ADVANCED STUDIES PROGRAM OVERVIEW

SPACE STATION EVOLUTION BEYOND THE BASELINE - 1991

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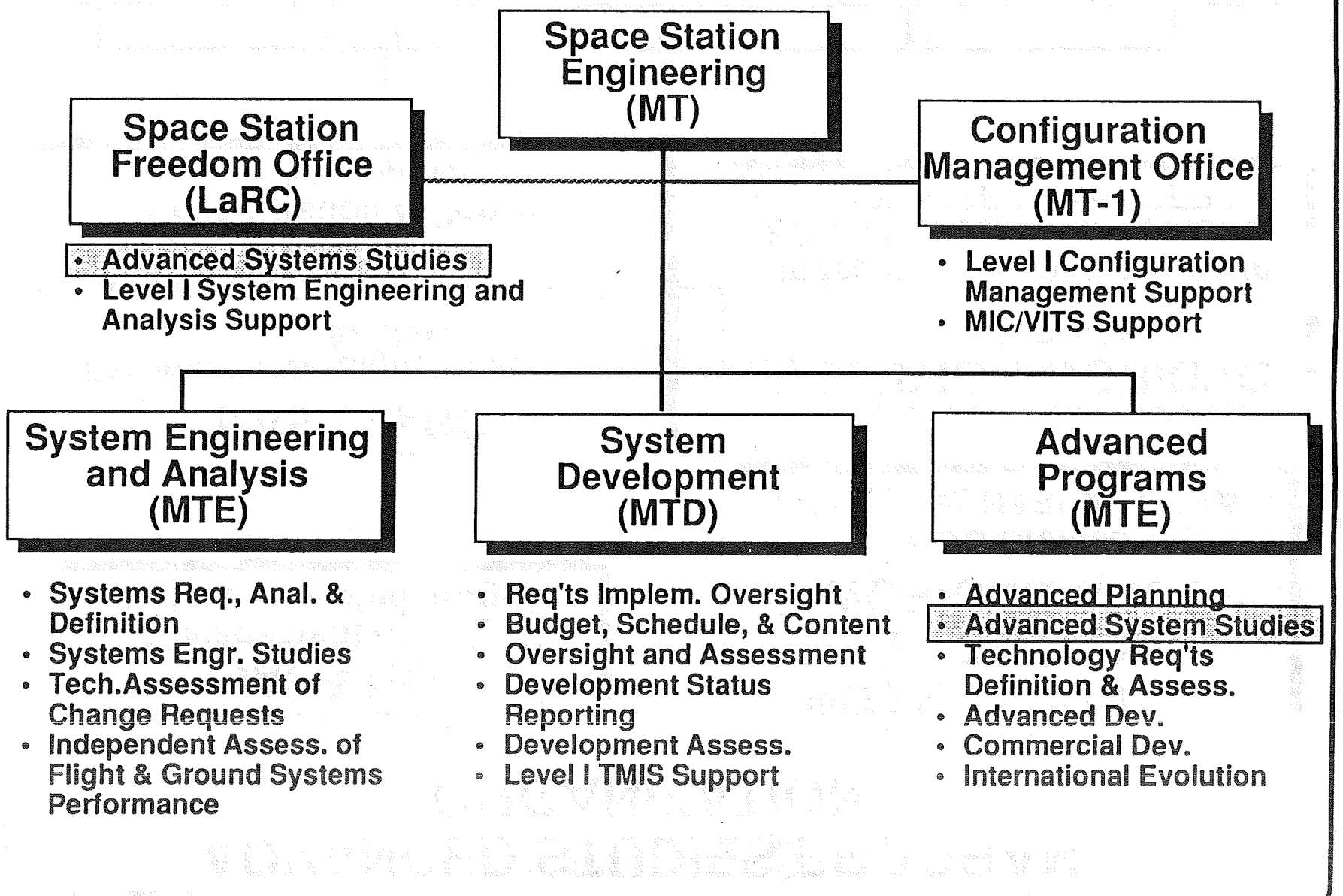
OBJECTIVES

- Develop evolution requirements & feasible evolution paths
- Identify design provisions that enable evolution of baseline systems
- Identify technologies that enable/enhance operations and evolution
- Perform early programmatic planning for development programs beyond the baseline
- Include international partner participation in evolution

