

White House Perspectives on Commercial Space

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Commercial Spaceflight Overview

- Space Policy, Perspectives, and Vision
- Budgets, Balance, and Potential
- Initiatives and Accomplishments
- Challenges, Opportunities, and Thoughts

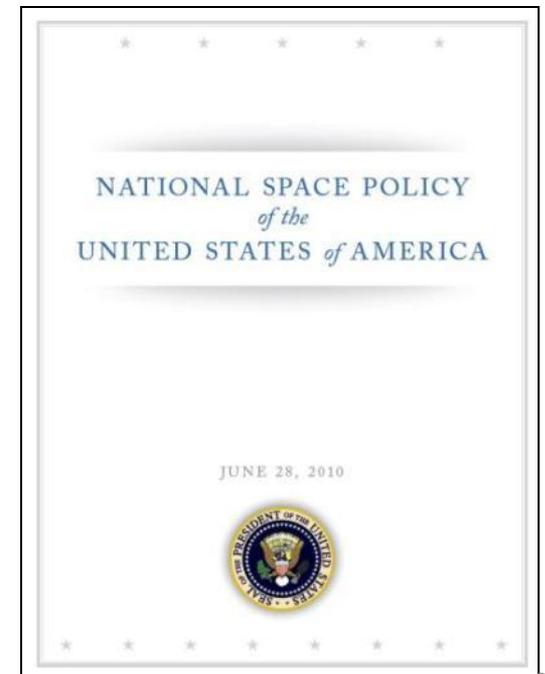




U. S. National Space Policy (PPD-4)

A robust and competitive commercial space sector is vital to continued progress in space. The United States is committed to encouraging and facilitating the growth of the U.S. commercial space sector that supports U.S. needs, is globally competitive, and advances U.S. leadership in the generation of new markets and innovation-driven entrepreneurship.

- **Energize competitive domestic industries**
- **Expand international cooperation**
- **Strengthen stability in space**
- **Increase assurance and resilience of mission-essential functions**
- **Pursue human and robotic initiatives**
- **Improve space-based Earth and solar observation**





Law, Budgets and Appropriations Addressing Some Elements of Commercial Space



President Obama at NASA's Kennedy Space Center – April 15, 2010

“...we will also accelerate the pace of innovation as companies--from young startups to established leaders-- compete to design and build and launch new means of carrying people and materials out of our atmosphere...in ways that will help us improve our technological capacity and lower our costs, which are both essential for the long-term sustainability of space flight.”

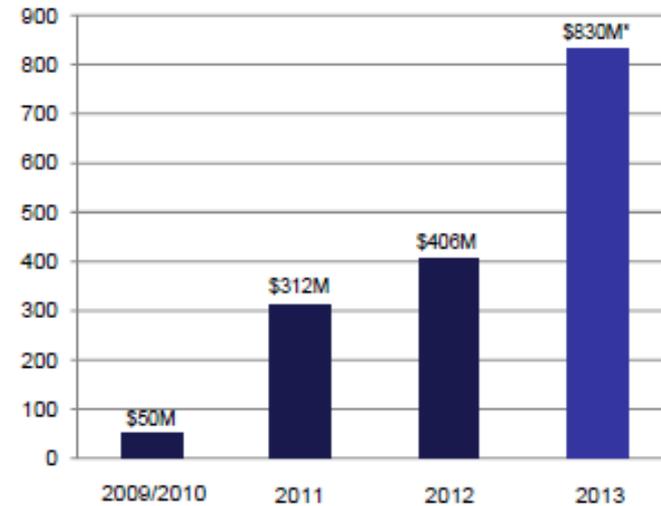
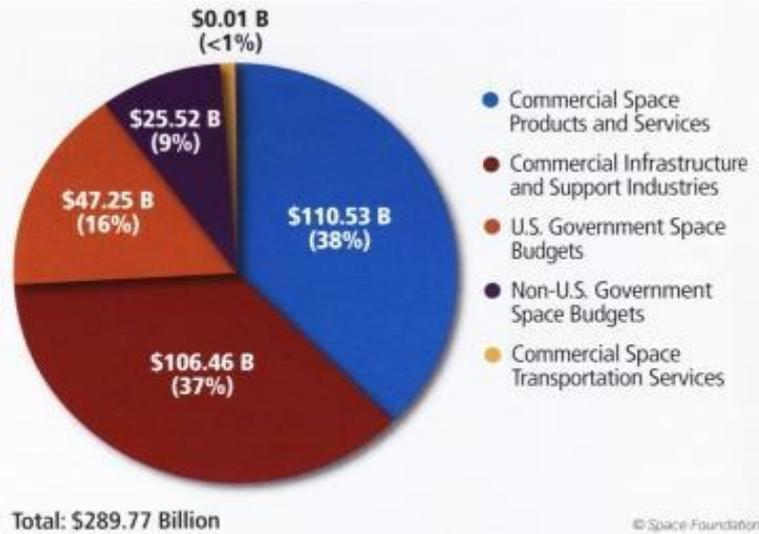
- **The Law: NASA Authorization Act of 2010 & 2012 Appropriations**
 - Extension of the Int'l Space Station until at least 2020
 - Support for a commercial space transportation industry
 - Development of a Multi-purpose Crew Vehicle and heavy lift launch capabilities
 - A “flexible path” approach to space exploration opening up vast opportunities including near-Earth asteroids (NEA), moon, and Mars
 - New space technology investments to increase the capabilities beyond low Earth orbit
- **2012 FAA Modernization & Appropriations**
- **2012 Space Exploration Sustainability Act**
- **FY13 National Defense Authorization Act**
- **President's Budget**



