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SECTION IX

PERSONNEL AND TRAINING

LUNAR EXPEDITION (U)

(LUNEX)

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## 9. PERSONNEL AND TRAINING

### 9.0 INTRODUCTION

This section of the Lunar Expedition Program Plan (Lunex) includes estimated personnel requirements to support the program and presents the training required to accomplish the end objective.

The personnel requirements were derived on the basis of the scope of the complete program and the personnel would be comprised of civilian and military personnel.

The training program was prepared by the Air Training Command and based on the Lunar Expedition Program Plan.

### 9.1 PERSONNEL

The accomplishment of the Lunar Expedition Program will have a manpower impact on the Air Force that is quite different than previous programs. The number of personnel actually on the expedition will be relatively small compared to the number of personnel required to support the operation. The actual contractor "in-plant" personnel required to accomplish this program are not included in the following figures. However, a general estimate of the total contractors' effort, based on the average estimated annual expenditure for the complete Lunex program, would be the equivalent of one of our larger manufacturing companies with 60 to 70 thousand personnel. It should also be stated that this effort would undoubtedly be spread throughout the industry and not concentrated in one company and the previous statement is only for comparison.

The military and civilian personnel required to support the Lunex program is estimated as follows:

Space Personnel	145
Lunar Expedition (21 men at expedition facility, crew rates of 5)	145
Ground Personnel	3677
Lunar Squadron	100
Launch Squadron	873
Instrumentation Squadron	293
Assembly & Maintenance Squadron	860
Supply Squadron	562
Base Support Units	639
Administration	350

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Personnel  
(Space plus Ground)

3822

Overhead

1287

Range Tracking  
Logistic Support Organization

940  
347

Grand Total Personnel

5109

## 9.2 TRAINING PROGRAM

The remaining portion of this section of the Lunar Expedition Program Plan (Lunex) presents the Training Program. It is based on the limited data and information available at the time of preparation. The knowledge gained from the state-of-the art development of this program will of necessity have to be applied directly to the training areas to insure "concurrency" of the programs training development. Further, the training knowledge and experience acquired from current research and development programs must be studied for application to this program.

The concepts and plans projected in this part of the PSPP will be subject to constant revision and/or updating. Use of various simulators and synthetic training devices must be a part of the training program. Identification of the required training equipment and real property facilities to house them must be accomplished early in the program development to insure training equipment and facilities being available to meet the training need dates.

The unique mission of the Lunex program requires a comprehensive and timely source of personnel equipment data (PED). This information is required for space crew and support positions required to operate and maintain the space vehicles and support equipment. Development of such data must be initiated as part of the design effort to reduce the time element for follow-on personnel sub-system requirements.

No effort is made in this section to specify requirements for the Space Launching System since they are delineated in the Space Launching System Package Program.

This section of the Proposed System Package Program was developed under the premise that Air Training Command would be assigned the individual aerospace crew and technical training responsibilities for this program. Therefore, ATC must develop their capability concurrent with hardware development through the engineering design phases to support the expedition.

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### 9.3 PLANNING FACTORS AND GROUND RULES

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#### a. Scope:

This section is conceptual in nature at this time and embodies the basis for the training to be accomplished in support of the Lunar Expedition Program. It includes guidance for individual, field, unit and crew training.

#### b. Definitions:

##### (1) Aerospace Crew Personnel:

Personnel performing crew duty in the Lunar Transport Vehicle.

##### (2) Cadre Personnel:

Those personnel necessary for logistic planning, AFR 80-14 Testing Programs, and ATC instruction and preparation of training materials. The requirements for participation in the testing programs will include test instruments for category testing in accordance with paragraph 5 a (1) and (2), AFR 80-14, and Job Training Standards for the Integrated Systems Testing Program in accordance with paragraph 8 g (3), AFR 80-14.

##### (3) Main Complement Personnel:

Personnel employed in the receipt, check-out, installation, repair, maintenance and operation of the system.

##### (4) Support Personnel:

Air Force Logistic Command personnel required for support functions as well as other agencies' supervisors and planners.

##### (5) Types of Training:

(a) Type I (Contract Special Training). Special training courses conducted by contractors at an ATC installation, contractor facility or any other designated site.

(b) Type II. (ATC Special Training) Special Training Courses conducted by ATC training centers' instructors at an ATC installation, contractor facility, or any other designated site.

(c) Type III. Career training.

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(d) Type IV. Special training provided by ATC training detachment instructors at the site of the organization requiring the training.

(6) Testing Programs:

(a) Component - the testing of the components of a sub-system, such as the guidance package, or ecological package.

(b) Subsystem - components assembled into a sub-system as the Re-Entry Vehicle Subsystem and tested as a unit.

(c) Integrated System - the Re-Entry Vehicle, Lunar Launching Stage and Lunar Landing Stage assembled together and tested as a whole system.

c. Assumptions:

(1) The man-rated Lunar Transport Vehicle will be available for use by the Lunar Expedition in 1968.

(2) ATC personnel will observe, participate and study the training programs developed for current research and development programs conducted under other government agencies and/or contractors.

(3) AFR 80-14 will be used as a guide for accomplishing the program testing.

(4) The terminology for normal levels of maintenance, i.e., organizational, field, depot, and shop, vehicle assembly and maintenance as specified in AFIC (AMC) letter MCM, dated 25 July 1960, subject: Standard Maintenance Terms and Maintenance Facility Nomenclature for Missile Weapon Systems will apply.

(5) The Air Force Maintenance policy of maximum maintenance at the lowest feasible level will prevail.

(6) Due to the time phasing of the subsystems, special consideration must be given to the training facilities requirements funding for the Re-Entry Vehicle technical training programs.

(7) Testing Dates:

(a) Start of Component Testing Dates are:

1. Re-Entry Vehicle - June 1963.
2. Lunar Launch Stage - February 1965.

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3. Lunar Landing Stage - May 1965.

(b) Start of Subsystem Testing Dates Are:

1. Re-Entry Vehicle - November 1964.

2. Lunar Launch Stage - May 1966.

3. Lunar Landing Stage - July 1966.

d. Peculiar Requirements and/or Limitations:

(1) The unique mission of this program makes it mandatory that the following actions be accomplished concurrent with the development of the hardware:

(a) The contractors will develop the Personnel-Equipment Data information concurrent with the design of the hardware. This information must be available to ATC personnel for early planning purposes.

(b) Type I training dates reflected in the time phasing chart will require the use of R&D and test equipment as training equipment.

(c) Production schedules for R&D and Expedition equipment will include the training equipment required to support Type II and Type III training. Allocation and delivery priorities will be in accordance with AFR 67-8.

(2) An identification of personnel necessary to support this system has been made in order to assist in defining the training parameters. Changes to these estimates will be made as more conclusive information becomes available. See Charts IX A and B.

(3) Maximum Cross-Training will be provided as required to all personnel associated with this program.

(4) The requirement for follow-on training and the value of past experience is recognized and maximum retention of personnel is mandatory.

(5) New and peculiar training problems are envisioned for the technical personnel.

(6) The training of the aerospace crew personnel will require the development of a program which is unique to the Air Force.

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e. Qualitative and Quantitative Personnel Requirements Information

(1) A QQPRI prepared in accordance with Mil Spec 26239A will be required to develop the training courses, course material and substantiation for the Personnel Classification changes.

(2) ATC and other applicable commands will furnish personnel for the QQPRI integration team and provide technical guidance to the contractor during preparation.

9.4 TRAINING

a. Training Responsibilities and Concepts:

(1) Engineering Design Effort

(a) ATC will participate in the engineering design effort to insure that technical data is collated with the personnel sub-system for follow-on training program requirements.

(b) ATC will be responsible for training required in support of the R&D effort under AFR 50-9.

