. Decker, Jr.
- b. Captain Phillip J. Crossman
- c. 1/Lieutenant William C. Covington
- d. 1/Lieutenant Malcolm R. Malcomson 2/Lieutenant John M. Nilles
- f. Mr. James H. Huckaby
- g. Mr. Luther H. Meuser
- Mr. Charles J. Marshall
- Mr. Donald L. Beam
- Mr. Albert J. Falkowski

## Rome Air Development Center

- a. Major James Suttie
- b. Major Byron L. Schatzley
- c. Mr. Joseph Fallik
- d. Mr. Russell H. Johnson
- e. Mr. Seward F. Norris
- f. Mr. Langine Wasskiewicz
- g. Mr. Robert F. Samson
- h. Mr. Daniel Loreto



WDTR

DEC 28 1956

SUBJECT: (U) ARS Progress Report

TO:

Commander
Air Force Cambridge Research Center
ATTN: CRZVA:820:LC, Mr. Radner

Cambridge, Massachusetts

1. Reference is made to your letter, same subject, 26 September 1956.

- 2. Inclosed is our exchange of correspondence with Missil. System Division of the Lockheed Aircraft Corporation on this subject which indicates action to date.
- 3. We appreciate your catching the error in question as it could have serious consequences if left unchallenged.
- 4. Your comments on the applicability of the date attributed to Berg and Meredith, Naval Research Laboratory, are requested.
- 5. Please note that the calculations used by Missile System Division of the Lockheed Aircraft Corporation in their report MSD 1958 were made by Dr. George Taylor.

FOR THE COMMANDER:

SGNED

. 3 Incl
1-ltr fr WDTR to LMSD
30 Oct 56, 1 pg, 1 cy
(WDTR 56-203) (S)
2-ltr fr LMSD 7 Dec 56
1 pg, 1 cy
(WD 56-05119) (S)
3-ltr fr WDTR to LMSD
2 pgs, 1 cy
(WDTR 56-273) (S)

FREDERIC C. E. ODER Lt Colonel, USAF Assistant for WS 117L Technical Operations

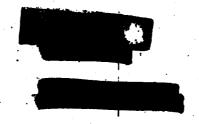
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WDTR

FCE Oder

WDTR 56-274



DEC 28 1956

WDTR

SUBJECT: (U) Pied Piper Progress Report for August, MSD 1958

dated 1 September 1956

TO:

Lockheed Aircraft Corporation

Hissile System Division AlTN: Mr. R. H. Salter, Jr. Post Office Box 50h Sunnyvalo, California

1. Reference is made to:

a. Our letter, same subject as above, dated 30 October 1956 (WDTR 56-208) (NED/18503).

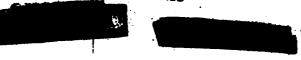
b. Your letter, 7 December 1956, NSD/18560.

- 2. In reference la, we called your attention to an error in calculation contained on page 5 of MSD 1958 which states wif the largest quoted value of 2.4 x 10° particles/cm²/yr is assumed then about 130 of those particles will impling upon the satellite during the exposure time of 0.01 seconds.
- 3. In reference 1b, you cite various data to support the use of quoted value (2.4 x 10° particles/cm²/yr) of mateoric flux. This is not germans to the question raised in reference 1a.
- 4. A simple trial calculation (inclosure 1) indicates an error in concluding that the flux used results in "130 impacts during the 0.01 seconds of exposure time". Using the flux quoted in paragraphs 2 and 3 above, (from MSD 1958) the inclosure calculation gives impacts of the order of 10<sup>-2</sup> impacts per second or 10<sup>-1</sup> impacts during 0.01 seconds.
- 5. If the flux figure of 2 x 10-2 particles/cm<sup>2</sup>/sec, quoted in paragraph 2, reference 1b, is used then, since the satellite has an external area of approximately 6 x 10<sup>5</sup> cm<sup>2</sup>, an impact rate of 1.2 x 10<sup>4</sup> particles/satellite/second or 120 particles/satellite/0.01 sec would result, which agrees with the 130 particles por 0.01 second figure given in FSD 1958. The value of flux of 2 x 10-2 particles/

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WDTR 56-273





cm<sup>2</sup>/see attributed to Berg and Moredith in paragraph 2 of reference 1b would be larger than the ISD 1958 value of 2.4 x 100 particles/cm<sup>2</sup>/year by a factor of over 105. Since this office does not yet have access to the results attributed to Berg and heredith, we cannot assess their applicability.

6. Since, as is stated in MSD 1958, an impact rate of 130 particles per 0.01 seconds could conceivably impart an angular oscillation to the camera in the neighborhood of the tolerance value of 0.00164 milliradians, it is assential that the best available figures of meteoric flux be accurately evaluated and their effect calculated in order that the camera and other components be adequately designed. This initial design cannot await the action indicated in paragraph 3 of reference 1b, although the instrumentation of early satellites should provide data for redesign, should the latter be necessary.

7. Please advise this office of the design data to be employed in this regard.

## SIGNED

1 Incl
Trial Calculation
1 pg, 1 cy (S)
(WDTR 56-273)

FREDERIC C. E. COER Lt Colonel, USAF Assistant for %5 117L Rechnical Operations

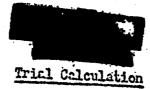
Copy furnished: AFCRC, CRZVA:820:4C, Mr. Radner

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FCE Oder

WO'IR 56-273





1. Assume a cylinorical satellite vehicle 7 feet in diameter (d) by 30 feet long (1). (A generous approximation).

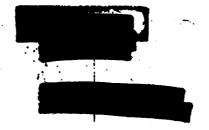
Area of satellite cylinder = x dl = x (7 x 12 x 2.54) (30 x 12 x 2.54) cm<sup>2</sup> = 6.15 x 105 cm<sup>2</sup>

- 2. One year = 365 x 24 x 60 x 60 seconds = 3.16 x 107 sec
- 3. 2.4 x 10° particles cm-2 yr-1 (MSD 1958 value)
  - =  $\frac{2.4 \times 6.15 \times 10^5}{3.16 \times 10^7}$  particles extellite-1.sec-1
- or of the order of 10-4 particles impacting on the satellite during an exposure of 0.01 sec.

This document contains information affecting the fictional Defense of the United States within the country of the fractional Law, Title 18, U.S.C., Section 793 and 794, the transmission of its contents in any manage to an unquilibriated person to prohibited by favor

INCL 1

Control of the second



VB 117L Vehicle Height on Launch Stand

WDI

WDIR

DEC: 26 1956

ATTN: Lt Col V. L. Hastings

J. S. Coolbauch/ls/13h4

- 1. The following values represent a summation of ourrent booster and WS 117L lengths:
  - a. SM-65 and WS 117L 96 feet
  - b. SM-68 and WS 117L 112 feet

In both cases, the WS 117L vehicle was assumed to have a length of 2h3 feet, a diameter of 61 inches and a nose cone with a 30 degree included angle.

- 2. The above numbers do not include any factors to account for possible future design changes or required clearances between the vehicle and launcher superstructure. A good assumption for possible variations in length due to redesign of the WS 117L vehicle is to use 30 feet as the maximum length. This, then, means that the SM-68 booster and WS 117L combined length would be 117d feet. To allow for possible variations in the SM-68 booster design, this number should be rounded off to 125 feet.
- 3. Better values for the vehicle lengths will be made available to DI as they become known.