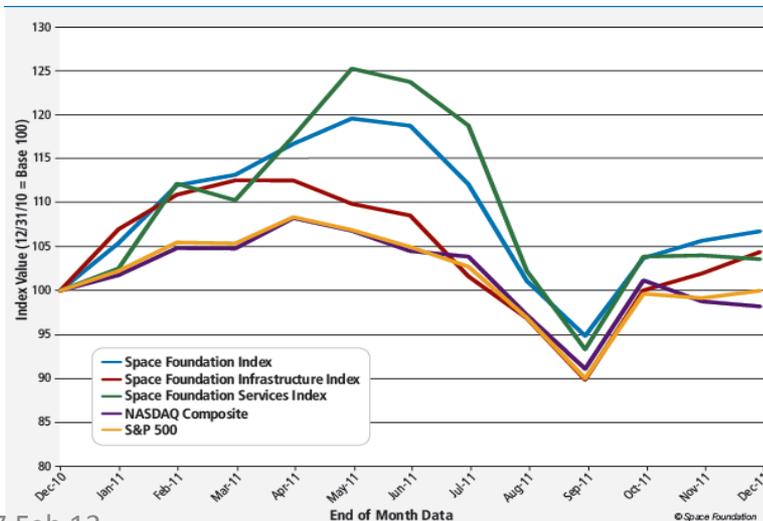


The Space Economy, Budgets, and Growth

(Figures from Space Foundation 2012 Annual Report)



* FY2013 President's Budget Request



- Space Economy grew by 12% in 2011 to \$290B with majority of growth from commercial success rather than increased government spending
- NASA Commercial Cargo and Crew Budget Requests have increased



Policy, Progress, and Potential

“Our goal is the capacity for people to work and learn and operate and live safely beyond the Earth for extended periods of time, ultimately in ways that are more sustainable and even indefinite. And in fulfilling this task, we will not only extend humanity’s reach in space -- we will strengthen America’s leadership here on Earth. “

