
NASA
SLI
SPACE LAUNCH INITIATIVE
Space Launch Initiative
New Capabilities ... New Horizons
Daniel Dumbacher
Deputy Program Manager
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Topical Outline

- Integrated Space Transportation Plan
- SLI: The Work of a Nation
- SLI Goals & Status
- Composites & Materials
- SLI & DoD/USAF Collaboration
- Summary

Integrated Space Transportation Plan: A National Plan

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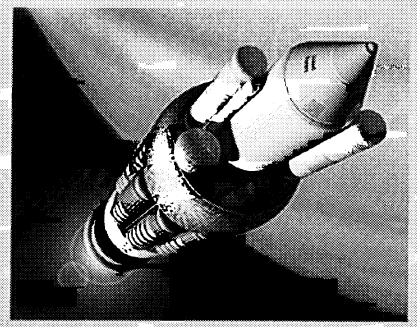
Space Shuttle Safety Upgrades

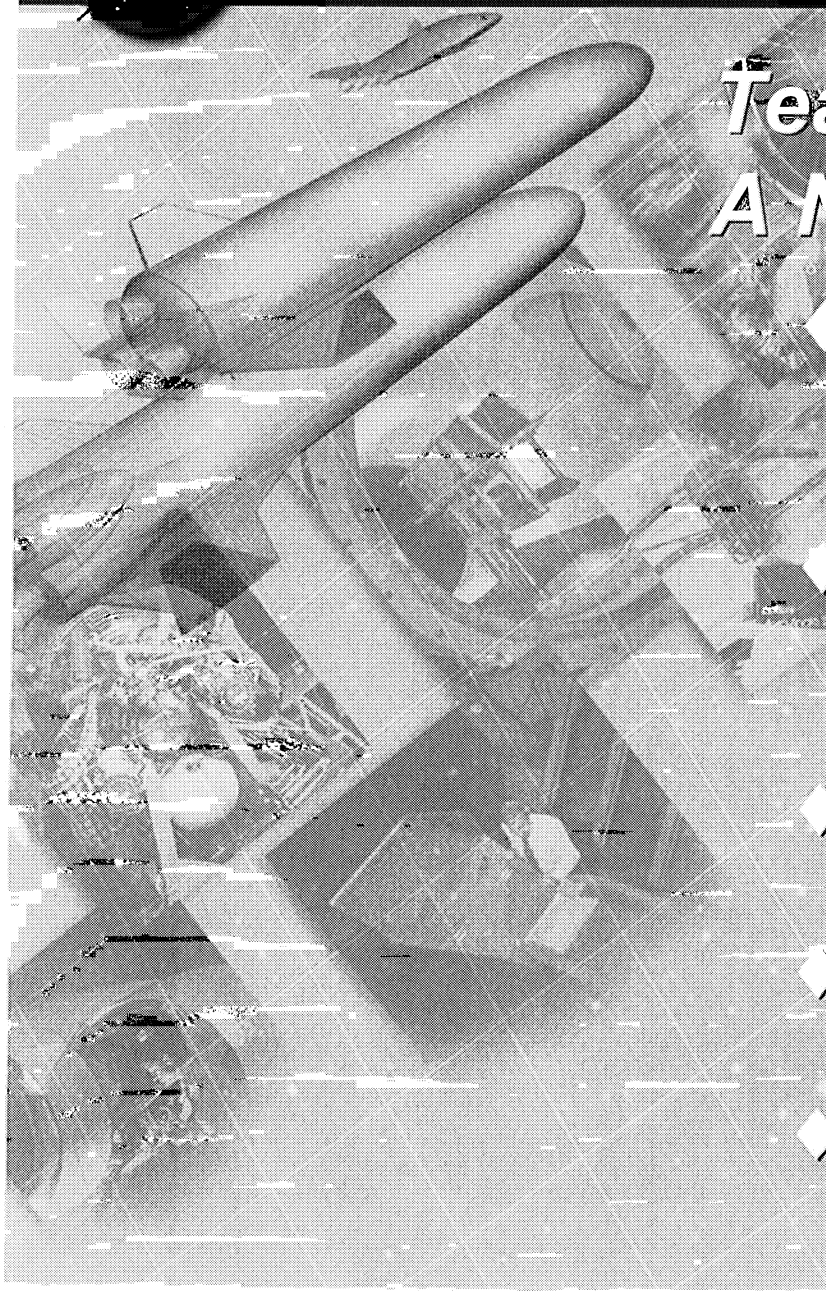
Space Launch Initiative



3rd Generation and In-Space Research and Technology

NASA's Long-Term Investment Strategy to Increase the Safety, Reliability and Reduce the Cost of Space Access

