National Center for Advanced Manufacturing Overview

Fourth Conference on Aerospace Materials, Processes, and Environmental Technology

September 19, 2000

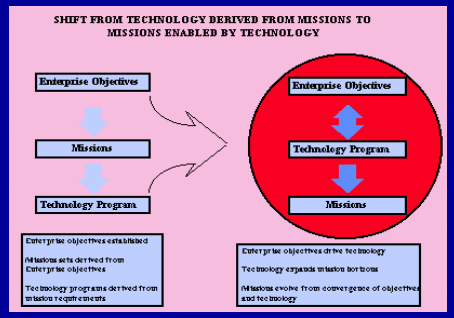
Background

- *Early '98 MSFC teamed with LMMSS to address large composite issues for VentureStar®*
- *The National Composite Center (NCC) concept was developed as strategy*
- *Presented the NCC concept to Dan Goldin and Senator Breaux, LA*
  - *Expand focus beyond VentureStar®, MAF, and composites (hence NCAM)*
  - *Structure as a virtual partnership involving - Industry, Government, and Education*
  - *MSFC to lead reporting to NASA HQ Chief Technologist, Sam Venneri*

Background


George C. Marshall Space Flight Center
Primary-Assigned Missions
Space Transportation Systems Development
Microgravity
Space Optics Manufacturing Technology
Agency-Assigned Center of Excellence
Space Propulsion
Programmatic Assignments
Reusable Launch Vehicle Technology
Advanced Space Transportation Technology
Space Shuttle Elements
Microgravity Research and Space Product Development Programs
Space Product and Development Program
Chandra X-Ray Observatory
Space Station Support and Utilization
Scientific Payloads and Research
Global Hydrology and Climate Center
Agency Support Activities
Communication Architecture and Providing Agencywide Area Network (WAN)
NASA Automated Data Processing Consolidation Center
NASA Digital Television Transition
Earned-Value Management (EVM)
NASA Preferred Technical Standards
Space Environment and Effects
IFMP Training Activity
NASA Operational Environment Team (NOET)
NASA Acquisition Internet Service (NAIS)
NASA Integrated Services Network (NISN)
Defense Contract Administrative Service Financial Management Support
National Center for Advanced Manufacturing (NCAM)
NASA Engineering Excellence Initiative
DA01—076
February 1, 2000

Background



NASA Technology Plan

"Aerospace Manufacturing Technology Core Competency"

- **Identify the long-term strategic technologies that are likely to be critical to the future missions of the Agency**
- **Determine those technologies where viable in-house "core competencies" will be essential to make that technology available to NASA in the future**

Background

ED Strategic Plan

"Advanced Manufacturing Technology Thrust Area"

- **ED seeks to focus its people and skill investments for a portion of its portfolio**
- **Technology thrust areas are intended to be crosscutting, high impact, and high value investments for ED customers**

Mission

NASA's National Center for Advanced Manufacturing

- Assure World Class Manufacturing Capabilities Enabling Space Transportation Systems
- Effect Cultural Change in Manufacturing to Intelligent Environment
- Create Federal, State, University and Industry Mfg. Partnerships
- Enhance Educational Development for Manufacturing
- Strengthen U.S. Competitiveness in Aerospace/Commercial Markets

Technology Development Approach

Technology Development Approach

- Strengthen overall long term investment in manufacturing technology
- Determine what technologies are critical to NASA and Industry missions
  - Understand technology readiness and gaps
  - Evaluate current/new technology for missions
  - Long term strategy, different from Project support
- Integrate manufacturing with counterpart discipline areas (systems, materials, design, operations, test, etc) “systems wise approach”
- Provide discipline leadership and authority
  - Develop a strategy to assure the technology base and national infrastructure availability