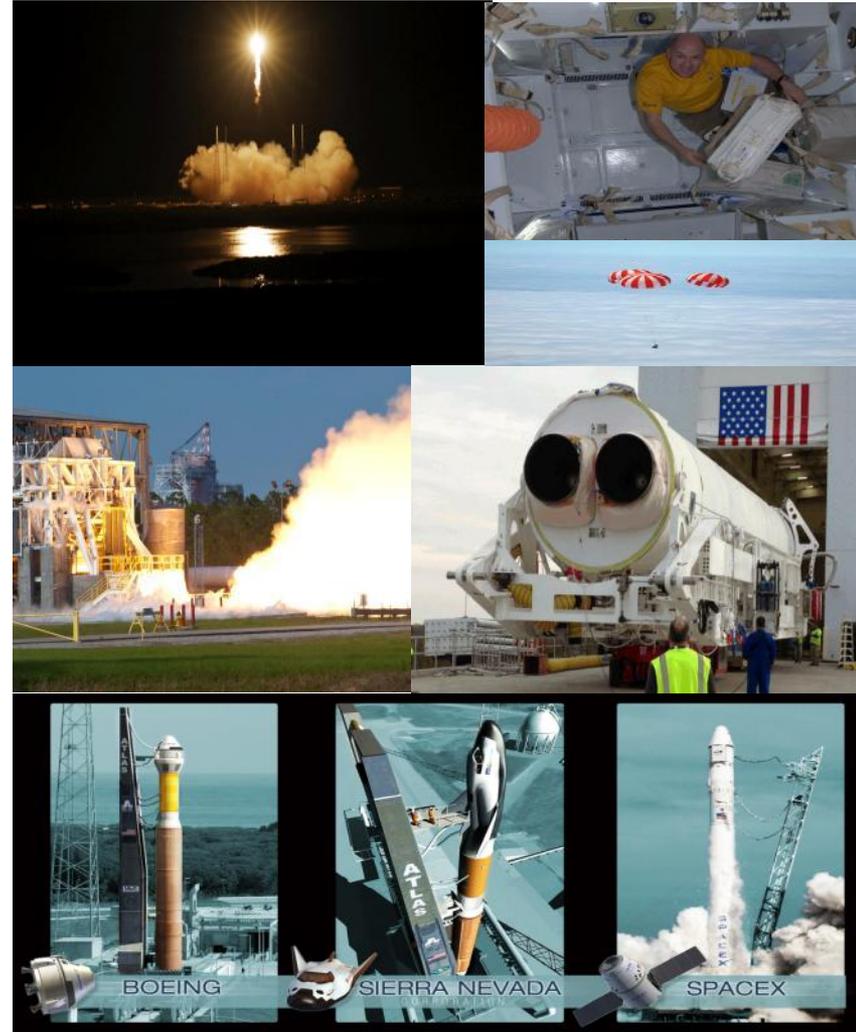
President Obama, April 15, 2010, Kennedy Space Center, Florida





Commercial Cargo and Crew Progress

- **SpaceX**
 - 72 months, 40 milestones, \$396M
 - Developed new U.S. intermediate class commercial launch vehicle (Falcon 9), Dragon spacecraft, LC-40
 - 1st successful end-to-end demo flight (May 2012) and ISS resupply service mission (Oct 2012)
- **Orbital Sciences Corporation**
 - 25/29 milestones to date, \$276M of \$288M
 - 1st flight of Antares planned Spring 2013
 - Demo mission to ISS could occur 3 months after maiden flight
- **Commercial Crew: 4 partners (Blue Origin, Boeing, Sierra Nevada, and SpaceX)** advancing system designs
 - Safety and performance requirements in place and have experienced almost no “churn” in over a year.
 - NASA technical teams established and ready to execute Phase 1 Certification Products Contracts
 - Phase 2 Certification contract strategy being refined
 - Independent Cost Assessment almost complete.





White House Supported Commercial Space Initiatives





Wide Spectrum of Commercial Space Opportunities

as outlined in the Science and Technology Policy Institute Commercial Space Report

Communication

- Fixed telecommunications services (voice, data, internet, multimedia)
- Broadcasting (TV and radio services, video services, internet content)
- Mobile services (data, voice, internet, multimedia, digital radio)

Positioning and Navigation

- Geolocation and navigation updates
- Air transport communication, inventory control
- Agriculture (precise seed planting)

Security/Defense

- C4ISR
- Space Situational Awareness

Energy, Resources, and Environmental Management

- Solar weather forecasting
- Orbital debris monitoring/management
- Earth observation

Launch services

- Military/civilian payloads
- Micro-gravity/Suborbital/ Orbital human spaceflight/training/simulation

Exploration

- Robotic/manned planetary missions
- Earth-like planet hunting
- Earth-crossing asteroid observation and tracking

Education and Research

- Student/university-built satellites and experiments
- Educational broadcasts of space activity
- Space-based research
- Suborbital (atmospheric/microgravity) research
- International Space Station National Laboratory
- Personal space

Potential Space-Based Services

- Space debris mitigation or removal/deorbiting
- Commercial space habitats or stations
- On-orbit servicing/refueling
- On-orbit manufacturing
- Space-based solar power generation
- Extraterrestrial mining

Bringing Space into Earth's Economic Sphere

Earth's Moon

- 382,500 km / 237,674 mi
- Witness to the birth of the Earth and inner planets
- Has critical resources to sustain humans