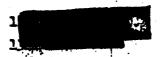
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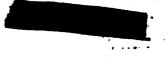
FREDERIC C. E. CDER It Colonel, USAF Assistant for WS 117L Technical Operations

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WDTR 56-271

WDTR
J S Coolbaugh





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TO COM WDD INGLEWOOD CALIF

BT

UNCLASS FROM AFDRD-SS 37326 REFERENCE IS MADE TO YOUR LETTER SUBJECT FUND REQUIREMENTS FOR WEAPON SYSTEM 117L PROGRAM DATED 21 NOV 1956. REQUEST THAT YOU REVIEW THE FUNDING INFORMATION PRESENTED IN EACH OF THE SUB-PARAGRAPHS OF PARAGRAPH 1 OF REFERENCED LETTER WITH A VIEW TOWARD DETERMINING IF ITEMS FOR WHICH P-200 FUNDS WERE RECOMMENDED MAY BE COSTAINED WITH P-100 FUNDS. ONE ELEMENT OF INFORMATION NEEDED IS A DETERMINATION OF WHICH ITEMS MAY BE PROCURED AS CFE FROM THE PRIME CONTRACTOR AS DISTINGUISHED FROM THOSE WHICH WILL BE PROCURED DIRECT BY THE AIR FORCE FROM OTHER CONTRACTORS TO BE GFE TO THE PRIME CONTRACTOR. REQUEST THAT YOUR RECOMMENDATIONS BE FORWARDED THIS HEADQUARTERS AS SOON AS POSSIBLE.

BT

21/1925Z DEC RJEPHQ



WOTLAR

13 December 1956

SUBJECT: Geomysical Information

TO:

General Electric Company

Missile & Ordnance Systems Repartment

Aerophysics Laboratory Attn: Hr. D. Vechon 3198 Chestmut Street

Philadelphia L. Fennsylvania

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- 1. Reference your recent telephone conversation with Maj W. W. Moelke, the items listed under Inclosures are forwarded herewith for your utilization and retention. (Uncl)
- 2. In using Item 1, you should keep in mind that the recommondations provided are tentative in many areas and therefore should not be acted upon without further analysis. A case in point is indicated in the margin of page 17. (Uncl)
- 3. With regard to your request for a duplicate set of the CNN-IA wind soundings provided N-V in April 1955 (by Air Weather Service through Nr. N. Sissensine of AFCRC), it is suggested that you wisit LNN/N-V to determine whether you need all of the INI cards involved (estimated at about 10,000) for your CPN calculations. There appears to be some question as to how typical these soundings are of the areas they represent, and also as to their value at high levels because of the limited number of observations that extend to altitudes of interest. (Uncl)

4. For your information, these coundings were taken between 1953 and 1955 at the following locations:

AF Stations:

Portland, Oregon Selfridge AFB, Michigan Griffiss AFB, N.Y.

Weather Bureau Stations:

Great Falls, Montana Spokano, Washington Baffalo, N.Y.

They were provided to facilitate wind drift computations for two (2) probable target areas (45°%, 45°E and 55°M, 35°E). Since high altitude wind soundings were not available to the areas, it

WDTLAR ct Maj Ebelke 1555



was decided to use data for analogous mind regime eross where G.D-1 radar observing equipment was located. Item 7; "Migh Altitude Mind Comparisons", was prepared by AFCRC from "Open Minds Over the Morld" by Brooks et al and indicates the test analogous areas. "The calmest area of the U.S. 1., the Morthwest, has a wind field with mearly the same average strength and deviations as the windiest terret area, 150%, 150%. Consequently, both avera a drift and the contribution to the CEP when average drift is considered in claims, should closely represent the target error and its distribution... Average wind field strength analogous to the 550%, 150% target, area cannot be found in the U.S.A. Nowever, the distribution of vector deviations around the mean vector very closely approximates such deviations over the Great Lakes area" (extract from "Report on Activities of and Technical Information Provided by AFCRC geophysical Consultant" dated h March 1955). (Secret)

ments you probably have for additional geophysics data (that may have already been provided by Mr. Sissenwine), and to coordinate with Reliference on the assumptions, correlations, etc. that are necessary in connection with utilization of same. For example, we understoom that in your wind drift calculations you are using a signa value of h as apposed to the value of 0.68 generally used; your reasons for this are not apparent to the Religible and should be discussed with them. (Confidential)

SIGNED

### 9 Incla:

1. Summary of Information, Geophysical Discussions with AFCRC Consultants at EDD(ARDG), 5-9 Nov 56. JOHN A. DODGE Lt Colonel, USAF Chief, Armament Group

- 2. Tables and Graphs (Netric) of the ARDC Model Atmosphere, 1956 (Preliminary Edition).
- 3. Abbreviated English Tables of the ARDC Model Atmosphere, 1956.
- 4. Announcement of Committee on Extension to the Stundard Atmosphere.
- 5. Graph, Synthetic Wind Speed Profiles for the Calmest Area of the U.S.
- 6. Graph, Synthetic Wind Speed Profiles for the Windlest Area of the U.S.
- 7. Graph, Derived Temperature vs Geometric Altitude.
- 8. Graph, Atmospheric Winds Retween 30 & 80 Kms (from Signal Corps sound-ings and paper by W.C. Strond in Journal of Geophysical Research).
- 9. High Altitude Wind Comparisons, Potential Target Areas and Analogous U.S

ROUTINE

x AF

NDZGW-10-4-E UNCL

COMDR WDD, INGLEWOOD, CALIF
COMDR ARDC, BALTO

### CONFIDENTIAL FROM WDTR 10-4

FOR RDZGW RE YOUR TWX RDZGW-10-1-E PRESENTATION ON WE 117 WILL

BE MADE AS REQUESTED IN YOUR TWX UNLESS ADVISED TO THE CONTRARY PD

THIS WILL HE AT A TOP SECRET LEVEL AND WILL INCLUDE CERTAIN

SENSTTIVE INFORMATION CONCERNING THE PROGRAM PD ACCORDINGLY CAM

MECESSARY ARRANGEMENTS REGARDING NEED TO KNOW SHOULD BE MADE WITH

DOD EX FOR ATTENDANCE AT THE PRESENTATION.IT IS PLANNED THAT THE

PRESENTATION WILL HE MADE BY LT COL FREDERIC C.E. ODER PD IN

ADDITION THE FOLLOWING HAMED WDD PERSONNEL WILL BE IN ATTENDANCE CLN

CHOR TRUAX CAM AND LT COL QUENTEN A RIEFE PD ALL OF THE ABOVE

NAMED OFFICERS ARE CLEARED TOP SECRET FD REQUEST THIS INFORMATION

RE FURNISHED TO APPROPRIATE DOD OFFICE PD

DOWNGRADED AT 3 YEAR INTERVALS: DECLASSIFIED AFTER 12 YEARS. DOD DIR 5200.10

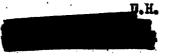
22 Oct

1956

WDTR

FREDERIC C. E. ODER, LT, COLONEL, USAF 1343

CONFIDENTIAL



SIGNED

CHARLES H. TERHUNE, JR COLONEL, USAF DEPUTY COMMANDER TECHNICAL OPERATIONS WOTLAR

SUBJECT: Report on Geophysical Discussions with AFCAC Consultants, 5-9 Nov 1955

TO:

Avec Menufacturing Corporation
Research & Advanced Development Division
Attn: Mr. R. Ricles
20 South Union Street
Leurence, Massachusetts

- 1. One (1) copy of subject report provided by Mr. M. Sissenuing of AFCRC is forwarded harmath for your information and retention.
- 2. It will be appreciated that some of the recommendation, contained therein are tentative and subject to change as methy a for treatment of atmospheric parameters are refined or new techniques introduced to compensate for data that are not available. There may also be a few conclusions that need further verification (e.g. see margin of page 17).
- 3. Much of the data referenced by Mr. Sissemine is evaluable at MBD/N-k; some has already been comperted to the a intering form or correlations required for applicability to ISMN-IELM problems. We therefore suggest that you arrange to visit us after you have had amough time to study this report in detail. This would enable you to obtain such additional data as you may require, and also to coordinate with R-W scientists on their treatment of the many assumptions, conclusions, etc., that are involved.

SIGNED

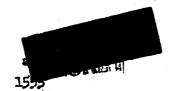
2 Incls.

