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ARTICLE 3 BALL

November 1961

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SPACE SYSTEMS DIVISION
AIR FORCE SYSTEMS COMMAND

9 November 1961

FOREWORD

This Outline Development Plan presents the elements of Project CUE BALL which is AFSC support for a classified priority Space Program. This document has been prepared in response to Hq USAF Secret Message AFCVC 54852, 25 September 1961. Achievement of the tasks outlined in this plan will meet initial requirements for a program of space launches, satellite control, and re-entry operations.

The directed phase of this effort includes four shots at sixty-day intervals. An alternate program of ten shots at forty-day intervals is also presented in order to provide more adequate demonstration of CUE BALL performance and reliability.

This document further describes the technical tasks, management approach, schedule of activities, and resources required to accomplish the proposed programs.


O. J. RITLAND
Major General, USAF
Commander

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PART I - PROGRAM SUMMARY

1.0 BACKGROUND INFORMATION

a. Project CUE BALL has been established by Hq USAF to carry out AFSC support for a classified Space Program. (See Annex A, "Hq USAF Program Message"). Space Systems Division, AFSC, has been assigned responsibility for Project CUE BALL which includes boosters, satellite vehicles, and associated services for launch, on-orbit control, and re-entry operations.

b. In accordance with current policy, information on Project CUE BALL will be supplied on a strict need-to-know basis. Therefore, technical information has been minimized in this outline development and funding plan.

c. The presently directed program for Project CUE BALL, referenced herein as the Program A, consists of four launches from PMR at 60-day intervals beginning in February 1963. However, the level of confidence of success associated with Program A is low. Therefore, an alternate Program B of ten launches at 40-day intervals is also presented using the same starting date.

d. Project CUE BALL has potentially serious problems with hardware and facilities lead time. These are discussed in appropriate detail in various sections of this document.

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1.1 APPROACH

a. Program Concepts.

Project CUE BALL includes system engineering, procurement, and test operations.

(1) The principal engineering problems concern the definition and integration of a suitable satellite vehicle within the very stringent time schedule.

(2) In order to meet procurement schedules, maximum use is being made of existing hardware, facilities, and support equipment.

(3) Maximum assurance of mission success in the operational test phases will be achieved through use of existing launch and on-orbit tracking and control sites and stations.

b. Mission Concept

(1) A two-stage Atlas/Agena booster configuration will provide primary propulsive power to launch and inject the satellite vehicle into the selected orbit.

(2) After separation of the boosters, the satellite vehicle maintains orientation and attitude using internal controls. The principal on-orbit requirement is for the satellite to be responsive to ground based commands in order that accurate de-boost and re-entry can be effected at any point along the trajectory.

(3) The re-entry operation is still under study.

1.2 PROGRAM SCOPE

a. Number of Flights - The testing organization has planned three mission configurations, each with an identical vehicle interface.

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One successful flight with each configuration is required to demonstrate the required system versatility. It is assumed that the urgency of Project CUE BALL warrants at least 90% confidence that three flights will be successful.

Figure I - 1 shows that the proper number of shots (r) is a function of the probability of success of a single shot (p). For Category I tests of the multi-stage CUE BALL System, a maximum value of ($p=.5$) seems appropriate. Therefore, a ten-shot launch series, the so-called Program B, has also been exercised and presented.

b. Program Tasks - The principal tasks and responsible organizations for Project CUE BALL are:

- (1) Overall program management: Hq SSD SPO (SSZX)
- (2) General system engineering and technical direction:
Aerospace Corporation.
- (3) Satellite control engineering and technical direction:
Hq SSD (SSZC)
- (4) Atlas Booster: General Dynamics/Astronautics.
- (5) Agena Booster: Lockheed Missile and Space Company.
- (6) Satellite Vehicle: (Associate to be selected).
- (7) National range support: Pacific Missile Range.
- (8) Launch operation: 6565th Test Wg (VAFB)
- (9) On-orbit operation: 6594th Test Wg (Sunnyvale)
- (10) Re-entry operation: (To be determined).
- (11) Launch site facilities: Vandenberg AFB.
- (12) Up-Range TT&C station facilities: (Under study)
- (13) Impact Range facilities: (Under study)

