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OFFICE OF SPECIAL PROJECTS (OSAF)
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LOS ANGELES, CALIFORNIA 90009

23 January 1979

MEMORANDUM FOR DR. MARK

SUBJECT: SAFSP Manned Space Optimization Program

During my trip to Washington last week I discussed our approach for providing Air Force crew members (payload specialists) on SAFSP Shuttle flights with Generals Allen, Davis and Anderson. General Allen liked the approach and expressed support to Gen Davis of our requirement for a Shuttle astronaut. Bennie Davis agreed with the way we propose to handle the personnel aspects and is now personally helping us recruit an experienced Air Force astronaut to head the group. Also, Andy Anderson has recognized the impact of our early manned activities in the Space Organization Study.

I believe you and I have laid the groundwork for us to move forward. Enclosed is our plan for implementation of this program. With your approval we will be in a position to move out on an expedited basis. Although we have both discussed the plan with General Allen and he has indicated support, you may want to touch base with him again before you give your formal approval.

The realization that we are moving forward in the near term to use man-in-space operations has been well received and enthusiastically supported. I believe we now have momentum going in the Air Force. If we can keep our manned spaceflight program from getting bogged down, then momentum should continue and hopefully spread.

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JOHN E. KULPA, JR.
Major General, USAF
Director

SAFSP MANNED SPACEFLIGHT

OPTIMIZATION PROGRAM

23 JANUARY 1979

Approved by

JOHN E. KULPA, JR.
Major General, USAF
Director

HANS MARK
Under Secretary of the Air Force

SAFSP MANNED SPACEFLIGHT OPTIMIZATION PROGRAM

Approved for Release: 2017/02/27 C05094704

I. INTRODUCTION

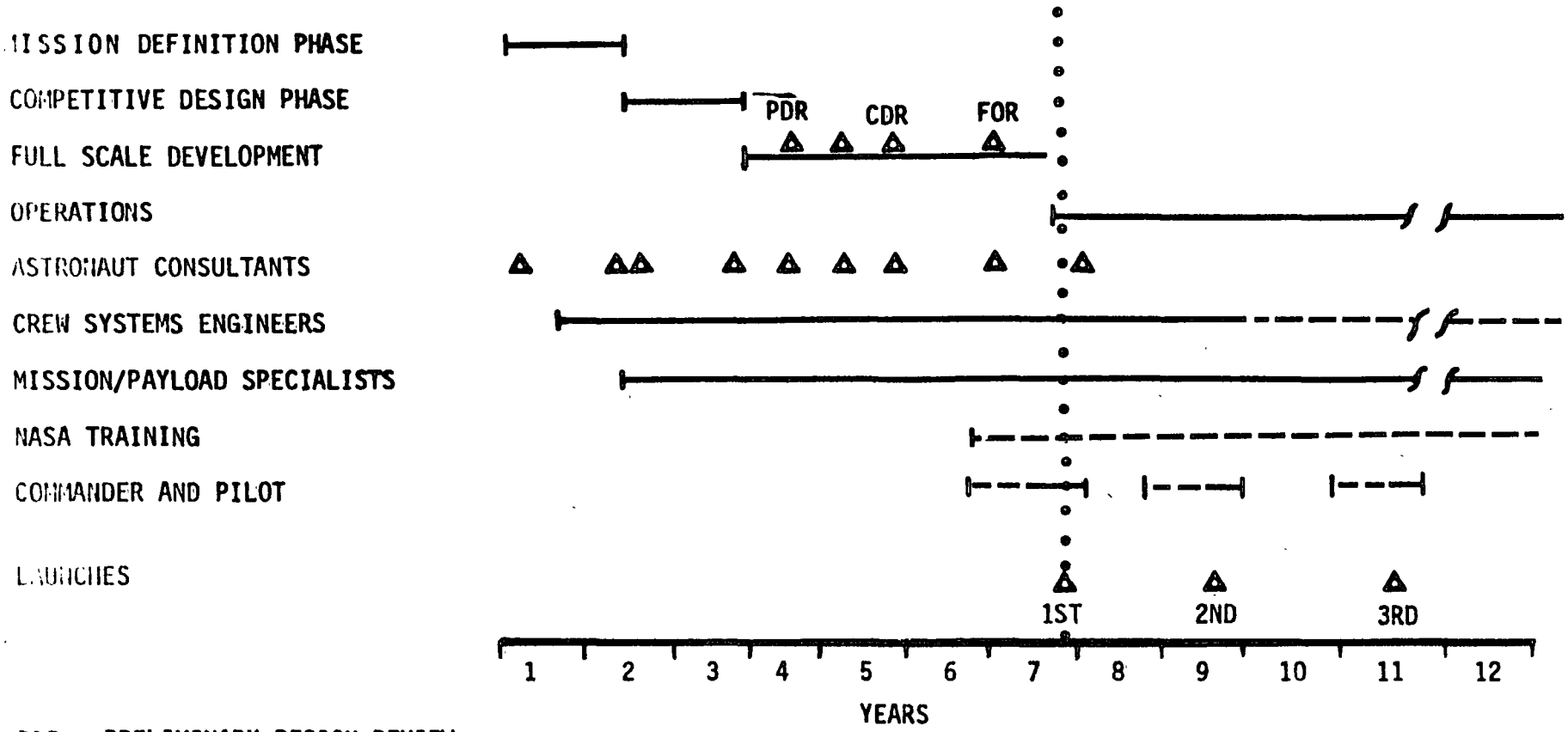