1. Agorda

 Report in Geophysical Discussions, 5-9 Nov 1956 JOHN A. DODOE Lt. Colonel, USAF Chief, Armament Group

survey at 237

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R-H Fr. G. B. Solomon:

Addition of Discussions on Geophysical Puphlems to TD Meetings

MDTLAR Haj Ebslim/ct/1555

- 1. Request that consideration be given to scheduling of quarterly technical sessions on geophysics problems in conjunction with TD meetings, beginning with the January 1957 sessions. Mr. N. Sissenwine, our AFCRC consultant on geophysical problems (possibly also Maj C. E. Jonsen, AFCRC, Staff Meather Officer) should be asked to attend same.
- 2. It is further suggested that the discussion areas for these sessions be prodetermined insofar as possible, and that the various other NM/R-M groups (e.g. Engineering Mechanics) known to have related geophysics problems be invited to send limited representation to cover their particular interests.
- 3. These suggestions are based on the following conclusions (drawn from correspondence with AFCAO over the past several months and the many discussions held by various MDD/R-W groups with the visiting AFCAC googlywics consultant team over the period 5 to 9 November 1956):
- a. Coordination with contractors as geophysical problems that have already received considerable internal WED/A-V attention loaves much to be desired. Specifically, it appears that:
- (1) Information, data and recommendations which AFCRC has provided are not always made available to contractors who also require same. As a result, AFGRC is the recipient of many complex inquiries of a repeat nature on the variations of such atmospheric parameters as pressure, temperature, relative humidity, wind density, shear, refractive index, etc.
- (2) Statistical information which does get relayed to contractors is sometimes out of context. This may load to erroncous design conclusions and unnecessarily exponsive design features. A recent case in point AVCO was advised that the following design criteria could be used as representative of extreme hot conditions in the U.S.:

Surface air temperature 125°F. Surface wind 0 to 60 mph.

No qualification of the above was provided although the temperature of 1250r is considered applicable in the U.S. to Death Valley only - and even there it

has a very limited espectancy. Furthermore, the concurrent wind speed experienced with such extremely high temperatures is only 5 to 10 mph. The duration of high temperatures should, of course, also be considered.

- (3) AVCO, GE (and perhaps other contractors as well) appear to be going through about the same manipulations in connection with the conversion of rew data to the necessary form for application to specific TOM! problems. They are all concerned with the many inaccuracies associated with available climatological data, entrapolation of limited data to cover unknown areas, and the establishment of correlations of uncertain value. Many of these contractor analyses and calculations undoubtedly involve unnoccscary cuplication of effort; all of them must eventually be checked for validity of interpretation and utilization of data. Since the state of the art is not affected and proprietary considerations are not involved, the desircability of such independent operations is open to question. The same sources of climatelegical data and basic recommendations (i.e. AFCRC and Air Weather Service) are available to all, of course, but it is thought that the other contractors should be advised that R-W computations (e.g. on the effect of wind on dispersion) will be made periodically available as well as advanced R-W thinking on the proper treatment of atmospheric parameters and their deviations in the establishment of structural, thermal and other escential design criteria. This would militate against the use of data out of proper design or operational context; it would also make it unnecessary for other contractors to obtain large duplicate collections of punch card data for independent processing and costly time consuming computations.
- b. Coordination within WDD/N-W on geophysics problems could also be much improved. Extensive personal contacts were made to obtain reasonable assurance that all geophysics problems of importance would be discussed with the AFCNC consultants during their recent visit; many of these contacts were ignorant of the licison role played by WDTIAR in the geophysics area, had no importance of the voluminous collection of data and recommendations on specific meteorological problems to be found in WBTIAR files, and were unaware of the overlap of their own particular problems with those of other WDD/N-W groups.
- c. Contacts with the AFCRC consultants should be more frequent than in the past and should include representation by other contractors to incure continuous and effective integration of effort on geophysics problems.
- 4. The complexity of meteorological problems is often difficult to recognize without considerable experience in meteorology and the knowledge thereby acquired of the inherent limitations and meaningfulness of available data. It is easy for the inexperienced analyst to either oversimplify the problem or to arrive at excessively conservative, naive or unrealistic correlations. Across the board coordination on meteorological and other goophysics problems through scheduled TD meetings as suggested should prevent further misinterpretation or misspplication of basic data and expedite progress towards our objectives.

5. One (1) copy of the report on the 5 - 9 Movember visit by the AFCRC people has been forwarded to both AVCO and GE to establish a common level of knowledge as to assistance that has been provided to date on geophysical problems. Roview of this report by the contractor personnel involved (believed to be Vachon of GE and Ricles of AVCO should lead to early elucidation of the areas that need the kind of open discussion proposed.

JOHN A. DODGE Lt Golonel, USAF

Chief, Armament Group

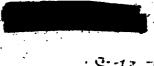
NUMERALDIN FOR CEREBAL PLYLAND

SUBJECT: WS-117L Flanning

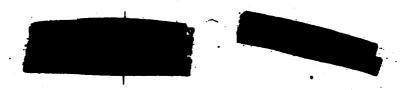
- 1. After hearing the presentation by the 1171 Program Carice last Saturday, I am concerned that there may be less than a desirable execut of coordination between their plans and our present situation. I thought it would be well to provide you with some gross comments along this line.
- 2. First is their requirement for boosters. Thile it is quite true that the IM-65 program finds itself with a preator manber of boosters than we now plan to use, the agin reason that these are excess is our impositive to efficiently and profitably complete and use than. Accordingly, we are in the midst of a planning exercise right now to reduce our production program, escentially eliminating all spere hardware. It is true that even so three standby Series "A" missiles will remain. Planning of this, however, is very dangerous since they are very early missiles and quite possibly will be required to fulfill their role as standbys during the IM-65 test program.
- 3. For some time now we have continued to carry on our production charts four Series "C" missiles above this beyond the requirements for the SN-65. These are indicated on the control room charts so being massigned, although during our recent Washington briefing they were included in the Flight Test Program. At Colonel Terlume's direction these were not eliminated in order that some cushion may exist for the lift program. We are rapidly symmething the point where we should firmly assign these missiles or cancel them.
- 4. Colorel Oder indicated that their orbiting vehicle would weigh 9500 pounds and that a structural analysis of the 65 indicated that this was satisfactory. While this may be true for the present configuration, a TD is today being issued which will authorize Convair to reduce thin gauges and hance structural strength to a minimum consistent with the Di-65 requirements. This change is imporative for range considerations but will seriously decrease the copability of the missile to support a 9300-pound pay look.
- 5. Although I do not understand it in detail, Colonel Offer mentioned the use of AC Guidance rather than GE Guidance for missiles

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used by thom. On the surface this sounds quite simple; but with the inevitable increased engineering and nedification leads, I do not see how we can efford this very early in the program.

- both at Patrick and at Comp Cooks. The planning we are presently doing is in practically all cases limited by facilities and the need for modification thereof as we change strice or tests within series. To consider additional wholesale modifications, much loss diversion to another program during the critical photes of the Flight Test France, is impossible. At Comp Cooks I will only point out that to follow the plan presented Saturday would viticte our statements that we in fact have an initial operational capability and would acrievely degrade our training programs.
- 7. Summarized, the problem looks to me as follows: The logal Program is in a state of potential slipping for a variety of recombe-component deliveries, subsystem deliveries, engineering vine, destilities, and funds. We are continually striving to meet our cratical dates despite these difficulties. To do so requires unlocating the contractors in less essential cross and above all to mintain considerable flexibility as now difficulties are discovered. Although I recognize the dilecter facing the 1171 program, it is my considered judgment that a strange the test plan outlined by them Saturday would so disrupt both programs that neither could be completed within anything approximating the program time scales. Without morning to be a "dog in the manger" I strongly urgo that no largher be planted for diversion to the 1171 program prior to mid-1953 and that no flights using Si-65 hardware be contemplated prior to January 1959.

SIGNED OTTO J. CLASSER Colorel, USAP Assistant for WS-107A-1

MDIC

mt (17 Dec 56)

Col Glasser

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WUTR

SUBJECT: Meeting of Technical Advisors to WS 117L

TO:

Commender

Wright Air Development Center ATTN: WCLOT-3, Nr. A. Bell

Wright-Patterson Air Force Base, Chio

- 1. The WE 1171, WEPO is required to prepare and submit, by the indicated dates, the following items:
  - 2. 1 February 1957

A definitive statement of work for the contract with Lockheed's Missile System Division.

b. 5 February 1957

An itemized bill of materials for all subsystems.

c. 2 April 1957

A revised WDD Development Plan WS 117L.

