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DEPARTMENT OF THE AIR FORCE
WASHINGTON 20330

OFFICE OF THE SECRETARY

11 February 1969

MEMORANDUM FOR I. NEVIN PALLEY

SUBJECT: Briefing on MOL and VHR Issues Given to DepSecDef on 8 February 1969

Per instructions from you and General Stewart, immediately after the briefing on Saturday, 8 February 1969, I have prepared hard copies of the vu-graphs that you, Dr. Foster and General Stewart used to give the briefing. In addition, I have prepared a Memorandum for Record which records information pertinent to the briefing. Attached to this Memorandum for Record is a complete list of the vu-graphs used, including those used by Mr. Hughes. As of this date, we have been unable to obtain hard copies of the DIA vu-graphs.

In accordance with the above, you will find attached the Memorandum for Record and one set of hard copies of the vu-graphs available at this time. At such time as the DIA graphics become available, I shall provide them to you.

A third copy of the vu-graph hard copies has been entered into the Ad Hoc Group file. No other copies have been made.

RICHARD H. CAMPBELL
Lt Col, USAF
MOL Program Office

Atchs:
a/s

CORONA/GAMBIT/DORIAN/HEXAGON [redacted]
[redacted] CHESS/RUFF/ZARF/UMBRA

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Control Systems Jointly

11 February 1969

MEMORANDUM FOR THE RECORD

SUBJECT: Briefing to Mr. Packard, Deputy Secretary of Defense, on MOL and Very High Resolution Imagery Issues

A briefing on the MOL Program and the current issues relating to the value of very high resolution photography was presented to Mr. Packard on Saturday, 8 February 1969, starting at 10:00 A.M. The briefing, given in the SecDef Dining Room (3E-928), lasted for approximately two hours. The following people were present during the briefing:

Mr. Packard	Deputy Secretary of Defense
Dr. Brown	Secretary of the Air Force
Dr. Foster	DDR&E
Mr. Moot	ASD (Comptroller)
Dr. Selin	Acting ASD (SA)
Lt Gen Carroll	Dir, DIA
Dr. Flax	ASAF (R&D) DNRO
Mr. Weiser	Acting Dep DDR&E (Strat & Space)
Mr. Palley	Asst DDR&E (Space)
Maj Gen Stewart	Vice Director, MOL
Mr. J. Hughes	DIA, Special Activities
Col E. Wynn	DIAST
Col A. Wood	OASD (SA)
Col R. Furlong	Dep Sec Def Military Asst
Lt Col R. Campbell	MOL Program Office
Mr. S. Bacher	DIAXX
SSgt Robertson	MOL Program Office

The briefing was given according to the outline shown below. A list of the viewgraphs used by the briefers is attached.

I.	INTRODUCTION	Dr. Foster	10 Min
	A. Security, subject matter, history, MOL objectives, issues, introductions		
II.	MOL PROGRAM, OPTIONS, AND STATUS	Gen Stewart	45 Min
III.	INTELLIGENCE APPLICATIONS OF VERY HIGH RESOLUTION IMAGERY		
	A. DIA Statement	Gen Carroll	5 Min
	B. DIA Presentation	Mr. Hughes	30 Min

IV. DNRO STATEMENT — Dr. Flax — 5 Min

V. QUESTIONS AND DISCUSSION

Pg 1&4 Presentation

During Dr. Foster's introduction of the briefing, there was a short discussion on the relationship of MOL to the NASA/Apollo and Apollo Applications Program. The essence of this discussion was to summarize for Mr. Packard some of the previous attention given to coordination and possible integration of MOL Apollo, and AAP. Study results on use of Saturn and Titan boosters by both NASA and DOD were also noted. Mr. Packard's interest in this area appeared to focus on the rationale used to explain why there are two separate programs (MOL and AAP) with seemingly common objectives.

Mr. Packard appeared to pay particular attention to the viewgraphs used by General Stewart to show the various options associated with achieving a very high resolution imagery capability. During the presentation of this material he made a number of notes which were probably cost figures for the various options.

The DIA portion of the briefing, given to Mr. Hughes (on the value of very high resolution photography to the production of intelligence), was interrupted by discussion of the value to DOD of better intelligence on the SA-3 Low-Altitude SAM system. Mr. Packard asked the group what DOD might have done with respect to the SA-3 system back in the early 1960s had we possessed a very high resolution capability at that time. Dr. Brown and Dr. Foster discussed this point with Mr. Packard in the vein that decisions probably would have been made then that would have resulted in more spending at the time, with possible cost savings in the years that followed.

There was considerable discussion of current and future DOD reactions to the SA-5 defensive missile system. General Carroll pointed out that while the SA-5 is probably a system to defend against aerodynamic threats there still remains a possibility that it has some ABM role. Dr. Foster then remarked that on the basis of this assessment DDR&E must still hedge it's penetration programs in the event that the SA-5 can be used as an ABM system. Dr. Brown reviewed some of the penetration aids decisions that have been made with respect to our knowledge of Soviet ABM efforts and the SA-5 system.

Both Dr. Flax and Gen Carroll made brief statements concerning their views on MOL and very high resolution. Gen Carroll noted that his concurrence with the MOL DCP was restricted to the need for a VHR imagery capability, and that he did not address the various alternatives for obtaining such a capability.

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Dr. Foster summarized the briefing by pointing out that the DCP fairly considered the various options, and that no new information has been made available that would warrant a revision of the DCP at this time. Mr. Packard concluded the session by thanking the group and noting that he would contact those individuals with whom he might wish to further discuss the MOL Program.

Information subsequently received from Mr. Palley (Monday, 10 February 1969) concerning reactions to the briefing, indicates that it achieved its purpose and that the best possible case was made for the MOL Program. Mr. Palley indicated that Dr. Foster appears to be confident that the MOL Program is in good shape (with respect to Program survival).

Richard H. Campbell
RICHARD H. CAMPBELL
Lt Colonel, USAF
MOL Program Office

1 Attachment
a/s

DORIAN/RUFF/UMBRA

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Vu-Graph Sequence
MOL/VHR Briefing to DepSecDef, 8 February

V-G	SUBJECT

I. INTRODUCTION (Dr. Foster)

1 Title Chart, "The Manned Orbiting Laboratory (MOL)...And...Very High Resolution (VHR) Imagery Issues."
2 Security Levels
3 Background, 1965-66-67
4 Background, 1968-69
5 Principal MOL Objective (w/MOL Sketch)
6 Issues (w/Bar Target and [redacted] Resolution Photo of U.S. Launch Stand)

II. MOL PROGRAM, OPTIONS, AND STATUS (General Stewart)

1 Title - MOL Laboratory Program (A-1)
2 MOL Program Objectives (D-1)
3 Baseline MOL Manned Mode (F-1)
4 Baseline MOL Unmanned Mode (F-2)
5 MOL Camera System (F-3)
6 Camera Field of View (F-4)
7 Why Manned and Unmanned Systems (G-1)
8 Man in MOL - Capabilities (G-2)
9 Mission Enhancement by Man (G-3)
10 Acquisition and Tracking Scope Concept (G-4)
11 Moscow Sheremetyevo Airfield at 15 X Magnification through ATS (G-20)
12 Moscow Sheremetyevo Airfield at 127 X Magnification through ATS (G-21)
13 Kozelsk ICBM Complex with MOL Ground Track (G-7)
14 Kozelsk ICBM Site, Inactive (G-8)
15 Kozelsk ICBM Site, Active (with mission loading operation) (G-9)
16 Cloud Avoidance via ATS - Moscow Area with DORIAN Optics Fields of View and ATS 15 X Fields of View (G-10)
17 [redacted] (C-1)
18 MOL Capability (C-2)
19 Contractor Team (I-1)
20 MOL Recovery (J-5)
21 Zero G Crew Transfer Mock-up (J-6)
22 Crew Transfer Tunnel Egress (J-16)
23 Re-entry Module Structural Test Article (J-13)
24 Dual Gas System Test Vehicle (J-12)
25 H-53 Helicopter refueling and spacecraft stability test (J-15)
26 MOL Major Assembly Breakdown (K-5)
27 Structural Test Section (Unpressurized) (K-6)
28 Pressure shell structure and small portion of the unpressurized section structure being prepared for static test (K-7)

V-G	SUBJECT
29	Forward Section Mission Module (K-8)
30	C-133 Loading Forward Section Mission Module (K-9)
31	Aft Section of Mission Module being Assembled in Assembly Jig (K-10)
32	Beryllium Trypod for 113 Dynamic Test Vehicle (L-5)
33	Beryllium T-Bar for 113 Dynamic Test Vehicle (L-6)
34	103 Engineering Development Vehicle Mission Module Forward Section (L-8)
35	Elemental Development Simulator (L-12)
36	Flight Crew Camera Control Console (L-13)
37	Assembly Area - Building 101 (M-3)
38	EM-COA- Building 101 (M-5)
39	Thermal Model - Ross Corrector - Building 101 (M-6)
40	72" Lightweight ULE, Mirror on Draper, Heavy Duty Polishing Machine (M-11)
41	Schematics - Buildings 101 and 102 (M-21)
42	Vacuum Test Chamber at EK - Chamber Ig (M-14)
43	UTC Solid Motor Cases (N-2)
44	SL-6 VAFB (Artist's Concept) (P-1)
45	Launch Complex Looking West - 27 Nov 68 (P-2)
46	Control and Recovery (P-3)
47	MOL Program Schedule (Q-1)
48	MOL Program Costs (Phase II) Program Status (R-1)
49	System Performance Comparison (E-9)
50	VHR Options
51	Option 1 - Present MOL Program - Arguments for and Against
52	Option 1 - Present MOL Program - Funding/Schedule/Cost Options
53	Option 2 - Manned Only MOL Program - Arguments for and Against
54	Option 2 - Manned Only MOL Program - Funding/Schedule/Cost Options
55	Option 3 - Unmanned VHR Program - Arguments for and Against
56	Option 3 - Unmanned VHR Program - Approach - Funding/Schedule/Cost ROM's
57	Option 4 - Camera System Only - Arguments/Costs
58	Option 5 - Terminate all VHR
59	Option 6 - Reduced VHR Goals
60	MOL DCP - Dec 1968

III. INTELLIGENCE APPLICATIONS OF VERY HIGH RESOLUTION IMAGERY (Mr. Hughes)

1	Title Chart, "The Value of and Need for Very High Resolution Photography."
2	Resolution Definition
3	Use of VHR, "Very High Resolution Photography, in the Analysis of Foreign Weapon Systems, Permits the:"
4	Confidence and Timeliness Definitions.
5	Title Chart, "Information Derived from Photography of the SA-3 System."
6	SA-3 Site and Missile, Kapustin Yar MTR, USSR, U-2 Mission 8005, 6 Dec 59, Approx 2-3 ft. res.
7	Drawing of SA-3 Missile from U-2 Mission 8005, Kapustin Yar, 6 Dec 59.