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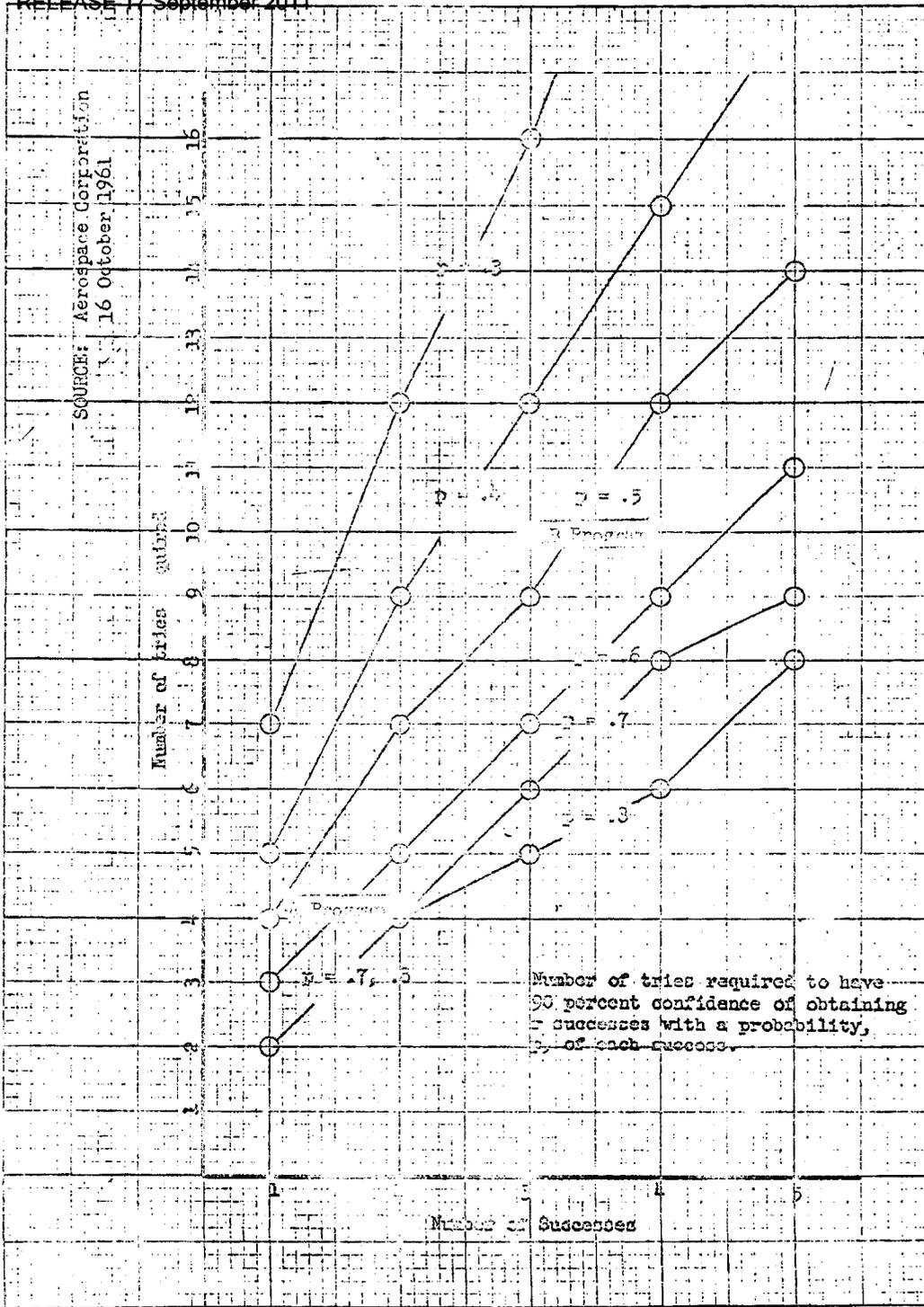


FIGURE I - 1

PART II - PROGRAM MANAGEMENT

2.0 SUMMARY

a. CUE BALL SPO. The CUE BALL SPO, Space Systems Division (SSD), AFSC, is the responsible management agency for Project CUE BALL. This responsibility includes the preparation of development, funding, and testing plans, and the direction of engineering, production, and field operations of the CUE BALL program, as approved by higher authority. The SPO will establish and maintain overall milestones and schedules (See Section III), make interpretations as required, and coordinate the participation of non-Air Force support agencies. SPO organization and manning requirements are included in Annex B.

b. Contractors. Definitive contracts will be negotiated by SSD for specific portions of the CUE BALL System effort. This will include Associates for:

- o General Systems Engineering and Technical Direction (GSE&TD)
- o First Stage Booster (ATLAS)
- o Second Stage Booster (AGENA)
- o Satellite Vehicle (To be determined)

Each Associate will be responsible to the SPO for the necessary planning and programming required to carry out his portion of the effort. This will include task definition, management organization, interior schedules, and subcontracted responsibilities.

c. AFSC Support. The SPO will define, coordinate, integrate, and establish priorities for the participation required of all USAF agencies.

It is anticipated that AFSC organizations will provide the principal support required for launch, on-orbit, and re-entry operation.

2.1 MANAGEMENT RELATIONSHIPS.

The Director, CUE BALL SPO, is responsible for overall direction of USAF elements. Management relationships of participating organizations are indicated in Figure II-1.