Team SLI



Team SLI Formed — A Nationwide Partnership

- Synergy Between Government & Industry
- Empowering the Right Work in the Right Hands
- Growth of Intellectual Capital
- Developing a National Team
- Knowledge-Driven Process Management

Pursuing Dramatic Improvements in America's Space Capabilities

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Goals:

- Improve Safety with a Goal of 1 in 10,000 Loss of Crew
- Reduce NASA's Mission Price

Objectives:

- Converge Requirements for NASA, DOD, and U.S. Commercial Missions
- Design A Complete Space Transportation Architecture
- Develop Critical Advanced Capabilities to Build & Operate the New System
- Competitive Business Environment for Industry

The SLI Team Design Philosophy

- We are designing the entire system, not just a rocket:
  - The system design includes all activities and processes that interface with hardware and software, contributing to the mission it is intended to perform.
  - The system design includes only those interfaces that add real value.
- We are designing for complete operations:
  - Operations include everything hardware and software sees (interface) from the moment it is an idea until it is retired.
  - Operations include all designs that result in safe, reliable, maintainable, and supportable hardware and software.
- We will eliminate, minimize, or simplify all interfaces, including:
  - Applicable documents, parts tracking, payload integration, inspection, sustaining engineering, packaging, shipping, tooling, facilities, logistics, training, test, verification, disposal, people, analyses, reviews, approvals, and so forth.
- We will develop new technology only to provide operational benefit that cannot be accomplished through managed requirements and system design.
- We are designing the total system for simplicity, even if some flight components become heavier or more complex.
- We are each responsible for looking at the entire system, asking the right questions, and minimizing system complexity and cost.

The Work of a Nation: A New Era of Collaboration

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- National Team
  - Civil
  - Commercial
  - Academic
  - Defense
- Empowering America's Leadership in Space through Technological & Business Innovations

Program Goal Status

- 70% of Life Cycle Cost Driven by Design
  - Requirements Simplification
  - Design Solutions to Address Operations and Safety (Requires Understanding of Root Causes)
  - Flow-down of Key Requirements to Technology Projects
- Separate Crew and Cargo (Converges With Projected Large GEO Satellites)
- Higher Mach Staging (Results in Powered Fly-back)
- RP 1st Stage Propellant
  - Smaller 2nd Stage - Drives TPS Operations Savings, Potential for Expander Engine
  - Shifts Emphasis From Composite to Metallic Cryo-Tanks
- Crew Escape System Required to Meet Safety Goals

