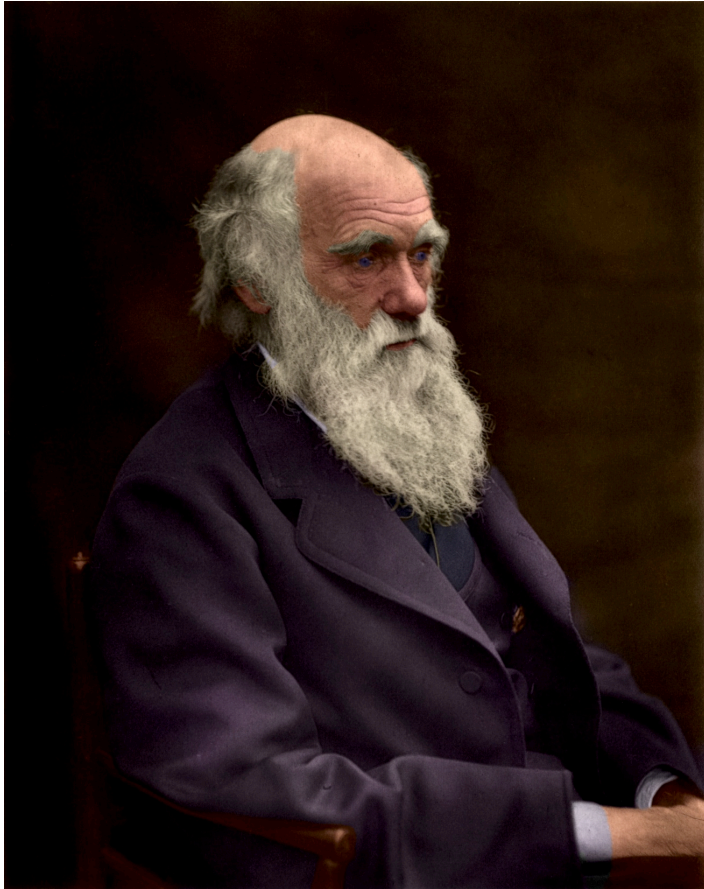




NASA's "Commercial" Programs: What Are They and Why Are We Doing Them?