2.2 CONTRACTOR STATUS. (As of 1 November) A class D & F pursuant to 10 U.S.C. 2304(a)(11) to negotiate CUE BALL contracts is needed immediately to initiate the following procurements:

a. Aerospace Corporation(GSE&TD). New funding is required immediately so that SSD can contract with Aerospace Corporation for the establishment of a CUE BALL Program Office. The proposed build-up of Aerospace support (in MTS - Members of the Technical Staff) is as follows:

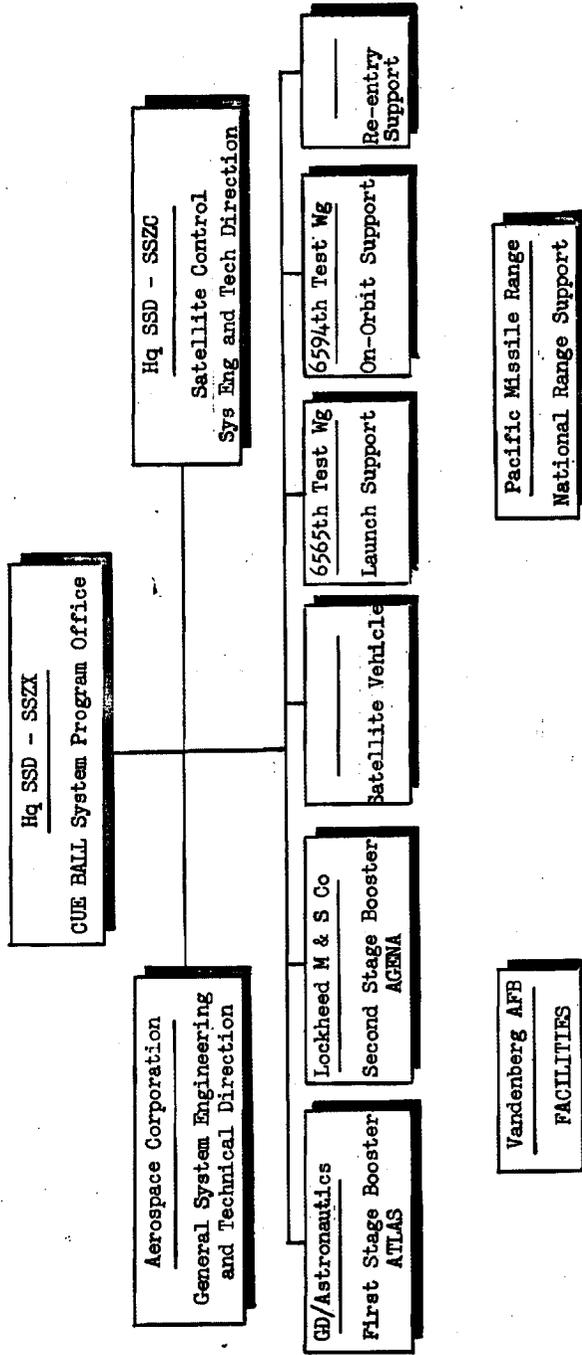
Month	Nov 61	Dec 61	Jan 62	Feb 62	Mar 62
-------	--------	--------	--------	--------	--------

Total MTS

b. General Dynamics/Astronautics (ATLAS). Six ATLAS first stage boosters were placed on order by SSD using reimbursable funds. This has protected Program A lead times and covered Program B through December 1961. Initial CUE BALL funding is required immediately to pay for these six boosters. Additional funding for four more ATLAS boosters will be required if the ten-shot Program B is approved.

c. Lockheed Missile and Space Co. (AGENA). Four AGENA vehicles have been ordered for CUE BALL using reimbursable funds. This has protected Program A lead times and covered Program B through December 1961. Initial FY62 funding is required immediately to pay for these AGENAs.

MANAGEMENT RELATIONSHIPS: Project CUE BALL.



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FIGURE II - 1

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Additional FY62 funds for six more AGENAs will be required for Program B.

d. Contractor for Satellite Vehicle.

(1) Design Study. A study is being completed by SSD/Aerospace to define the design requirements of the Satellite Vehicle. Availability, performance, and reliability are primary criteria for this effort which will provide procurement data in November 1961.

(2) Contractor Selection. Immediate funding is required to permit solicitation and evaluation of proposals for the Satellite Vehicle. Source Selection and initiation of contractual coverage in December 1961 is mandatory to maintain CUE BALL launch dates.

2.3 TEST SUPPORT STATUS

a. Range Support. A support commitment has been obtained from the Commander, PMR, for either Program A or B of CUE BALL. No CUE BALL funding is required by PMR.

b. Launch Support. The 6565th Development Test Wing will provide launch support for both CUE BALL programs within presently programmed funding.

c. On-Orbit Support. The 6594th Satellite Test Wing will provide on-orbit support (telemetry, tracking, and control) for both CUE BALL programs. Funding estimates are shown on pages V - 2 and V - 3.

d. Re-entry Support.