GEOSYNCHRONOUS ORBIT

MID-EARTH ORBIT

LOW EARTH ORBIT

HEO/MEO/GEO/LaGrange Points

- Telecommunications, Positioning, Navigation, Timing, Geospatial Services, Imagery, Intelligence, Situational Awareness
- Microgravity destinations beyond LEO
- Opportunities for construction, fueling and repair of complex in-space systems
- Excellent locations for advanced space telescopes, science, and Earth Observation

Mars and its Moons

- 54,500,000 km / 33,900,000 mi
- A premier destination for discovery: Is there life beyond Earth? How did Mars evolve?
- True possibility for extended, even permanent, stays
- Technological driver for space systems

Near-Earth Asteroids

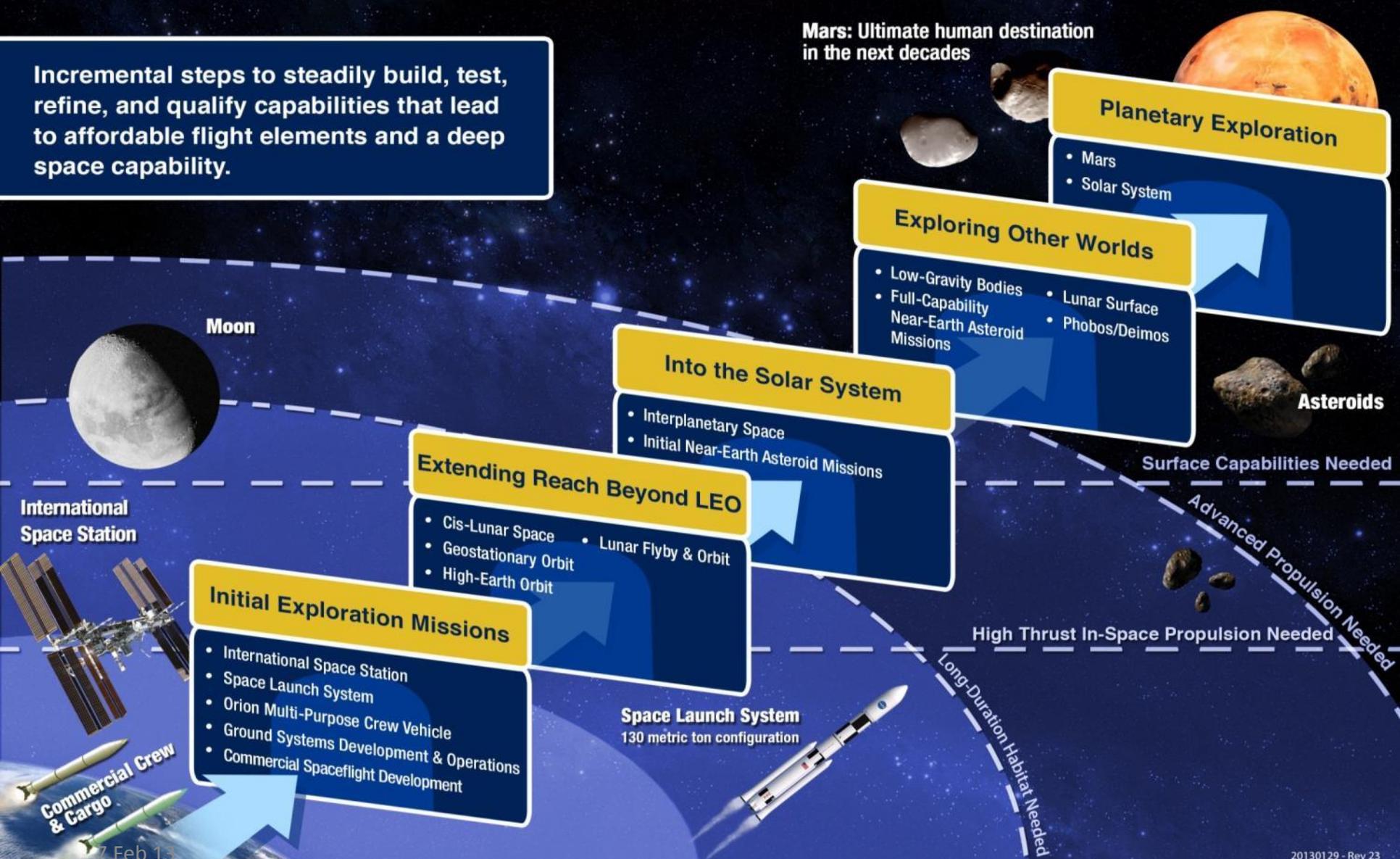
- Compelling science questions: How did the Solar System form? Where did Earth's water and organics come from?
- Planetary defense: Understanding and mitigating the threat of impact resources
- Excellent stepping stone for Mars



Commercial Space: Vital Element of the Space Exploration Grand Strategy and NASA's Capability-Driven Framework

Incremental steps to steadily build, test, refine, and qualify capabilities that lead to affordable flight elements and a deep space capability.