Phil McAlister, NASA Headquarters
February 2021

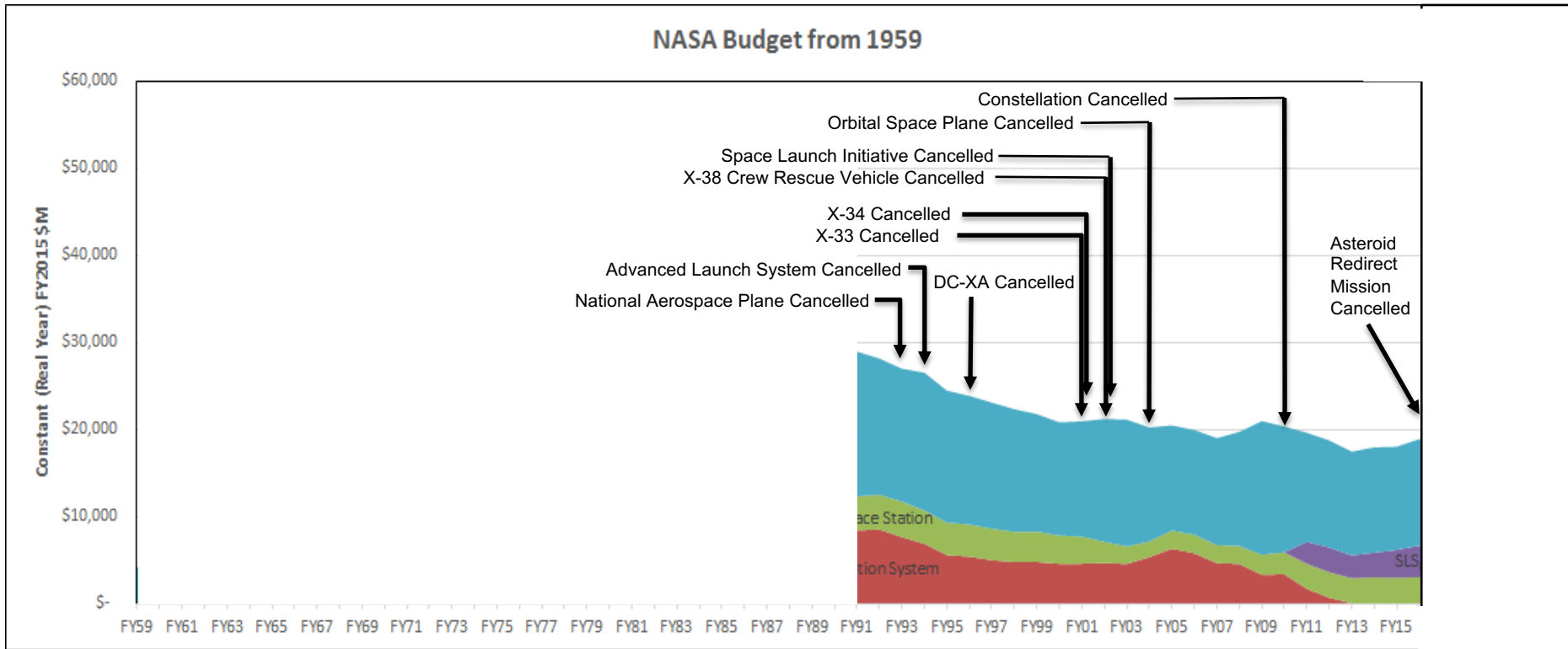


“It is not the strongest of the species that survive, nor the most intelligent, but the one that is most responsive to change.”

“Those who live by the sword...will be shot by those who don't.”

-Anonymous

Why Do We Need to Change?





Investing in Space

Fundraising for 100 largest closely held companies



SOURCE: NewSpace Global

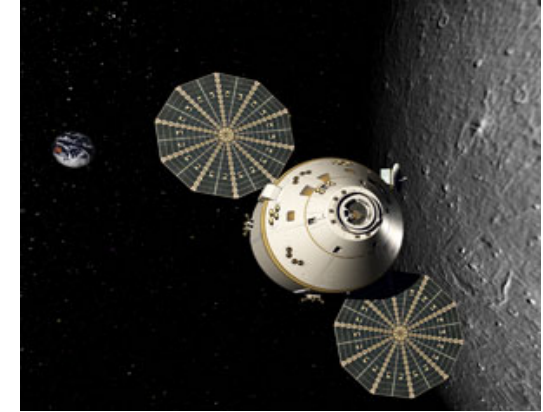
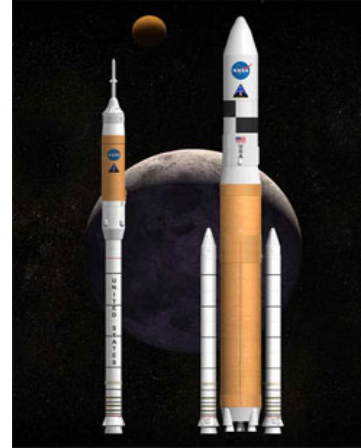
1995-2002 annual totals were \$2.5 million or less except 1998. 2015 includes projected funding.



Background

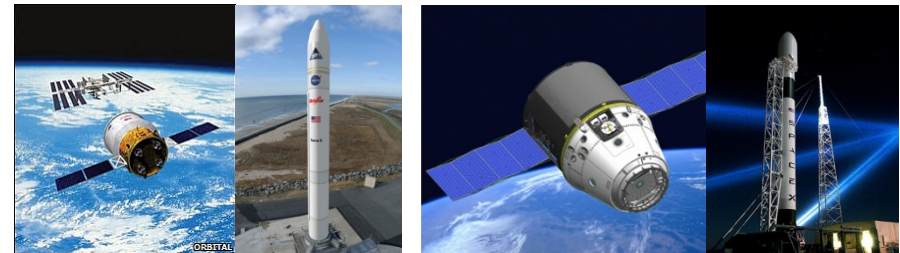


- In 2005, with the phase-out of the Space Shuttle certain, NASA embarked on the Constellation Program, featuring the next generation of traditionally-acquired launch vehicles and spacecraft.



Constellation Program

- At about that same time, NASA began a small initiative to have U.S. private industry build, own, and operate spacecraft to resupply cargo to the space station. At that time, only the governments of the U.S., Russia, Japan, and Europe had built such spacecraft.