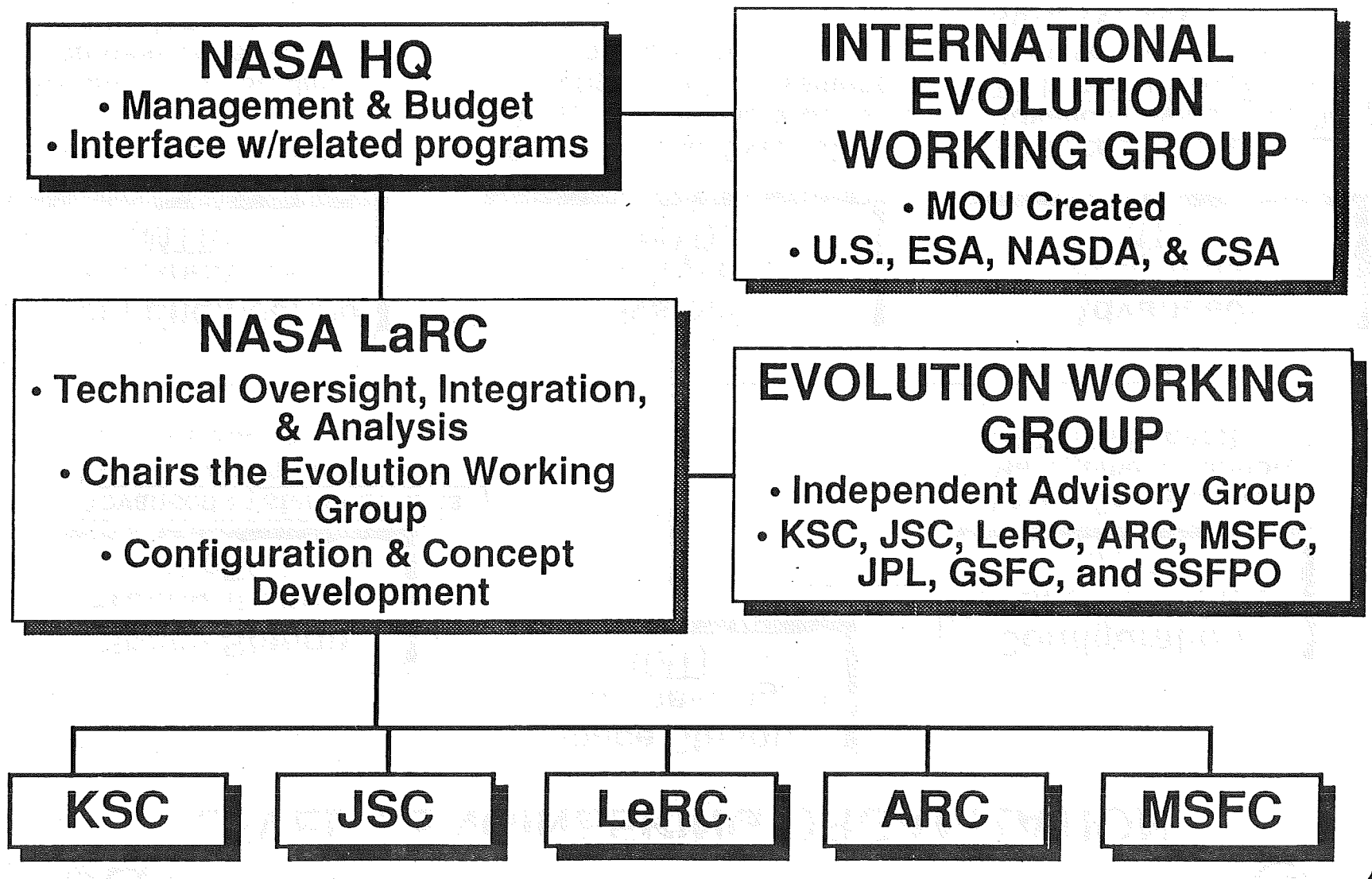
APPROACH

- Evolution responsibility assigned to Level I, Space Station Engineering
- LaRC provides technical oversight and integration
- Evolution Working Group established to provide support from work packages and field centers
- Studies program provides primary interface between SSF and other agency advanced programs such as Space Exploration Initiative
- International Evolution Working Group provides forum for participation by the international partners (MOU agreement)