SSD/Aerospace Study. During October, a study of CUE BALL re-entry operations was initiated within SSD/Aerospace. This study will define facilities, sites, and forces necessary to support the CUE BALL mission. Definitive results (including lead times, funding requirements, and equipment) are expected in December 1961.

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3.0 BASIC LAUNCH SCHEDULES

a. Definitions -- This section presents procurement and launch schedules for two programs:

(1) "Program A" is the four-shot/sixty-day interval effort directed by Hq USAF. The vehicles associated with this program are identified by the "-A" suffix, e.g., 1-A, 2-A, etc.

(2) "Program B" is the ten-shot/forty-day interval effort recommended for Project CUE BALL by AFSC. The vehicles associated with this program are identified by the "-B" suffix, e.g., 1-B, 2-B, etc.

b. Launch Schedules.

<u>Launch Dates</u>	<u>Program A</u>	<u>Program B</u>
1 February 1963	#1-A	#1-B
2 April 1963	#2-A	#2-B
12 May 1963		#3-B
2 June 1963	#3-A	
21 June 1963		#4-B
31 July 1963	#4-A	#5-B
9 September 1963		#6-B
19 October 1963		#7-B
28 November 1963		#8-B
7 January 1964		#9-B
16 February 1964		#10-B

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3.1 PROCUREMENT LEAD TIMES

a. Definitions - Normal procurement lead times for the principal hardware elements of Project CUE BALL are:

- o ATLAS 1st Stage Booster: 21 months
- o AGENA 2nd Stage Booster: 18 months
- o SATELLITE VEHICLES: 15 months (approx)

These times are based on the interval from initial contractual coverage to completion of launch operations. Under premium overtime conditions, these lead times can be reduced; they can also be cut back by pre-empting similar hardware already under procurement for other, low priority programs. In order to minimize such undesirable measures, Project CUE BALL funding should be made available at the earliest possible time.

b. Interim SSD Actions

(1) Aerospace Studies. Action has been taken under an existing SSD/Aerospace support contract to conduct urgent CUE BALL studies at a level of 10 MTS (Members of the Technical Staff) man-months during October/November 1961.

(2) GSE&TD. Aerospace GSE&TD support cannot be provided without new funds and new contractual coverage.

(3) ATLAS. Six ATLAS vehicles have been placed on order by SSD using reimbursable funds.

(4) AGENA. Four AGENA vehicles have been placed on order by SSD using reimbursable funds.

(5) SATELLITE VEHICLE. SSD/Aerospace studies are in progress in order to develop procurement data (vehicle specifications and a technical statement of work) during November 1961.

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c. Procurement Lead Time - The desirable procurement schedule for the various CUE BALL vehicles, using the launch schedules and normal procurement lead times (paragraphs 3.0.b and 3.1.a, respectively) are approximately as follows:

<u>LAUNCH NUMBER</u>	<u>BUY ATLAS</u>	<u>BUY AGENA</u>	<u>BUY SATELLITE VEHICLE</u>		
#1-A/1-B	Six ATLAS Boosters on order - Normal lead times protected using reimbursable funds	Four AGENA Boosters on order - Normal lead times protected using reimbursable funds	1 Nov 1961		
#2-A/2-B			2 Jan 1962		
#3-B			12 Feb 1962		
#3-A			2 Mar 1962		
#4-B			21 Mar 1962		
#4-A			30 April 1962		
#5-B			31 Jan 1962	30 Apr 1962	
#6-B			9 Mar 62	9 Jun 1962	
#7-B			19 Jan 1962	19 Apr 1962	19 Jul 1962
#8-B			28 Feb 1962	28 May 1962	28 Aug 1962
#9-B	7 Apr 1962	7 Jul 1962	7 Oct 1962		
#10-B	16 May 1962	16 Aug 1962	16 Nov 1962		

d. Funding Requirements.

(1) Program A. Immediate funding requirements (through 31 March 1962) were forwarded to Hq AFSC by SSD Secret Message SSZX-26-10-1, 26 October 1961. Estimated FY62 requirements are summarized in Part V, Fund Estimate.

(2) Program B. Estimated FY62 requirements are summarized in Part V, Fund Estimate.

3.2 LAUNCH PROGRAM

a. Test Support Plans - Support by Pacific Missile Range, 6565th Development Test Wing, and 6594th Satellite Test Wing has been scheduled.