- 2. In order to meet the above schedule and incur the least inconvenience on the part of attending individuals, all three of the above items will be considered in a meeting held at WDD during the third and fourth weeks of January 1957. A more detailed schedule of events is as follows:
  - a. Ili January 1957

Individuals from the ARDC Conters begin to convene at

WDD.

b. 15 January 1957

The Missils System Division of Lockheed will submit a proposed definitive statement of work.

### o. 23 January 1957

The WS 117L WSPO and the Technical Advisory Group will have accomplished:

- (1) A definitive statement of work to be used as the easis for ensuing discussions with Lockheed.
  - (2) A coordinated ARDUM 80-4 documentation.
- (3) In itemized bill of materials for all subsystems, with particular emphasis on items of NFB which will require procurement action during late FY 57 or early FY 58.

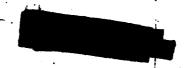
### d. 23 - 25 January 1957

The WS 117L WSFO and the Technical Advisory Group will meet with representatives of the Hissile System Division of Lockhood to coordinate a mutually acceptable definitive statement of work for the entire WS 117L Program.

- 3. The Wright Air Development Center is requested to send representatives to this meeting at MDD, and the attending representatives should be those individuals who have been assigned the responsibility of providing technical guidance and assistance to WS 117L. Since there are so many areas assigned to WADC, a staggered schedule of visits is desired in some cases, therefore, the following people or their substitutes should attend as follows:
  - a. Mr. Donald Reynolds, MCMMI, 15 and 16 January
  - b. Captain Ralph 3. Decker, Jr., WCLFN, 16 thru 23 January
  - c. Lieutenant John Milles or Lieutenant W. Kram, WCLER, 17 thru 22 January
  - d. Mr. James H. Huckeby, WCLEW, 17 thru 23 January
  - e. Mr. Luther H. Meuser, WCLAR, 21 thru 22 January
  - f. 1/Lieutenant Carl E. Johnson, WCLP, 16 thru 18 January
    g. 1/Lieutenant William C. Covington, WCLCN, 16 thru 23
    January
  - h. 1/Lieutenant Malcolm R. Malcomson, WCLCE, 16 thru 23

The other representatives should attend during the period of 15 to 18 January, and Mr. A. L. Bell should plan on being present during the period of 15 thru 25 January.

h. Security clearances and requests for hotel accommodations should be forwarded to Western Development Division, ATTN: WDSIR, no later than 7 January 1957.



### NEMORANDUM FOR RECORD

12 December 1956

SUBJECT: Planning Schodule - WS 117L

- 1. Several items requiring concentrated planning action will occur during the next 4 months. These are:
  - a. The writing of a definitive Work Statement for LMSD for WS 117L.
  - b. The submission of the FY 58 budget requirement.
  - c. The revision of the 80-4 development plan for MS 117L.
  - d. The writing of Sub-system development plans for the Sub-system projects and two supporting projects.
  - e. Submission of GFB buying list by sub-system project. These lists should identify the items to be procured by Nomenclature, Stock number, quantity desired, need date, estimated lead time and point of delivery.
- 2. A schedule of events has been established and is presented as follows:
  - a. IMSD Report 2011 was distributed to the ARDC Center for review and comments on the adequacy of the proposed sub-system development plans. These sub-system plans were also to be considered as basic material for use as definitive work statements on the sub-system areas. The Center comments are to be returned to WPTR by 7 January 1957.
  - b. Mr. Silberman has requested LMSD to submit a proposed definitive work statement for the WS 117L Contract on or before 15 January 1957.
  - c. Nambers of ARDC Center consultant teams should be named, and visit request letters sent to them to convene these groups at WED on 1h January 1957. The purpose of these groups should be to coordinate a definitive work statement for the system and subsystems and to coordinate the 80-h, 613's for the sub-system development plans. This work should be completed by 23 January 1957.

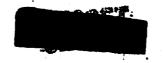
DOWNGRADED AT 3 YEAR INTERVALSE DECLASSIFIED AT ER 12 YEARS. DOD DIR 5200.10;

- d. On 23 25 January 1957, this consultant group plus members of LNSD should meet to agree on a fully acceptable definitive statement of work for the entire WS 117L Program.
- e. 1 February 1957. Submit definitive work statement to BMO to incorporate into the LMSD Contract.
- f. Concurrently with this work, the project offices should be itemizing a bill of materials for their subsystems—particular emphasis should be placed on those items of GFE that will require procurement action during late FI 57 or FI 58. Forms have been prepared by EDTRP for this task. This material will be submitted by 5 February 1957.

g. Sub-system development plans should fall out of the definitive contract meetings and the basic material necessary for the submission of Project 613's. This material and the revised WDD Development Plan WS 117L will be submitted by 2 April 1957.

1

QUENTEN A. RIEZE Lt Colonel, USAF L17L Project Office Technical Operations





(U) Purchase Request, Massachusetts Institute of Technology

MCPTS

Mr. Gene Silborman

VD1R

DEC 1 0 1956

J. C. Herther/1s/1343

1. Exhibit "A" of the Statement of Work on Purchase Request #57-HDD-21h dated 27 November 1956 will be changed in accordance with the following instructions:

a. Item I and II will be deleted and the attached inclosure #1 will be substituted in lieu thereof.

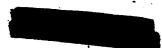
b. The title of the inclosure of Item L.A., "Specifications for an Inertial Guidance and Orbital Attitude Control System for WS 117L", will be changed to "WS 117L Guidance and Control Subsystem Development Plan (TECHNICAL APPROACH)".

- c. Item III: Reports, will be changed as follower
- (1) On page 2, the number of copies of reports shall be broken down in three columns; total number of copies, total number of copies for the Air Force, and the total to Lockheed Aircraft Corporation. The total number of copies shall remain the same. The number of copies to the Air Force shall be, in order listed on page 2 where a total number is shown, I. 5, 3, II. 5, 3, III. 3, 3, 3, 5. The number of copies to Lockheed Aircraft Corporation shall be I. 5, 2, II. 5, 2, III. 2, 2, 2, 5.
- (2) On page 2, under III Film Report, delate "As required" and "As stated" and substitute "Not applicable".
- (3) On page 2, delets "and Film Reports" and add the following address for the reports to be sent to Lockheed: Missile System Division, Lockheed Aircraft. Corporation, ATTN: J. H. Carter, P. O. Box 504, Sunnyvale, California.
  - (h) On page 3, delete the paragraph on film reports.
- (5) On page 3, I.A.l., change to read: "As of Date: Unless otherwise specified, close of the 15th day of each month".
  - (6) On page 3, I.A.2, delete "15th" and substitute "lst".
  - (7) On page h, I.A.h.b, delete "Last working" and substitute "the 15th".
  - (8) On page 6, I.B.1 & 2, use instructions 5 & 6 above.
  - (9) On page 11, II.A.1, delete "last working" and substitute the "15th".

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WDTR 56-256





- (10) On page 12, II.B.1., delete "30 June and 31 December" and sub-
  - (11) On page 12, II.B.2., delete "15th" and substitute "lat".
  - (12) On page 13, II.B.h.b.(2)(a), delete "end" and substitute "15th".
  - (13) On page 13, II.B.4.b.(2)(b), add "or other launch site".
  - (14) On page 16, III.C.1, delete "30th" and substitute "15th".
  - (15) On page 16, III.C.2., delete "15th" and substitute "1st".
- (16) Delete all information in Item III.F., as it is not applicable on pages 18, 19, 20 and 21, down to III.G.
- d. On page 31, IV A., delete "at a minimum" in the last sentence of this paragraph.
  - 2. Please furnish WDTR with 10 copies of the final contractual document.

