



Focus Session on Commercial Crew

Technical Feasibility Panel for the Human Spaceflight Study

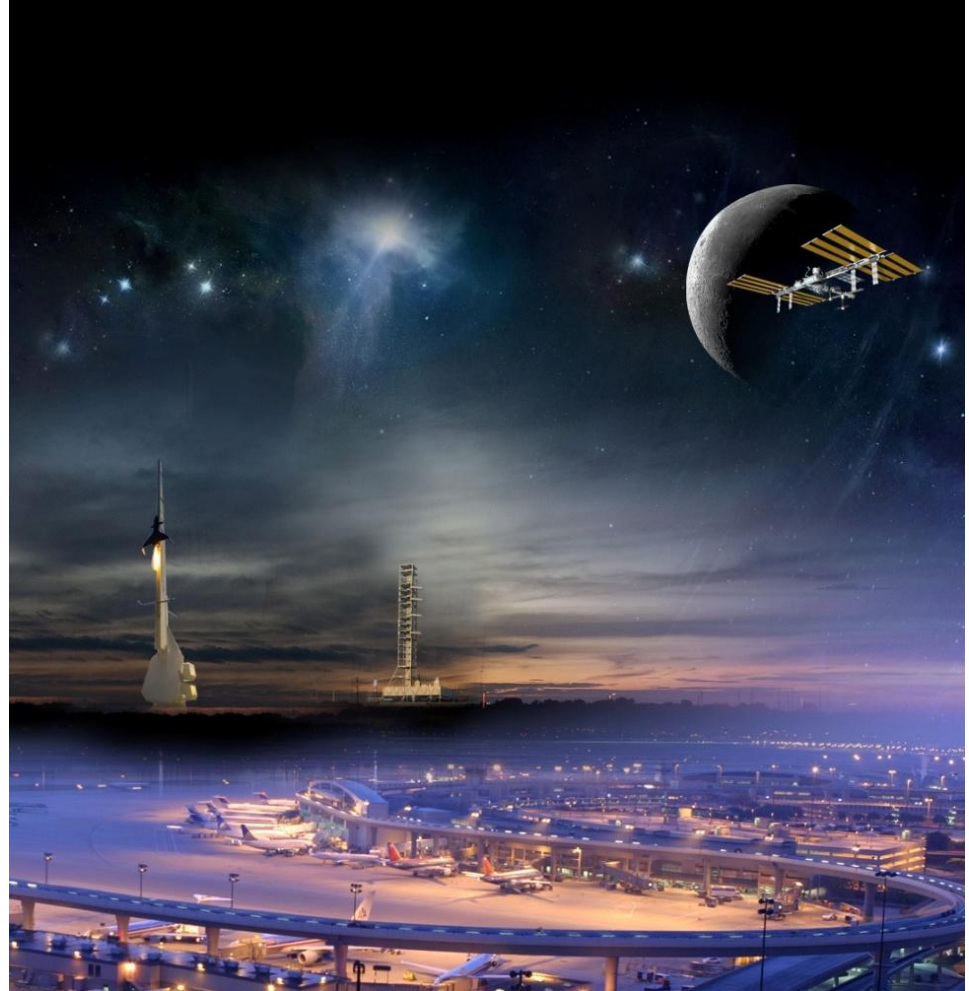
February 4, 2013
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NASA HQ



The Future State



- The vision of commercial human spaceflight to Low Earth Orbit (LEO) is a robust, vibrant, profit-making commercial enterprise with many providers and a wide range of private and public users.
- NASA's commercial spaceflight initiatives are helping to make this vision a reality.



Commercial Cargo Status



- SpaceX

- After 72 months, 40 milestones, and a \$396M investment from NASA, SpaceX developed and brought into operations:
 - A new U.S. intermediate class commercial launch vehicle (Falcon 9),
 - A spacecraft (Dragon), and
 - A launch pad (LC-40)capable of safely transporting cargo to the ISS and returning cargo to the Earth.



- Orbital Sciences Corporation

- Orbital Sciences has completed 25 of 29 milestones and received \$276M out of \$288.
- The maiden test flight of the Antares is planned to occur within the next couple months. The Demonstration Mission to the ISS is planned to occur in the Spring/Summer.