This plan presents a systematic approach for the utilization of man on board the Space Shuttle in support of SAFSP programs. The approach contains five elements enhancing SAFSP missions through exploitation of inherent Space Shuttle capabilities. The first element is the basic Shuttle crewmembers - the Shuttle Commander, the Pilot, and Mission Specialist. Second, is the non-crewmember Payload Specialist who, as a member of SAFSP, will provide the detailed onboard payload knowledge. Third, is an Astronaut Deputy for Manned Operations. The intent is to select a current or former Air Force Astronaut in the grade of 0-5 or 0-6 to head the program. Fourth, is the acquisition of NASA civil servant engineers experienced in manned spaceflight hardware development. Crew Systems Engineers will provide the day-to-day transfer of NASA manned spaceflight technology to SAFSP. Fifth, is a consultant group of active and former astronauts who will participate in concept reviews, design reviews, and other major program milestones.

These five elements will bring to bear the full spectrum of manned spaceflight knowledge and insights necessary to enable a complete examination of the utility of man's involvement in SAFSP missions during the Space Shuttle era. Figure 1 illustrates how the elements of the program will be employed through a typical space program life cycle.

II. OBJECTIVES

The objective of the SAFSP Manned Spaceflight Optimization Program is twofold - to provide a comprehensive, systematic means for determining the optimum level of manned spaceflight in SAFSP programs and to provide a capability to satisfy SAFSP manned spaceflight requirements once they have been identified.

TYPICAL SPACE PROGRAM TIMELINE



PDR - PRELIMINARY DESIGN REVIEW
CDR - CRITICAL DESIGN REVIEW
FOR - FLIGHT OPERATION REVIEW

——— FULL TIME ACTIVITY

- - - - - INTERMITTANT ACTIVITY

Figure 1

III. SCOPE

The scope of the SAFSP Manned Spaceflight Optimization Program:

a. Provides for satisfaction of manned space program needs for SAFSP using the Space Transportation System through the 1980's.

b. The on-orbit functions performed by the Payload Specialist will include those defined by NASA for the Payload Specialist position plus additional duties necessary to the accomplishment of the mission. The additional duties would be among those typically reserved for the NASA Mission Specialist.

c. The program shall contain all the elements necessary to enable a complete examination of the utility of man on board the Space Shuttle in support of SAFSP missions.