### SIGNED

FREDERIC C. E. CDER Lt Colonel, USAF Assistant for HS 117L Technical Operations

I Incl
EXHIBIT "A", Statement of Work
3 pgs, EDTR 56-235 (Rev 7 Dec 56)
3 cys

copy furnished to:
WDTO, Captain Johnston
W/ 1 Incl-EX "A", Statement of Work
WDTR 56-235 (Rev 7 Dec 56) 1 cy, 3 pg

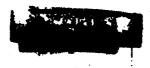
When inclosures and withdrawn the classification of this correspondence will be down proded to the correspondence in accordance with AFR 203-1.

1343

MDTR 56-256

MOTE

J C Herther



#### "A" TIEIHXE

### STATISHENT OF WOLK

I. The Contractor shall conduct studies, research, development, furnish necessary personnel, facilities and materials as required to accomplish the task set forth below:

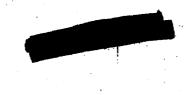
### A. Program Objective

The objective of this program is the successful application of "all-inertial" navigation techniques and instrumentation to the guidance and control system of 15 1171, the Advanced Reconnaissance System. The Instrumentation Laboratory of the Massachusetts Institute of Technology shall develop and test a guidance and orbital attitude control subsystem which shall provide guidance and control signals for a satellite vehicle during all phases of flight, and shall become an integral part of the Reapon System. In carrying out the development of this system, maximum possible use will be made of existing hardware evolved by previously sponsored Government research and development programs and currently in production. The development shall be accomplished in accordance with inclosure 1, "WS 1171 Guidance and Control Subsystem Development Plan (TECHNICAL APPROACH)".

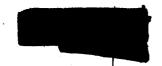
#### B. Tasks

- l. Perform over-all guidance and control system analysis to insure compatibility with the rest of the MS 117L System.
- 2. Study, investigate, develop and test equipment and techniques for the guidance and control of W3 117L. Develop, design, fabricate, assemble, bench-test and participate in the early W3 117L flight-test program, and evaluate experimental and developmental components and systems to achieve the above objective.
- C. The tasks, as described in persgraph (B) above, shall be performed on the Ascent Guidance System, consisting of three phases:
  - 1. Booster Powered Phase
  - 2. Coast Phase
  - 3. Orbital Powered Phase

and the Orbital Attitude Stabilization System, as described in the attached "AS 117L Guidance and Control Subsystem Development Plan (TECHNICAL APPROACH)".



WDTR 56-235 (Rev 7 Dec 56)



D. In order to provide suitable equipment to meet the WS 117L flight test requirements, the work on the Ascent Guidance System and the Orbital Attitude Control System will be divided in the following menner:

## 1. Systems for meeting minimum requirement

a. Ascent Guidance - Modification and augmentation of an AC Spark Plug Division WS 315A Guidance System for use in early WS 117L vehicles. It is planned that one AC unit will be furnished to the contractor by the Government not later than December 1957. AC technical information will be furnished to the contractor by the

b. Orbital Attitude Control - A complete system compatible with other %S 117L Subsystems based on design and mechanization accomplished under the previous Study Contract AF 33(616)-2039, Supplement 10.

## .2. Advanced Systems

a. Ascent Guidance - A light-weight, more accurate, S 117L System designed around the US 107A-1 Guidance System being developed by the centractor for the Government on another contract.

b. Orbital Attitude Control - Development of new compoments and system configuration capable of maintaining adequate attitude control while operating in the radiation environment of the nuclear reactor auxiliary power unit for a period of one year as a

### II. DELIVERY

A. The work called for in paragraph I.B.l. above, shall be performed in a time schedule and technical data and results delivered by technical reporting in such a way as to be incorporated into re-

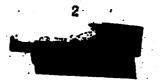
B. The work called for in paragraph I.B.2. above, shall be performed, and delivery of one (1) engineering model (suitable for flight test in a WS 117L vehicle) of each of the systems described in paragraph I.D. shall be accomplished according to the following

Item D.1.a. Ascent Guidance System - June 1958

Item D.l.b. Orbital Attitude Control System - August 1958

Item D.2.a. Ascent Guidance - September 1959

Item D.2.b. Orbital Attitude Control - January 1960

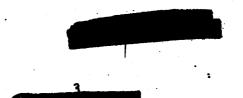


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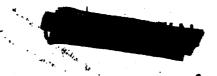
C. Complete specifications and drawings of all systems shall also be furnished with the engineering models, to permit fabrication of subsequent like items of equipment by a qualified manufacturing source, according to the time schedule listed in paragraph II.B.

D. Parts lists, specifications and drawings of components and sub-assemblies shall be furnished at the same time that they are furnished to the producer of the test and engineering models to minimize the transition time required from the engineering model delivery to delivery of subsequently produced units by a manufacturing source.



. No. 1

WDTR 56-235 (Rev 7 Dec 56)



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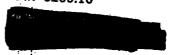
5 December 1956

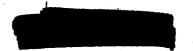
MEMORANDUM FOR COLONEL TERHUNE

SUBJECT: Repart of Trip to Hq. USAF 27-30 Nevember 1956

- 1. In accordance with Hq. UBAF request contained in TWX, cite 58580, dated 13 November 1956, the undersigned together with Lt. Celenel Quenten A. Riepe and Lt. Jehn C. Herther departed Western Development Division on 27 November 1956 for the purpose of participating in a presentation to Secretary Quarles at 10:00 29 November 1956 on the present status of the critical components of the early and feasible Advanced Reconnaissance System program.
- 2. We were able to discuss the proposed presentation with General Schrisver on the morning of the 28th and as a result of this discussion made some rearrangements in our briefing. Further, we together with Mr. Carter and Mr. Salter of MSD/IAC prepared a "script" for each of the participants. Inclosure 1 is a copy of that script, Inclesure 2 is a list of project office, consultant and contractor personnal present for the presentation for Mr. Quarles.
- 3. On the evening prior to the scheduled time of the presentation, some uncertainty developed as to whether or not Secretary Quarles would be able to hear the presentation at all due to the budget blits. Fortunately, he was able to attend as scheduled.
- h. At 8:15 29 November 1956, Western Development Division representatives together with our "penel of experte" got together and held a dry run on the presentation. General Schriever was able to attend this session and furnished excellent guidance to the group.
- 5. During the presentation, Secretary Quarles asked quite a number of questions to the extent that the over-all session lasted 1 hour and 15 minutes. Since he was on a first name basis with all of our "panel of experts" the session was fairly informal. These who attended the presentation, such as General Putt and Golomel Johnston, who are familiar with the Secretary's usual reactions to presentations of this sort, felt that we had been quite successful in satisfying the Secretary's concerns and questions concerning the system. The Secretary made several comments but they would be cenfusing out of centext. General Putt told me later that after a

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"little more seftening up by Mr. Horner and myself" we (MDD) should bring in an ever-ell scheduling and systems presentation. He (General Putt) is aware of our P-100 and P-200 request for 17 million and expects to be able to get us the money.

- 6. Et. Celemel Riepe and I made a brief contact with Celemel R. J. Quinn, Jr. and Lt. Celemel G. M. Adkins, AFOIN-IX2. Their effice had requested RADC to brief AFOIN on WS 117L. We explained the present project set-up and convinced them that at present, things were too unclear to make feasible a valid presentation to the Directorate of Intelligence.
- 7. I discussed with Gelenel C. P. Richman and Mr. Eugene Barmard of AFOIN-Z their experiences in regard to ingelligence handling problems similar to that which can be expected with WE 117L.
- 8. The undersigned together with Lt. Colonel Quenten A. Riepe established initial contact with representatives of Reconnaissance Branch, Operations Control Division of the Directorate of Operations: Golomel W. E. Basye, Chief, AFCOP-OC-R, Celemel C. C. Andrews, and Major R. C. Brown. Our visit was somewhat timely inasmuch as Colonel Basye had just received a copy of the MS 117L Development Plan and Development Directive and was quite concerned over the publication of a preliminary operational concept. We advised him of the study that Western Development Division had requested from Rand which is directed to this subject (among others) and suggested that in view of the unique and somewhat complicated nature of MS 117L, it might be desirable that his office work closely with the project office in regard to weapon system documentation when such is required. The primary purpose of the visit was to assure that Hq. USAF would not come out with a preliminary operational concept until adequate time had been allewed to study the problem. It does not appear that Colemel Baspe's people will press for an early issuance of this document although it is also ebvious that issuance can not be too long delayed because of the many costly matters which must be resolved particularly in the training and operational planning end of the project.