Partner and leverage

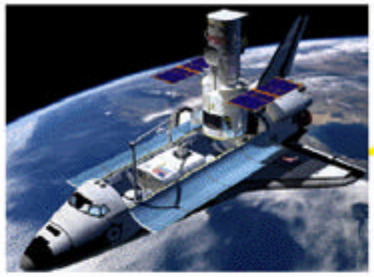
Space Transportation Significance

NCAM Supports Space Transportation

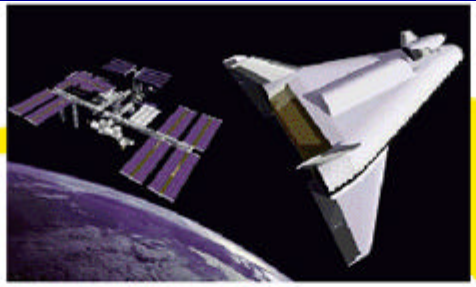
- Revolutionize space transportation by delivering advanced manufacturing research and technology development
  - Safe, affordable and reliable space transportation systems for the Nation and for NASA
  - Builds the technology base needed for next generation launch vehicles
- Affect a vigorous robust aerospace industry
- Provides environment to foster innovation and collaboration
  - Industry, Education and Government

Space Transportation Significance

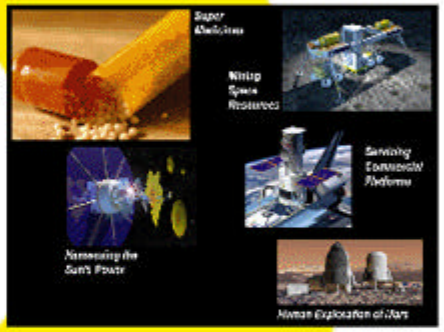
Generations of Reusable Launch Vehicles



Today: Space Shuttle
1st Generation RLV
- Orbital Scientific Platform
- Satellite Retrieval and Repair
- Satellite Deployment



2010: 2nd Generation RLV
- Space Transportation
- Rendezvous, Docking, Crew Transfer
- Other on-orbit operations
- ISS Orbital Scientific Platform
- 10x Cheaper
- 100x Safer



2025: 3rd Generation RLV
- New Markets Enabled
- Multiple Platforms / Destinations
- 100x Cheaper
- 10,000x Safer

2040: 4th Generation RLV
- Routine Passenger Space Travel
- 1,000x Cheaper
- 20,000x Safer

Partnering

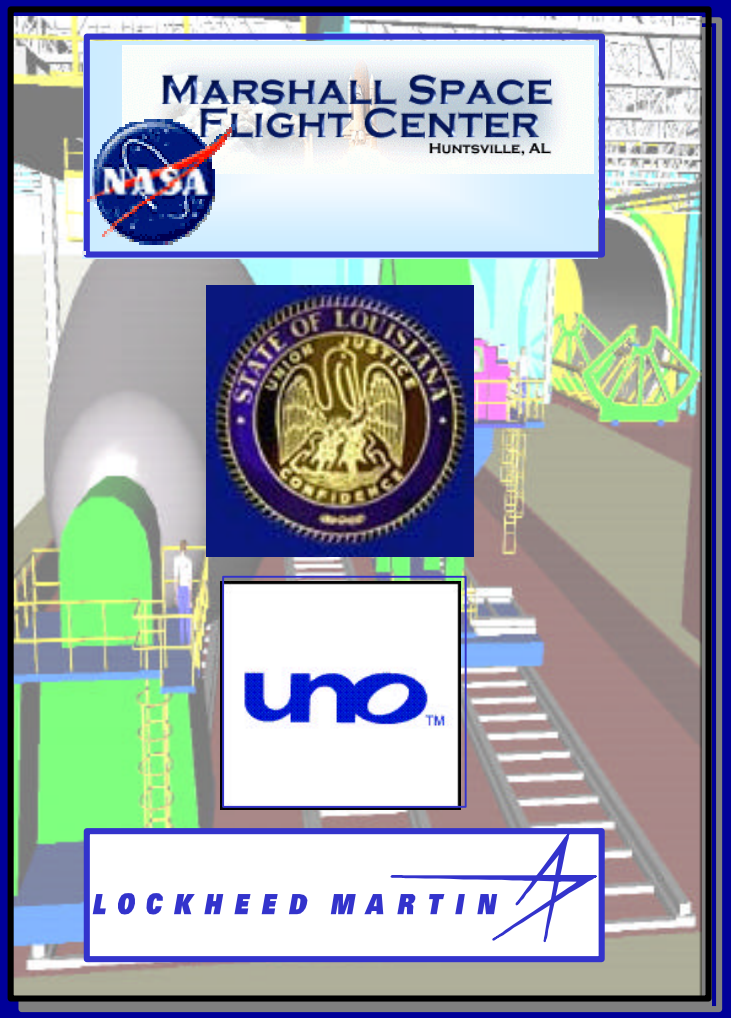
Strategic Partnerships and Alliances are Essential