V-G	SUBJECT
8	SA-3 Site, Pruzhany MRBM Complex, USSR, KH-4 Mission 9054, 13 Jun 63, Approx 10 Ft. Res.
9	SA-3 Missile, Set Navolok. USSR. [redacted]
10	SA-3 Missile, [redacted] (with drawing from photo).
11	Comparison of drawings as derived from 1959 U-2 photo [redacted]
12	Quotes from 1964 and 1965 NIE's on SA-3.
13	SA-3 Deployment. 1961-64 (Map).
14	SA-3 Radar, [redacted] USSR [redacted]
15	Low Blow (SA-3) Radar. [redacted] Air Corridor Photo, April 1968, Approx [redacted] Res.
16	SA-3 Radar Drawings as derived from 1963 [redacted] 1968 Air Corridor photo ([redacted] photo).
17	Quote from 1968 NIE on SA-3.
18	SA-3 Performance Boundaries (Graph).
19	Title Chart, "Value of VHR in Analyses of Other Weapon Systems," and "Other Applications."
20	E-266 Capabilities [redacted]
21	VLAD-A (E-266), Vladimirovka Airfield, USSR, KH-7 Mission 4031, 21 Aug 66.
22	FTD Drawing of VLAD-A, 26 A pr 67, from KH-7 Photography.
23	VLAD-A Capabilities from Imagery
24	FOXBAT Aircraft, [redacted] 1967.
25	Current FOXBAT Capabilities compared with earlier [redacted] Imagery estimates.
26	Y-Class Submarine. Severodvinsk. USSR. KH-7 Mission 4032. 22 Sep 66.
27	[redacted] USSR, KH-8 Mission 4316, 19 Sep 68.
28	[redacted], KH-8 Mission 4316, 19 Sep 68.
29	MOSKVA Under Construction, Nikolayer, USSR, KH-7 Mission 4027, 20 Apr 66.
30	[redacted] KH-8 Mission 4316, 16 Sep 68.
31	MOSKVA, Mediterranean Exercise, Aircraft Photo, 1968
32	GANEF SA-4 System [redacted]
33	[redacted] USSR, KH-8 Mission 4308. 24 Sep 67.
34	[redacted], KH-8 Mission 4308, 25 Sep 67.
35	[redacted] KH-8 Mission 4308, 23 Sep 67.
36	HALF BACK Radar (SA-4), Pritzwalk Air Warning Site, East Germany, Mission BRX 548/68. 1968.
37	[redacted] KH-8 Mission 4317, 12 Nov 68.
38	Title Chart, "Signature Analysis."
39	MRBM Launch Site 2, Sagua La Grande, Cuba, Aircraft Photo, 23 Oct 62.

V-G	SUBJECT
40	Missile Equipment, Mariel Port Facility, Cuba, Aircraft Photo, 4 Nov 62.
41	Drawing of Typical SS-4 Battalion Launch Site
42	Title Chart, "Assessment of Unidentified Installations."
43	[redacted] China, KH-8 Mission 4315, 8 Aug 68.
44	[redacted] China, KH-8 Mission 4310.
45	"VHR System in Arms Limitation Situation."
46	MRBM Field Launch Site, San Cristobal #1, Cuba, 14 Oct 62, U-2 Photo.
47	MRBM Launch Site 1, San Cristobal, Cuba, 23 Oct 62, Low-Altitude Aircraft Photo.
48	MRBM Launch Site 2, San Cristobal, Cuba, 1 Nov 62, Low-Altitude Aircraft Photo.
49	IRBM Sites Being Dismantled, Remedios, Cuba, 9 Nov 62, Low-Altitude Aircraft Photo.
50	Ship Loading Missile Equipment, Casilda Port, Cuba, 6 Nov 62, Low-Altitude Aircraft Photo.
51	Ship Loading Missile Equipment, Casilda Port, Cuba, 7 Nov 62, Low-Altitude Aircraft Photo.
52	Importance of military intelligence (for military planning and force structure development, and to assist in development of strategy and tactics).
53	Conclusion of (Ad Hoc) studies (that VHR imagery would make a very substantial contribution to the timeliness, adequacy, and confidence levels of S&T assessments on foreign weapon systems and equipment).

IV. DNRO STATEMENT (Dr. Flax)

(No Vu-Graphs used)

V. THE DDR&E AD HOC GROUP STUDY (Mr. Palley)

1	Title Chart, "The Need for Very High Resolution Imagery and Its Contribution to DOD Operations and Decisions."
2	Ad Hoc Group Charter
3	(Ad Hoc Group) Methodology
4	Missile Penetration History
5	Soviet SA-5 System Performance
6	Defense Information Needs to Use Penetration Aids
7	Missile Penetration Information
8	(Ad Hoc Group) Conclusions
9	Soviet GRIFFON Missile [redacted]
10	Moscow [redacted] KH-8 Mission 4306, 25 Jun 67.
11	Confidence in Performance Estimates
12	Gain in Reaction Time
13	[redacted] USSR, KH-8 Photo
14	Resultant Actions (from Ad Hoc Group Study).

[redacted]

THE MANNED ORBITING LABORATORY

PROGRAM (MOL)

AND

VERY HIGH RESOLUTION (VHR) IMAGERY ISSUES

BYEMAN/TALENT-KEYHOLE/COMINT

~~TOP SECRET~~

DORIAN/GAMBIT/HEXAGON
CHESS/RUFF/ZARF/UMBRA

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SECURITY LEVELS

THIS BRIEFING IS CLASSIFIED

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AND INCLUDES INFORMATION CONTROLLED JOINTLY UNDER THE FOLLOWING SECURITY CONTROL SYSTEMS:

BYEMAN	TALENT-KEYHOLE	COMINT
CORONA GAMBIT DORIAN HEXAGON [redacted]	CHESS RUFF ZARF	UMBRA

Background

1965

* Sec AF ..... "Program can be justified..."
* Sec Def ..... "A vital national need..."
* DCI ..... "Is in the interest of the US... weighed against cost, time, and importance..."
* PSAC ..... "Very great value..."
* President ..... Approved program...

1966

* Sec Def ..... Reaffirmed baseline program...

1967

* Sec Def ..... Reaffirmed need...