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The principal gap in the test program is definition of the re-entry operation. An SSD/Aerospace study of the re-entry phase will be complete late in November 1961.

b. MAB Facility. CUE BALL schedules require the assignment of space in MAB-3 at Vandenberg AFB about 1 August 1962. All modification of the facility and checkout of associated equipment must be completed so that CUE BALL MAB operations can begin on 1 November 1962. MAB-3 is presently occupied by other programs. This situation is now under study to determine the cost and extent of the adjustments required.

3.3 MASTER SCHEDULES.

Figures III-1 and III-2 summarize the schedules of Programs A and B for CUE BALL, respectively.

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4.0 GENERAL

a. Scope. Project CUE BALL facilities requirements have been examined in four areas:

- o Contractor production and test facilities
- o Vandenberg AFB
- o On-orbit TT&C Stations
- o Re-entry Operations

b. Status.

(1) No contractor facilities requirements have been identified at Aerospace, LMSC, GD/A, or Philco. It is doubtful that the selected SATELLITE VEHICLE contractor would require new facilities.

(2) A requirement has been identified at Vandenberg AFB for modifications to a Missile Assembly Building (MAB #3). An estimate on the FY62 and/or FY63 facilities funds is being prepared by the appropriate CE organization.

(3) Existing on-orbit TT&C Stations are adequate for support of Project CUE BALL from a facilities funding position. However, additional TT&C requirements are now under study by SSD/Aerospace. It is probable that a new up-range station and a down-range ship will be required. It is expected that some FY63 facilities funds will be associated with the up-range installation and that PMR will meet requirements for facilities funding related to shipborne stations. Definitive funding information is not expected to be available until December 1961.

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4.1 MISSILE ASSEMBLY BUILDING (MAB #3, VAFB).

a. Requirement. Vandenberg AFB facilities are required for the assembly and checkout of CUE BALL Satellite Vehicles. Current investigations indicate that a portion of MAB #3, currently occupied by elements of the ATLAS booster program, is the most suitable location for CUE BALL operations. Minor facilities funds (e.g., approximately [REDACTED] are required to adapt MAB #3.

b. Schedule. Approximately three months lead time will be required to relocate ATLAS and install/checkout CUE BALL facilities. Since CUE BALL operations must start 1 November 1962, MAB #3 modifications must be initiated by 1 August 1962.

PART V - FUND ESTIMATE

5.0 FUND ESTIMATE

a. Scope. Estimates based on the incremental funding concept are presented separately for Program A (USAF directed) and Program B (AFSC recommended) for Fiscal Years 62, 63 and 64. These estimates are incomplete concerning re-entry operations and facilities pending completion of studies now in progress. In addition, costs for the Up-Range Tracking Station have been roughly estimated and may require substantial revision during December 1961.

b. FY62 Funding. Because of immediate requirements for CUE BALL program initiation, FY62 funding has been identified by TWX to AFSC on 26 October in two increments as follows:

(1) First. Funds needed to initiate long lead time procurement and contract performance through 31 March 1962. Release of Initial FY62 funds is required during November 1961 in the amount of [REDACTED] for either Program A or B.

(2) Balance. Funds required to complete FY62 commitments. Release of balance of FY62 funds is required before the end of March 1962.

5.1 PREVIOUS FUNDING REQUEST

Previously, FY62 funding requirements, for the CUE BALL Program A only, were forwarded through Command channels by SSD Secret Message SSZX-26-10-1, 26 October 1961. This message summarized FY62 requirements, exclusive of funds for re-entry operations and facilities, as follows:

Initial Increment: [REDACTED]
Balance Increment: [REDACTED]
Total FY62 [REDACTED]

5.2 FUNDING SUMMARY:

See pages V-2 (Program A) and V-3 (Program B).