IV. SHUTTLE CREWMEMBERS

A. The Shuttle Crew will consist of the Commander, Pilot, Mission Specialist, and Payload Specialist. The Commander, Pilot, and Mission Specialist will be NASA astronauts. The NASA astronauts to fly on Shuttle flights which carry SAFSP supported programs will be selected from among the military astronauts detailed to NASA. Primary and backup NASA crewmembers will be identified for each flight and trained in payload operations to the degree required by each program. Both a Mission Specialist and a Payload Specialist may not be required on all flights. Typically, a Payload Specialist will provide the detailed payload operations expertise, and the Mission Specialist will provide the Shuttle-to-payload Support Systems expertise.

The Payload Specialist will be a member of the payload program office. He will have a technical background, and his line duties will regularly involve him with the spacecraft hardware, preferably in system and component level testing. He will fly on the Shuttle and perform on-orbit duties as required by the spacecraft program director. He will be responsive to the Program Director prior to launch, to the DOD Mission Director during orbital operations, and to the Shuttle Commander during launch and recovery operations. He will be responsible to the Program Director during all phases of program development, flight preparation, and flight operations.

B. Tasks/Responsibilities - The tasks and responsibilities are broken down sequentially into three timeframes: prior to launch cycle, launch cycle, and during flight.

1. Prior to Launch Cycle

   a. NASA Astronauts (Commander, Pilot, and Mission Specialist) responsibilities prior to the launch cycle include: payload specific training, crew activities planning and procedures review, participation in the NASA Flight Operations Review, and program advisory functions. The advisory functions are covered in Section V.

   b. Typical Payload Specialist tasks and responsibilities prior to the launch cycle include:

      (1) participation in the payload system level tests
      (2) participation in data discrepancy resolution
      (3) conducting integrated payload flight tests
      (4) participation in the development, evaluation, and review of all payload related operational procedures
      (5) interfacing with the JSC Flight Activities Officer and JSC Payload Officer for planning

(6) participation as a member of the payload safety review panel

(7) participation in the payload specific training provided to the Shuttle Commander, Pilot, and, if applicable, Mission Specialist

(8) Flight Independent Training, including basic, advanced, and recurring training as required

(9) Flight Specific Training, including payload task, phase, and integrated training

2. Launch Cycle - The following outlines the general area of responsibilities and level of involvement for each crewmember during the launch cycle, when the Payload and Shuttle are integrated at the launch pad.

	P/S	M/S	PLT	CDR
Payload (P/L) Systems Tests	F	P	-	K
Orbiter P/L Support Systems Tests	P	F	-	K
Interface Verification	F	F	-	K
Simulated Flight	F	F	F	F
Payload Arm/Propellant Load	F	P	K	K
Health/Status Checks	F	F	K	P

F - Fully Proficient

P - Proficient

K - Knowledgeable

3. In Flight - The following outlines the general payload responsibilities of all crewmembers from launch to recovery. The specific tasks associated with each area will be dictated by the specific payload design.

	P/S	M/S	PLT	CDR
Ascent - Health/Status	F	F	K	P
Orbiter/Payload Interface Ver.	F	F	-	K
Ground Support/Payload Interface Verification	F	F	-	K
Activation	F	P	-	K
Orbital Operations				
Attitude Maneuvers/Tracking	K	K	F	F
Support Systems Management	P	F	K	K
Deployment/RMS Operations	F*	F	-	F
EVA	F*	F	F	K
Operations	F	P	K	K
Malfunction Analysis**	F	P	-	K
Health/Status Monitoring	F	F	K	P
Power Down/Secure	F	F	-	K
Recovery - Health/Status	F	F	K	P

C. Training Programs

1. Payload Specific - As a member of the payload program office, the Payload Specialist will participate in the payload system level testing. He must also participate in the development and evaluation of integrated STS/payload operational procedures. His payload knowledge and operating skills will be developed through his continuing involvement in these activities.