(c) Selection of the initial aerospace crew personnel and ATC aerospace crew training instructors for the Lunar Transport Vehicle will commence 8 months prior to the start of Category I Testing.

(d) All Lunar Transport Vehicle crews and military space launching support personnel will be phased into special training (Type I), 6 months prior to Category I Testing.

(e) Environmental space training for the selected crews and instructor personnel will start 9 months prior to the start of Category II testing and will be conducted by the Aerospace Medical Center, Brooks AFB, Texas.

(f) ATC Lunar Transport Vehicle crews will be phased out of training 30 days prior to the requirement for Type II or III aerospace crew training to provide follow-on training capability in this area.

(2) Flight Testing & Expedition Program:

(a) ATC will be responsible for all individual training, i.e., technical, aerospace crew, AGE and additional job tasks as required.

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(b) All requirements for Type I Special Training, AFR 50-9, in support of this effort will be contracted for by ATC.

(c) ATC will maintain liaison with the contractor concerning engineering changes in the program during its development to keep training information in consonance with the program sub-program configurations and other concepts having a direct implication to training.

(d) Flight Testing & Expedition Crew proficiency will be the responsibility of the Lunex Program Director unless ATC is requested to furnish this training.

#### 9.5 TRAINING PERSONNEL

##### a. Field Training Detachment (FTD)

The number of personnel required to provide training for lunar vehicle personnel will be determined during the training programming conference. QQPRI, TPR's, Personnel Plan, Operational Plan and Maintenance Plan will be available at this time.

##### b. Contractor Technical Service Personnel (AFR 66-18)

Contractor technical service personnel may be initially required to augment Field Training Detachment (FTD) personnel. CTSP requirements in support of this program will be phased out as blue suit capability is achieved.

##### c. Trained Personnel Requirements (TPR)

TPR will be developed by commands concerned upon approval of QQPRI, and will be tabulated as gross requirements by command, by AFSC and by fiscal quarter. These requirements will be phased on anticipated need dates for personnel to be in place at the testing sites, launch sites, and maintenance areas, and will be furnished Hq ATC in sufficient time to allow proper planning for required training.

#### 9.6 TRAINING EQUIPMENT PACKAGE

##### a. General:

Training equipment requirements will be developed to support:

(1) Check-out and ground maintenance to be performed by the direct support personnel for the Lunar Transport Vehicle.

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(2) Flight test operations and maintenance to be performed by the responsible crews. In consideration of this, present and near future systems experience gained in the aerospace area will be applied to the Lunex program to assist in the identification of training equipment. The training for this program must be conducted in the most realistic environment practicable.

(3) Post mission maintenance and test equipment.

b. Equipment Selection:

Selection of training equipment will be based on the following general rules:

(1) Maximum utilization will be made of training equipment programmed for other missile and space system training programs.

(2) During the initial phases, equipment programmed for test, development, and the expedition programs will be used to the maximum extent practicable when regular training periods can positively be scheduled in the use of that equipment. The lack of availability of such equipment will result in degradation of training.

(3) Equipment selection will be made in consideration of future and/or subsequent programs to provide maximum training capability in similar systems with minimum cost.

(4) Maximum use and development of training films, training graphics, and synthetic training aids and devices will be made to reduce requirements for critical operational items during the initial phases of the program.

(5) Training equipment will be identified in sufficient time to enable procurement and delivery in advance of equipment for use in the flight test and expedition program.

c. Planning Factors:

Planning factors for determination of Training Equipment Requirements:

(1) In view of the limited program information presently available, definitive planning factors upon which over-all equipment requirements may be based cannot be provided. However, for preliminary planning, the following factors may be applied to subsystems of the program to determine order of

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magnitude. Provided Control Centers used for other space vehicles will be applicable to the Lunar Transport Vehicle, category \*I, \*\*II, and \*\*\*III training equipment requirements as specified in USAF letter dated 30 January 1961, subject: Weapon System Training Equipment Support Policy will be as follows:

<u>Major Vehicle Sections</u>	<u>Per cent of Sub-System Cost Required for Training Items</u>
(a) <u>Re-entry Vehicle</u>	250%
<u>1. Complete R/V - 1 ea</u>	
<u>2. Sub-systems of R/V - 1 ea</u>	
<u>3. Major components of each         sub-system for Bench Items - 1 ea</u>	
(b) <u>Lunar Launch Stage</u>	150%
<u>1. Sub-systems of Launch         Stage - 1 ea</u>	
<u>2. 50% of Major Components         for Bench Items</u>	
(c) <u>Lunar Landing Stage</u>	100%
Major Components - 1 ea	
(d) <u>Cargo Package</u>	100%
Complete Cargo Package	
(e) <u>Aerospace Ground Equipment</u>	200%
<u>1. Complete set for handling         and testing vehicle sections         and included equipment</u>	
<u>2. Complete set as bench items         for maintenance training</u>	

\* Cat I Trainers

\*\* Cat II Parts/Components/End Items

\*\*\* Cat III Training Aids/accessories

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(2) Training films and transparencies requirements will be developed as soon as possible.

(3) Spare parts support will be required for all Category I and II training equipment.

(4) A continuing requirement will exist for the modification of training equipment. These modifications should be provided by review and processing of training equipment change proposals concurrent with operational equipment change proposals.

(5) Funding of P-400 money will be omitted in consonance with AFR 375-4, Para 12.

## 9.7 FACILITIES

### a. General:

The needs for training facilities should be established approximately three years prior to the dates at which Type II training equipment will be required. Facilities must incorporate sufficient flexibility to accommodate future updating of training equipment resulting from program configuration changes.

### b. Aerospace Crew Training Facilities:

(1) Initial training for aerospace crew personnel will require the use of existing space training facilities. Joint-use agreements between NASA and other USAF agencies and the Air Training Command will be required to insure maximum utilization of these facilities. Aerospace Medical Center's facilities (Brooks AFB, Texas) will be utilized to the fullest. Inter-service agreements with the Navy for use of specific training device facilities should be considered for crew training.

(2) The establishment of a centralized space training facility would have a direct bearing on the over-all specific requirements for this type of training. The results of the System Study Directive (SSD) Nr 7990-17610, titled: "Centralized Space Training Facility," will have direct bearing on the posture of the training facilities of the future. For this reason, facility requirements for follow-on training are not projected.

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c. Other Training Facilities:

It is anticipated that Technical Training Centers now in existence can absorb the additional technical training load without increasing the facilities. However, modification of existing facilities to provide training laboratories with specialized power and environmental systems will be necessary. This requirement must be identified in sufficient time to permit facility programming through normal procurement cycles.

9.8 BUDGET AND FINANCE

a. Training Equipment Costs

Funding will be required for training equipment identified in Section 9.6, Training Equipment Package.

b. Training Facilities Costs

Funding and costs of training facilities will be determined once the decision is made whether to build a Centralized Space Training Facility or to continue with decentralized procedures. Funding can then be determined for the required facilities and modifications.