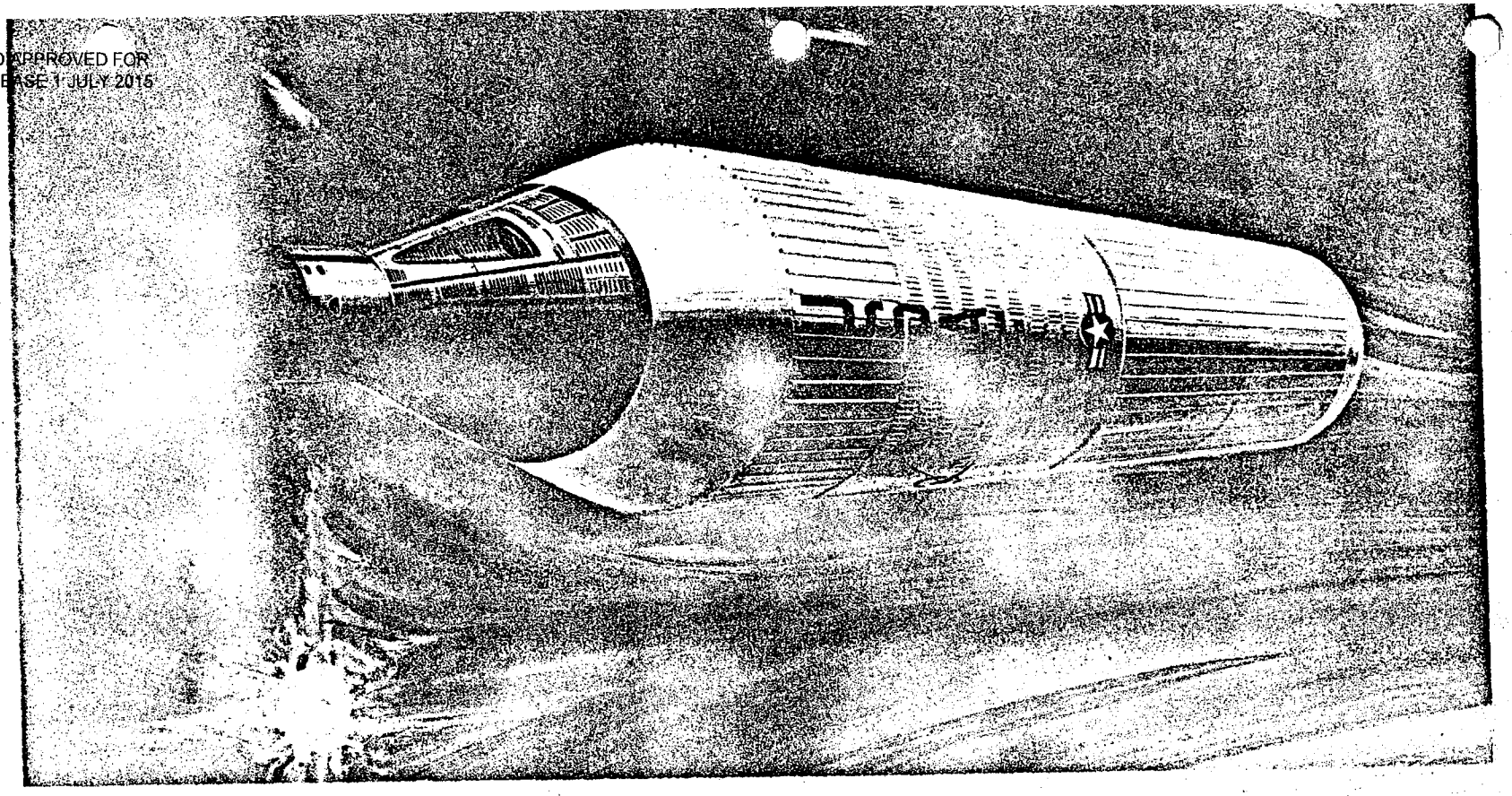
Background

1968

* DU/Sec State ..... "Is MOL worth the cost?"
* DCI ..... Not for "national intelligence..."
  Perhaps for "military programs..."
* DDR&E ..... Ad Hoc Group study.
* DDR&E ..... DCP prepared.
* Dep Sec Def ..... Approved MOL DCP

1969

* DIA ..... Collecting HR requirements for presentation to USIB.
* OASD(SA) ..... Recommends review and revision of MOL Program.



PRINCIPAL MOL OBJECTIVE:

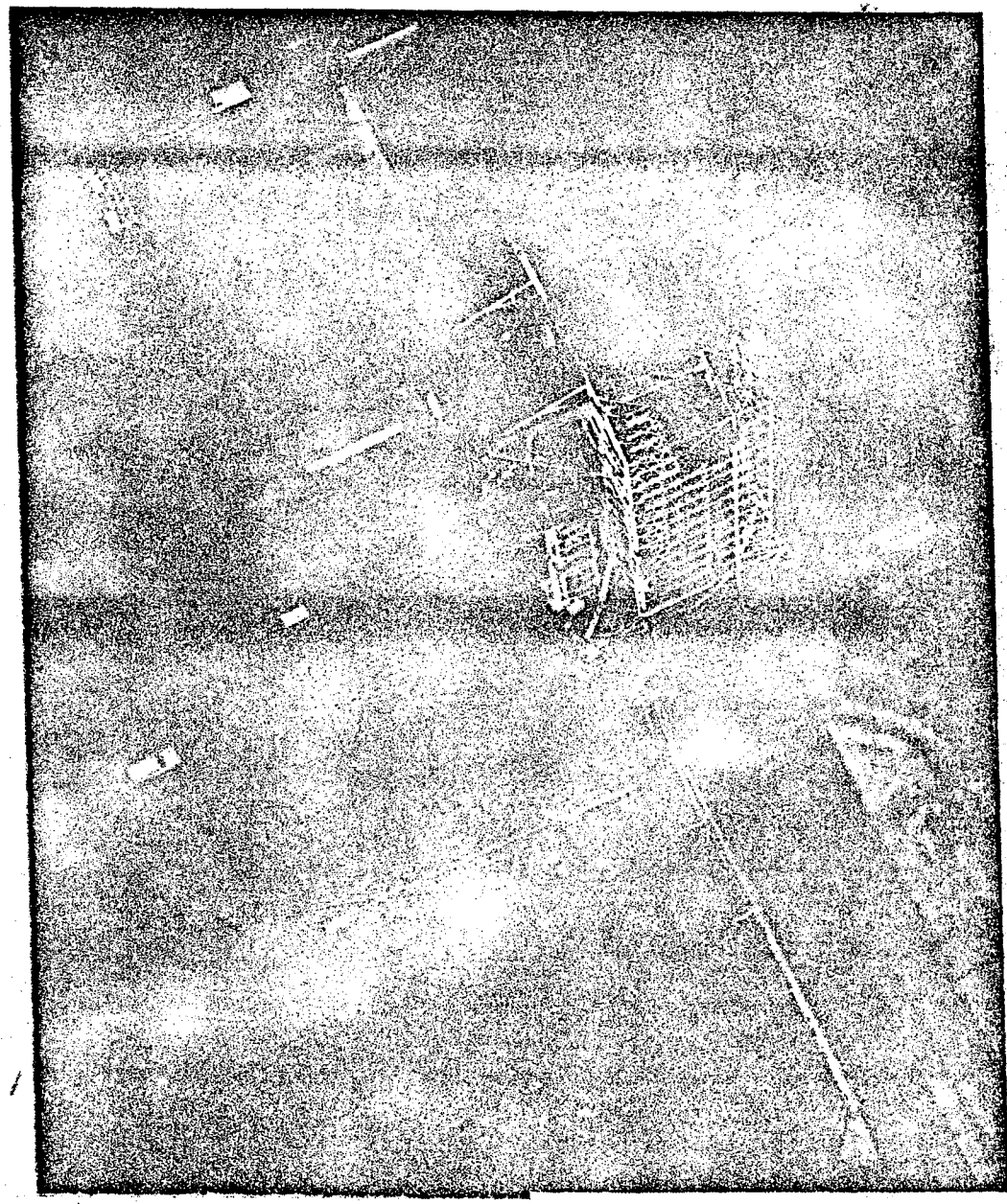
To acquire [redacted] or-better ground resolution photography of significant targets in denied areas for technical intelligence on strategic and tactical weapon systems

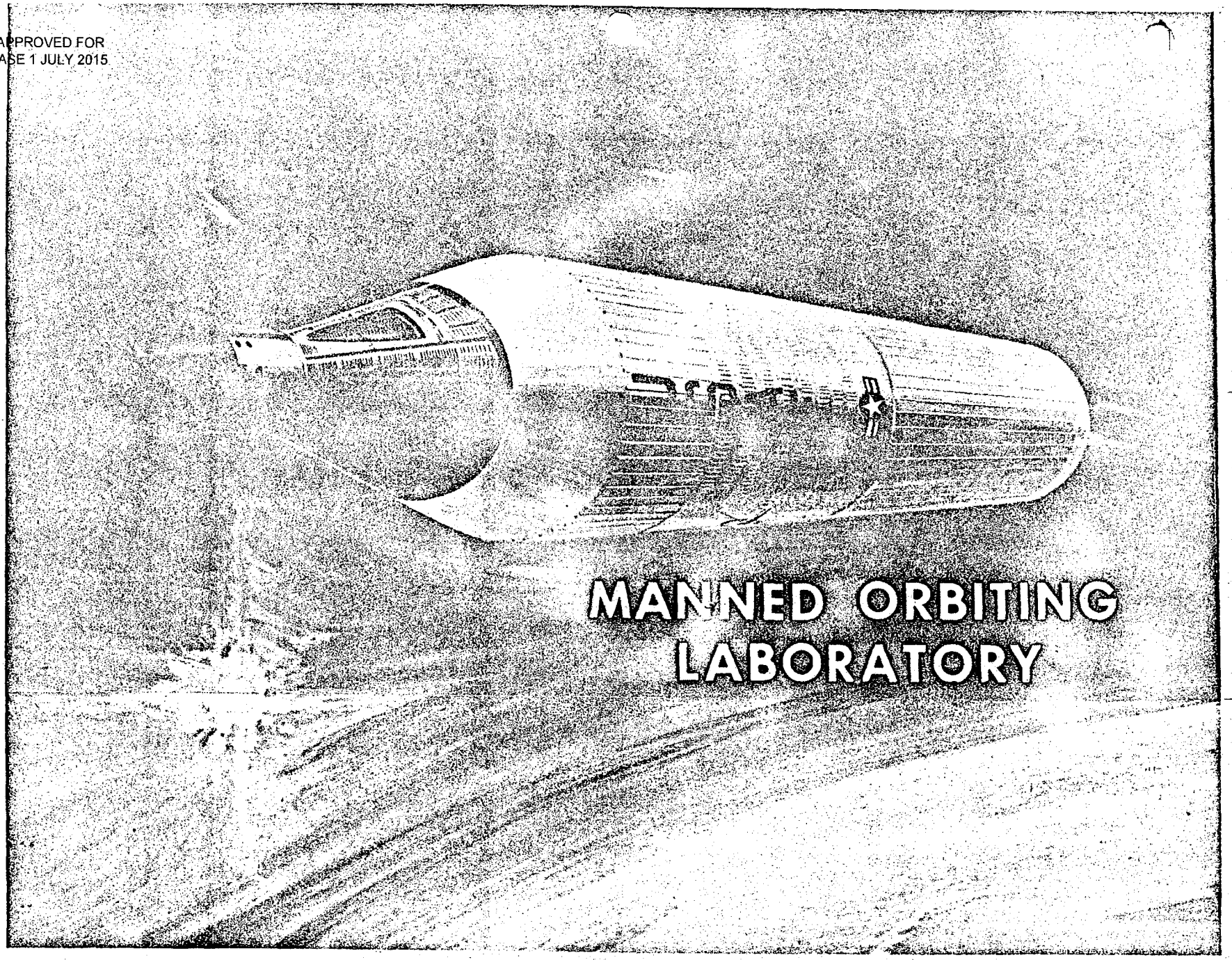
ISSUE:

1. Is a Very High Resolution imagery [redacted] capability worth its development cost?

2. Is continuation of the approved MOL Program the most cost/effective way to acquire the capability?

3. Is the need urgent enough to require the planned annual fundin ?





MANNED ORBITING LABORATORY

MOL Program Objectives

PUBLICLY STATED:

- NEW KNOWLEDGE OF MAN'S PERFORMANCE IN SPACE ON DEFENSE– RELATED TASKS...
- DEVELOP TECHNOLOGY & EQUIPMENT TO ADVANCE MANNED & UNMANNED SPACEFLIGHT...
- PERFORM NEW & REVEALING EXPERIMENTS WITH THAT TECHNOLOGY & EQUIPMENT...