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INITIAL FUND ESTIMATE PROGRAM "A", PROJECT CUE BALL

Category Contractor FY62 FY63 FY64 Total

TECHNICAL SERVICES

General Systems En-
gineering and Tech-
nical Direction Aerospace

FLIGHT PROGRAM

4 ATLAS Boosters GD/Astro,
and Launch Serv. NAA, others

4 AGENA Boosters LMSC
and Launch Serv.

4 SATELLITE VE- Unknown
HICLES and Services

SUPPORT PROGRAM

Telemetry, Tracking LMSC &
and Command (TT&C) Philco

Additional Up-Range Unknown
TT&C Station

Re-entry Operations Unknown

SUB-TOTALS

GENERAL SUPPORT

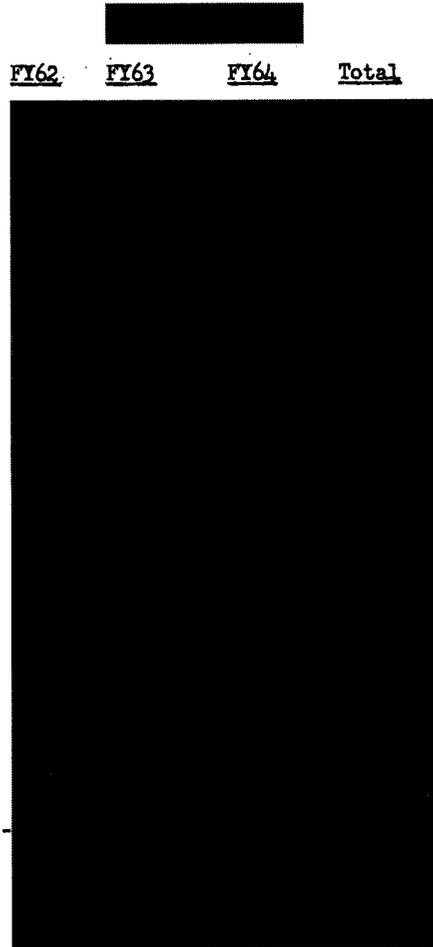
TOTAL P-6399

FACILITIES (P-300) Location

MAB #3 VAFB

Up-Range TT&C Station Unknown

Re-entry Operations Unknown



Estimates available in December 61

Estimates available in December 1961

(Under Study)

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INITIAL FUND ESTIMATE PROGRAM "E", PROJECT CUE BALL

Category Contractor FY62 FY63 FY64 TOTAL

TECHNICAL SERVICES

General Systems En- Aerospace
gineering and Tech-
nical Direction

FLIGHT PROGRAM

10 ATLAS Boosters GD/Astro,
and Launch Serv NAA, others

10 AGENA Boosters LMSC
and Launch Serv.

10 SATELLITE VE- Unknown
HICLES and Services

SUPPORT PROGRAM

Telemetry, Tracking LMSC and
and Command (TT&C) Philco

Additional Up-Range Unknown
TT&C Station

Re-entry Operations Unknown

SUB-TOTALS

GENERAL SUPPORT

TOTAL P-6399

FACILITIES (P-300) Location

MAB #3 VAFB Estimates available in Dec 61

Up-Range TT&C Station Unknown Estimates available in Dec 61

Re-entry Operations Unknown (Under study)

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DE RJEZFF 23C
P 261457Z
FM HQ AFSC ANDREWS

FB MD

TO SSD LOS ANGELES CALIF

~~SECRET~~ SCGN 26-9-50. FOR SSG. THIS MESSAGE IN TWO PARTS.

PART I. THE FOLLOWING MESSAGE RECEIVED FROM AFCVC IS
RETRANSMITTED AS FOLLOWS: QUOTE. SECRET FROM AFCVC 64852.
THIS MESSAGE CONFIRMS OUR RECENT DISCUSSION. PROJECT
EXEMPLAR HAS BEEN ESTABLISHED BY HIGHER AUTHORITY. THE
CODEWORD EXEMPLAR IS CLASSIFIED CONFIDENTIAL. PAYLOAD AND
MISSION ASSOCIATED WITH EXEMPLAR ARE TOP SECRET. THE AIR
FORCE HAS BEEN ASSIGNED THE RESPONSIBILITY FOR BOOSTERS,
SPACE VEHICLES, LAUNCH AND COMMAND AND CONTROL SERVICES
ASSOCIATED WITH THIS SATELLITE SYSTEM. THE PROGRAM SHOULD

11605

PAGE TWO RJEZFF 23C
BE PLANNED FOR FOUR LAUNCHES FROM PMR AT SIXTY-DAY
INTERVALS BEGINNING IN FEBRUARY 1963. SECAF HAS BY SEPARATE
ACTION ORDERED THE PROCUREMENT OF AGENA AND ATLAS
BOOSTERS ON AN UNASSIGNED BASIS. THESE VEHICLES ARE HEREBY
ASSIGNED TO EXEMPLAR. YOU ARE REQUESTED TO SUBMIT AN
OUTLINE DEVELOPMENT PLAN NO LATER THAN 15 NOVEMBER 1961.
COST ESTIMATES SHOULD BE BASED ON THE FOLLOWING CRITERIA:
(1) ATLAS/AGENA COSTS FOR THE ABOVE REFERENCED "UNASSIGNED"
VEHICLES WILL BE INCLUDED IN THE PLAN. (2) EXISTING LAUNCH,
CHECKOUT AND COMMUNICATION FACILITIES WILL BE USED. (3)
PAYLOAD COSTS ARE EXCLUDED. (4) TERMINAL VEHICLE AND
ENGINEERING MANAGEMENT COSTS WILL BE INCLUDED. PROJECT
EXEMPLAR WILL BE HANDLED ON A STRICT NEED-TO-KNOW BASIS.
UNQUOTE. PART II. SSD IS DIRECTED TO TAKE THE NECESSARY
ACTION INDICATED IN PART I. SCP-3