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\* Proposed  
\*\* Numbers are estimates for  
Type I Training Cadre

CHART IX - A  
PROJECTED MANNING AFSC's  
FOR LUNAR TRANSPORT VEHICLE PROGRAM

Major Segment of System	Cadre Requirement	AFSC	AFM 35-1 Title	System Association
PART A				
Vehicle Crew	1 (AFSC)	13XX	*Aerospace Flight Test Pilot	Vehicle Commander, flies vehicle, programs flight data inputs to flight regime computer.
	1 (ATC)	13XX	Aerospace Pilot	Instructor
	1 (AFSC)	15XX	*Aerospace Performance Engineer & Navigator	Deputy Vehicle Commander, navigates and maintains vehicle in flight.
	1 (ATC)	15XX		
	1 (AFSC)	30XX	*Aerospace Communications Electronics & Computer Specialist	Maintains electronic, communi- cations and computer components. Assists in vehicle maintenance.
	1 (ATC)	30XX		
PART B				
Vehicle Support	**2 (AFSC)	30551/ 71	Electronic Digital Data Processing Repairman/ Maintenance Technician	Operates and maintains airborne computer and associated equipment.
	1 (ATC)			

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Major Segment of System	Cadre Requirement	AFSC	AFM 35-1 Title	System Association
Vehicle Support (Continued)	2 (AFSC)	29373	Airborne Radio and Electric Countermeasure Operator Technician	Operates and Repairs radio and radio Elint equipment.
	1 (ATC)			
	2 (AFSC)	42250/70	Instrument Repairman/Technician	Vehicle Instruments.
	2 (AFSC)	42251/71	Mechanical Accessories and Equipment Repairman/Technician	Maintenance of mechanical accessories.
	1 (ATC)			
	2 (AFSC)	30151/71	Aircraft Electronic Navigation Equipment Repairman/Maintenance Technician	Maintain electronic navigation equipment.
	1 (ATC)			
	1 (AFSC)	30150/70	Aircraft Radio Repairman/Maintenance Tech.	SHF, UHF data link equipment.
	1 (AFSC)	30153/73	Aircraft Electronic Countermeasures/Maintenance Technician	Repair Airborne Electronic Elint equipment.
	1 (AFSC)	46250/70	Weapons Mechanic/Maintenance Supervisor	Capsule ejection system and loading

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Major Segment of System	Cadre Requirement	AFSC	AFM 35-1 Title	System Association
Vehicle Support (Continued)	1 (AFSC)	56850/ 70	Liquid Fuel Systems Maintenance Specialist/ Technician	Liquid Air System and fuel systems.
	1 (ATC)			
	2 (AFSC)	53450/ 70	Airframe Repairman/ Technician	Airframe including nose cone.
	1 (ATC)			
	2 (AFSC)	42152/ 72	Aircraft and Missile Pneudraulic Repair- man/Technician	Repairs Hydraulic and Pneumatic Systems.
	1 (ATC)			
	2 (AFSC)	42353/ 73	Flight Control/Auto Pilot Systems Repair- man/Technician	Checks out and repairs auto pilot system.
	2 (AFSC)	31150/ 70	Guidance Systems Mechanic/Technician	Maintains and repairs vehicles guidance systems/infra-red detections and associated equipment.
	1 (ATC)			
	2 (AFSC)	31250/ 70	Control Systems Mechanic/ Technician	Maintains and repairs vehicles control systems.
	1 (ATC)			
	2 (AFSC)	00370	Abort System Vehicle Technician	Maintains and repairs vehicles abort system.

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Major Segment of System	Cadre Requirement	AFSC	AFM 35-1 Title	System Association
Vehicle Support (Continued)	2 (AFSC)	43351/71	Missile Engine Mechanic/Technician	Propulsion system and retro rockets.
	1 (ATC)			
	2 (AFSC)	42350/70	Aircraft and Missile Electrical Repairman/Technician	Electrical System
	1 (AFSC)	56650/70	Refrigeration Specialist/Supervisor	Maintain refrigeration and ventilation equipment.
	1 (AFSC)	30152/72	Aircraft Early Warning Radar Maintenance Repairman/Technician	Radar Doppler Navigation Equipment.
	1 (ATC)			
	2 (AFSC)	27250/70	Air Traffic Control Operator/Technician	Operates acquisition and precision approach radar.
	1 (AFSC)	30551/71	Electronic Digital Data Processing Repairman Operator/Technician	Insures proper operation and repair of approach computer.
	2 (ATC)			
	Additional Specialist		62271	Diet Supervisor
		90150/70	Aeromedical Specialist/Technician	Sub-professional tasks for physical exams and treatment.
		58250/70	Fabric, Leather and Rubber Products Repairman/Repair Supervisor	
		92250/70	Personal Equipment Specialist/Supervisor	

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CHART IX - B

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LUNEX/SPACE LAUNCHING SYSTEM

1. The estimates for the launch system are not included in view of the status of the Space Launching System (SLS) study. It can, however, be estimated that the launch complex personnel utilized in both the liquid/solid propellant type boosters will be integrated into a team for support of this system.
2. At such time as the S.L.S. is designated as the primary launch support system, a PSPP will be made for the launch vehicle and support AFSC's as a part of this program.

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PROGRAM SCHEDULE

LUNAR LANDING STAGE		CY 61												CY 62											
Chart IX-D		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1	ATC Input to PSPP																								
2	SOR or ADO Published																								
3	SPO Established																								
4	SPO Rep Appointed																								
5	Prime Training Center Selected																								
6	SPP Prepared, Finalized																								
7	Contractor Selected																								
8	PSS Data Contracted																								
9	PED Effort Starts																								
10	QQPRI Effort Starts (Components)																								
11	TEPI Effort Starts (Components)																								
12	Test Directive Coordinated																								
13	QQPRI Integration Team (Components)																								
14	QQPRI Review (Components)																								
15	Crew Selection																								
16	Draft QQPRI Received (Components)																								
17	Draft TEPI Received (Components)																								
18	Test Plan Prepared																								
19	Training Parts Pre-Provisioning																								
20	Frelim QQPRI Approved (Components)																								
21																									
22	Training Program Requirements																								
23	Training Program Conference																								
24	Training Parts Provisioning																								
25	Mock-Up and DEJ																								
26	Tech Spec Tng (50-9) Component Test																								
27	Test of Components																								
28	Training Facilities Requirements																								
29	Subsystem QQPRI Integrated																								
30	Subsystem TEPI Integrated																								
31	Subsystem QQPRI Approved																								
32	Subsystem TEPI Received																								
33	Type II Training Effort Starts																								
34	Subsystem Testing Begins																								
35	Eval of Tng Starts																								
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**PROGRAM SCHEDULE**

