

PRECURSOR SPACE STATION FREEDOM EXPERIMENTS

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ABSTRACT

The NASA Office of Aeronautics and Space Technology uses the In-Space Technology Experiments Program (IN-STEP) as the primary management vehicle to pursue innovative and potentially high payoff space technology experiments. The purpose of this presentation is to provide an overview of the IN-STEP approach in developing precursor Space Station experiments; identify those experiments now in the program; review the key points of the IN-STEP 1992 Announcement of Opportunity; and describe the OAST in-space technology experiments development process.

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Space Station Utilization Conference

Precursor Space Station Experiments

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- OAST In-Space Technology Experiments Program
- Current In-Space Experiments
- OAST 1992 In-STEP Announcement of Opportunity
- OAST In-Space Development Process

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In-Space Technology Experiments Program (In-STEP)

- Evolved from the NASA In-reach and Out-reach Programs
- Small in size and cost
- Proposals solicited as a group by Announcement of Opportunity from NASA, industry, universities
- Proposals solicited in technical areas of highest priority to OAST
- Selection based on rigorous technical and programmatic review (NASA, industry, and universities evaluators)



OAST Space Technology - In-space Experiments

Platforms

- 16 Experiments
- Mid-deck 0-G Dynamics Experiment (MODE) flown on STS-48 Mission (MIT-SERC/LaRC)

Transportation

- 4 Experiments
- Tank Pressure Control Experiment (TPCE) flown on STS-43 Mission (Boeing/LaRC)

Science

- 6 Experiments

Planetary Surface

- 1 Experiment



In-Space Experiments

Platforms

Emulsion Chamber Technology (ECT)
 Middeck Active Control Exp. (MACE)
 Joint Damping
 Middeck 0-G Dynamics Exp. (MODE)
 Middeck 0-G Dynamics Exp. Reflight
 Jitter Suppression
 Heat Pipe Performance (HPP)
 Liquid Motion
 Two-Phase Flow
 Risk Based Fire Safety
 Solar Array Module Plasma Interaction Exp. (SAMPIE)
 Thermal Energy Storage (TES)
 Modal Identification Experiment (MIE)
 Optical Properties Monitor
 Electrolysis
 Sodium Sulfur Battery



Transportation

Tank Pressure Control Exp. (TPCE)
 Tank Pressure Control/Thermal
 Phenomenon (TPCE/TP)
 Vented Tank Resupply
 Acceleration Measurement



Science

Investigation of Spacecraft Glow (GLOW)
 Cryo System Experiment
 Hydrogen Maser Clock
 Environmental Verification Exp. for the
 Explorer Platform (EVEEP)
 LIDAR In-space Technology Exp. (LITE)
 Inflatable Antenna
 Orbital Acceleration Research Exp. (OARE)
 Cryo-heat Pipe

Planetary Surface

Permeable Membrane

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In-STEP 1992 Announcement of Opportunity

- Technology Categories of Interest:

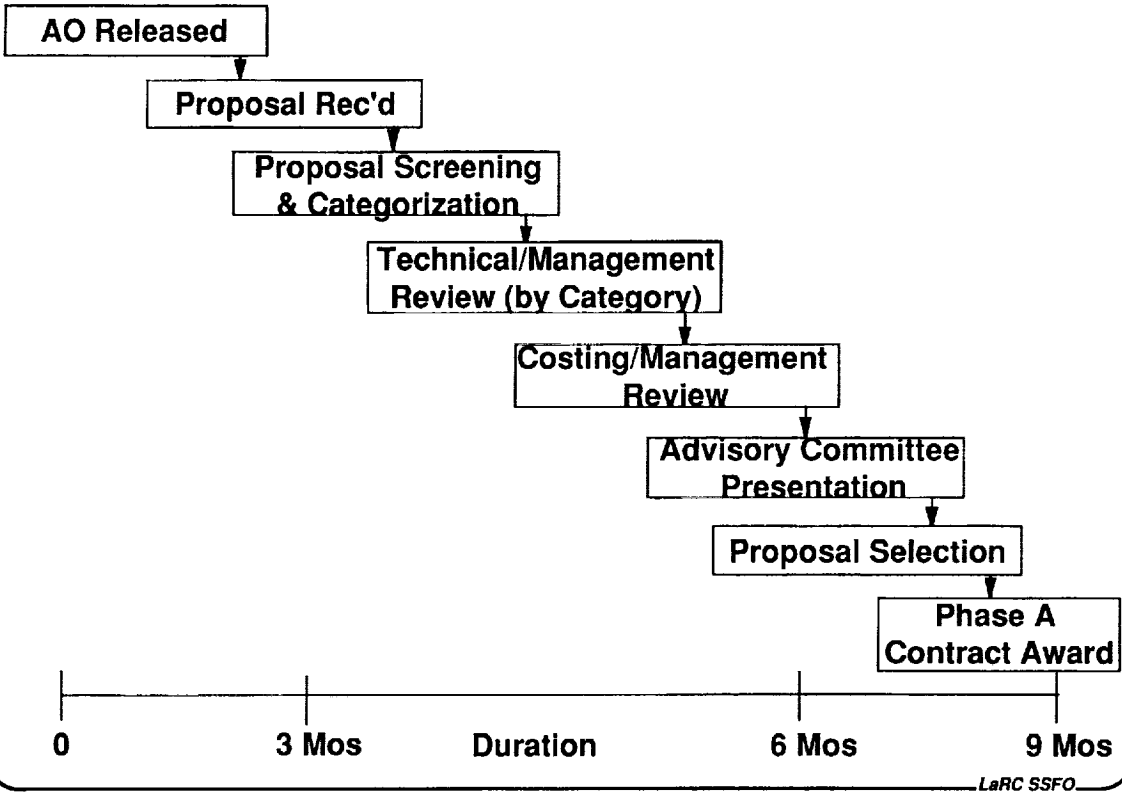
- (1) Space materials, coatings, and environmental effects
- (2) Cryogenic fluid handling
- (3) Human support
- (4) Space power
- (5) In-space construction, repair, and maintenance
- (6) Science sensors and sensor cooling
- (7) Vibration isolation
- (8) Space communications