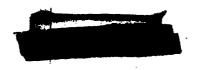
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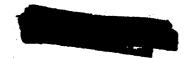
1. Presentation Script

2. Project office consultant & contractor personnal

3. Those in attendance at the presentation

AND RECEIPT C. E. CORR
Lt. Celenel, USAF
Assistant for WS 117L
Technical Operations

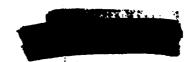




- I. Introduction (Oder) 3 Minutes
- II. Critical and Peculiar Subsystems for Early ARS Capability
  - A. Guidance and Control (Draper) 5 minutes
    - 1. Pre-crbital Guidence
      - a. Use of Past USAF Experience and R & D
      - b. Use of 3154 System
      - c. Accuracy of System (Orbital-Ellipticity)
      - d. Feasibility of Inertial System
      - e. Time Scale of Development
    - 2. Orbital System
      - a. Stability required
      - b. Effect of Attitude Centrol and Stabilisation on accuracy of data collecting system (be prepared to discuss interaction with visual system)
      - c. Feasibility of System
      - d. Time Schedule of Development

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# B. <u>Visual Recommaissence System</u> (MacLeish and Geldmark) (15 Min)

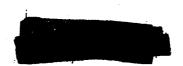
- EKC (1) Camera Film Readout Ground Reconstitution
  - (2) State of Development
  - (3) Feasibility
  - (h) Time schedule for Development

(be prepared to answer questions regarding "Minicard" sorting and recall use in early capability)

- C. Utility of Results of Piencer ARS System (MacDenald) (10 Min)
  - (1) What can be seen as a function of resolution?
  - (2) What good is it?
  - (3) When does need exist?
- D. Ground-Space Communications (Rideneur) (5 Min)
  - (1) Acquisition our ability to do so by what means
  - (2) Tracking accuracy effects ability to position photographs by what means use of successive passes
  - (3) Date Link bandwidth and effective picture quality
- E. Battery Auxiliary Power (Salter) ( 3 Min)

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- (1) Power Requirement for early system
- (2) Battery system wt. and output/lb and effect en duration
- (3) Feasibility of batteries and the operational life
- (h) Availability date of batteries for this use



## .

### III. Feller-en Systems

- A. Infrared Recommaissance (Salter) (3 Min)
  - (1) Concept Phase I and II
  - (2) AIGHM Warning and Tracking
  - (3) Where we stand feasibility use of other tests and results
- B. Electronic Reconnaissence (Ridenour) (3 Min)
  - (1) Einsteins of Satellite Ferret as function of time
  - (2) ARS Approach to Ferret Problem
    - a. Signal density
    - b. New signal search
    - c. Order of battle
- C. Advanced APE Development (Major Anderson) (3 Min)
  - (1) Muclear
    - a. Esticisotope
    - b. Reactor
  - (2) Chemical and Solar (Mr. Salter) (3 Min)



## Preject Office Consultant and Contractor Personnal who appeared before the Secretary:

Lt. Colonel Frederic C. E. Oder - WDD

Lt. Celemel Quenten A. Riepe - MDD

Lt. John G. Herther - WLD

Dr. Duncan McDonald - Boston University

Dr. C. Stark Draper - Harvard University

Dr. Leuis Ridenour - Leckheed Aircraft Corporation

Dr. Ford Tuttle - Eastman Kedak Company

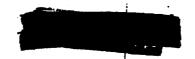
Br. Peter Goldmark - CBS Laboratories

Mr. Jack Carter - Leckheed Aircraft Corporation

Mr. Richard Leghorn - Eastman Kedak Company

Br. Kenneth MacLeish - Eastman Kedak Company

Mr. Robert Salter - Leckheed Aircraft Corporation



## Those in attendance at the Presentations

The Henorable Benald A. Quarles - Secretary of the Air Force

The Honorable Iyle S. Garlech - Assistant Secretary of the Air Porce - (Financial Management)

General T. D. White - CS/UBAR

Lt. General D. L. Putt - BCSD

Mr. D. R. Jackson - CASAF (Material)

Mr. William Weitsen - OASAF (R & D)

Colonel R. L. Johnston - AFDED

Celcnel A. T. Culburtson - AMDED

Colonel F. L. Hoore - AFDED

Colonel O. G. Johnson - AFDAR

Lt. Colonel J. R. Finton - APDDC

Lt. Colonel E. A. Doty - AFDRD

Lt. Celemel W. R. Kelse - SAFRD

Major F. J. Dillon, Jr. - AFDED

Gommander R. C. Truex - WDD (MDTR)

Lt. Celemel P. E. Worthman - Hq. ARDC (HDZOW)

Lt. Colonel V. M. Genes - Hq. ARDG (HDZPI)

Lt. Golenel E. Gibbs - Hq. ARDC (Project Vanguard Lisisem Officer)

Mr. R. D. Gooms - Hq. ARDC (RDTDM)

Colonel J. L. Armstrong - AEG

Majer G. M. Anderson - ARG



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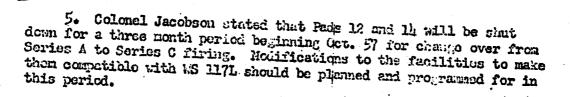
### . HEROKARDUM FOR RECORD

SUBJECT: Discussion of the WS 117L Facility Requirement at AFRIC

- 1. A meeting was hold in Colonel Leonhard's Office (LDI) to discuss the WS 117L facility requirement at AFFTC. Colonel Leonhard, Mr. Mollelo (WDI) and Lt. Colonel Oder and Lt. Colonel Ricpo (LDTR) were present.
- 2. The purpose of the meeting was to resolve the Western Development Division position on the 7.4 million program submitted by AFWIC in their support of MS 117L. Essentially it was agreed that our DF of 23 Oct 56 to MDI and MDT was still walid. i.e., that we would not require the construction of the new facilities as proposed by AFMIC rather we would use the 107-A facilities on an availability basis.
- 3. The meeting moved from Colonel Leonhard's Office to Colonel Terhune's Office and Colonel Jacobson joined the group. Colonel Leonhard summarized to Colonel Terhune as follows:
- a. The 107-A facilities at AFMTC are sufficiently flexible to permit those tests currently planned i.e. (eight) for US 117L to be accomplished on 107-A facilities with modification as outlined in the DF of 23 Oct. 56 to LDI LDTT.
- b. The WS 117L facilities required for FY 59 are such that they can be included in a \$50,000,000 Guided Missile authorization already established.
- c. Facilities people in Mg. USAF, General Brown, are currently running a survey to determine the availability of existing government owned facilities that are located where they would be useful to the MS 117L Program. This effort will reduce the total facilities requirement if successful.
- d. Based on this it was recommended to Colonel Terhune that the AFFIC program for WS 117L facilities be reduced to that required in the 23 Oct 56 DF and Hq. USAF and AFFIC be so advised.
- 4. Colonel Termune concurred, emphasizing his belief that the current AFMTC facility program would provide for WS 117L requirement as well as the 107-A.

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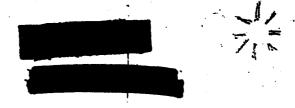
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SIGNED

QUENTEN A. RIEPE Lt. Col., USAF





WDIR

Mr. Frank Collbohm, Director The Fand Corporation 1700 Main Street Santa Monica, California

Dear Mr. Collbohn:

NOV 2 0 1956

The Western Development Division has been assigned the responsibility for the development of US 117L, the Advanced Reconnaissance System. System Requirement No. 5, 17 October 1955, Western Development Division Development Plan US 117L, 2 April 1956, USAF Development Directive No. 65, 3 August 1956, and ARDC System Development Directive US 117L, 17 August 1956, have defined the system, the requirement for the system, the objectives of the system to be developed, the development plan and directed the development of the system. Thus, only the operational aspect of the system has not been carefully analyzed and defined.