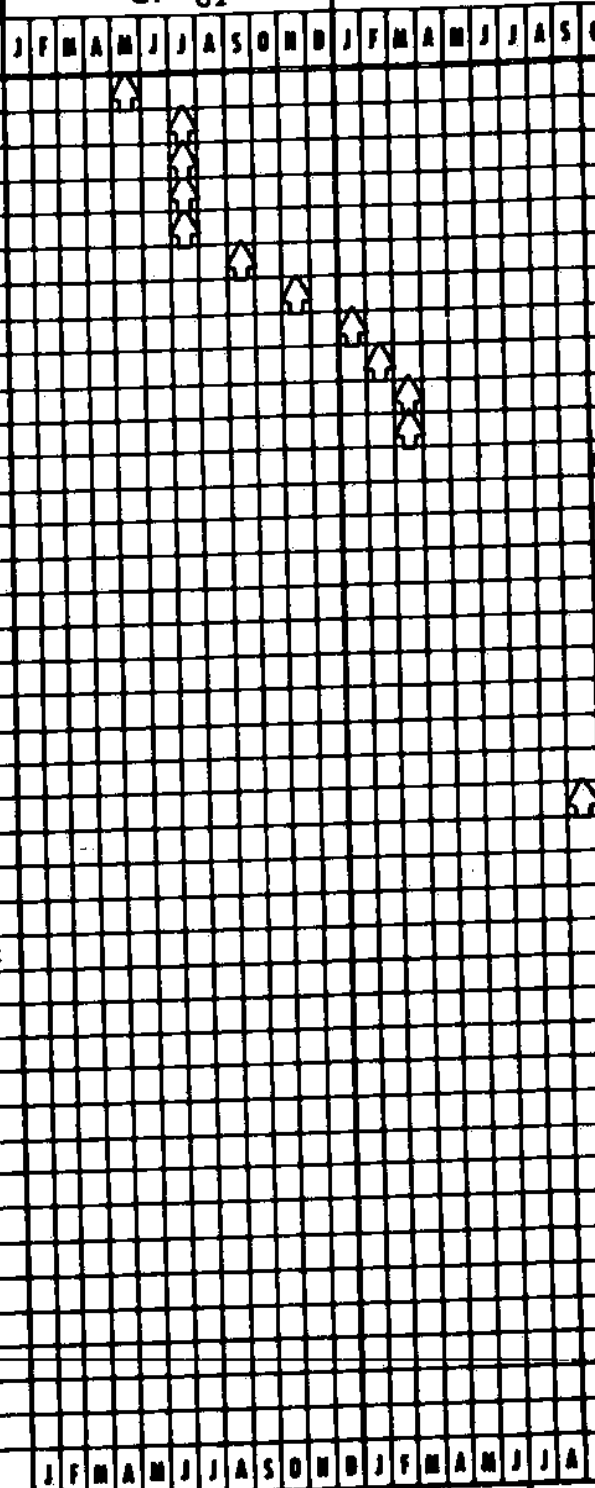
Chart IX-E **LUNAR LAUNCH STAGE AND**

**CARGO PAYLOAD PACKAGE**

- 1 ATC Input to PSPP
- 2 SOR or ADO Published
- 3 SPO Established
- 4 SPO Rep Appointed
- 5 Prime Training Center Selected
- 6 SPP Prepared, Finalized
- 7 Contractor Selected
- 8 PSS Data Contracted
- 9 PED Effort Starts
- 10 QQPRI Effort Starts (Components)
- 11 TEPI Effort Starts (Components)
- 12 Crew Selection
- 13 Test Directive Coordinated
- 14 QQPRI Integration Team (Comp)
- 15 QQPRI Review (Components)
- 16 Draft QQPRI Received (Components)
- 17 Draft TEPI Received (Components)
- 18 Prelim QQPRI Approved (Comp)
- 19 Test Plan Prepared
- 20 Training Parts Pre-Provisioning
- 21 Training Program Requirements
- 22 Training Facilities Requirements
- 23 Training Program Conference
- 24 Training Parts Provisioning
- 25 Mock-Up and DEI
- 26 Tech Spec Training (50-9) Component Test
- 27 Test Component Starts
- 28 Subsystem QQPRI Integrated
- 29 Subsystem TEPI Integrated
- 30 Subsystem QQPRI Approved
- 31 Subsystem TEPI Received
- 32 Type II Tng Effort Starts
- 33 Subsystem Testing Starts
- 34 Eval of Tng
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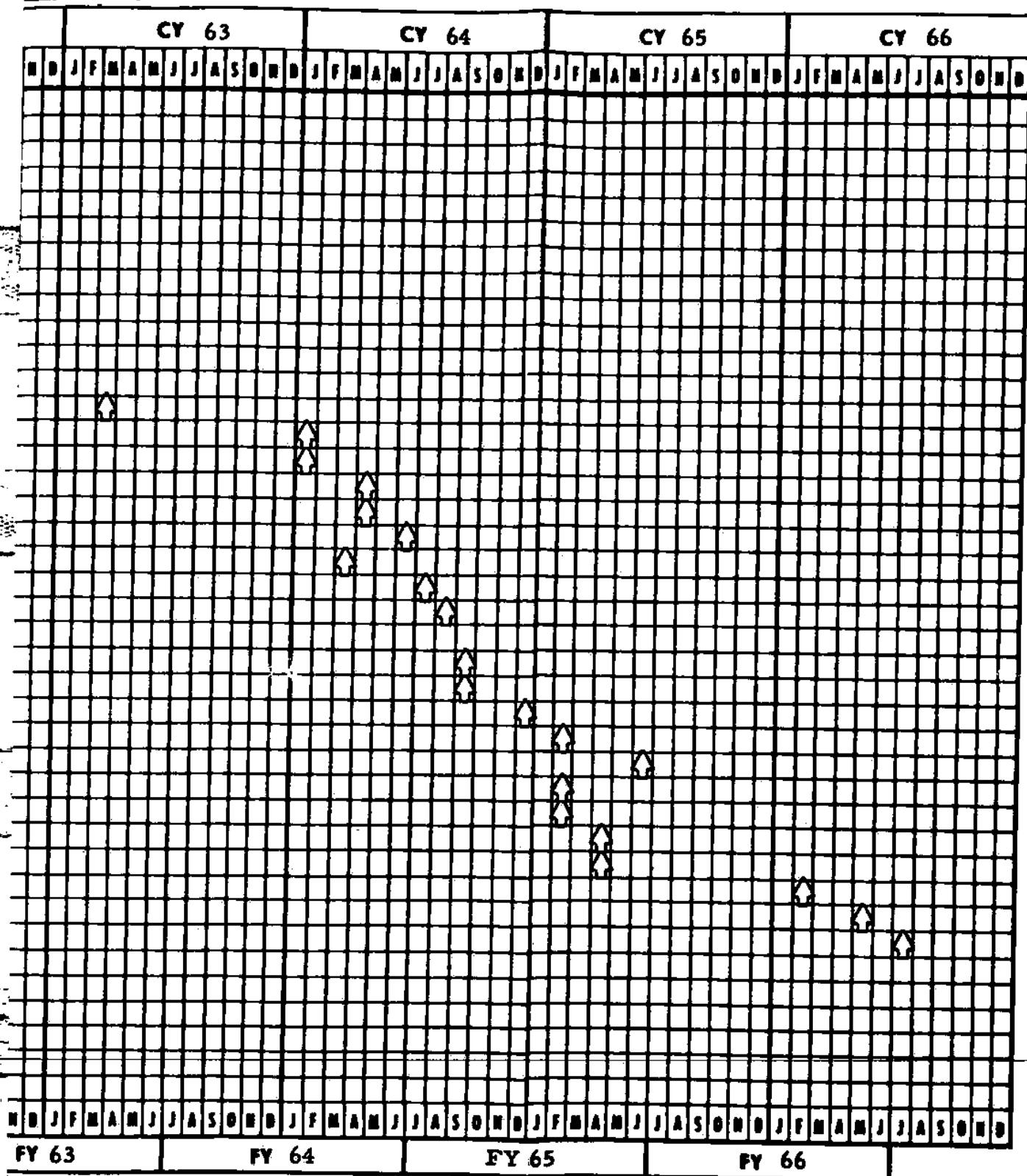
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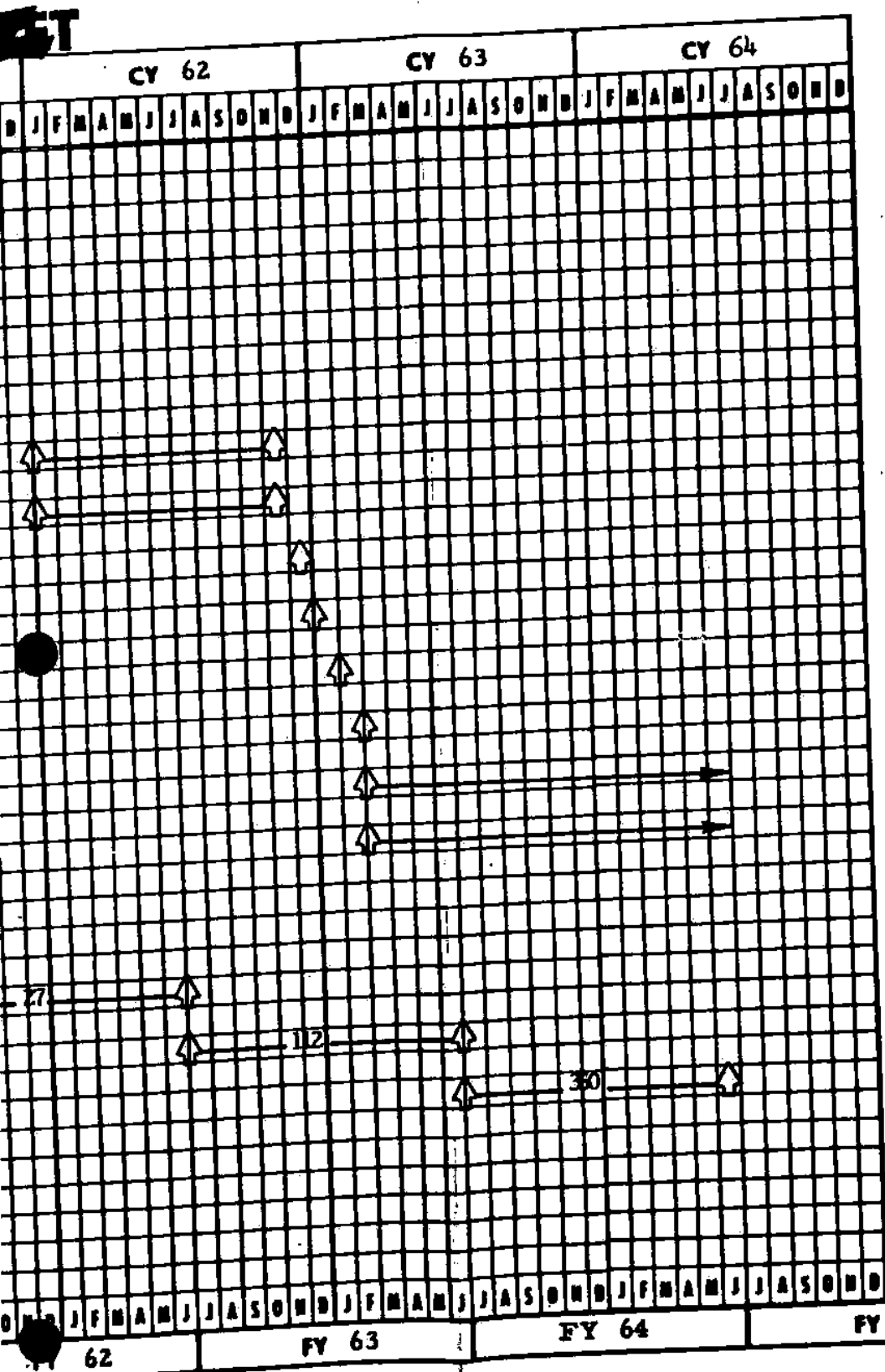
PROGRAM SCHEDULE