Commercial Cargo Program



- A Blue Ribbon panel of space experts determined that the Constellation Program was “unsustainable” and the Program was cancelled.
- Even though the Commercial Cargo Program had not launched anything at that time, it was going well and most of the development was done. Preliminary indications were that the cost of the commercial cargo spacecraft were going to be 4 to 10 times less than similar, traditionally-acquired spacecraft.
- NASA “double-downed” on its strategy to outsource spaceflight development to the private sector by announcing the Commercial Crew Program designed to assist in the development of privately-owned and operated spacecraft to transport astronauts to/from the International Space Station.
- A contentious debate ensued about the future of human spaceflight.

Common Criticisms



- The “commercial” approach is unproven and risky.
- Private industry is not financially or technical capable of doing a job that only governments have proved to be able to do.
- Private industry will never be able to produce spacecraft as safe and reliable as NASA.
- Private industry will cut corners in order to make a profit.
- The cost savings are illusory.

May 2012

(<https://www.youtube.com/watch?v=hqDzWE5tmUU>)



NASA Acquisition Approaches



Program Characteristics	Traditional Approach
Owner	NASA
Contract Type-Fee	Cost-Plus
Contract Management	Prime Contractor
Customer(s)	NASA
Funding for Capability Development	NASA procures capability
NASA's Role in Capability Development	NASA defines "what" and "how"
Requirements Definition	NASA defines detailed requirements
Cost Structure	NASA incurs total cost

NASA Acquisition Approaches

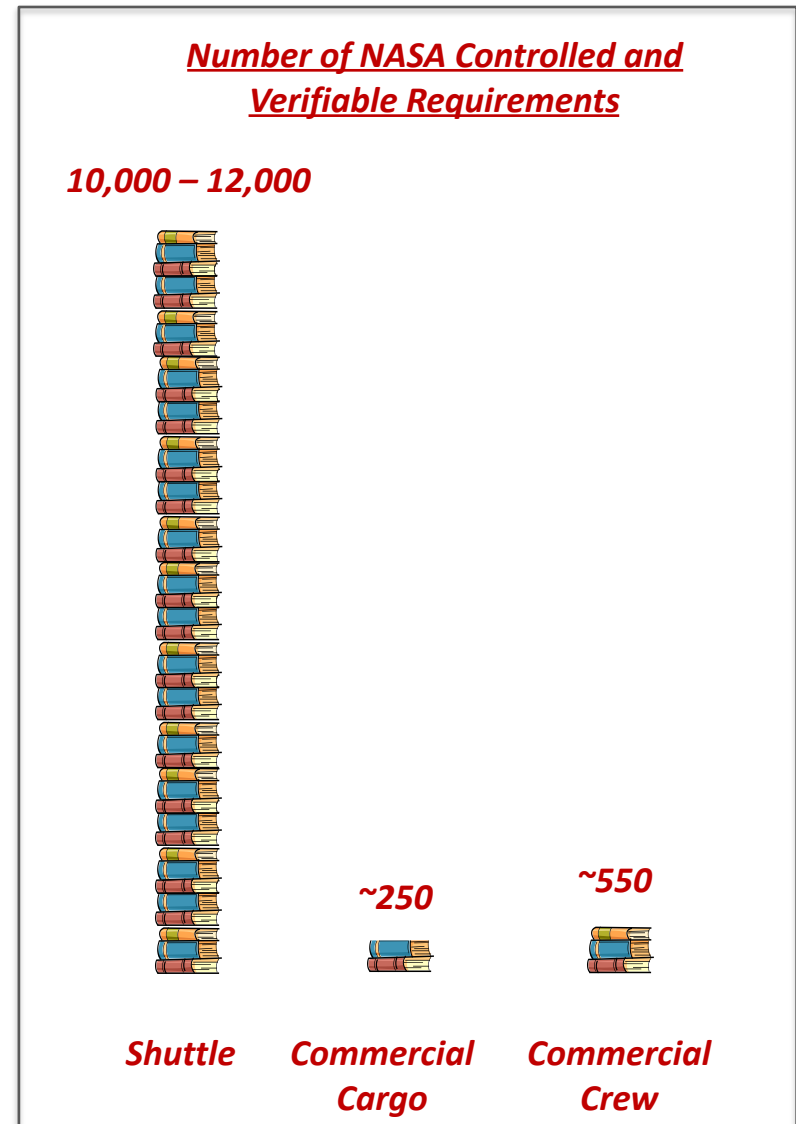


Program Characteristics	Traditional Approach	Commercially-Oriented Approach
Owner	NASA	Industry
Contract Type-Fee	Cost-Plus	Fixed Price
Contract Management	Prime Contractor	Public-Private Partnership
Customer(s)	NASA	Government and Non-Government
Funding for Capability Development	NASA procures capability	NASA provides investment via milestone payments
NASA's Role in Capability Development	NASA defines "what" and "how"	NASA defines "what" and industry defines "how"
Requirements Definition	NASA defines detailed requirements	NASA defines top-level requirements
Cost Structure	NASA incurs total cost	NASA and industry share costs