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INTERVALS;
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9 Nov 61

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TO: SSZX-

HEADQUARTERS
OFFICE OF THE DEPUTY COMMANDER AFSC
FOR AEROSPACE SYSTEMS
UNITED STATES AIR FORCE
Air Force Unit Post Office, Los Angeles 45, California

REPLY TO
ATTN OF: DCAPO-1

SUBJECT: CUE BALL Program

17 OCT 1961

TO: Hq AFSC (SCPOM)
Andrews AFB
Wash 25, DC

1. Reference your secret message nr. SCGN-26-9-50, dated 26 September 1961, our secret message nr. SSZ-27-9-3, dated 27 September 1961, and your secret message nr. SCGN-10-10-14, dated 10 October 1961, concerning the CUE BALL Program.

2. Your headquarters has placed this program in a high importance category. As a result, an ad hoc group has been established under the Deputy for Satellite Systems, SSD, to manage the function pending approval of a recommended organization. The initial launch date will be difficult to meet; therefore, we assume, for planning purposes, that a very high priority will be assigned to the program.

3. Attached are a proposed listing of manpower requirements, organization chart, and functional responsibilities for each branch. This requirement is submitted based on knowledge available to this organization and should be considered within this parameter. In the event that you have additional information concerning CUE BALL that has not been released to DCAS, request this requirement be adjusted accordingly.

4. You will note that we have requested a Lt Colonel position, AFSC 2716, for duty as Deputy Director. This position is necessary due to the fact the Director and/or Deputy will be required to engage in TDY to manage the program more than fifty per cent of their time. Additionally, it is essential that one of these individuals be present at his duty station at all times.

5. AFR 26-3 has not been applied on a functional basis to identify manpower spaces for this program. There is no reprogramming capability within DCAS to satisfy this requirement. Dependent on the priority assigned, a program or programs of lesser priority will of necessity be eliminated if we must reprogram from within DCAS.

6. Expeditious processing of this requirement is requested.

FOR THE COMMANDER

RALPH HAYES
Colonel, USAF
Chief, Personnel & Manpower

- 3 Atchs
- 1. List of Manpower Rqmts
- 2. Proposed Orgn Chart
- 3. CUE BALL Functional Stmt.

*2 Atchs
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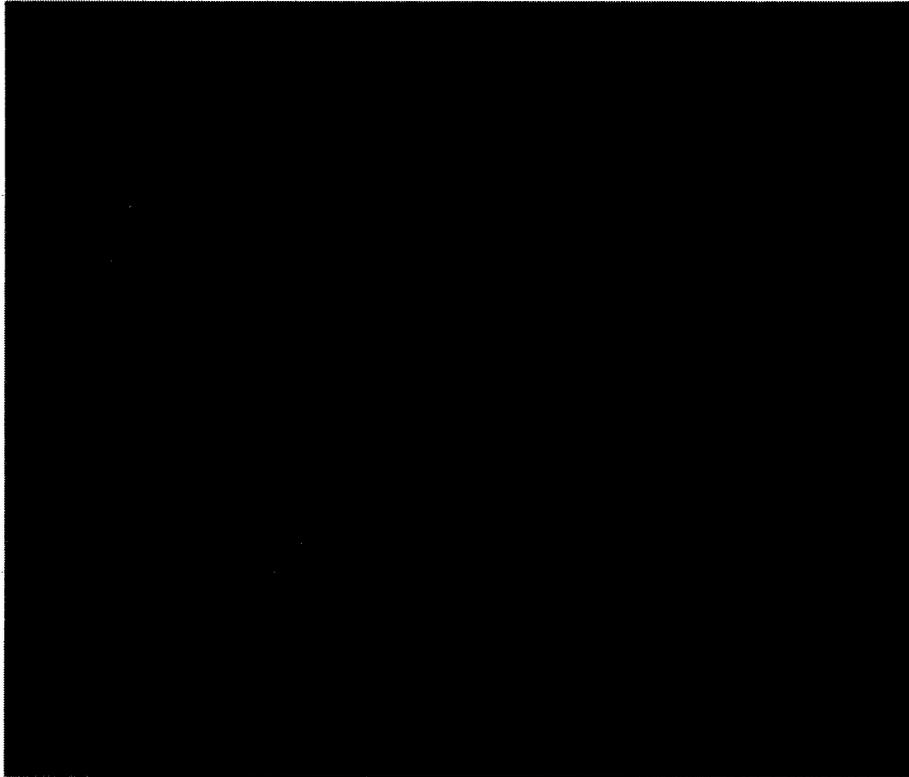
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MANPOWER REQUIREMENTS