- Key Points:

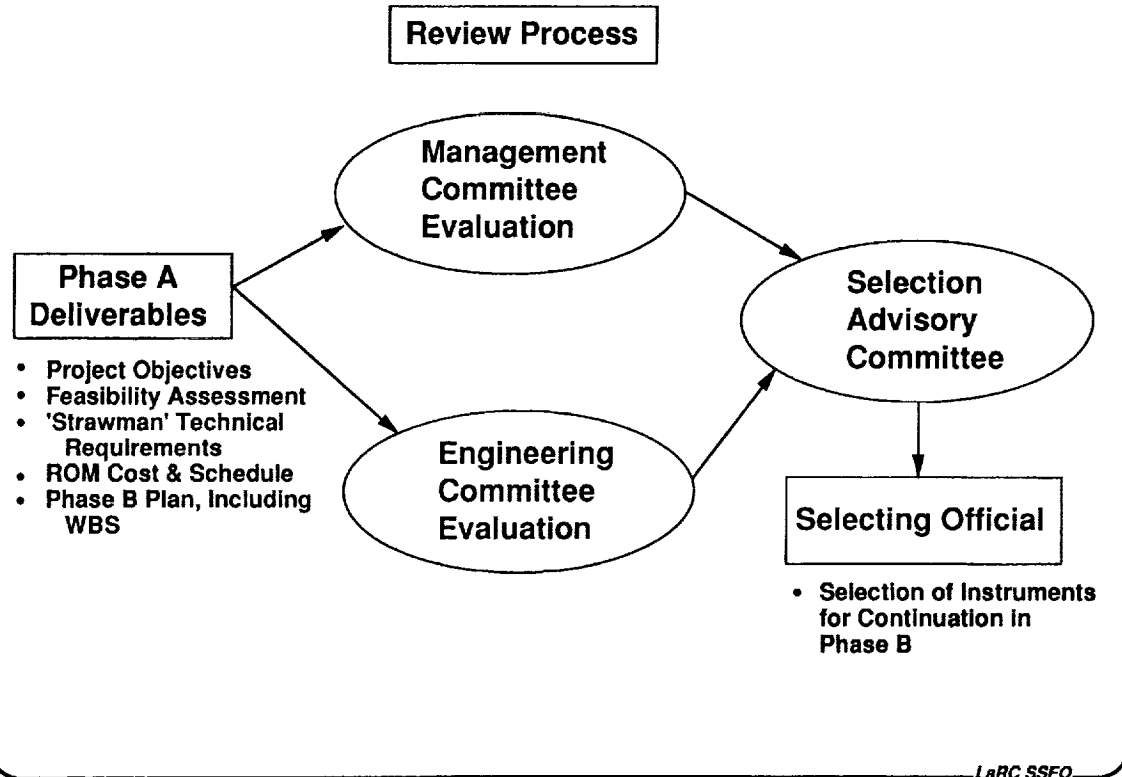
- Approximately fifty Phase A proposals to be selected
- New experiments ready for flight starting 1997
- Use any suitable carrier--including Space Station Freedom