“Commercial” at NASA



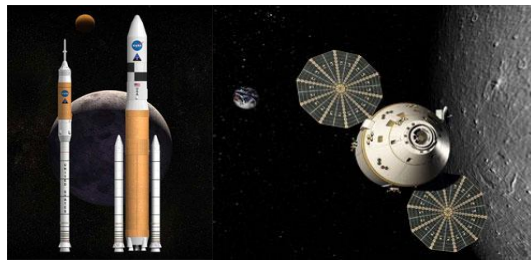
Program Characteristic	Early Space Age Approach	Commercial-Oriented Approach
Owner	NASA	Industry
Contract Fee-Type	Cost Plus	Fixed Price
Contract Management	Prime Contractor	Public-Private Partnership
Customer(s)	NASA	Government and Non-Government
Funding for Capability Demonstration	NASA procures capability	NASA provides investment via milestone payments
NASA’s Role in Capability Development	NASA defines “what” and “how”	NASA only defines “what” (Industry defines “how”)
Requirements Definition	NASA defines detailed requirements	NASA defines top-level capabilities needed
Cost Structure	NASA incurs total cost	NASA and Industry cost share

Commercial Crew Approach



Traditional NASA Development

Goal: ISS Crew Mission
Extensive Government Involvement
No Cost Sharing
Government Owns IP
Detailed Design Requirements
Unlimited Data and Lots of Deliverables
Higher Costs



Non-Traditional Development

Goal: Commercial Human Transport
Limited Government Involvement
Cost Sharing
Commercial Partner Owns IP
Tailored Human-Rating Requirements
Pay-for-Performance Milestones
Lower Costs

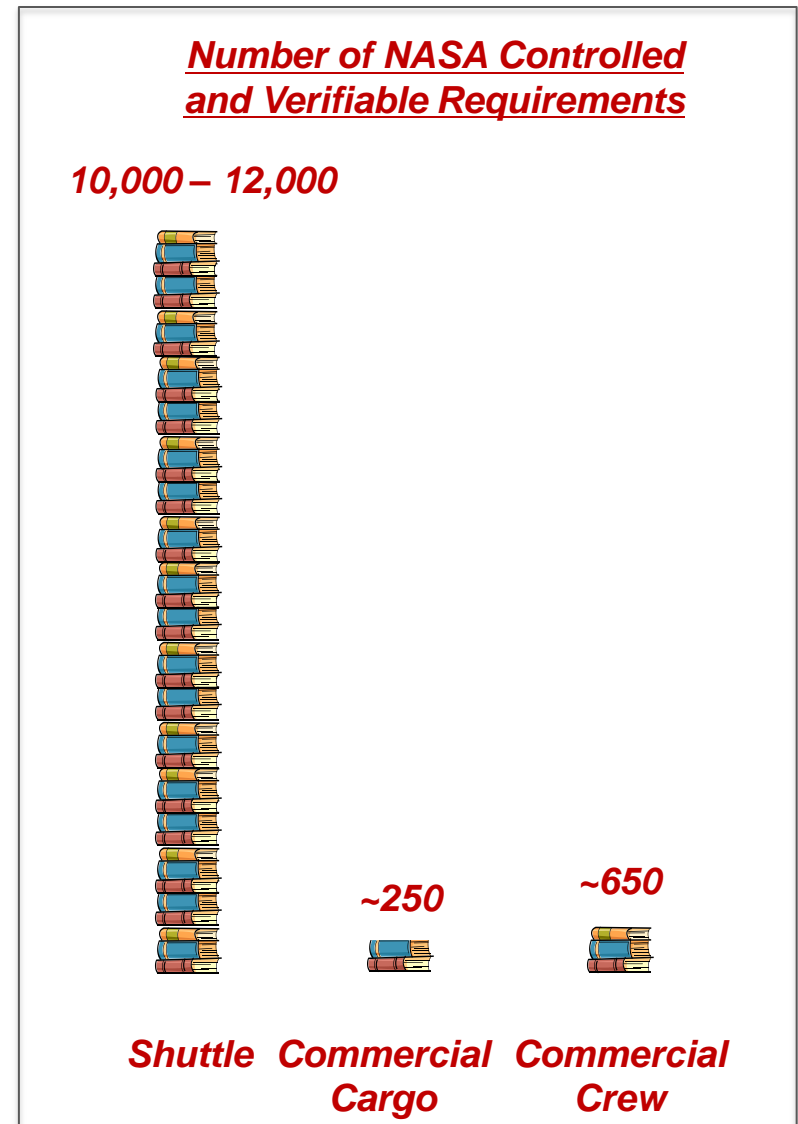


NASA had clearly chosen a non-traditional development approach for the Commercial Crew Program.

Requirements



- By NASA controlling fewer, higher level requirements, the companies can determine how best to meet NASA's requirements.
- It also forces NASA to determine what we need, as opposed to what we want.
- In addition, it allows NASA to use fixed-price contracts, as opposed to traditional cost-plus contracts.