CUE BALL DIRECTORATE
DEPUTY FOR SATELLITE SYSTEMS
SPACE SYSTEMS DIVISION

<u>SEQUENCE CODE</u>	<u>OFFICE SYMBOL</u>	<u>FUNCTION TITLE</u>
1085	SSZX	CUE BALL DIRECTORATE
<u>NO. REQUIRED</u>	<u>GRADE</u>	<u>AFSC</u>
		<u>POSITION TITLE</u>



RECAP

OFFICERS

COL-----

LT COL-----

MAJ-----

CAPT-----

TOTAL

DOWNGRADED AT 12 YEAR
INTERVALS AUTOMATICALLY

CIVILIANS

Steno Spec.-----

Clerk-Steno-----

Clerk-Typist-----

TOTAL

TOTAL REQUIREMENTS

Officers-----

Civilians-----

GRAND TOTAL

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CUE BALL DIRECTORATE
[Redacted]

PROCUREMENT & PROGRAMMING BRANCH
[Redacted]

ENGINEERING BRANCH
[Redacted]

TEST, OPERATIONS & SUPPORT BRANCH
[Redacted]

SSZX-1
Nov 61

RECAP
Officers Civilians Total
[Redacted]

DOWNGRADED AT 12 YEAR
INTERVALS. NOT AUTOMATICALLY
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CUE BALL DIRECTORATE

FUNCTION TITLE

OFFICE SYMBOL

SEQUENCE CODE

Cue Ball Directorate

SSZX

1085



Responsible for management and direction of the CUE BALL Program. Specifically, this responsibility includes: Formulating, documenting, and continually updating development plans, implementing directives, and technical, resource, and financial requirements; presenting and justifying those requirements and gaining formal approval therefor; integrating and coordinating the efforts of participating local offices and external agencies, furnishing direction and guidance to such participants, and monitoring their progress; regulating the commitment of authorized funds and otherwise exercising program financial control; initiating, negotiating, directing, and monitoring contractual efforts for general systems engineering, vehicle and component development, and supporting functions as required; supervising technical direction by the engineering management contractor; approving key technical decisions, and insuring adequate review and approval of specifications and other detailed technical data.

Procurement & Programming Branch



Responsible for over-all administration and management of non-technical phases of the program. Effects procurement and contractual actions. Acquires, maintains, prepares, and processes procurement data. Negotiates, authenticates, and issues contracts and contractual changes. Prepares financial analyses, financial status reports, and budget estimates. Controls expenditures to insure their most advantageous application against program objectives. Establishes and maintains master schedules, program milestones, manpower and financial charts, and other management tools for use in periodic reviews for the Director. Assembles and arranges other data for inclusion in program briefings. Supervises the preparation, review, coordination, publication, updating, amending, and distribution of development plans, work statements, special reports, and other program documentation as required. Gathers inputs from contributors and prepares portions of such documents. Handles general administrative functions for the Program Directorate including security and personnel matters.

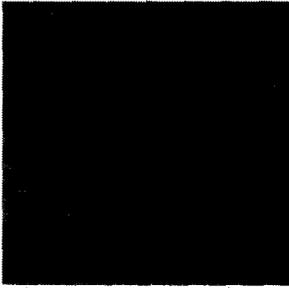
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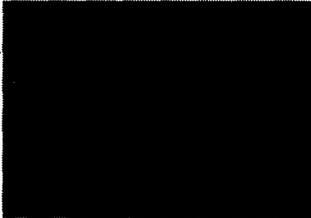
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Engineering Branch



Responsible for the final stage vehicle, for integration of subsystems within it, and for integration of the total vehicle system. Directs the engineering management contractor in exercising its systems engineering and technical direction function for the over-all program and in the design, development, fabrication and testing of final stage vehicle, including resolution of unique electrical, thermal, and radiation interface problems introduced by the incorporation of the payload. Reviews, revises, and approves work statements, specifications, test plans, development plans, cost proposals, CCN's, ECP's, ATPM's and other technical and administrative contractual documents. Evaluates the necessity and adequacy of contractor's current and proposed technical efforts, relates to manpower and financial resources applied, and directs changes in accordance with findings. In the booster and communications and control areas, represents the CUE BALL Directorate in all matters concerning configuration, modification, component design and development, testing, and delivery schedules.

Test Operations & Support Branch



Responsible for aerospace ground equipment, facilities, range activities, test operations, and general support. Insures that program requirements in these areas are properly formulated, updated, and documented, and that they are issued to, understood by, and acted upon by responsible offices and agencies. Receives, in turn, funding, resource, and other requirements from participating organizations and acts to fulfill commitments to them. Pursues directly those mission-peculiar portions of the areas cited which are not within the responsibility of existing groups. In the aerospace ground equipment area, represents the CUE BALL Directorate in all matters concerning configuration, modification, component design and development, testing, and delivery schedules.

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