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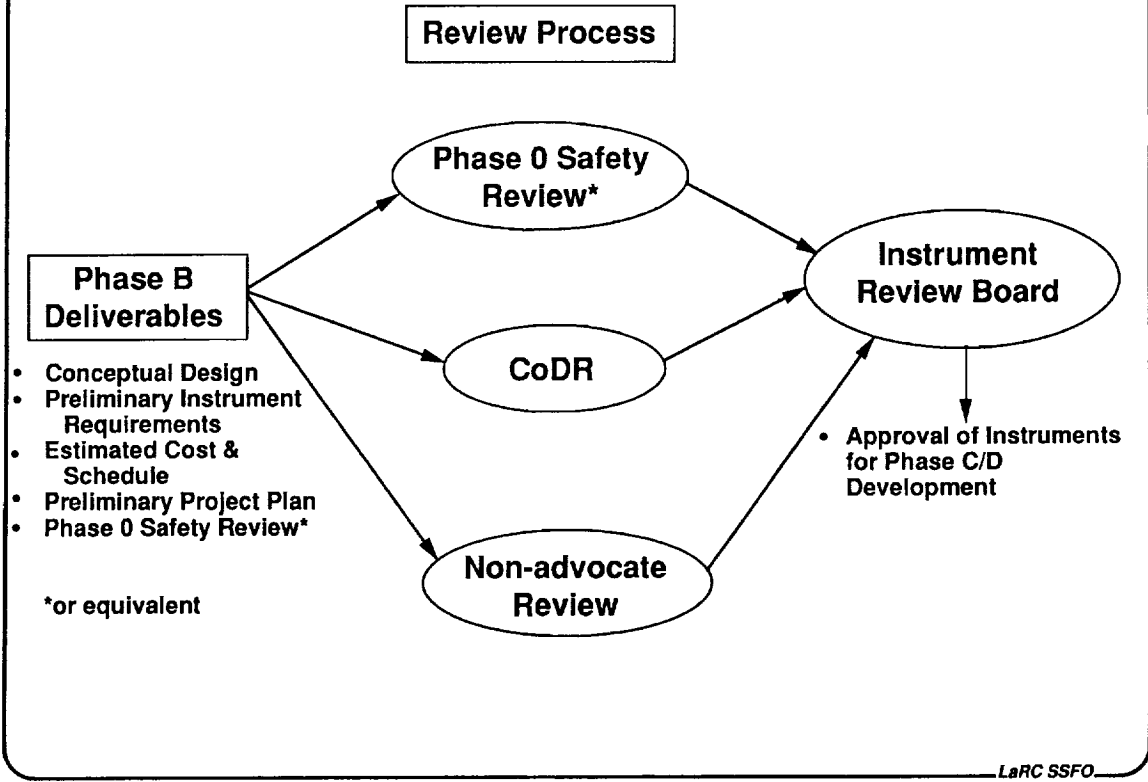
Experiment Selection Process



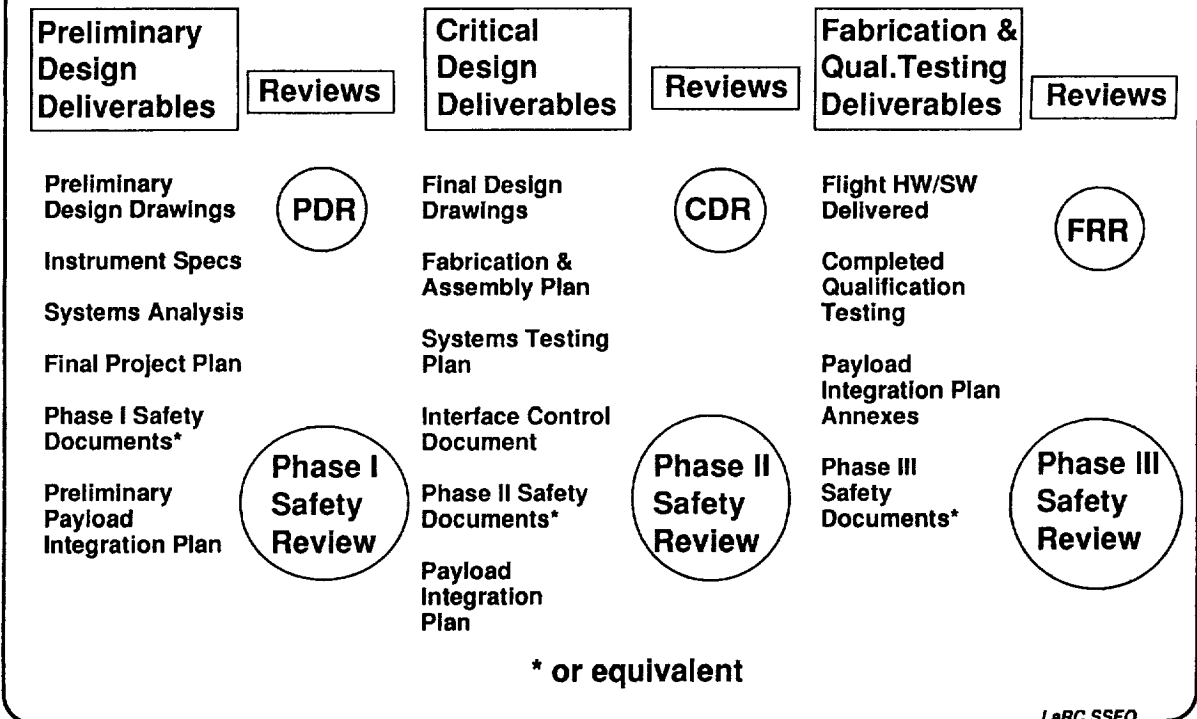
Phase A: Feasibility



Phase B: Project Definition



Phase C/D: Project Implementation





Phase E - Flight Operations and Technology Transfer

- Flight Operations
- Data Reduction/Analysis
- Conference Presentations
- Publications