- Common Set of Objectives and Goals
  - Maintain synergy, builds trust
  - Understand convergence issues government/industry
  - Eliminates redundant effort
- Increases competitively funded research
- Leverage assets and experience
- Cultural change to sharing of information

NCAM MAF Project

"A person of words and not of deeds is like a garden full of weeds"

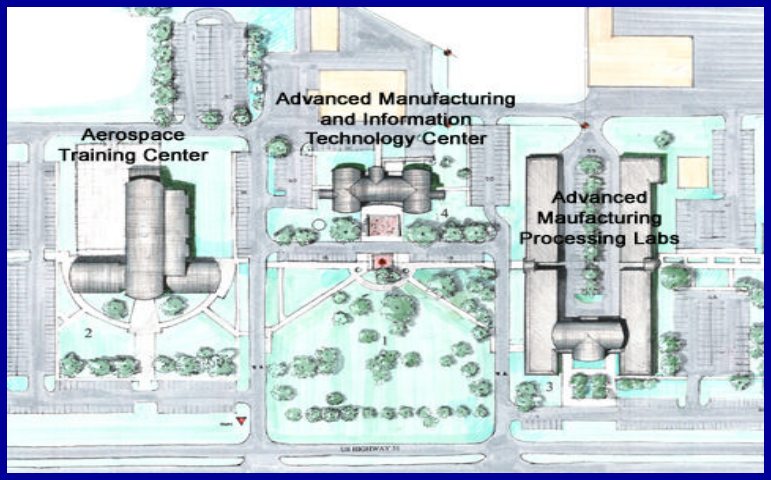
- NASA
- State of Louisiana
- Academia – UNO
- U.S. Industry - LMMSS



NASA & Calhoun Community College

- NASA
- State of Alabama
- Calhoun Community College
- Boeing

Productivity Enhancement Complex



Calhoun

Aerospace and Advanced Technology Park

Boeing Delta IV Plant

Educational Development

- **Develop advanced technical workforce for NASA and industry**
- **Focus research toward NASA and industry needs**
- **Increase number of high-value jobs**

Why is NASA involved in education?

Education is critical to the development of revolutionary technology--the new set of "tools for our future."

Education is critical to the future of NASA. We depend on it for our highly skilled and knowledgeable workforce.

Education is critical to the vitality of the nation. Every American must have a fundamental understanding of science, and technology in order to fully participate in society.

Intelligent Synthesis Environment

"If the last century was the industrial revolution then this century will be the information revolution"

- **Cultural changes required**
- **Leverage Information technology**
- **Collaboration through virtual centers**
- **Advances the state-of-practice of product development**
- **Broader than just manufacturing**
  - **Leverage other ISE areas**
- **NCAM serves as a user testbed for MSFC ISE initiatives**
- **A long term strategy (ISE is a journey not destination)**
- **"Poor Man" ISE approach being pursued**

Summary

- **The NCAM is a strategy, organization, & partnership**
  "not a place or facility"
- **Focused on long-term technology development**
- **The NCAM initially will be a regional partnership however the intent is National in scope**
- **Need benchmarking - concept to finished product not trial and error**
- **Significant progress has been made to date**
  - **Setting the vision for the future**