Mars: Ultimate human destination in the next decades



Thoughts on Commercial Space

- **Commercial Cargo and Crew a top aerospace priority**
- **Dawn of a new era for commercial space in civil, commercial, and national security sectors**
- **ISS will be the centerpiece of human spaceflight activities until at least 2020: Historic Commercial Cargo and Crew progress...stability needed**
- **Research and technology breakthroughs will improve affordability, sustainability, and mission opportunities**
- **Several challenges ahead – Interagency and bicameral approach vital**
- **Commercial space part of a balanced and capability-driven Exploration Grand Strategy to asteroids, Lagrange points, the moon, and ultimately, Mars**
- **Prudent national investments + private sector innovation + clear policy, strategy, and plans = success in space + economic/national security**



Thank You



3 Decade Legacy of Progress on Commercial Space

1980s and 1990s

- **The Commercial Space Launch Act of 1984 states the need:** *“...to promote economic growth and entrepreneurial activity through the use of the space environment for peaceful purposes.”*
- **The 1985 Amendments to the National Aeronautics and Space Act (P.L. 85568), NASA:** *“shall ... seek and encourage, to the maximum extent possible, the fullest commercial use of space.”*
- **Launch Services Purchase Act of 1990 (P.L. 105303) required** NASA to purchase launch services for its primary payloads from commercial providers whenever such services are required in the course of its activities.
- **US Commercial Space Guidelines 1991(NSPD-3)** provided guidelines to promote the policy of driving down market costs for private space through government investment
- **The Commercial Space Act of 1998 (P.L. 105303) states that:** *“To the maximum extent practicable, the Federal Government shall plan missions to accommodate the space transportation services capabilities of United States commercial providers;”* that *“a priority goal of constructing the International Space Station is the economic development of Earth orbital space;”* and that *“competitive markets... should therefore govern the economic development of Earth orbital space.”* 7 Feb 13

2000s

- **The Commercial Space Transportation Competitiveness Act of 2000 (P.L. 106405):** *“a robust United States space transportation industry is vital to the Nation’s economic well-being and national security.”*
- **The White House Space Policy (2004) states:** *“the United States Government must capitalize on the entrepreneurial spirit of the U.S. private sector,”* and that *“dramatic improvements in the reliability, responsiveness, and cost of space transportation would have a profound impact on the ability to protect the Nation...and use space for commercial purposes.”*
- **The NASA Authorization Act of 2005 (P.L. 109155) states that:** *“In carrying out the programs of the Administration, the Administrator shall ... work closely with the private sector, including by ... encouraging the work of entrepreneurs who are seeking to develop new means to send satellites, crew, or cargo to outer space.”*
- **The White House Space Transportation Policy (2006) states that U.S. government departments and agencies shall:** *“Use U.S. commercial space capabilities and services to the maximum practical extent; purchase commercial capabilities and services when they are available in the commercial marketplace and meet United States Government requirements...”*

Recent Legal and Policy Guidance

- **The NASA Authorization Act of 2008 (P.L. 110422) states that:** *“In order to stimulate commercial use of space, help maximize the utility and productivity of the International Space Station, and enable a commercial means of providing crew transfer and crew rescue services for the International Space Station, NASA shall make use of United States commercially provided International Space Station crew transfer and crew rescue services to the maximum extent practicable.”*
- **The National Space Policy of 2010 states that U.S. government departments and agencies shall:** *“purchase and use commercial space capabilities...to the maximum practical extent; actively explore the use of ... arrangements for acquiring commercial space goods; refrain from conducting United States Government space activities that preclude, discourage, or compete with US commercial space activities, unless required by national security; actively promote the export of US commercially developed...space goods and services.”*
- **The NASA Authorization Action of 2010 states that NASA:** *“...shall continue to support...enabling the commercial space industry...to develop reliable means of launching cargo and supplies to the ISS.”*