Payload-specific training, conducted at a payload facility, will be required for the Mission Specialists, Commander, and Pilot. The Payload Specialist will participate in the design and conduct of this training. The Commander and Pilot courses will be comparatively short. The Mission Specialist training will be longer and include participation in some system level testing and simulations.

*NASA recommends no P/S involvement in EVA. If EVA is required, extra training may be required.

**Includes fault isolation, repair, work-around procedures, etc.

2. Flight Independent - This is a generic training, provided by NASA, to give the Payload Specialist the skills and knowledge to safely serve as a crewmember in the STS. The initial training will take several weeks. Recurring training will be required, but its duration and content will vary according to individual mission requirements.

3. Flight Dependent - This training activity normally will start several months prior to launch and is designed to train the crewmembers through integrated rehearsals of the full mission. The rehearsals will involve all crewmembers, ground support teams, and support facilities. The actual payload or a simulation will be included in the flight dependent training as necessary to ensure crew proficiency.

Figure 2 illustrates a possible sequence of events in the five months prior to launch. The Mission Specialist may become involved at this time to support integrated tests and simulations conducted at the payload facility.

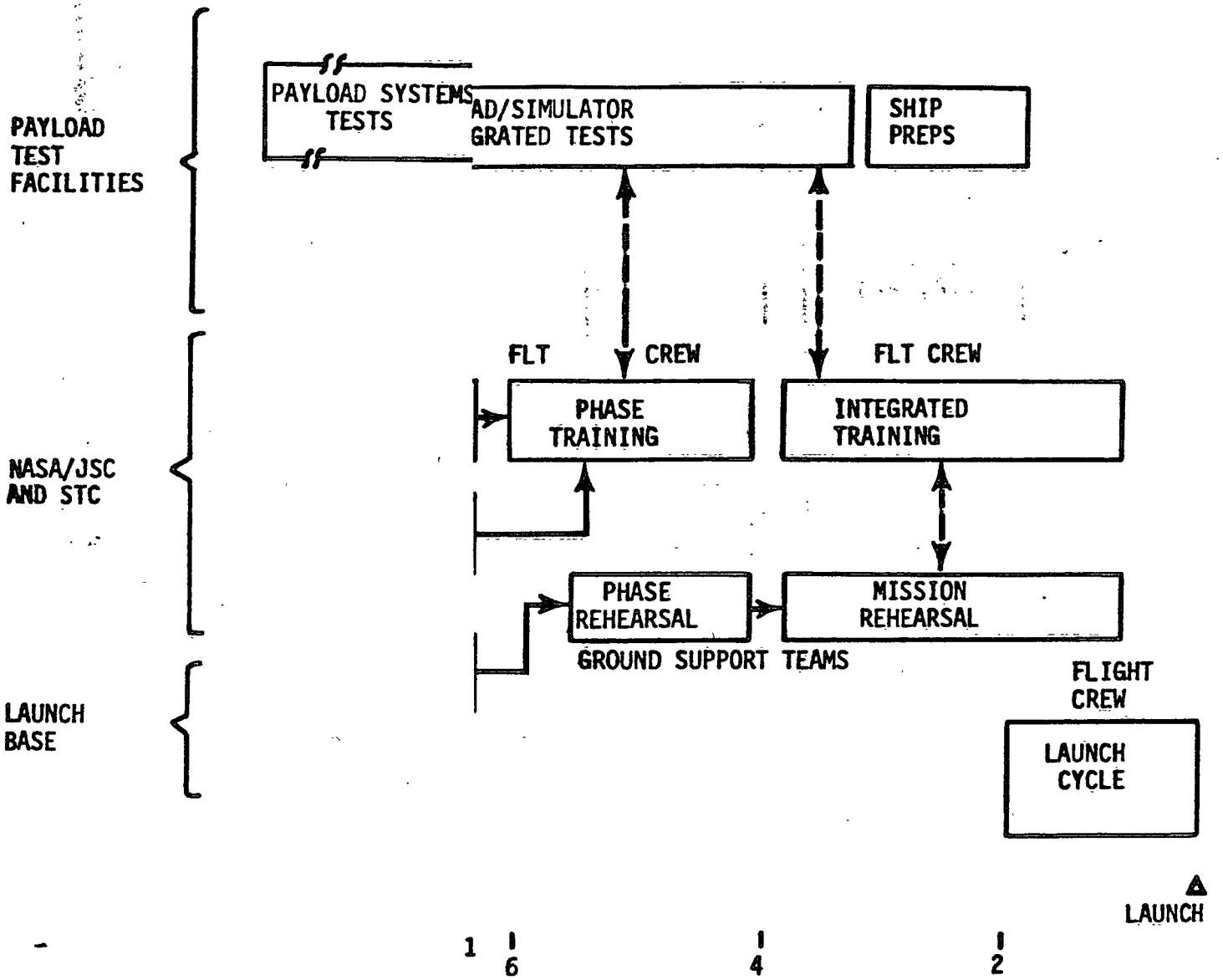
The Payload Specialist will begin flight dependent activity more than a year prior to launch. He will be involved in preparation of the Flight Requirements Document and the preliminary Crew Activities Plan which are submitted to NASA one year prior to launch. The participation in the development and review of plans and procedures will be a continuing responsibility of the Payload Specialist.