	INTEGRATED SYSTEM	FY 66												FY											
		CY 65												CY 66											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1	System QQPRI Integrated												↑												
2													↑												
3	System TEPI Integrated												↑												
4																									
5	System QQPRI Reviewed																↑								
6																									
7	System QQPRI Approved																	↑							
8																									
9	System TEPI Received																		↑						
10																									
11	TPR Prepared and Distributed																			↑					
12																									
13	Training Program Conference																					↑			
14																									
15	Lunar Launch and Return (System Test)																							↑	
16																									
17	Training Support Conference																								↑
18																									
19	Training Equipment In Place																								
20																									
21	Training Materials Ready																								
22																									
23	Type III Training Starts																								
24																									
25	Lunar Expedition																								
26																									
27																									
28																									
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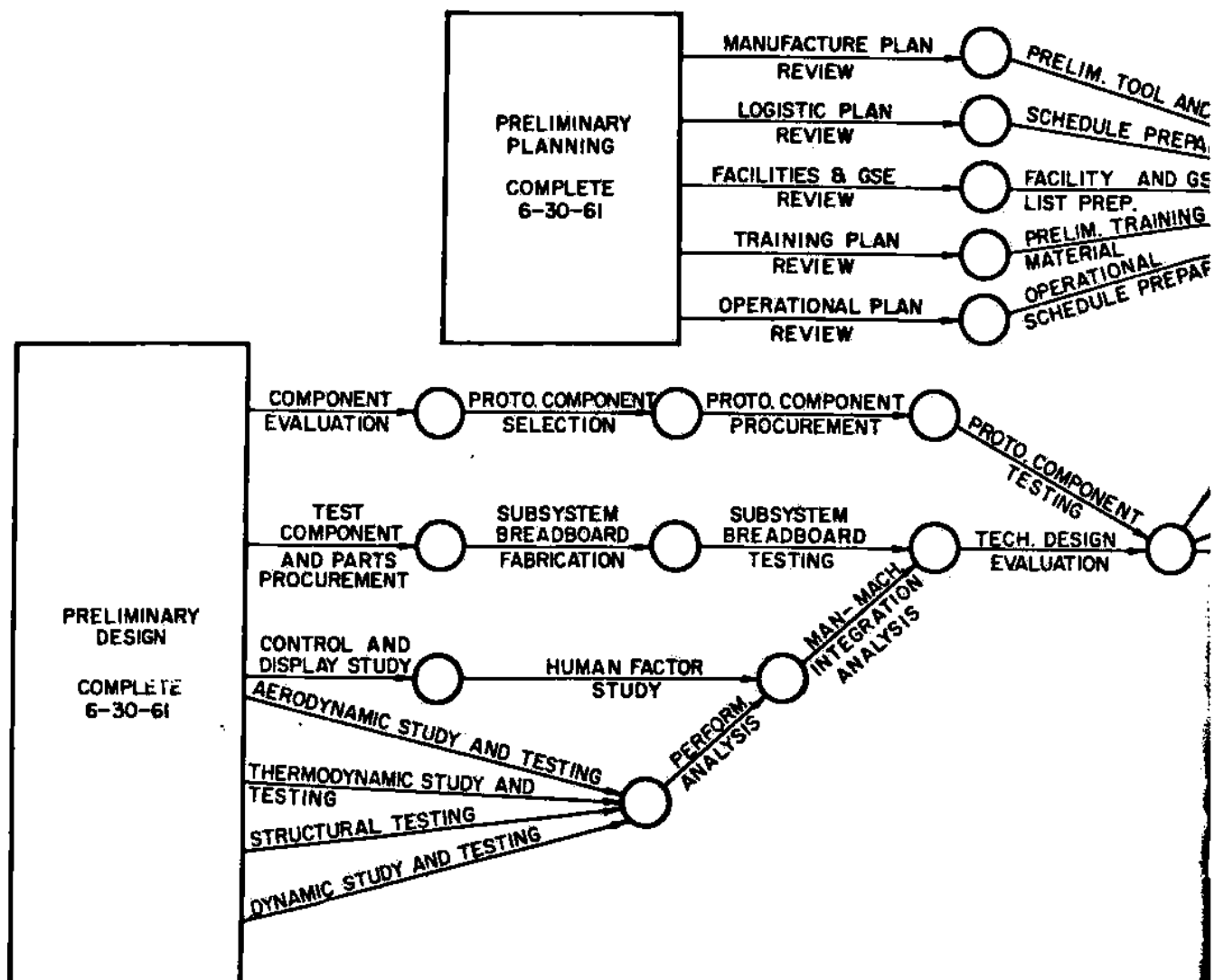
J F M A M J J A S O N D J F M A M J J A S O N D