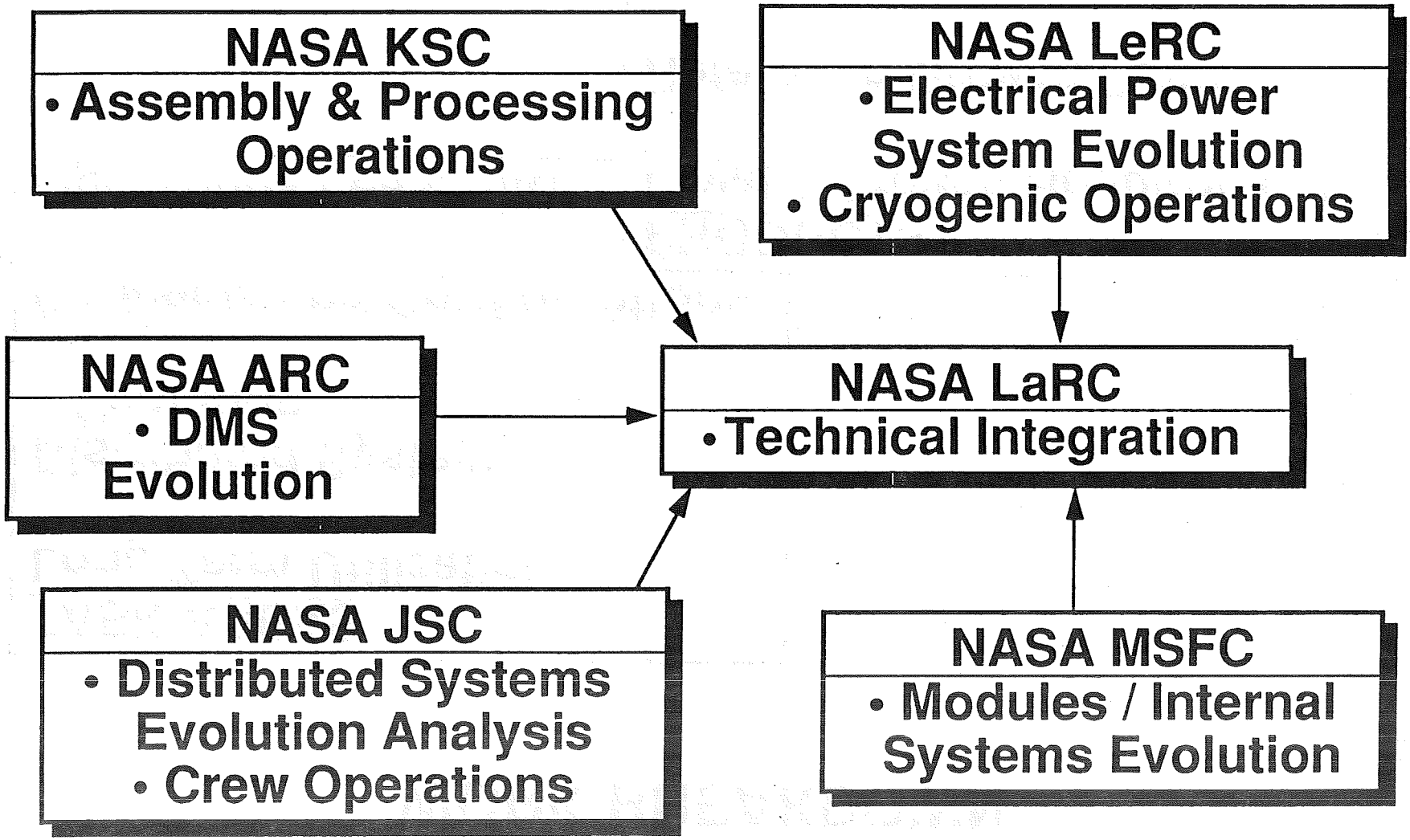
LEVEL 1 ENGINEERING ORGANIZATION



ADVANCED STUDIES PROGRAM ORGANIZATION



NASA CENTER SUPPORT AREAS



WORK BREAKDOWN

TASK AREAS

Long Term Utilization

Distributed Systems Evolution

Concepts and Configurations