V. DIRECTORATE FOR MANNED OPERATIONS

A. The members of the Directorate for Manned Operations will participate in all programs for which SAFSP has launch integration responsibility with the STS. Personnel may be assigned to a specific program full time or participate on an as-required basis. It is expected that directorate members will participate in the following activities:

FIGURE 2

SCHEDULE



:CDR= SHUTTLE COMMAN
PLT= SHUTTLE PILOT HT. TRAINING
DUCED, DEPENDING ON FLIGHT CREW EXPERIENCE/CURRENCY

1. Mission concept formulation and reviews
2. Payload specialist selection
3. Design proposal evaluations and reviews
4. Payload operating procedures development and evaluation
5. Crew training program development
6. Crew activity planning
7. Task, phase, and full mission rehearsals
8. Monitoring of payload related crew activities during orbital operations

B. The directorate will be composed of individuals with experience in manned orbital operations, extra-vehicular activity (EVA), and crew systems engineering. Some of these people will be employed full time, while others may be brought in from NASA or private firms on a consultant basis.

1. Deputy for Manned Operations - This individual will be an active duty military astronaut, responsible for monitoring the activities of each program and ensuring that the appropriate support is provided to each program. The Deputy for Manned Operations must also maintain an active liaison with NASA to ensure that the development of manned payload activity, procedures, and training are in agreement with current NASA requirements and operating philosophies.

It is desirable that this position be filled by a military astronaut on active duty, with relatively recent NASA operations experience. The Deputy for Manned Operations will establish the final structure of the directorate and should be assigned by mid-1979.

2. Crew Systems Engineers - Personnel in these positions should have experience in disciplines associated with manned spaceflight.

The majority of qualified personnel are currently employed by NASA at JSC. They could transfer to SAFSP as a civil service transfer or could be assigned under an Air Force/NASA detailee agreement.

The following is a list of the areas of expertise required. At least one specialist will be selected for each discipline listed.

a. Payload Deployment and Retrieval Systems

b. Crew Training and Procedures

c. Manned Payload Support/Control Systems

d. Extravehicular Activity

Involvement in a developing payload program will vary according to the phase of the program. For example, the Crew Training and Procedures specialist would have a low level of involvement during concept formulation but would become very actively involved in the months prior to launch, when the payload procedures are being developed, validated, and rehearsed in simulators.