CLOSELY HELD:

- [redacted] RESOLUTION RECCE PHOTOGRAPHY WITH MANNED & UNMANNED SYSTEMS ...
- EXTENT OF MAN'S ABILITY TO PERFORM MILITARY TASKS IN SPACE...
- SPACE FACILITY FOR OTHER POTENTIAL MILITARY APPLICATIONS WHEN FEASIBLE & DESIRABLE...

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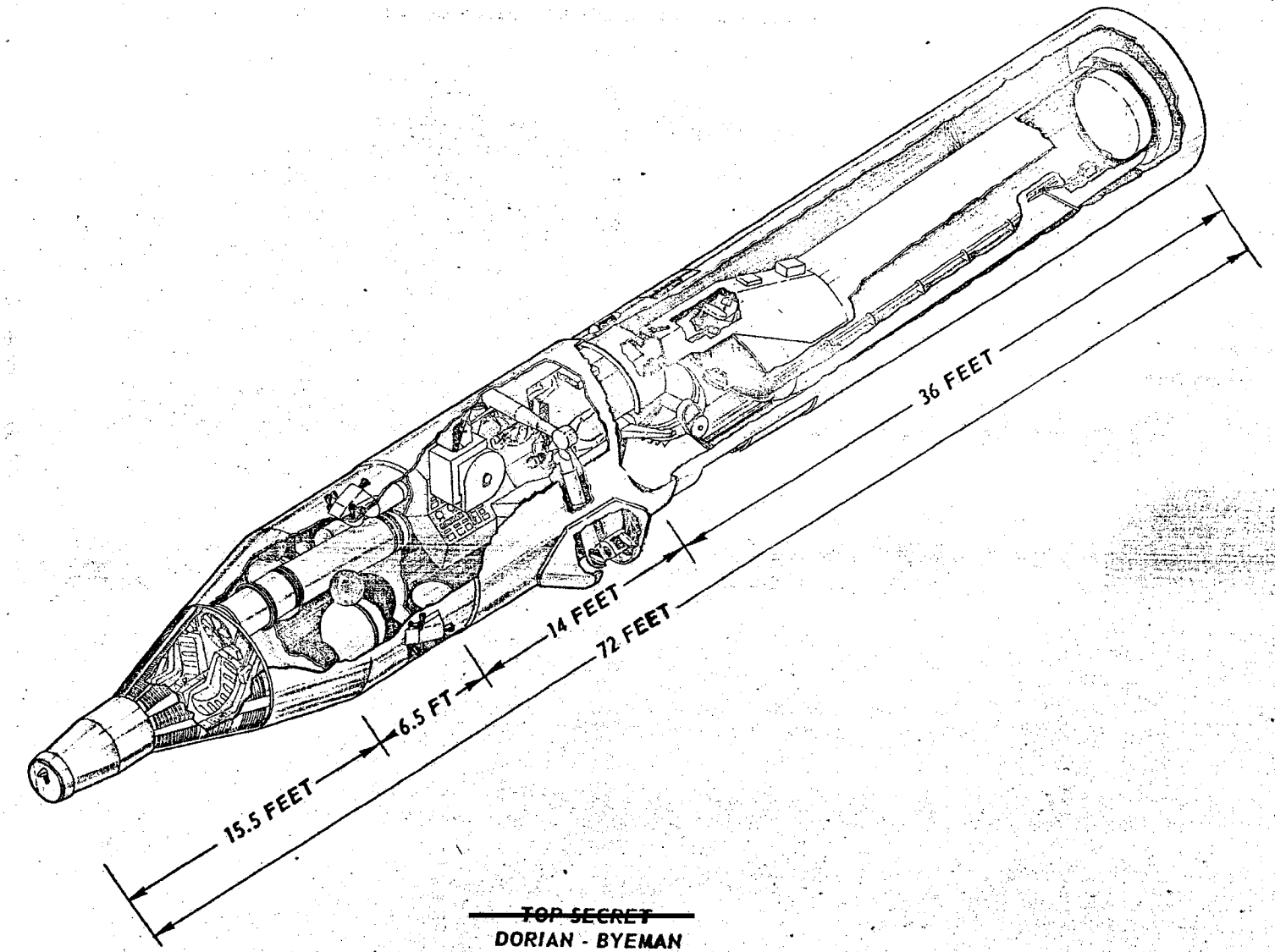
BYEMAN/ DORIAN

BASELINE MOL MANNED MODE



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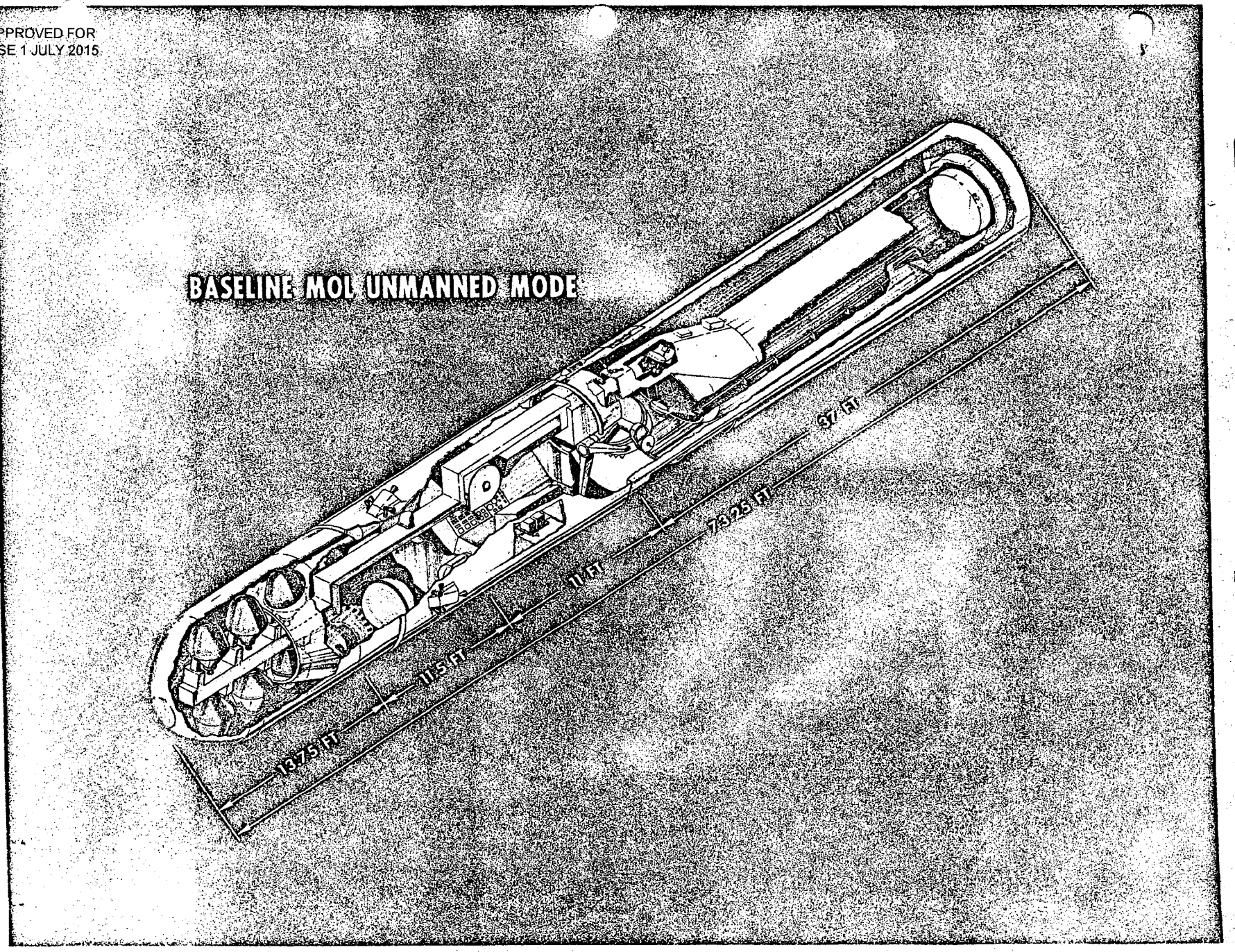
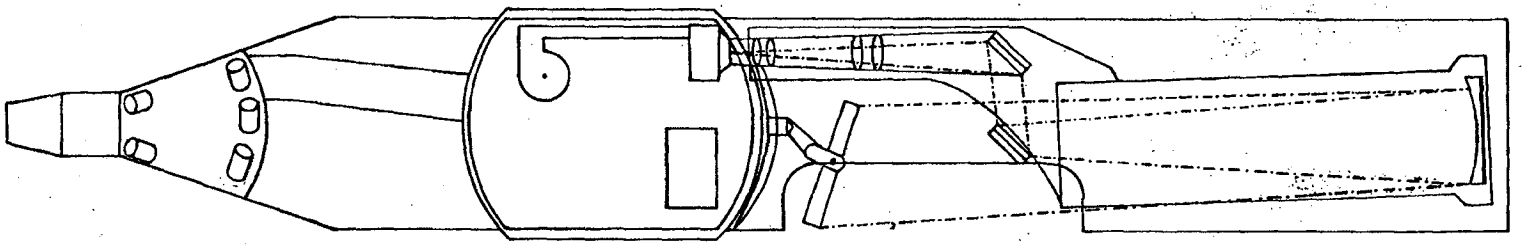
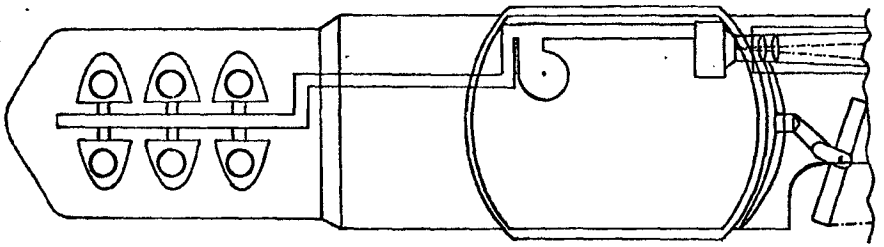
DORIAN - BYEMAN