Operations Feasibility

PRODUCTS

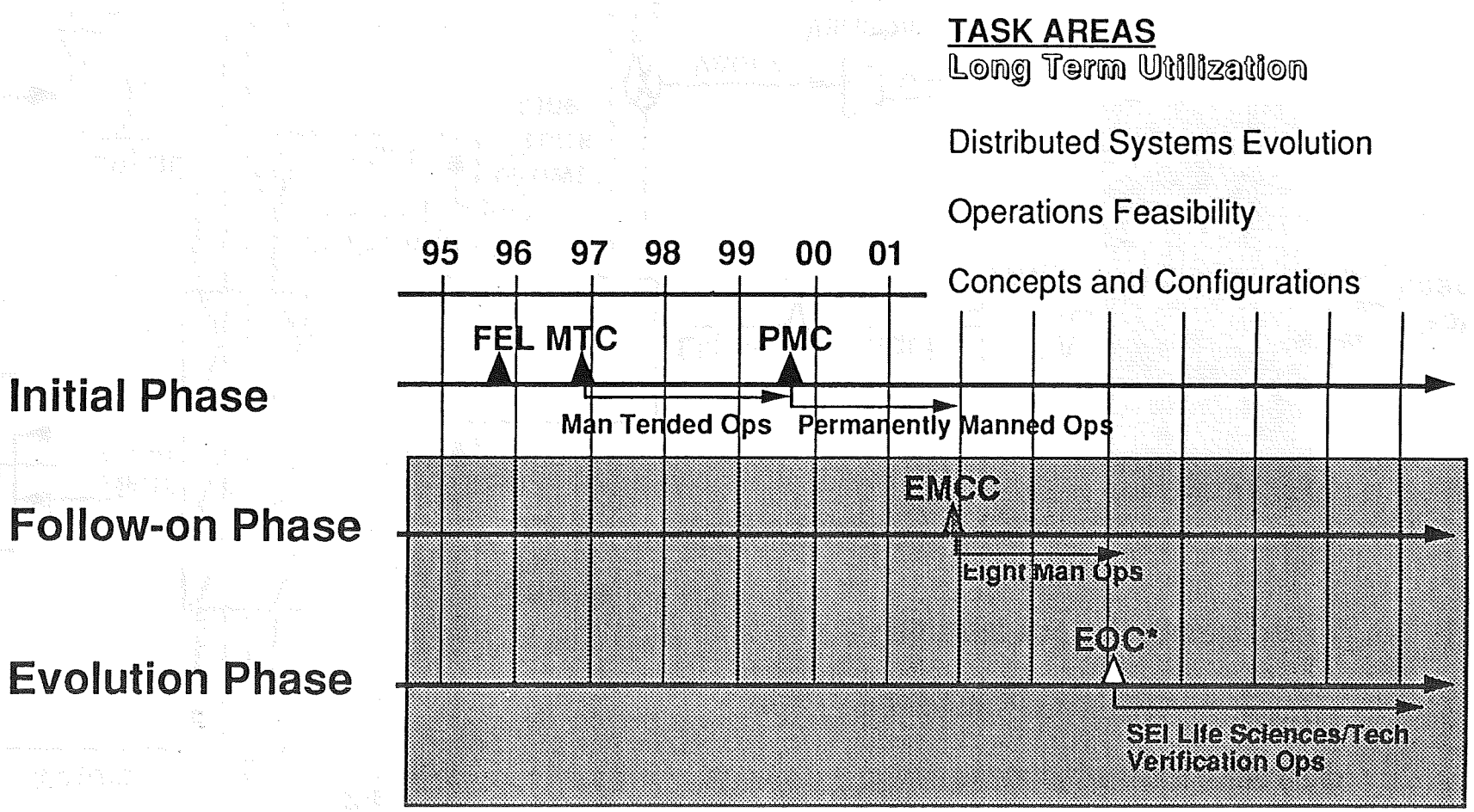
Level 1 Growth Requirements

Reference Growth Paths

Technology Requirements

Early Programmatic Planning

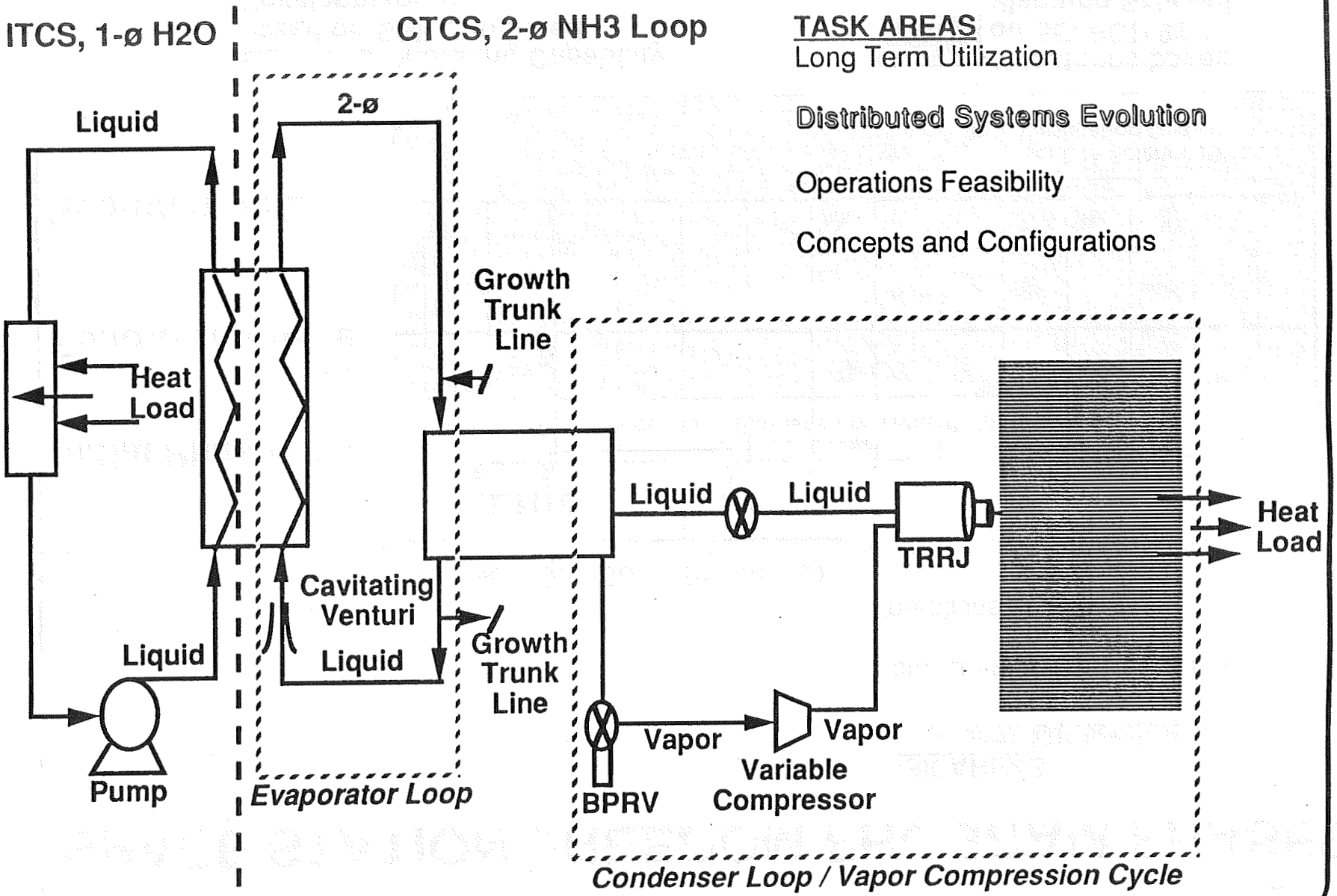