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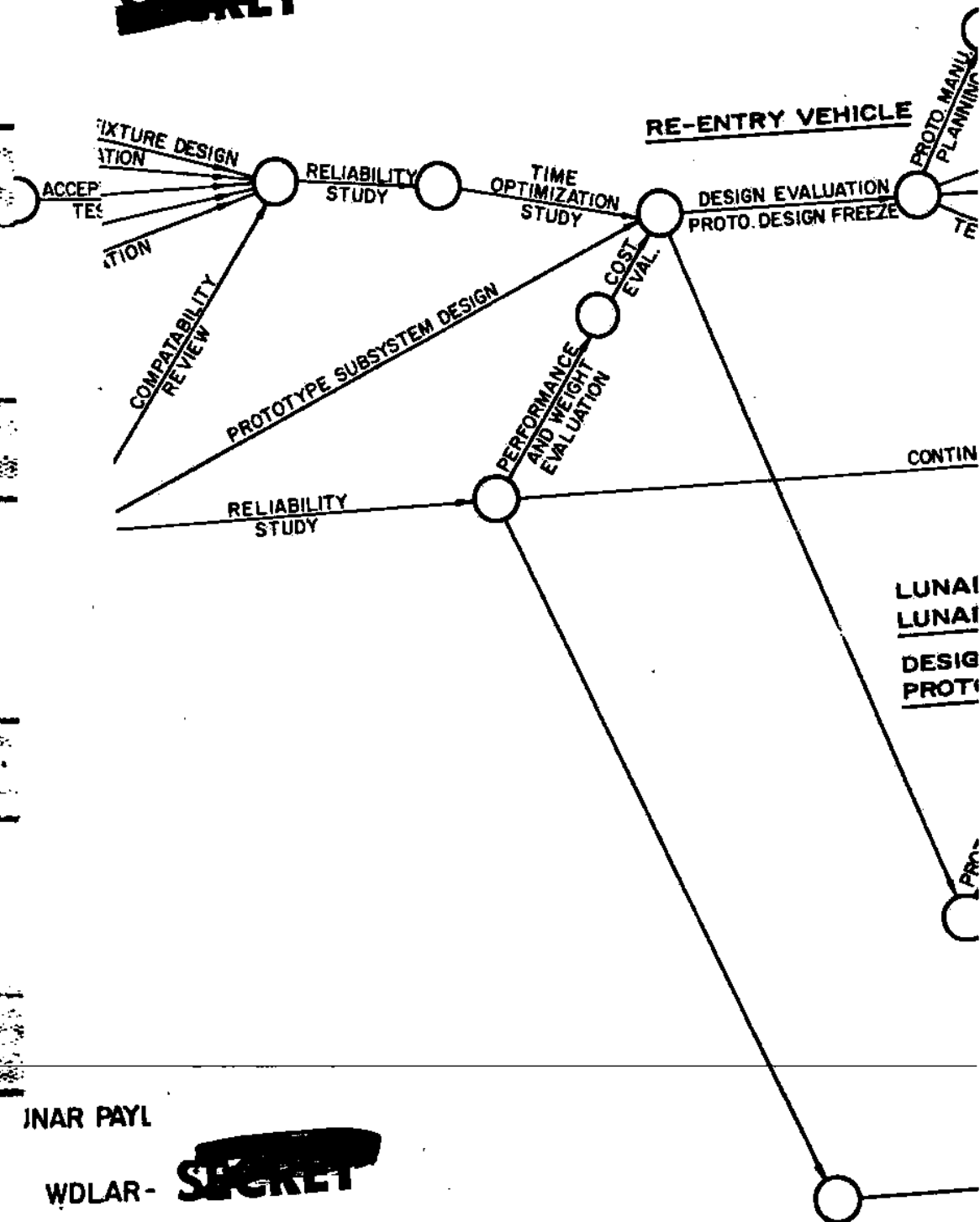
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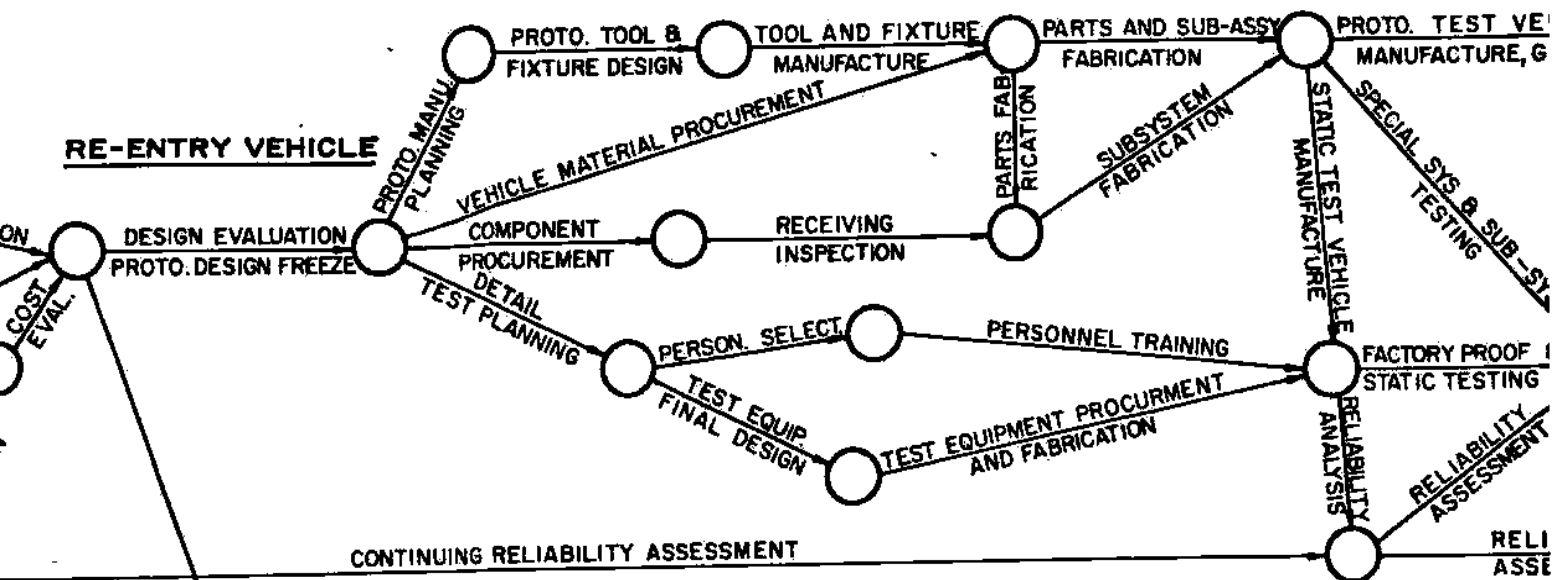