MOL CAMERA SYSTEM





* Frame Camera
* [redacted] Telephoto
* 6 Foot Diameter Mirrors
* 1.08°(1.5 nm) Field of View
* 9½ inch Film
* [redacted] Ground Resolution

CAMERA Field of View

Why Manned & Unmanned Systems?

* MANNED SYSTEM FIRST TO:
  - ASSURE CAMERA PERFORMANCE...
  - REALIZE EARLY USEFUL PRODUCT...
  - MATURE UNMANNED SYSTEM SOONER...

* ALSO UNMANNED SYSTEM IF:
  - THREAT/OBJECTIONS TO MANNED OPERATIONS...
  - UNKNOWN PHYSIOLOGICAL LIMITATIONS...
  - MANNED SYSTEM NOT COST-COMPETITIVE...

Reverse Remarks on Vertical Mount

MAN IN MOL

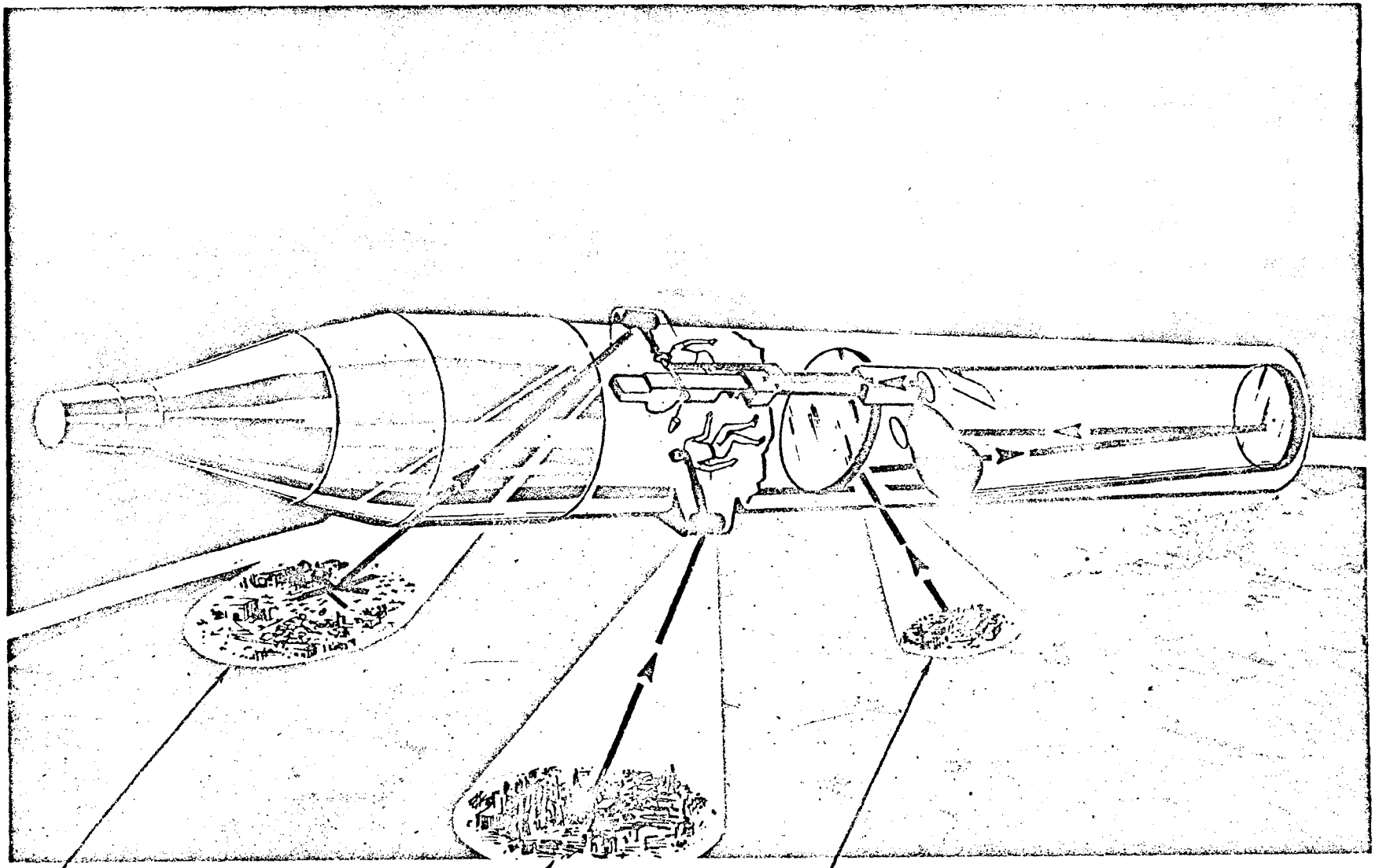
- VERIFY, ADJUST, OR MANUALLY CONTROL CAMERA:
  - * POINTING...
  - * TRACKING...
  - * ALIGNMENT...
  - * FOCUS...
  - * EXPOSURE...
- BACK-UP OTHER SPACECRAFT SUBSYSTEMS...
- ASSIST DIAGNOSTICS PROCESS...
- INCREASE RECONNAISSANCE VALUE/QUANTITY...

Reverse Remarks on Vertical Mount

Mission Enhancement By Man

- TARGET COVERAGE VERIFICATION...
- CLOUD-FREE TARGET SELECTION...
- HIGH-VALUE TARGET SELECTION...
- ALTERNATE FILM CAPABILITY...
- ON-BOARD INTERPRETATION...
- VISUAL RECONNAISSANCE...
- [redacted]

Reverse Remarks on Vertical Mount



ASTRONAUTS INSPECTING TARGETS IN NEXT CLUSTER, FOR CLOUD COVER AND "ACTIVITY"

WHILE TARGET FROM PREVIOUS CLUSTER IS BEING PHOTOGRAPHED

FIGURE

ACQUISITION TELESCOPE SYSTEM OPERATING CONCEPT

Resultant Actions

* AD HOC GROUP REPORT DISTRIBUTED TO CIA, DIA, SERVICES, JCS, DNRO.

* MOL DEVELOPMENT CONCEPT PAPER (DCP) APPROVED BY DEPUTY SECRETARY OF DEFENSE.

* DIA PREPARING TO PRESENT DOD REQUIREMENTS FOR VHR TO USIB.