Members of the Mestern Development Division have informally discussed the operational aspects of MB 117L with Messrs. G. H. Putt and Ed Barlow of Fand and have asked them to consider the development of an operational concept for MB 117L as a problem suitable for MB to undertake. The problem as proponted to Rand contains the following items:

- l. Determine what information can be retrieved from the data collected by the WS 117L systems, including visual, infrared and ferret sensors, that will be useful on a national basis. (Useful on a national basis is contrasted here with data useful to the Air Force and is meant to include that information of importance to the President of the United States and his Special Advisors, the Departments of State, Commerce, Agriculture, Defense and special agencies having use for the type of information that can be retrieved. Further, information important on a national basis is to include that intelligence that can place the United States in a more favorable bargaining position among the international family of nations.)
- 2. Determine the optimum mixing ratio between visual, ferrot and infrared data collected to provide for maximum output to satisfy the national intelligence requirements.

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WDTR 56-213



- 3. Establish the relative priority in determining the "quick reaction time" necessary to supply the needs of the various intelligence customers on a national basis.
- A. Determine the effect of accuracy of coverage, location accuracy, ground resolution, methods of analysis and other pertinent factors that would vary the ability of the system to fulfill the various national requirements.
- operational concept(s) for WS 117L that will provide planning inputs necessary to write the Qualitative Personnel Requirements Information Reports, the Logistics Plan, the Final Operational Plan, Technical Crew and Training Plans, and the Installation Plan as defined in Air Force Regulation 5-47, dated 29 August 1956.

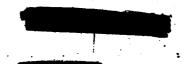
Rand's interest and investment in the Air Force Satellite Program and broad experience in this type of analysis make this problem paculiarly Rand-like. Since the study may require a variety of talents and special inputs involving association with sensitive aspects of the broad national intelligence community, Rand is in a favorable position to tackle this problem.

The development of WS 117L has been justified on the basis of the military, perticularly lir Force, intelligence requirements. Cartainly, if the system is capable of producing intelligence of interest on a national basis, this capability should be exploited to the fullest. An early answer to the full WS 117L capability and how it can be exploited operationally is of vital importance to the Wostern Development Division in the early stages of development of WS 117L.

The proper people to further discuss this problem with you or assist you in any way in the analysis of the problem can be made available at your request.

## SIGNED

CHARLES H. TERHUNE, JR. Colonel, USAF Deputy Commander Technical Operations



WDTR

Lt. Col. Riepo

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WDTR 56-213

MEMORANDOM FOR RECORD

SUBJECT: Management Problem Within the Lockheed Aircraft Corporation

l. This memorandum is written for the purpose of pointing out an apparent management problem within the Lockheed Aircraft Corporation, Missile Systems Division, 13 117L organization. If the problem continues, it will seriously effect the utilization of the Launch and Down-Range Instrumentation at AFMT. This, in turn, has direct effect on the MS 117L program schedule.

### 2. The problem can be set up as follows:

In order to comply with the requirements established by AFMTC that are necessary for organizations using the presently installed (or special) launch and down-range equipment, it is necessary that using agencies comply with the procedures established by the "Test Requirements Handbook", AFMTC (ALDC). In this handbook, the instructions for Operational Directives, Range Safety and Using Agencies having special requirements (i.e. bS II/L) are explained.

- 3. WDTR has been informed by personnel from LAC-WED Test Organization that this type of thing is standard operating procedure with them, and that they have nearly completed this effort. They admit that very few of the WS 117L technical requirements have been given to them by the Research Group. Clearly, this gives rise to possible errors or caissions. The Test Group is apparently very familiar (through personal experience) with the layout and situations that exist in fact at the AFMTC and WADC.
- 4. On the other hand, technical WS 117L requirements are being established within the LACTOR Research Group. Requirements which will require the use of "on station" unmodified facilities at AFATC, plus the installation of specific WS 117L equipments at AFATC are being delineated. However, since this effort is being accomplished by the Research Group, there is a tendency to consider technical, rather than operational problems. This group admits to general non-familiarity with AFATC and the operational techniques already established at the test centers.
- 5. It would seem that this is an organizational or management problem that should be resolved immediately within LAC-WED. Errors or crissions caused by lack of management effectiveness in coordinating these apparent independent efforts, can cause serious WS 117L program schedule difficulties in the very near future.

- 6. The programming of facilities at test centers is a complex problem which has an inherent fixed lead time which is troublesoms at the best. This consideration and the early program schedule for LS 117L at SFMC makes it essential that careful, coordinated planning must be done.
- 7. This problem has been brought to the attention of the various people concerned by kDTR in the past, and is being made a matter of record by this memo.

SCANED

WILLIAM O. TROMTSCHEL Captain, USAF WS 117L Office Technical Operations SUBJECT: Munpower and Functions

TO: WELL

MOM WILL

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Afficient are functional statements covering the Test Croup, Openial Sections, and 107A-1, 107A-2, 315A and 117L Branches.

l Ingl: UDID President Statemts FREDERICK S. PORTER, IR.
LI. Colonel, USAF
RICHARD K. JACCHEGE, Lt. Col., USAF
Chilet, Meck Group

## FUICHTOHAL STREETERS - NDIT

### TEST CROUE

Responsible for formulation, dissemination and revision of a test philosophy uniquely suited to the requirements of the Ballistic Missile Program. Maintains Master Test Plan for all phases of systems testing. Reviews progress of systems testing to have that military requirements of the weapon system is closely demonstrated. Is directly responsible for the timely preparation of test equirements to support testing requirements placed upon DCD field testing installations.

### SPECIAL TEST BRANCH

Initiates or monitors studies and tests other than complete missite systems tests in support of technical groups and verpon systems offices. Tests include alled tests, drop tests, and others pertaining to development of simple components. Supervises preparation of test requirements; implements test programs. Selects center to handle tests; performs listed with centers to assure that support. Initiates study contracts with schools or industry for investigation of special technical problem areas.

## 107A-1, 107A-2, 315A and 117L HRANCHES

Maintains Moster Test Plan for all phases of vector system testing, including purpose, schedules, sites, and conducting agency. Reviews all testing to insure demonstrated compliance with requirements. Insures preparation and supports of requirements decuments and Center Data Acquisition and Support Plans.



NOV 9 1956

### MENORANDUM FOR RECORD

GUBJECT: Sub-Contract Difficulties with MIT

1. Meeting with representatives from WDTR, BNO, LAC and the AFPR, LAC. Those in attendance were:

• •	• •	
Mr. C. F. Hagenmaier	•	· Liend
Mr. W. V. Tyminski	_	LESD
Mr. J. B. McChesney	_	
A. D. WOOHERIDA	-	Lisd
Mr. John H. McLaughlin	•	ACO - APPR
Mr. Eugene Silberman	_	BNO - MCPTS
Major R. Rowland		
TA CONTRIB	-	BHO - MCPTS
Lt. Colonel R. E. Hogan	-	BMO - MOPTO
Major R. H. Cline	_	BMO - MCPTG
Lt. Colonel Quenten A. Riepe	_	
The secretary directive it we life be	₩	MDD - HDIR
Lt. John C. Herther	•	MDD - WDTR

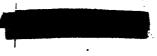
## 2. Subject Problem: Sub-Contract Difficulties with MIT

Statement: The Air Force will not pay "donations or gifts" to MIT on sub-contract status to IMSD in accordance with the ASIN'S and the AFPI's. The "donation" is in the form of a higher "burden" cost (100%) to industrial customer in contrast to a 45% burden or overhead cost to the Air Force.

Status: Lockheed Missile Systems Division has asked the ACO-AFPR to approve MTT as a subcontractor, but has not presented a complete sub-contract proposal to the ACO. This is the reason the ACO has not forwarded the LMSD letter to the Project Office with comments.