SPACE STATION FREEDOM PROGRAM PHASES



* Enhanced Operating Capability based on SSF Continued Development Plan

Milestones based on SEI POP 91-1 Planning Schedule

DISTRIBUTED SYSTEMS EVOLUTION



TASK AREAS

Long Term Utilization

Distributed Systems Evolution

Operations Feasibility

Concepts and Configurations

SHUTTLE ET MATING ANALOGY TO ON-ORBIT TANK MATING

TASK AREAS

Long Term Utilization

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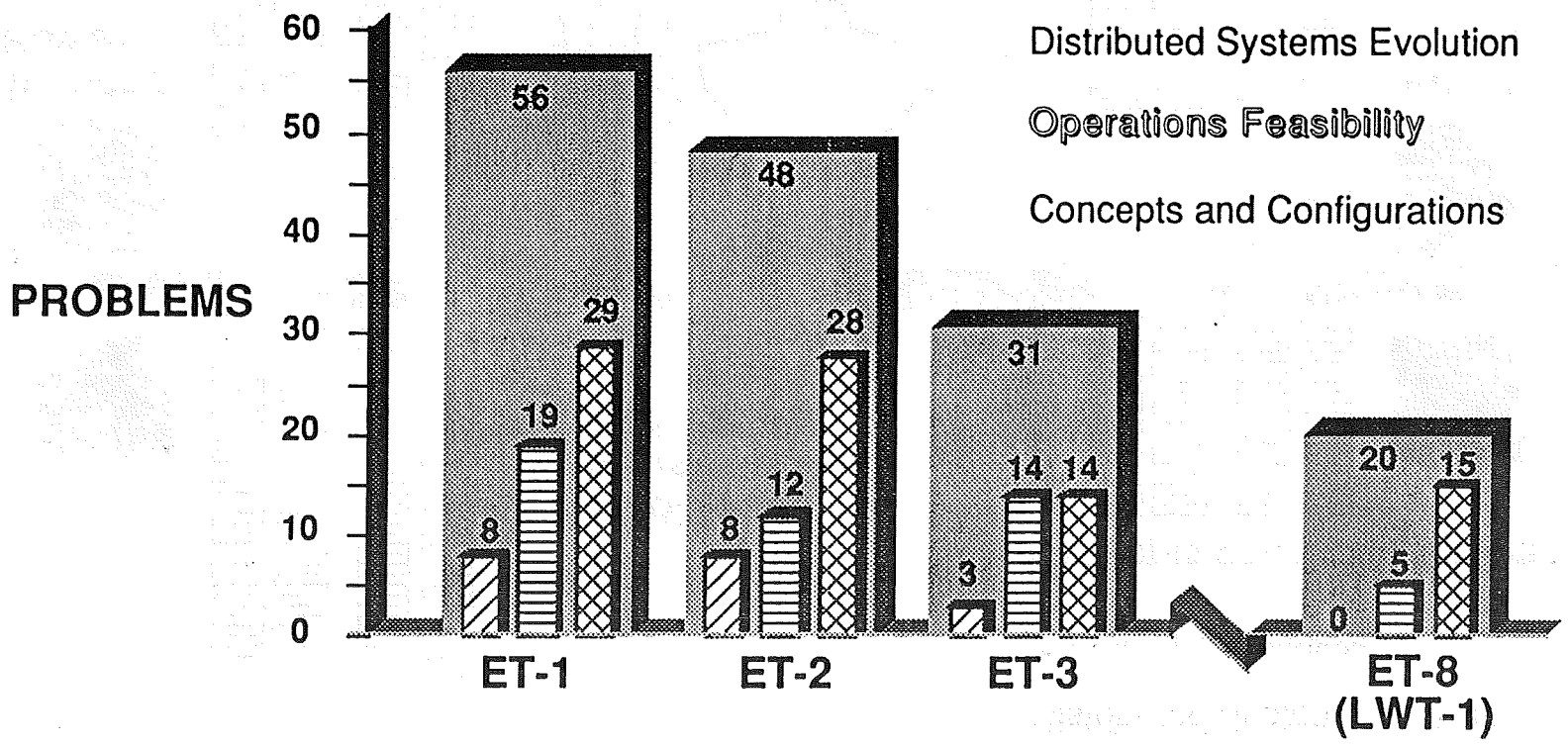