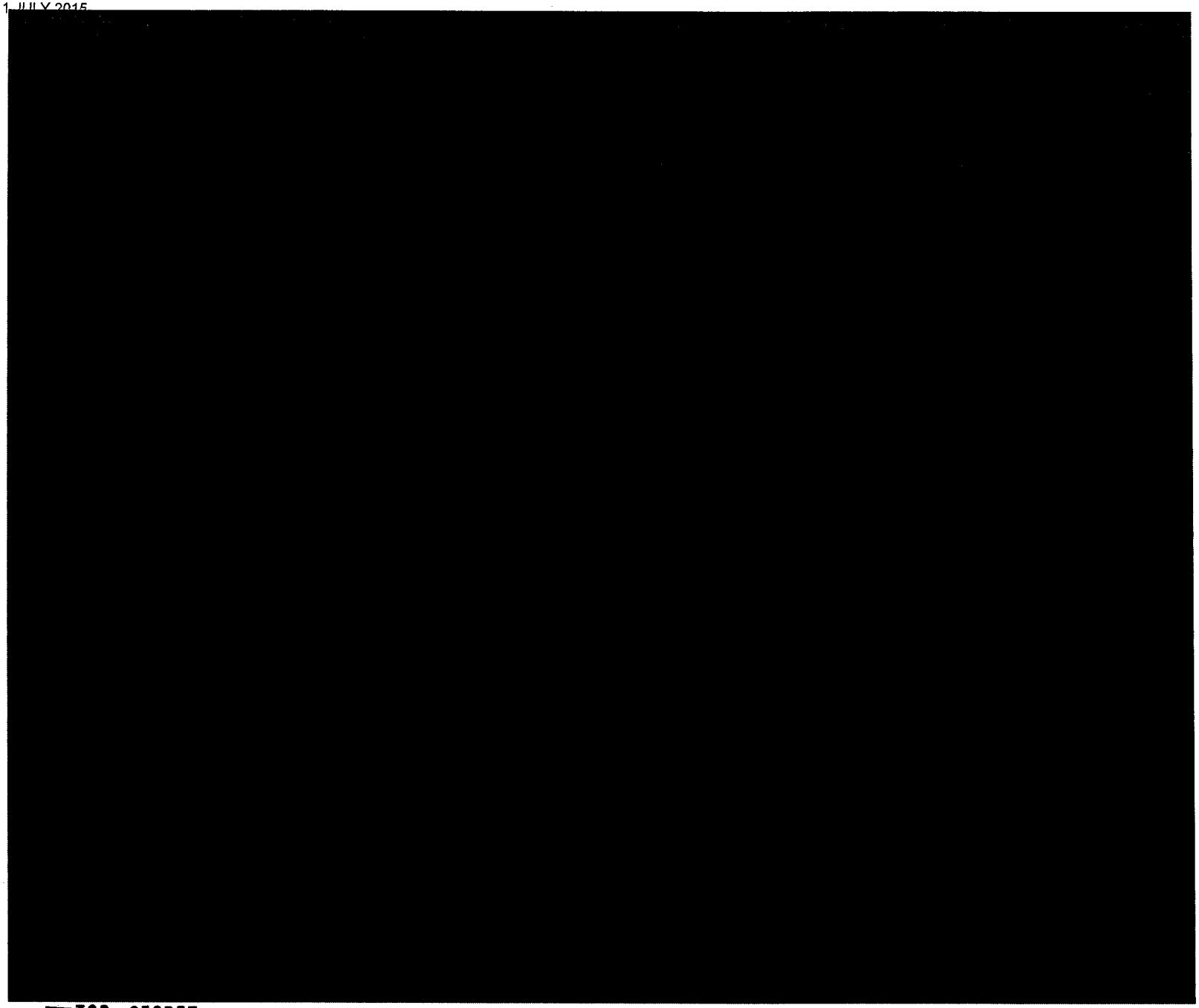
Confidence in Performance Estimates

WEAPON SYSTEM	CONFIDENCE AT RESOLUTION LEVELS 24"
FIGHTER AIRCRAFT	30%
MOBILE BALLISTIC MISSILE	20%
ATTACK SUBMARINE	20%
SAM OR MISSILE DEFENSE	10%
ARMORED VEHICLE	5%
BALLISTIC MISSILE R/V	5%

[redacted]

GAIN IN REACTION TIME

SOVIET SYSTEM	TIME GAINED FOR U.S. REACTION (WITH VHR)
MANNED AIRCRAFT	2 to 3 Years
OFFENSIVE MISSILES	2 to 3 Years
DEFENSIVE MISSILES	5 to 6 Years
SUBMARINES	1 to 2 Years
ARMORED WEAPONS	5 to 7 Years



Missile Penetration Information

Critical Characteristic	Expected Tolerance with Perfect Technical Intelligence	Confidence Level HR Photography	Confidence Level VHR Photography
Interceptor Reload Time	± 20%	[redacted]	
Interceptor Flyout Range	± 10%		
Interceptor Acceleration	± 20%		
Potential Loiter Time	± 10%		
Interceptor Maneuver, g's	± 30%		
Existence of Optical Sensors	Yes or No		
Radar Discrimination and ECCM Capability	Yes or No		
Radar Frequency Range	± 10%		
Radar Beam Width	± 5%		

CONCLUSIONS

* IMPORTANT THREAT PARAMETERS & CHARACTERISTICS CAN BE DERIVED FROM VHR ALONE...
* VHR CAN PERMIT ASSESSMENT OF ELINT-TYPE TARGETS PRIOR TO TEST...
* VALUE OF VHR CAN BE SHOWN (I.E., STRATEIGIC, DEFENSIVE, AIR, ASW, BALLISTIC MISSILES, CPR, TACTICAL)...
* CONTRIBUTION OF VHR IN CONFIDENCE & REACTION TIME...
* UNIQUE CAPABILITYS FOR [redacted]..
* CONTRIBUTION TO ARMS LIMITATION & CRISIS INTELLIGENCE.....
* CUMULATIVE VALUE IN PHOTO SIGNATURES, CAMOUFLAGE/DECEPTION, UNIDENTIFIED INSTALLATIONS, ORDER OF BATTLE...
* POTENTIAL FOR HR COLOR...
* VALUE OF VHR WILL INCREASE...

AD HOC Group Charter

FUNDAMENTAL PURPOSE

Determine both quantitatively and qualititively the essentiality and/or increased value of VHR over HR photography as it contributes to DOD operations and decisions...

TASKS

* Survey available material...
* Review actual/simulated VHR and HR photography...
* Analyze significant current military/national intelligence problems. Express VHR value in terms of unique contributions, increased confidence, and/or possible DOD decisions and actions...
* Evaluate [redacted] and crisis reconnaissance...
* Investigate usefulness for arms control/disarmament...

Methodology

* IDENTIFY SPECIFIC, POTENTIAL SIGNIFICANT WEAPON SYSTEM DECISIONS...

* IDENTIFY SPECIFIC/RELATED USSR/CPR THREATS...

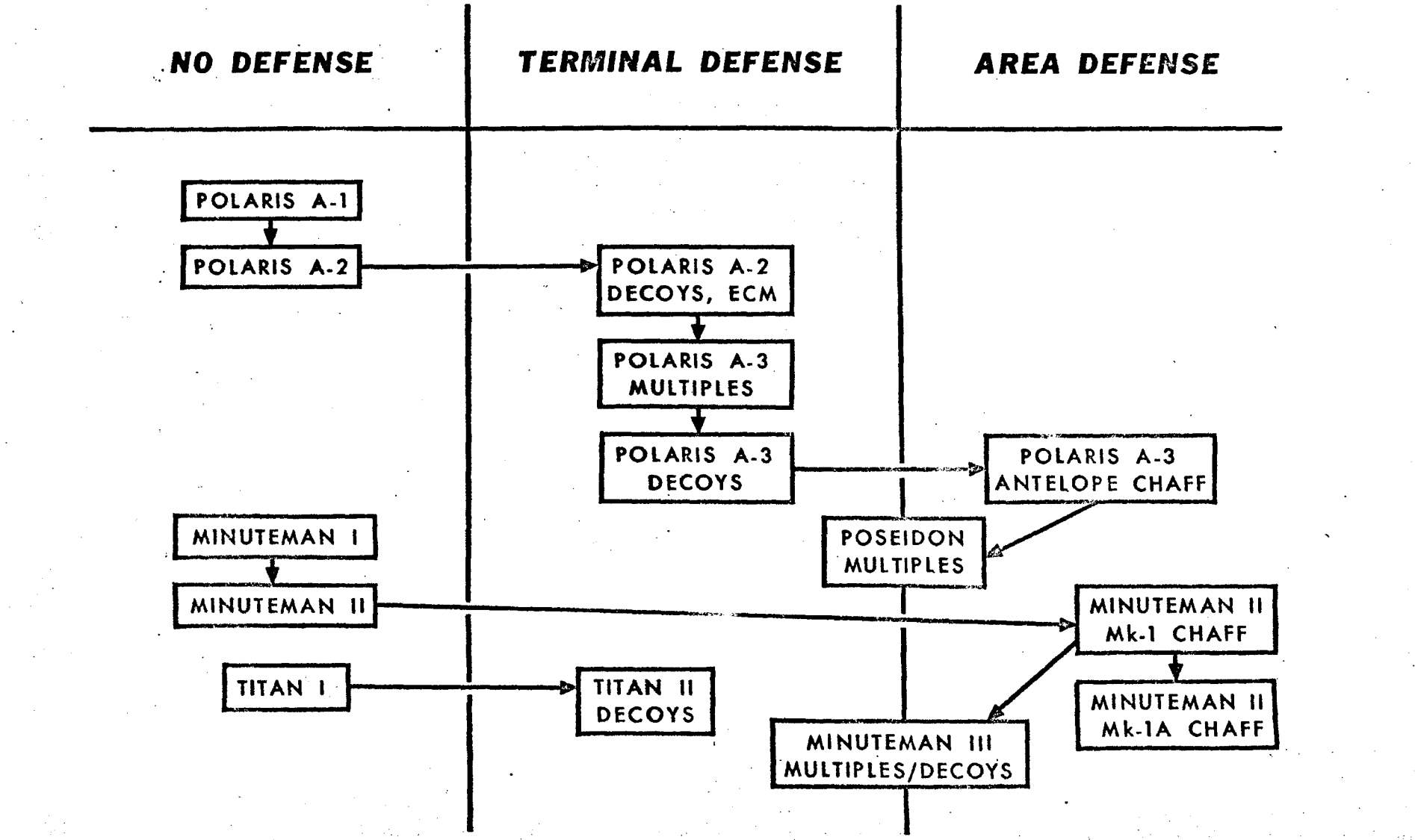
* DETERMINE INTELLIGENCE INFORMATION NEEDED...

* DETERMINE BASIC & SPECIFIC ANALYTICAL REQUIREMENTS...