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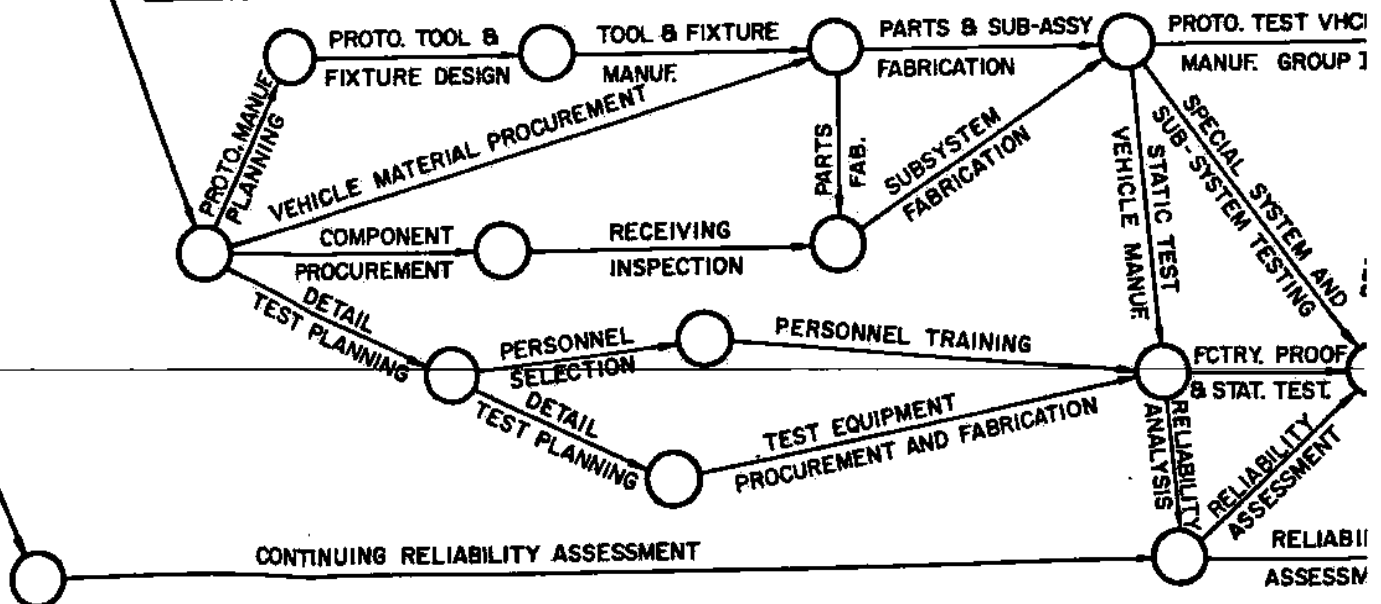
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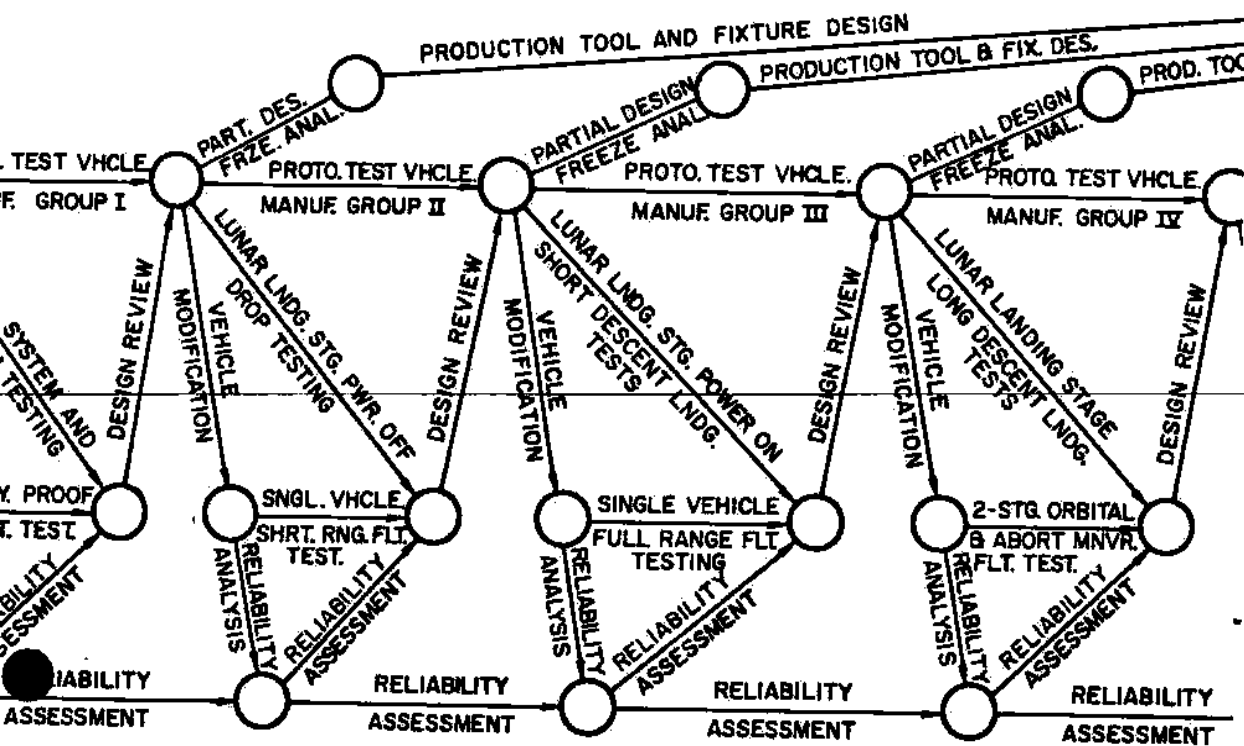
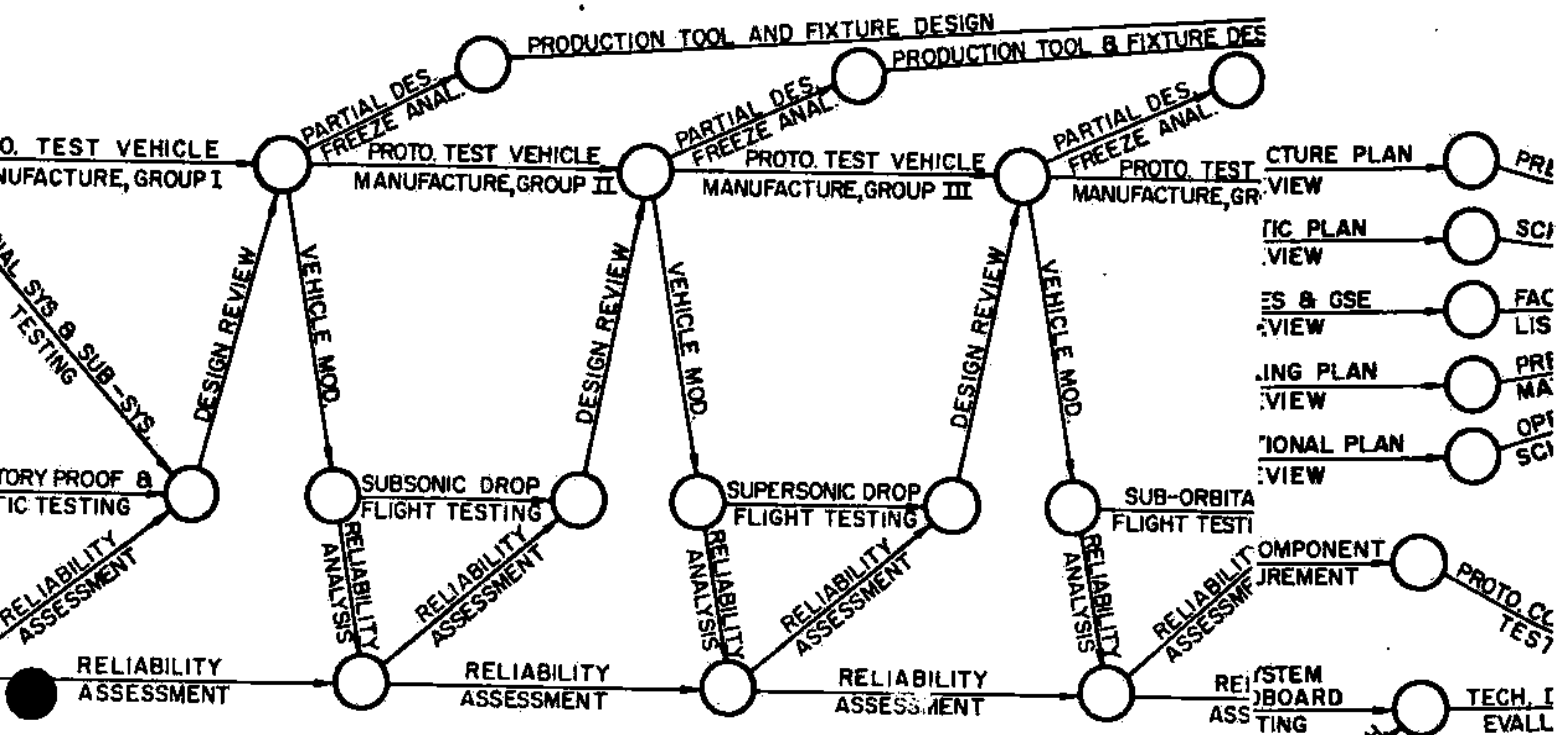