- 3. The MIT has been agreed to by the Project Office, the BED guidance procurement office, Colonel Box's Office (EDTLG) an Independent Raw Study, and the LMSD as the preferred guidance and control contractor for WS 117L. This is based on:
- a. The large amount of MIT designed equipment for WE 315A that can be made directly applicable to WS 117L use.
- b. The availability of these systems from the  $\Lambda_{\circ}$  C. Spark Plug Company, the fabricator and supplier of these 315 $\Lambda$  components.
- c. The large amount of Air Ferce facilities provided HIT and A. C. Spark Plug that can be fully utilized in the WS 117L work.

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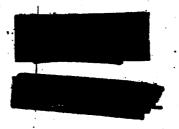
- d. These systems will have had 27 IRBM flight tests prior to WS 117L receiving hardware from A. C. Spark rlug.
- e. The accepted competence of the available ATT group to
- f. The long time (2 + years) effort of this group on the WS 117L problem under contract to WADC.
- li. Recommendations: That, since MIT will not make a special case of the WS 1171 problem and reduce their rates to LAMD for sub-contract purposes, the Air Force would like to pursue the following courses of action in the order of preference as they are presented:
- a. Attempt to obtain a deviation from the ASPR and AFPI to allow the higher overhead rate on sub-contract. This will require special justification to show that this route will cost the Air Force less than if the second course of action were followed, which is:
- b. Direct contract between the Air Force and MIT on an associate contractors basis, whereby the lower MIT overhead rate could be realized. Under this plan, the LMED would have placed on them the responsibility of providing Technical Direction to the MIT product and its compatibility with the WS 117L system. This responsibility would be recognized in the MIT contract and would require Administrative and Technical Direction Meetings between LMED-WOTR MIT BMO.
- c. Forget MIT and select an alternate sub from a competent group, including, NAA, Sperry, ARMA, etc.
  - 5. Action agreed to:
- a. LMSD will present to the AQO a complete (with costing) sub-contract proposal within three days so that he can accept or refer it for exception to the ASFR and AFFI.
- b. LMSD will study the associate contract method for acceptability to the LMSD.

## SIGNED

QUENTEN A. RIEFE Lt. Colonel, USAF WS 117L Office Technical Operations



WDTR 56-216



(U) Operational Concept for MS 117L

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(IN TURN)

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F. C. E. Oder/1s/1343

1. Shortly after the Development Flan WS 117L was approved and the Development Directive received, it was realized that there was an immediate need for a study to devise an operational concept for WS 117L.

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- 2. Several organizations were considered as being capable of studying the problems of an operational ARS. Cost, unfamiliarity with the ARS, and the ability of the organization to contact the necessary parts of the National Intelligence community reduced this group down to the Rand Corporation and the Advanced Study Group of the Air University Command. This problem was discussed with Colonel Terhune, who approved of informally discussing this with Rand as a possible problem for them to consider as part of their program of studies for the Air Force.
- 3. Wr. Barlow, Chief of the Engineering Division of Rand, assigned the problem of defining the ARS Operational Concept and outlining the study team requirements to Mr. A. H. Katz and Mr. Merton Davies, who have had several sessions with Lieutenant Colonel Riepe of this office. Messrs. Matz and Davies have indicated that there is considerable interest within Rand in the problem. However, they have requested the MID to state their interest in the results of such a study to the Management of the Rand Corporation. The expression of this WDD interest and the outline of the problem as we see it is the purpose of the attached letter to Rand.
- 4. Mr. Katz felt that the letter should be signed as high in WDD as necessary to represent the WDD interest.

### SIGNED

1 Incl Ltr fr WDTR to Rand Corp 2 pgs, 3 cys (WDIR 50-213)

FREDERIC C. E. CDER Lt Colonel, USAF Assistant for WS 117L Technical Operations

DOWNGRADED AT 3 YEAR INTERVALS:
DECLASSIFIED AFTER 12 YEARS.
DOD DIR 5200.10

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WDTR 56-21L

Organisation and Manning for WS 117L Program

WDT.

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- l. Western Development Division has been assigned the responsibility for the development of WS 117L, a system many times more complex and sophisticated than any yet attempted. It has been determined that the WDD will, with the assistance of the ARDC Centers and other consultants, provide the technical direction and management of this program. The attached organisation and manning is what we believe will be required to adequately do this job. Personnel selected to fill the positions in the proposed organisation should be carefully selected to assure top quality management and direction of the various facets of the system.
- 2. In considering our manning requirements for approval there are several . factors which should be given consideration:
- a. WS 117L has ten (10) closely interrelated subsystems as well as a flight test program and a program in the measurement of the external environment. Because of the technical intricacies of each of these and the many problems posed by their individual development together with the economical integration of these into a workable and usable system, considerable supervision of the prime contractor (and his subcontractual efforts) by the WEPO is mandatory. Without such supervision the costs of the program would undoubtedly be much higher than would be the case with close Air Force supervision.
- b. Because of previous management decisions, the WS 117L Project Office, unlike the case of WS 107A-1, WS 107A-2 and WS 315A, is solely responsible for the technical direction and program management for the government for the ARS. For this reason, comparisons between the authorised strength of WDTR and the other WDD project offices are not too valid.
- c. Program complexity rather than total funding should be the yardstick for WSPO manning. The cost to the Air Force of the proposed WSPO manning is, nevertheless, quite reasonable in relation to the amount of money which will be spent on contract.

- 3. This process of screening and selecting personnel to man the organisation will take time. However, it is felt that the following goals are the optimum
  - Personnel on hand as of 5 November 1956:

1 Assistant for WS 117L Lt Colonel 1 Deputy Assistant for WS 117L Commander (Acts as Chief, System Integration Branch)

1 Chief, Plans and Programs Branch

1 Chief, Resources Management Section

5 System Integration Project Officers

9 Total 9 Assigned Officer Personnel

Lt Colonel : Major

1 Major, 3 Captains and 1-1/1th.

b. Planned build-up to 1 January 1957:

1 Chief, Facilities and Test Branch

1 Facilities and Equipment Project Officer

I Test Plans and Logistics Project Officer

2 Product Engineering Project Officers

5 System Integration Project Officers
1 Resources Management Project Officer
1 Program Management Project Officer 5 System Integration Project Officers

1 Progrem Management Project Officer 12 Total additional personnel

- \_21 Total assigned officers
- Planned build-up to 1 July 1957:

2 Program Management Project Officers

1 Resources Management Project Officers
2 Product Engineering Project Officers

2 Facilities and Equipment Project Officers

1 Test Plan and Test Logistics Project Officers

9 Total additional personnal

30 Total assigned officer personnel

d. By 1 January 1958 sertain subsystems of the WS 117L vill have reached the point of limited production. This will require six (6) additional military personnel in the System Engineering Section. (Not shown on the

Total goal military personnel by 1 Jamery 1958 is estimated to be 36 officers.

## e. Givilian support personnel required:

- 1 GS-7 Administrative Assistant for Assistant for WE 117L
- 9 Secretary-typists 8 each GS-4; 1 each GS-4

Beareteries to be assigned as follows:

3 in Plans and Programs

3 in System Engineering

2 in Facilities and Test

1 in the Office of Doputy Assistant for WS 117L

The build-up rate for secretarial help would be proportional to the military personnel build-up rate.

- 4. As you can see from the proposed organization chart and the job descriptions submitted, we intend to make full use of the presently existing staff functions within 100. For example, the Facilities Group will, of necessity, work very closely with the WDI organisation; the Flans and Operations functions will be closely coordinated and accomplished with the assistance of associated parts of WDT, WDS and WDO, etc.
- 5. Since there will be considerable effort required to recruit the number and type of personnel required to man the proposed organization, it is requested. that we be authorised to requisition personnel up to the 1 January 1957 level immediately: Counting those officers on hand and under orders (less a loss of one (1) to WDTC per agreement with Colonel Norton and Colonel Classer on 1 Mov. 1956) an additional ten (10) officer vacancies will be required to bring the authorised strength to the proposed teenty-one (21) by 1 January 1957.
- 1 Incl Organisation and Manning for WS 117L (bound)

FREDERIC C. R. COER Assistant for WS 1171 Twomicel Operations