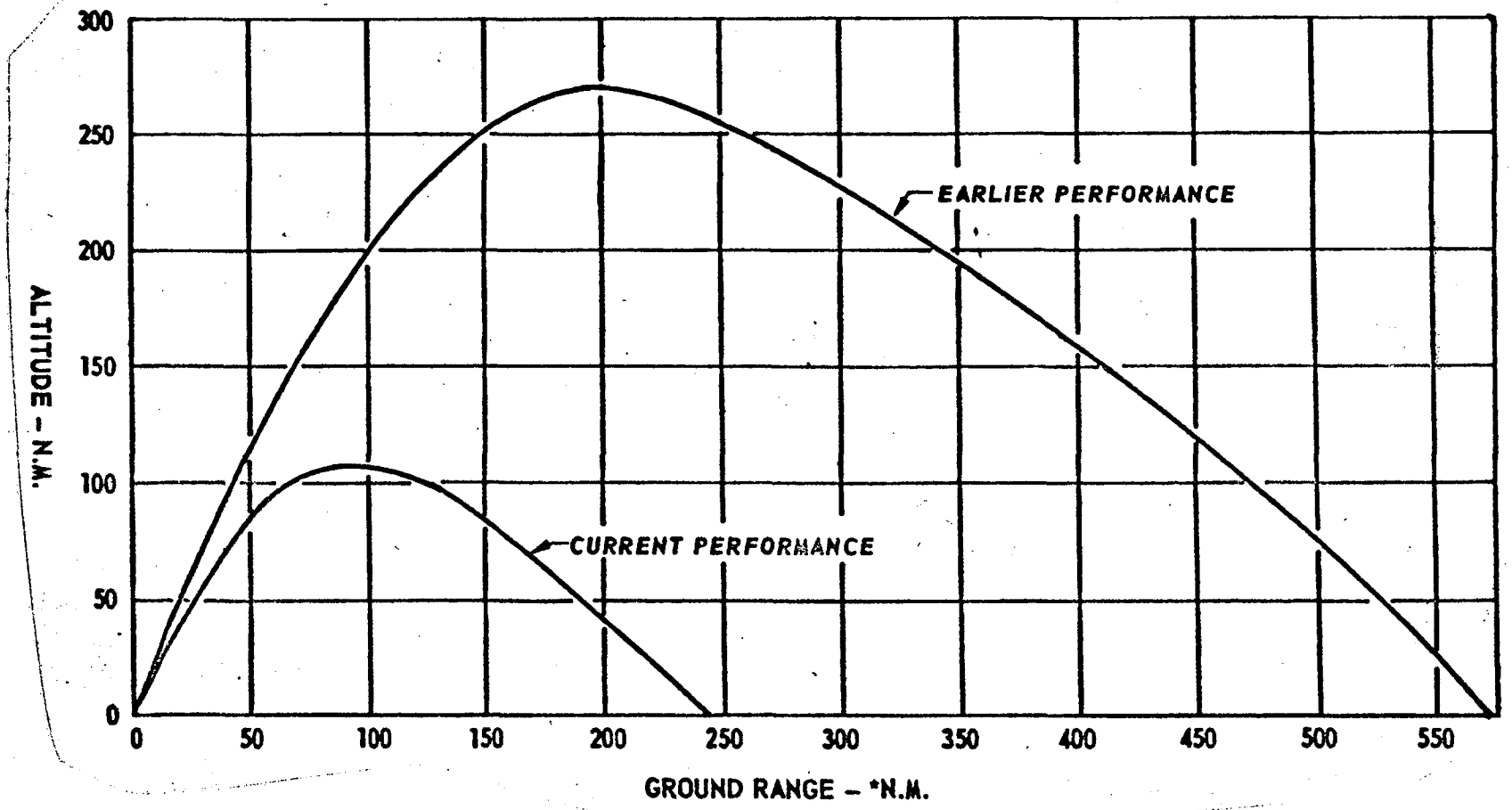
* DETERMINE VHR/HR UNCERTAINTIES & VARIANCES WITH & WITHOUT VHR...

* RELATE TO WEAPON SYSTEM DECISIONS...

Missile Penetration History



Soviet SA-5 System Performance



OPTION I - Present MOL Program

ARGUMENTS FOR:

- HIGHEST CONFIDENCE...
- EARLY OPERATIONAL CAPABILITY...
- MANNED/UNMANNED OPTION...
- MAN-IN-SPACE CAPABILITIES BONUS...

ARGUMENTS AGAINST:

- TOO COSTLY...
- VHR NOT SIGNIFICANT...
- DEVELOP ONLY MANNED SYSTEM...
- DEVELOP ONLY UNMANNED SYSTEM...

OPTION I - Present MOL Program

FUNDING/SCHEDULE/ COST OPTIONS

	FY70	FY71	TOTAL	FV-3 LAUNCH
DCP APPROVED	$576M	$565M	$3040M	FEB 72
INCREASED FUNDING	$635M	$590M	$2980M	DEC 71
DECREASED RATE	$515M	$600M	$3130M	MAY 72

TOP VERTICAL

OPTION II - Manned Only MOL Program

ARGUMENTS FOR:

- LOWEST COST FOR HIGHEST CONFIDENCE & EARLY OPERATIONAL CAPABILITY...
- MAXIMUM FLEXIBILITY/CAPABILITY/GROWTH POTENTIAL...
- MORE THAN COST-COMPETITIVE...
- MAN-IN-SPACE CAPABILITY BONUS...

ARGUMENTS AGAINST:

- TOO COSTLY...
- VHR NOT SIGNIFICANT...
- NEED UNMANNED OPTION " INSURANCE"...
- DEVELOP ONLY UNMANNED SYSTEM...

OPTION II - Manned Only MOL Program

FUNDING/SCHEDULE/ COST OPTIONS

	FY70	FY71	TOTAL	FV-3 LAUNCH
DCP-PROPOSED*	$550M	$525M	$2810 M	FEB 72
INCREASED FUNDING	$590M	$540M	$2750M	DEC 71
DECREASED FUNDING	$510M	$550M	$2900M	MAY 72

*6 LAUNCH PROGRAM

Reverse Remarks on Vertical Mount

Reverse Remarks on Vertical Mount

OPTION III - Unmanned VHR Program

ARGUMENTS FOR:

- LOWEST PROGRAM COSTS...
- LOWER RECURRING COSTS...
- MANNED SYSTEM FEATURES NOT IMPORTANT...
- NO "SPY-IN-SKY" RAMIFICATIONS...

ARGUMENTS AGAINST:

- LOW CONFIDENCE/ DELAYED MATURITY...
- LIMITED CAPABILITY/GROWTH POTENTIAL...
- NOT COST-COMPETITIVE (RECURRING)...
- "SPY-IN-SKY" FEARS GROUNDLESS...

OPTION III - Unmanned VHR Program

APPROACH

- TERMINATE MOL MAN-UNIQUE APRIL 1.
- CONTINUE CAMERA. HOLD UNMANNED MOL.
- REEVALUATE PRACTICALITY & DESIRABILITY.
- RECOMPETE SPACECRAFT APPROACHES.
- TERMINATE OR GO BY DEC 1969.

FUNDING/SCHEDULE/ COST ROM'S

PROGRAM	FY70	FY71	TOTAL	1ST LAUNCH
UNMANNED MOL	$450M	$400+M	$2.6-2.9B	MID 72
MOL CAMERA/HEXAGON	[redacted]			MID 72
MOL CAMERA/NEW SC	?	?	?	?

Reverse Remarks on Vertical Mount

Reverse Remarks on Vertical Mount

OPTION IV - Camera System Only

ARGUMENTS FOR:

- AVAILABLE FOR FUTURE USE...

ARGUMENTS AGAINST:

- UNKNOWN SYSTEM INTEGRATION TASKS AHEAD...
- LIMITED ADDITIONAL TECHNOLOGY GAIN...

COSTS[1]:

PROGRAM	FY70	FY71	TOTAL	AVAIL
FIVE CAMERAS[2]	$160M	$120M	$1630M	1972

(1) ASSUMES APRIL 1 MOL PROGRAM TERMINATION

(2) BARE CAMERAS NOT MM'S

~~SECRET~~

BYEMAN/DORIAN

Reverse Remarks on Vertical Mount

OPTION V - Terminate All VHR

- TERMINATION COSTS: $120-140 Million...
- TOTAL COST a/o 1 APRIL: Approx $1.2 Billion...
- PRODUCTS:
  - ▲ CAMERA TEST FACILITIES...
  - ▲ ADVANCED CAMERA TECHNOLOGY...
  - ▲ PARTIALLY DEVELOPED:
    - ★ MAN-SPACE HARDWARE...
    - ★ CAMERA SYSTEM...
    - ★ T-IIIM BOOSTER...
    - ★ LAUNCH FACILITY...

Reverse Remarks on Vertical Mount

OPTION VI - Reduced VHR Goals

REDUCED VHR GOAL: [redacted] Resolution

G-3 GROWTH POTENTIAL:

- PRESENT CAPABILITY: [redacted] AT 72nm...
- CY 1971 POTENTIAL: [redacted] AT 72nm...
- REDUCED ALTITUDES NOT PRACTICAL...

NEW CAMERA SYSTEM:

- FOCAL LENGTH & APERTURE BETWEEN MOL AND GAMBIT-3...
- EQUAL OR MORE COSTLY THAN COMPLETING MOL CAMERA...

MOL DCP - DEC 1968

RECOMMENDATIONS:

- VHR VALUE TO DOD & MOL MISSION FLEXIBILITY:
  - ★ JUSTIFIES REMAINING COSTS ($1.8B);
  - ★ AND ANNUAL OPERATING ($100-120M/LAUNCH)...
- $575M IS MINIMUM IN FY70...
- CONTINUE PRESENT PROGRAM. DO NOT CANCEL UNMANNED OPTION AT THIS TIME....
- DIA SHOULD ADVISE USIB THAT:
  - ★ DOD VALIDATES VHR REQUIREMENTS;
  - ★ WILL OPERATE MOL AGAINST NATIONAL OBJECTIVES;
  - ★ AND UNDER USIB PRIORITIES...