**LUNAR LAUNCH STAGE  
LUNAR LANDING STAGE**

**DESIGN EVALUATION,  
PROTOTYPE DESIGN FREEZE**





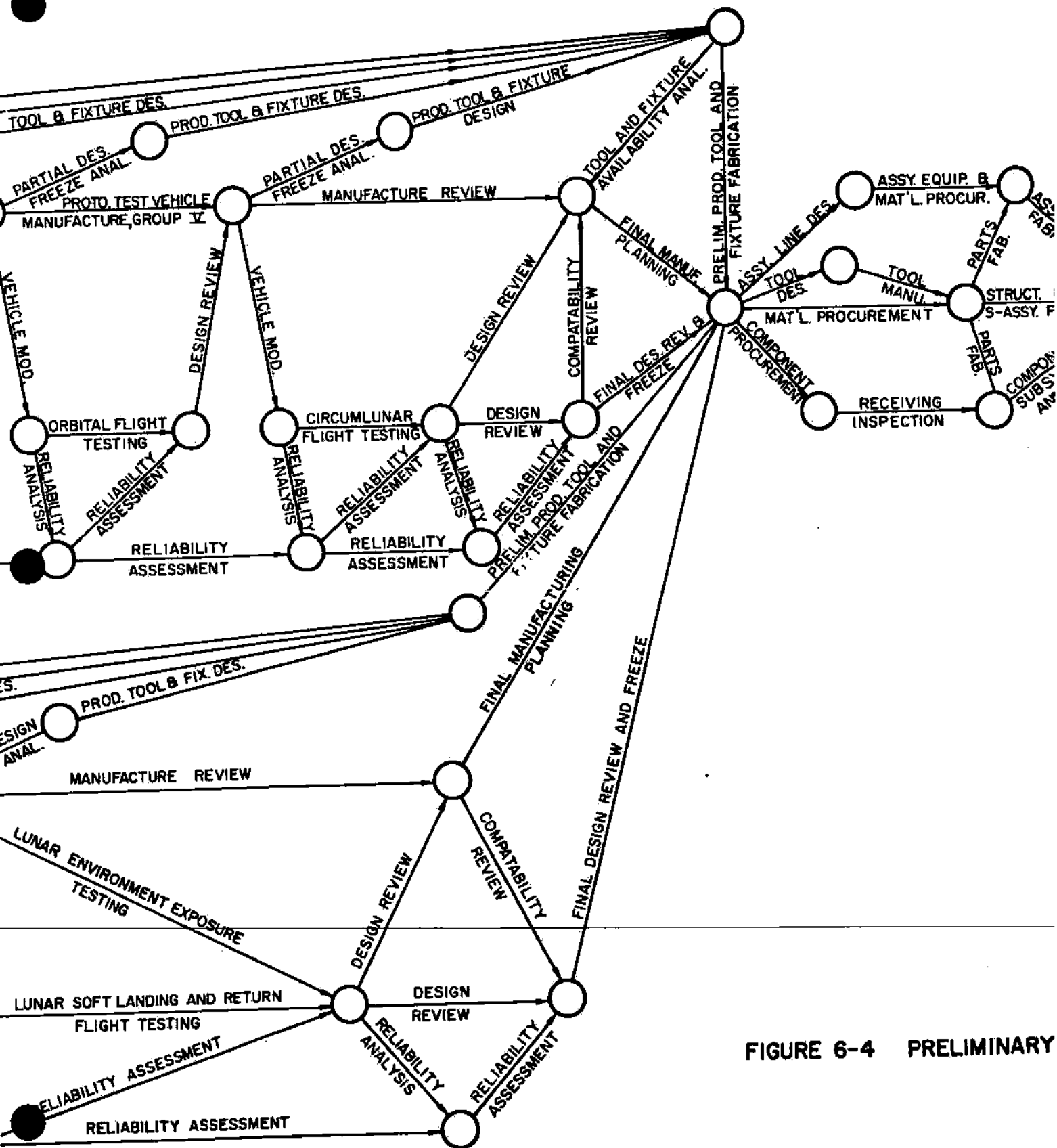
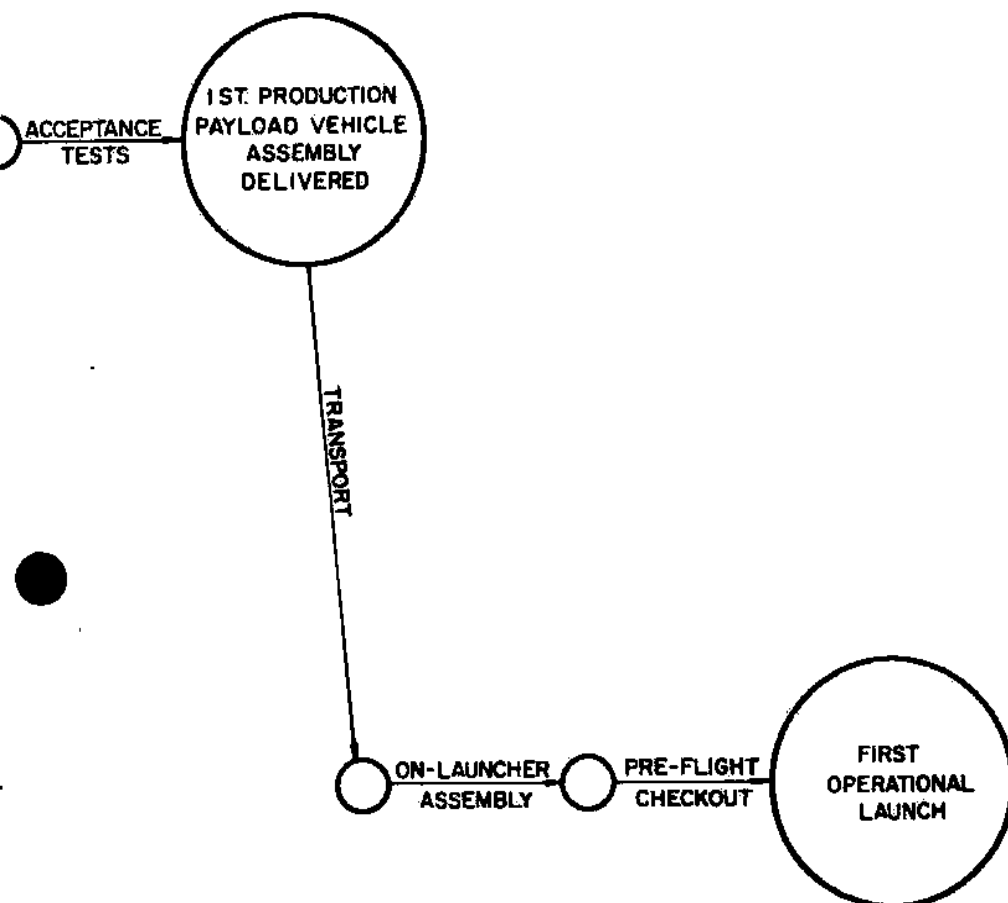


FIGURE 6-4 PRELIMINARY



NAR PAYLOAD

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SMB