3. Consultants - Consultants will be required periodically to assist in specific areas requiring unique experience or skill:

a. There are approximately 15 former astronauts with EVA experience in the Apollo and Skylab programs, who might be available and are well suited for a consultant role. Two or three former astronauts would probably be able to provide sufficient initial support and still offer a wide range of experience. Astronaut support for each payload program would be arranged, if necessary on an as-needed basis.

b. Active astronaut consultants will provide similar services as the previous group as part of their normal duties. There are approximately 62 people in this category, including the 35 newly selected astronauts. While all of these individuals have not flown or performed EVA, they are

a good source of current NASA operational concepts and space state of the art utilized by the STS. Services can be arranged by an agreement with NASA management who have expressed full cooperation in this area.

c. Specialist consultants can be drawn from the NASA organization using an agreement similar to that concerning the active astronauts. These individuals have specialized expertise and will be called in to assist the Crew Systems Engineers in working particular problems.

4. Payload Specialists - The payload specialists are the backbone of this program. They will view the interface between the payload program and the shuttle program from the payload side as opposed to the mission specialist who looks at this same interface from the shuttle side.

VI. SAFSP PAYLOAD SPECIALIST SELECTION

The SAFSP Payload Specialist selection system provides a methodology for selecting Air Force officers who will perform payload specific duties on Space Shuttle flights. The system is modeled after those used by the Air Force and NASA to select astronauts. Due to the large administrative burden foreseen for an Air Force wide selection process, eligibility will be restricted.

A. Formal Qualifications

1. Education - Applicants must possess a Bachelors Degree with a scientific or engineering major from an accredited collecte, university, or one of the service academies. Masters degrees and/or doctoral degrees are desirable.

2. Seniority - Applicants must have at least five years commissioned service.

3. Experience - Applicants must have attained a fully qualified status in an engineering, scientific, or computer related AFSC.

4. Physical Requirements -Applicants must be in good health and pass an Air Force Class II Flight Physical.

a. Vision - Distant visual acuity must be correctable to 20/20 or better in each eye. Uncorrected vision must be no weaker than 20/200 in each eye.

b. Hearing loss not to exceed:

Frequency (Hz)	500	1000	2000
Loss (db			
Better ear	30	25	25
Worse ear	35	30	30

per ISO, 1964 standard.

c. Blood Pressure - Preponderant Systolic not to exceed 140, nor diastolic to exceed 90 mm Hg measured in sitting position.

d. Maximum height is 76 inches.

5. Duty Status - Applicants must be a regular or reserve officer on extended active duty.

6. Availability - Applicants for the initial cadre of Payload Specialists must be available for reassignment to SAFSP not later than 1 October 1979.

7. Extended Active Duty Commitment - Applicants must be willing to accept a five year extended active duty commitment effective upon assignment to SAFSP or upon selection to the Payload Specialist program, whichever is later.

8. Expanded Background Investigation - Applicants must possess a current Expanded Background Investigation (EBI).

B. Selection Criteria

1. Interview - The interview before the selection board will weigh heavily in the final selection process.

2. Experience - Major consideration will be given to the job experience of the applicant. It can be expected that working experience in military satellite programs, both in development and operations, will be viewed favorably.

3. Health - Consideration will be given to the applicants' state of health, as indicated by their medical history.

4. Physical Condition - Consideration will be given to physical condition, measured in terms of ongoing exercise programs, sports activities, and history of athletic participation.

5. Recommendations - Written recommendations from current or former supervisors will be considered.

6. Postgraduate Education - Consideration will be given to post-graduate level education, degrees awarded, and schools attended.

7. Grade Point Averages - Consideration will be given to the grade point attained from university level education.

8. Officer Effectiveness Reports - Major consideration will be given to Officer Effectiveness Reports.

9. Other Considerations - In addition to the selection criteria specifically identified above, consideration will also be given to any other factors which the selection board believes will better qualify an individual for the position.

C. Payload Specialist Selection Board

The Director of SAFSP will establish a Payload Specialist Selection Board whose responsibility will be to evaluate Payload Specialist candidates and recommend selectees to the Director who will make the final selections. The Payload Specialist Selection Board will consist of a Selection Advisory Panel and a Preliminary Screening Panel.