Number of Requirements



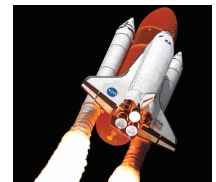
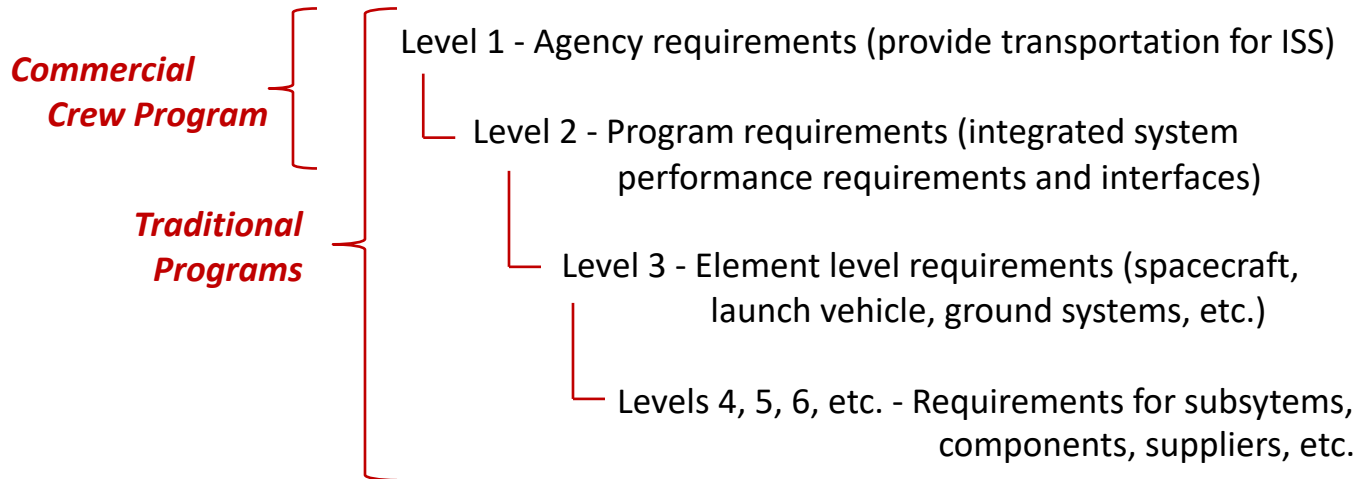
- Commercial programs have significantly reduced NASA-controlled requirements needing full verification
 - CCP has approximately 5% that of Shuttle, Commercial Cargo (COTS) approximately 2%
 - Commercial Crew requirements deal with safety of all mission phases, whereas commercial cargo deals only with ISS interfaces
- By controlling fewer, higher level requirements, the contractor is enabled to determine how best to meet NASA's requirements.



Level of Requirements



- CCP requirements will be controlled by NASA at a higher level than traditional programs
 - Lower level requirements controlled by the commercial partner, with NASA having insight
 - Allows the commercial partner to accelerate decision-making and control costs



May 2020



- 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, production is limited to only one (or a few) of the systems, and which are dependent on significant technology development, then a traditional approach is more appropriate.
- Commercial-like programs may be more appropriate under the following conditions:
 - No technology breakthroughs are 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 – space tourism and some microgravity products are existing markets with substantial growth potential
 - Government foundational customer base – the International Space Station represents a long term, repeatable customer base
 - Strong industrial base – many U.S. companies have demonstrated the capability to develop safe and reliable crew transportation system(s).

Partnering Can Lead to Innovation



- Public-private partnerships combine the strengths of the government and the private sector.
 - Government has extensive experience and expertise, and it has access to significant financial resources. Consensus is at a premium.
 - Private sector has a laser focus on cost effectiveness. And, speed is at a premium.
 - The combination of the public and private sectors creates a healthy tension which can enable superior results than either entity working individually.