CATEGORY 1 = REQUIRES REPLACEMENT HARDWARE FROM EARTH

CATEGORY 2 = REPAIR RESULTING IN ON-ORBIT SCHEDULE IMPACT

CATEGORY 3 = NOT LIKELY TO CAUSE A SIGNIFICANT ON-ORBIT PROBLEM

REFERENCE GROWTH CONCEPT

TASK AREAS

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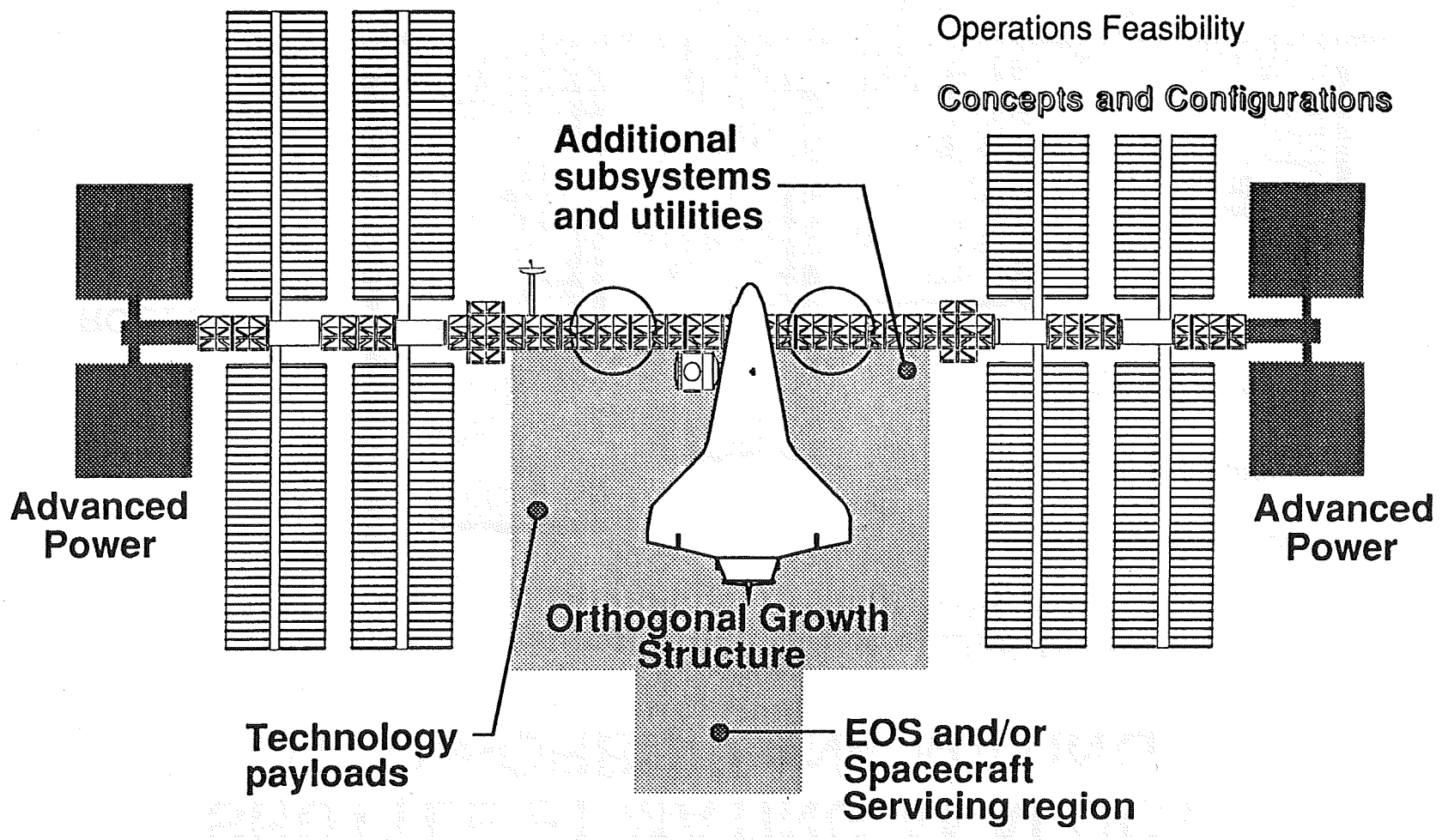
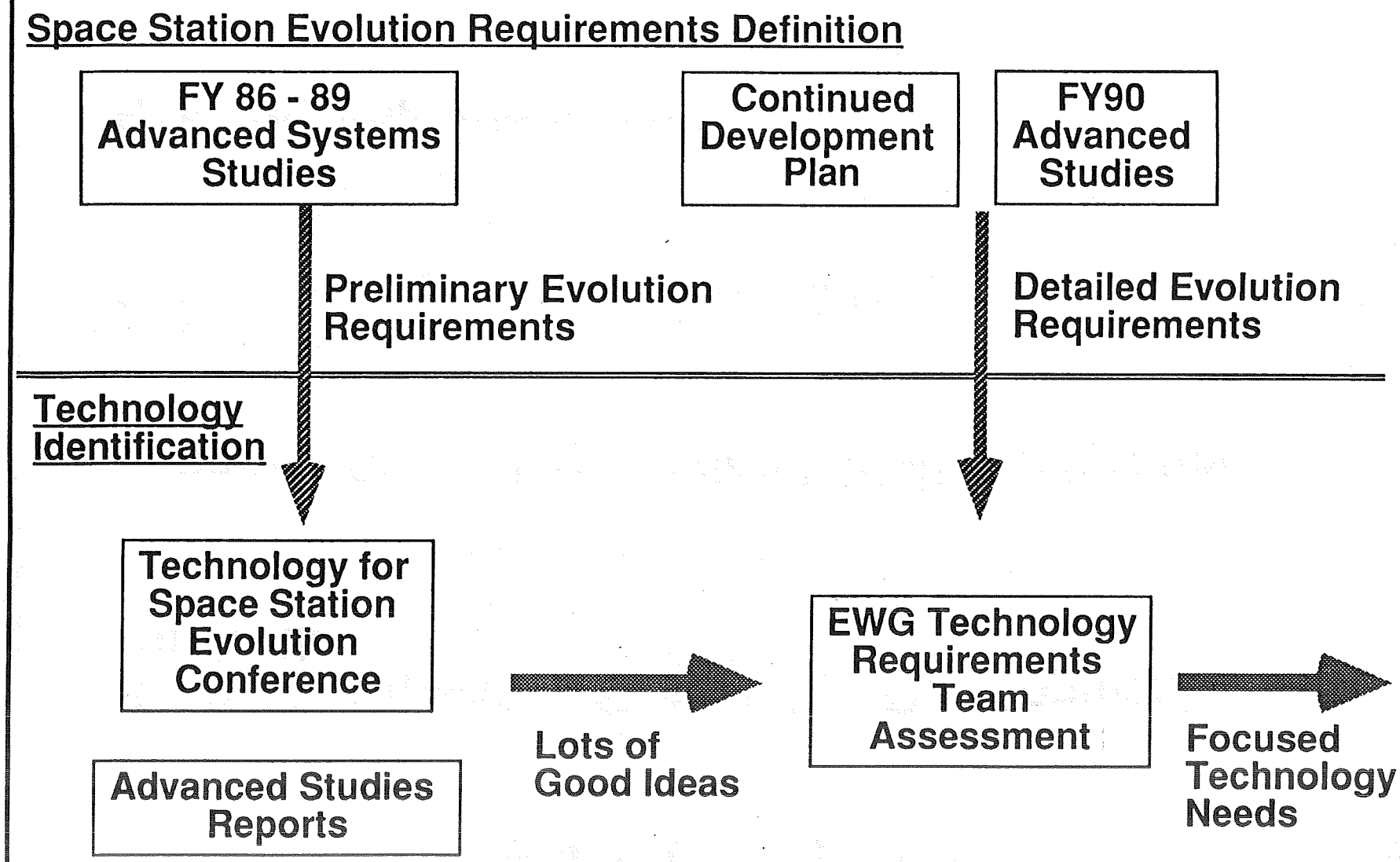


TECHNOLOGY ASSESSMENT PROCESS



TECHNOLOGY DRIVERS

- Supports expanded Research & Development utilization
- Supports Space Exploration Initiative utilization
- Enhances crew safety / productivity
- Reduces operations cost

SSF TECHNOLOGY PRIORITIES

- Vehicle Health Management
- Crew Training Systems
- Advanced Heat Rejection
- High Efficiency Space Power Systems
- Water Recovery & Management
- Robotics
- Advanced Extravehicular Mobility Unit
- Orbital Debris Protection
- Advanced Avionics Architectures

ACCOMPLISHMENTS

- Created a Continued Development Plan for Space Station Freedom
- Evaluated growth capability and limitations of the baseline design to a detailed subsystem level
- Developed and baselined evolution requirements in the Program Requirements Document
- Developed technology requirements for long term Space Station Freedom utilization

NEAR TERM DIRECTION

- Document a reference growth concept
- Advocate and implement critical scars in the baseline design
- Lay the groundwork for on-time technology availability