1. Chairmanship - The Vice Director of SAFSP will chair the Selection Board.

2. The Selection Advisory Panel (SAP) will evaluate the best qualified candidates based upon inputs from the PSP and interviews and recommend to the Director of SAFSP a list of selectees and alternates. The SAP shall consist of five members. Those are the Vice Director of SAFSP (Chairman), a NASA representative, an AFFTC representative, a payload program office representative, and the Deputy for Manned Operations.

3. The Preliminary Screening Panel (PSP) will evaluate all applicants and identify a limited number of best qualified applicants to the Selection Advisory Panel for further consideration. The Preliminary Screening Panel will consist of at least five individuals and will be chaired by the Deputy for Manned Operations. The other members include one representative from each program for which a Payload Specialist will be selected, a representative from the Air Force Flight Test Center (AFFTC), and a member-recorder.

4. Establish Authority - The Director of SAFSP will appoint the members of the Payload Specialist Selection Board.

D. Payload Specialist Screening and Selection Timeline

The Payload Specialist screening and selection timeline is as follows:

Milestone	Date
Notify eligible candidates of Payload Specialist openings and request an expression of interest	26 Jan 79
Distribution of applications to interested eligible candidates	23 Feb 79
Collection and administrative review of applications (medical exams may be pending)	30 Mar 79
Notification to resubmit of required applications where required	6 Apr 79
Deadline for resubmitted applications	27 Apr 79
Convene Preliminary Screening Board - Screen for qualifications - Screen against criteria	30 Apr 79
Invite finalists for interviews	7 May 79
Convene Payload Specialist Selection Board - Conduct interviews - Select Payload Specialists	21 May 79

E. Selection System Process Approval

Prior to implementation of the Payload Specialist selection process, coordination will be effected with the Air Force Military Personnel Center (AFMPC), and approval will be obtained from the Under Secretary of the Air Force. In addition, SAFSP will obtain concurrence from the AFMPC to retain officer personnel for extended frozen tours of up to eight years in the Payload Specialist position.

VII. SCHEDULE

The schedule is divided into two parts. The first part is the schedule for establishment of the SAFSP manned spaceflight optimization program. The second part is the implementation schedule for the specific SAFSP space programs.

Program Schedule

The program milestones for establishment of the SAFSP Manned Spaceflight Optimization Program follow:

Milestone	Date
Coordinate with AFMPC on Payload Specialist Selection System	Complete
Preliminary Launch System Integration Plan	Complete
Preliminary SAFSP Manned Spaceflight Optimization Program Definition	Complete
Initiate Astronaut Consultations	Complete
Initial discussions with NASA on transfer of NASA Crew Systems Engineers	Jan 79
Submit Manpower Package	Feb 79
Release of Launch System Integration Plan	Jun 79
Astronaut Deputy Director joins SAFSP	Jun 79
Payload Specialists join SAFSP	Summer 79
Crew Systems Engineers join SAFSP	Summer 79
Program fully operational	Sep 79

VIII. DEFINITION OF MANPOWER

The SAFSP Manned Spaceflight Optimization Program will require skills which have not previously been resident in SAFSP. The acquisition of these skills is envisioned over a three year period for the initial cadre with replenishment or augmentation dictated by personnel losses and mission requirements.

An input is being prepared for submission to the Under Secretary of the Air Force on 1 Feb 79 which will identify the skills and the number of people in the initial cadre.

IX. PROGRAM COSTS

Individual programs will determine the degree of manned spaceflight involvement for each program and the costs and benefits to be derived. The SAFSP Manned Spaceflight Optimization Program shall provide the individual programs with the technical expertise, analytical tools, and information channels necessary to comprehensively examine this cost question on a program by program basis. Questions to be examined are the cost effectiveness of manual versus automated structures erection, manual versus automated backup deployment and operations schemes, and on-flight replacement of failed components.