~~SECRET~~

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Reverse Remarks on Vertical Mount

THE NEED FOR VERY HIGH RESOLUTION IMAGERY

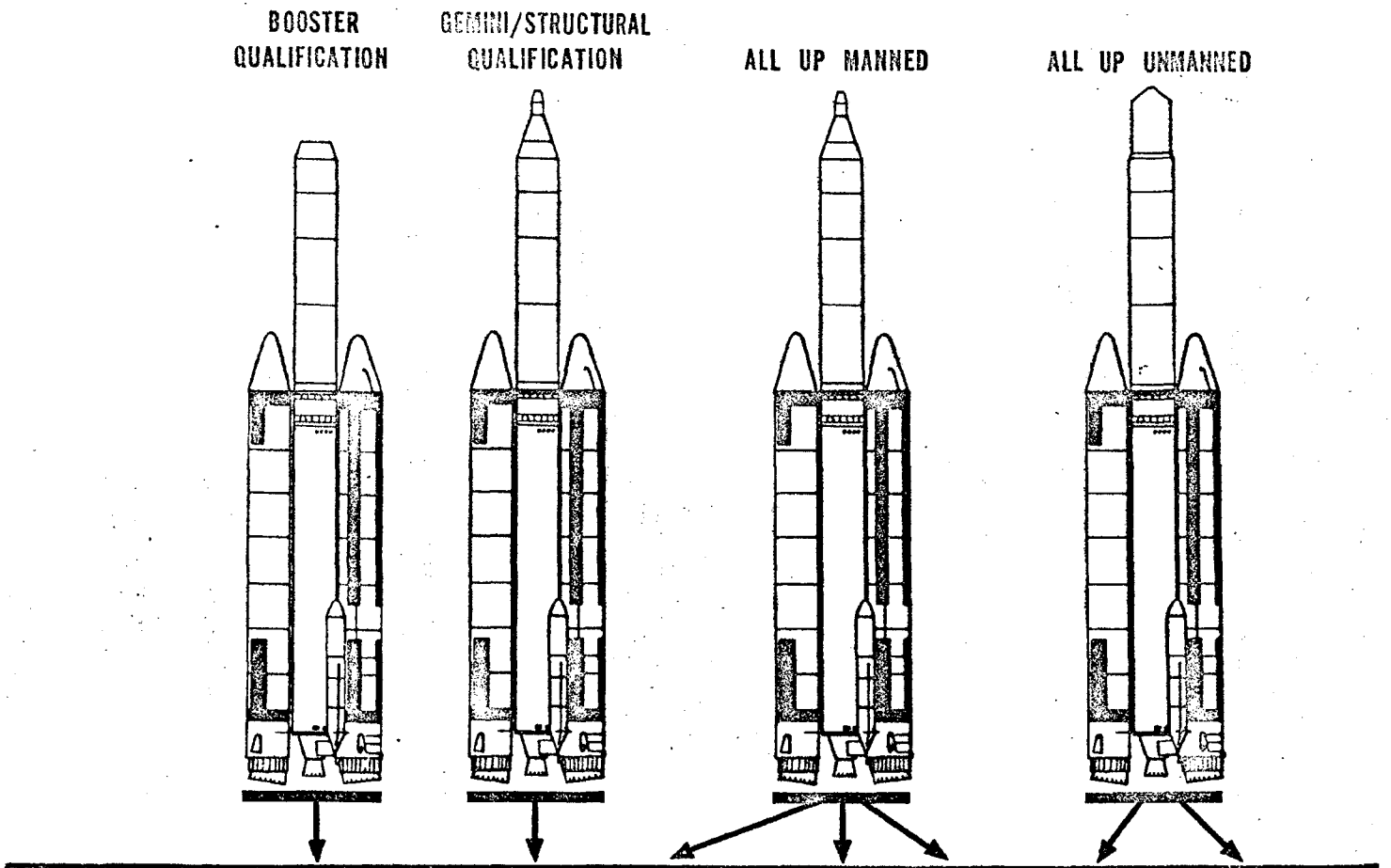
AND ITS CONTRIBUTION TO DOD OPERATIONS AND DECISIONS

NOVEMBER 1968

BYEMAN/TALENT KEYHOLE/COMINT

DORIAN GAMBIT
CHESS/RUFF/ZARF/UMBRA

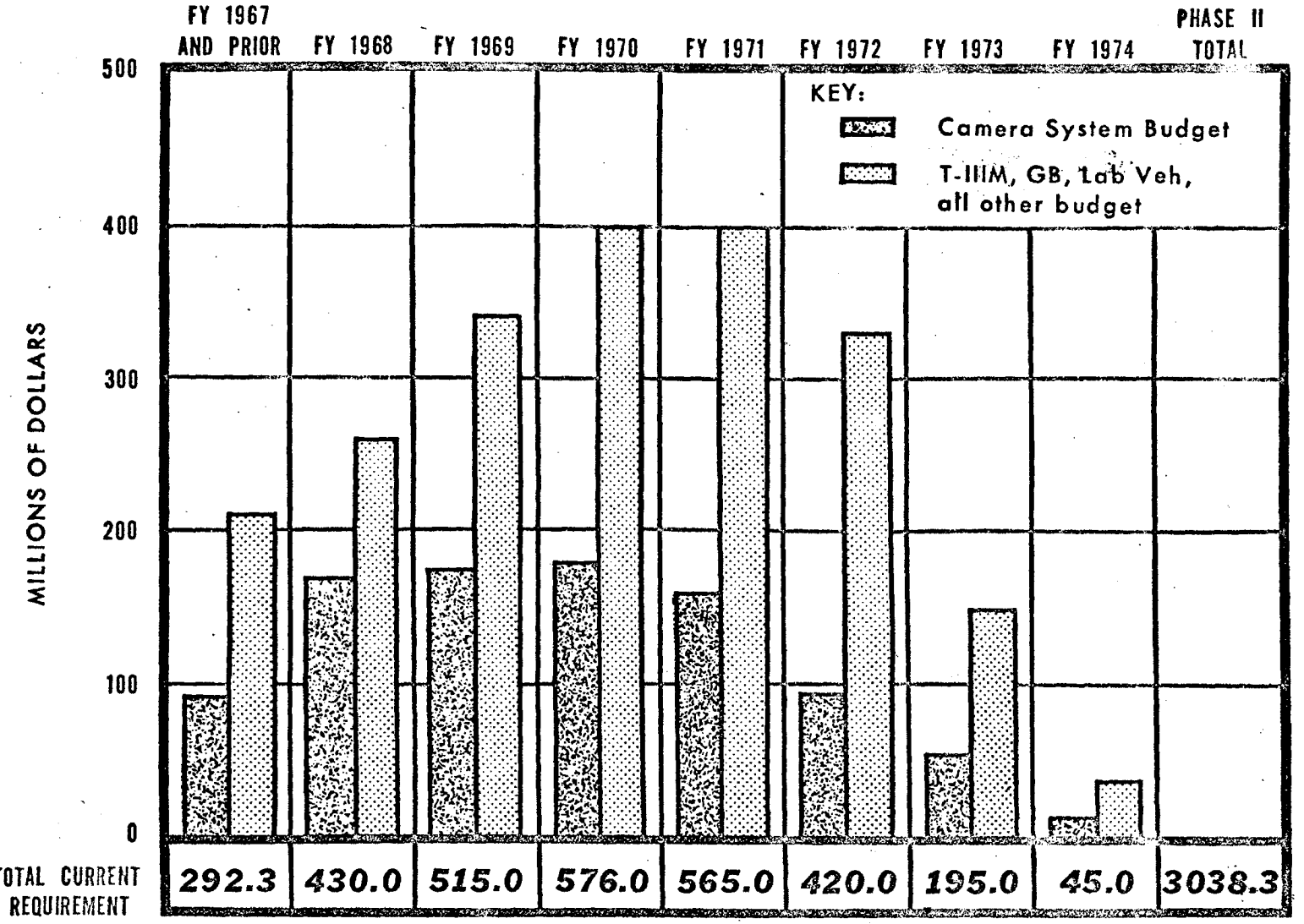
MOL PROGRAM SCHEDULE



Quarter	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Year	1970		1971				1972				1973			

MOL Program Costs (Phase II)

AS OF JANUARY 1, 1969



Reverse Remarks on Vertical Mount

PROGRAM STATUS

TECHNICAL:

- BOOSTER/LABORATORY/GEMINI - NO PROBLEMS...
- CAMERA SYSTEM:
  - ▲ TEST/MANUFACTURING FACILITIES SATISFACTORY...
  - ▲ LOW THERMAL EXPANSION MIRROR MATERIAL OK...
  - ▲ MIRROR SURFACE GOALS ATTAINABLE...
  - ▲ MIRROR DRIVE/CONTROL MEETING SPECS...
  - ▲ AUTOMATIC POINTING/TRACKING NOT YET...
  - ▲ INVESTIGATING CONTAMINATION THOROUGHLY...

SCHEDULE:

- STILL ON SCHEDULE TOWARD DEC 71 - DOLLAR PACED...
- NON-CRITICAL WORK BUNCHED AHEAD...
- BIG SOFTWARE JOB AHEAD...

System Performance Comparison

VHR OPTIONS

- I. PRESENT MOL PROGRAM...
- II. MANNED-ONLY MOL PROGRAM...
- III. UNMANNED VHR PROGRAM:
  - 1. UNMANNED MOL SYSTEM...
  - 2. MOL CAMERA/HEXAGON SPACECRAFT...
  - 3. MOL CAMERA/NEW SPACECRAFT...
- IV. MOL CAMERA SYSTEM ONLY...
- V. TERMINATE ALL VHR ACTIVITIES...
- VI. REDUCED VHR GOAL...

IN DCP

Reverse Remarks on Vertical Mount

Reverse Remarks on Vertical Mount

CONTRACTOR TEAM

- MCDONNELL-DOUGLAS (Eastern Div.)
- MCDONNELL-DOUGLAS (Western Div.)
- GENERAL ELECTRIC
- EASTMAN KODAK[1]
- MARTIN

[1] COVERT CONTRACTOR

~~TOP SECRET~~
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