Unique Approach to a Unique Situation

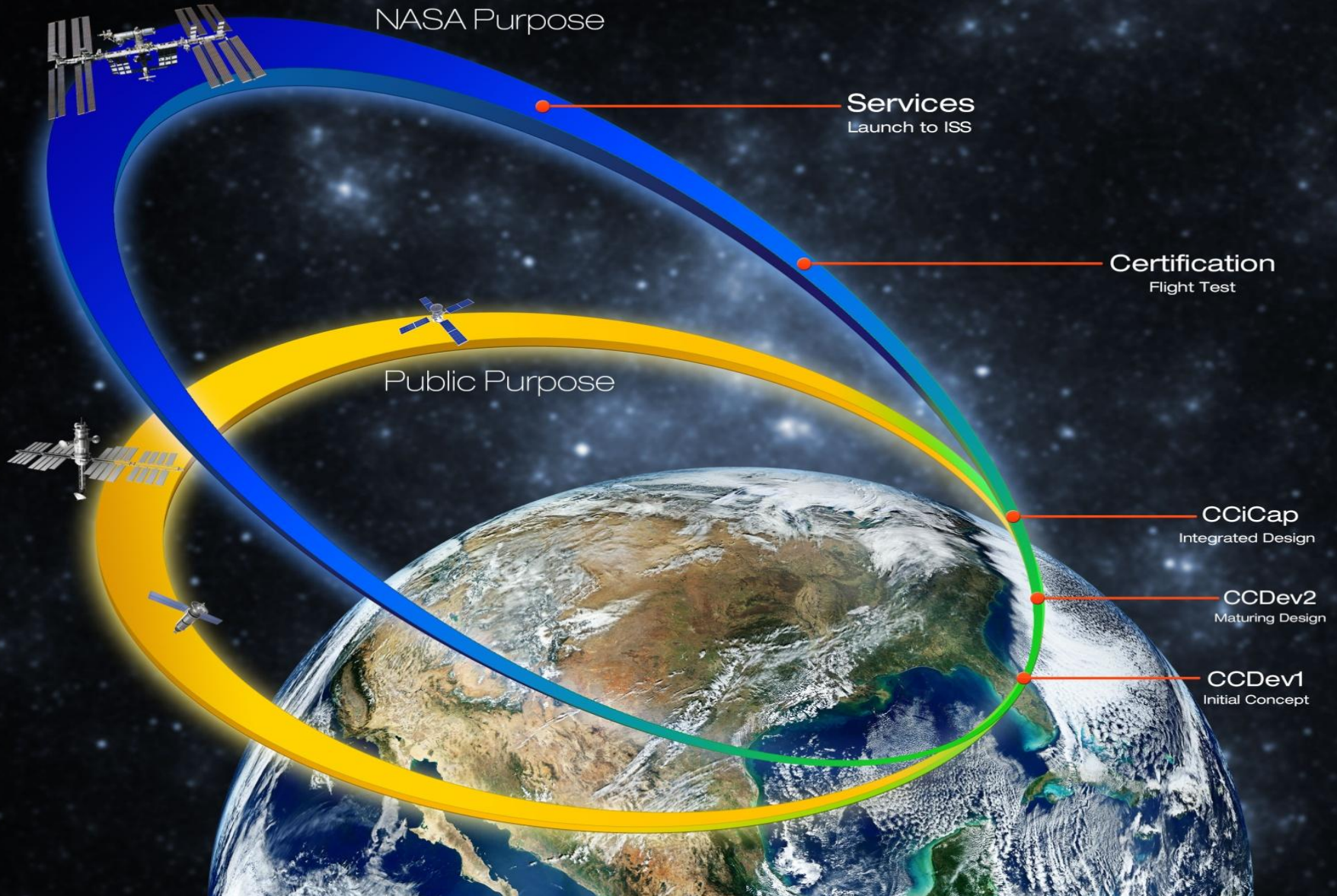


- Over the years, NASA has used a variety of a different approaches to overseeing and understanding the development of spacecraft. Each approach was tailored to meet the specific needs of the program.
- Within the context of the Commercial Crew Program, the following key ingredients are present which enable the adoption of these key paradigm changes:
 - No technology breakthroughs were required – we are not pushing the technological state of the art by flying people to and from low Earth orbit
 - Very real prospect of other customers beyond NASA – spaceflight participants and sovereign clients are existing markets with substantial growth potential
 - Government foundational customer base – the International Space Station represents a long term, repeatable market
 - Strong industrial base – many U.S. companies have the capability to develop safe and reliable crew transportation systems.



- The purpose of contrasting NASA's traditional and non-traditional approaches does not mean one is better than the other.
- Each approach is appropriate for the type of program required.
 - For technically-ambitious, one-of-a-kind programs where NASA is the only customer and production is limited to only one (or a few) of the systems, then a traditional approach is more appropriate.
 - For more commercial-like programs that feature the key ingredients mentioned previously, the approach being followed by the CCP is more appropriate.
- The combination of a unique contracting mechanism and an innovative technical approach should enable the development of a safe, reliable, and cost effective crew transportation system for use by a wide range of public and private users.

Commercial Crew Program Lifecycle



Current Commercial Crew Partners



NASA's Complimentary Strategy



The Future of American

HUMAN SPACEFLIGHT



**Space
Launch System
and Orion MPCV**

**Deep Space
Exploration**



**Commercial
Crew Program**

**Low-Earth Orbit and ISS
Research & Development**