Architecture

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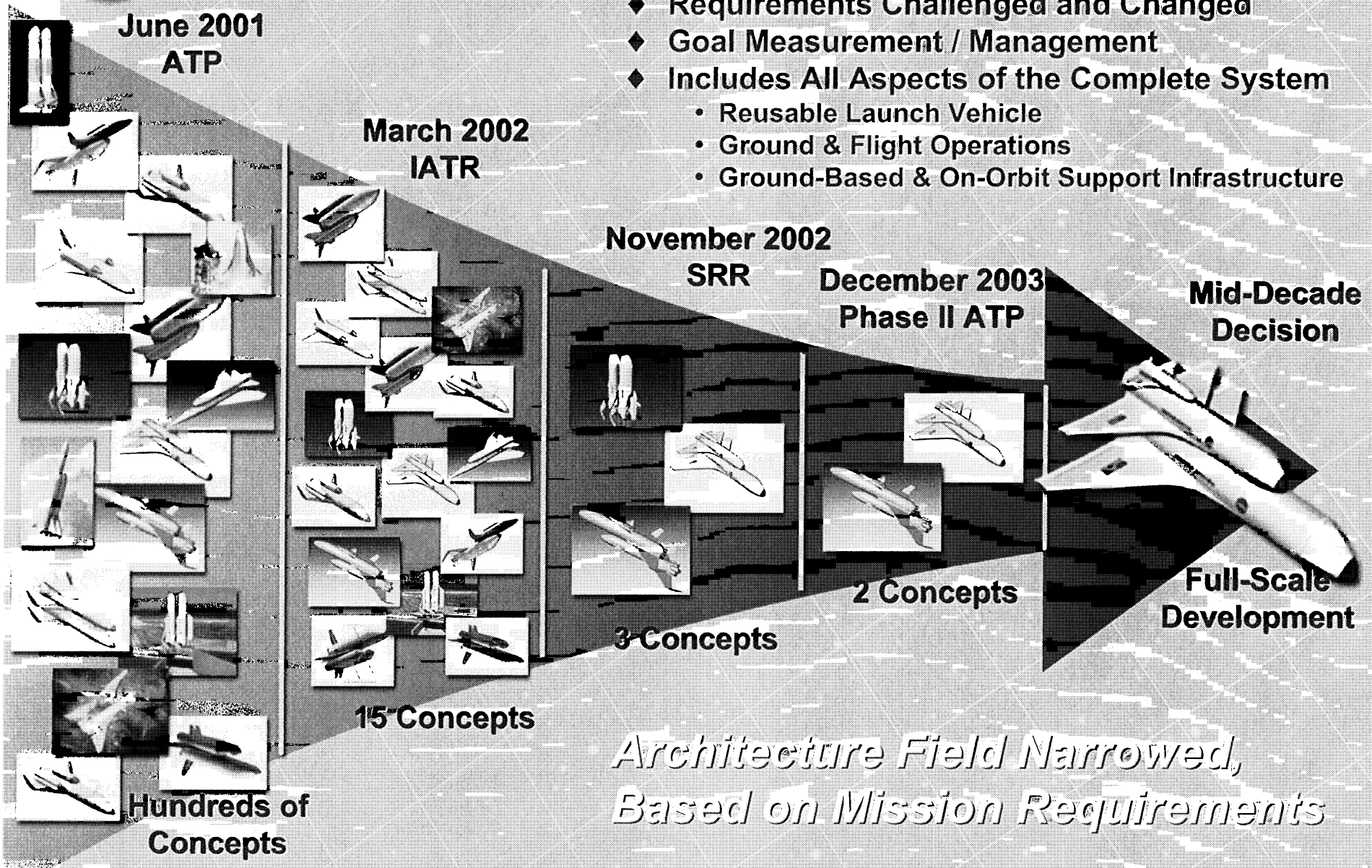
- Requirements Challenged and Changed
- Goal Measurement / Management
- Includes All Aspects of the Complete System
  - Reusable Launch Vehicle
  - Ground & Flight Operations
  - Ground-Based & On-Orbit Support Infrastructure



Architecture Field Narrowed, Based on Mission Requirements

Advanced Engineering Environment

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Data + People + Tools

Integrated Analysis Solutions

Informed Decisions

- A SINGLE Integrated Engineering Environment:
  - Mission Performance Analysis
  - Life-Cycle Analysis
  - Data Configuration Management
  - Design Decision Making
  - Access to the Right Expert at the Right Time With the Right Data
  - Elimination of Non-Value-Added Activities (e.g., Data Manipulation/Input)
- NASA-wide Resource Independent of Analysis Expert's Location
- Complementary with Proposed Agency AEE Initiative

Investment Alignment

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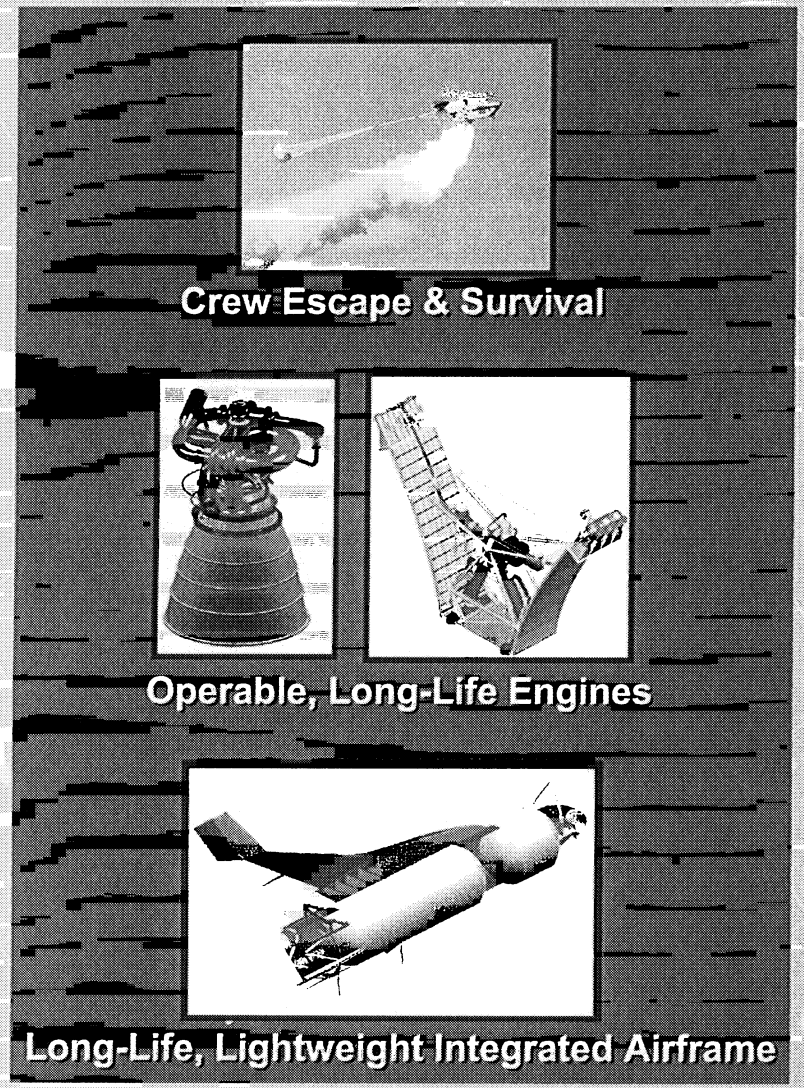

Critical Technology Areas

Technology Focused on High-Value Investments

- Matching Technology to Competing Designs
- Government Controls Data Rights
- Maximizing Return on Investment:
  - Requirements, Design, Hardware Test, & Proven Business Models

A Year of Technical & Business Success

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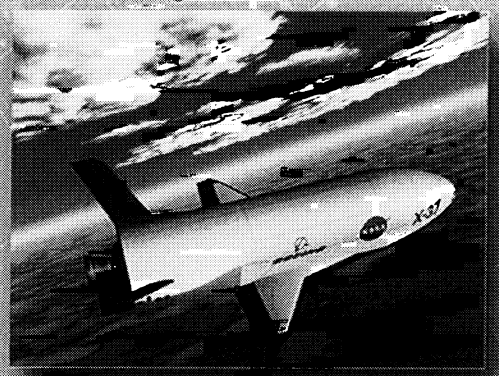
X-40A Flight Test

X-37 Flight Demonstrator



X-40A Assembly/Checkout

Technology Research Focused on High-Value Investments: Flight Demonstrations

- X-37 Flight Demonstrator:
  - Crew Carrier Prototype Test Vehicle
  - 7 Successful Flights of Scale-model Vehicle (X-40A)
  - X-37 Wings Manufacturing and Test Completed
  - 6% Scale Model Wind Tunnel Test Completed
  - 80% of X-37 Acreage Areas Can Be Used to Test Advanced Thermal Protection Materials

Integrating Advanced Technologies for Testing in Real-world Flight Environments

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SLI is:

- One NASA Team
- Creating Capability to Design New Transportation Systems
- Advancing New Technology and Engineering Systems
- Implementing Disciplined Management Systems
- A Flexible and Accountable Organization that Delivers as Promised
- Different


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SLI Is Designing Complete Space Transportation Systems While Developing the Capability to Build and Operate Them
Next Generation RLVs Will Lead the Way in the 21st Century