

Why Go to the Moon? The Many Faces of Lunar Policy

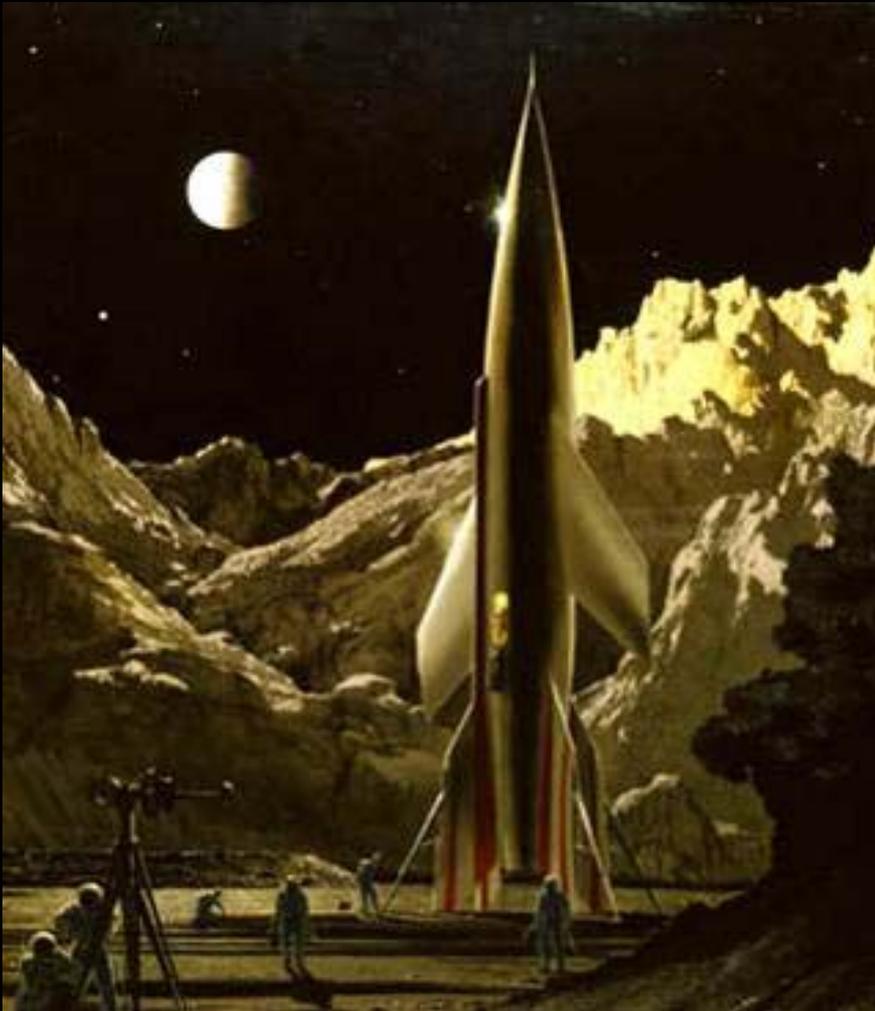


**Roger D. Launius
National Air and Space Museum
Smithsonian Institution**

The Moon as a Target for Human Exploration

- Moon captures the fancy of humankind.
 - The most dominant and changeable element in the night sky.
 - Kindles enthusiasm, joy, lust, fear, and horror.
 - Often associated with deities and supernatural activities.
- Moon fundamental part of modern popular culture.
- Moon early target for U.S./USSR space programs.

Underlying Assumptions in the Human Space Program



- Adventure and discovery/quest for knowledge.
- Popular conceptions of space travel.
- Foreign policy and national security issues.
- Potential economic/public good payoffs.

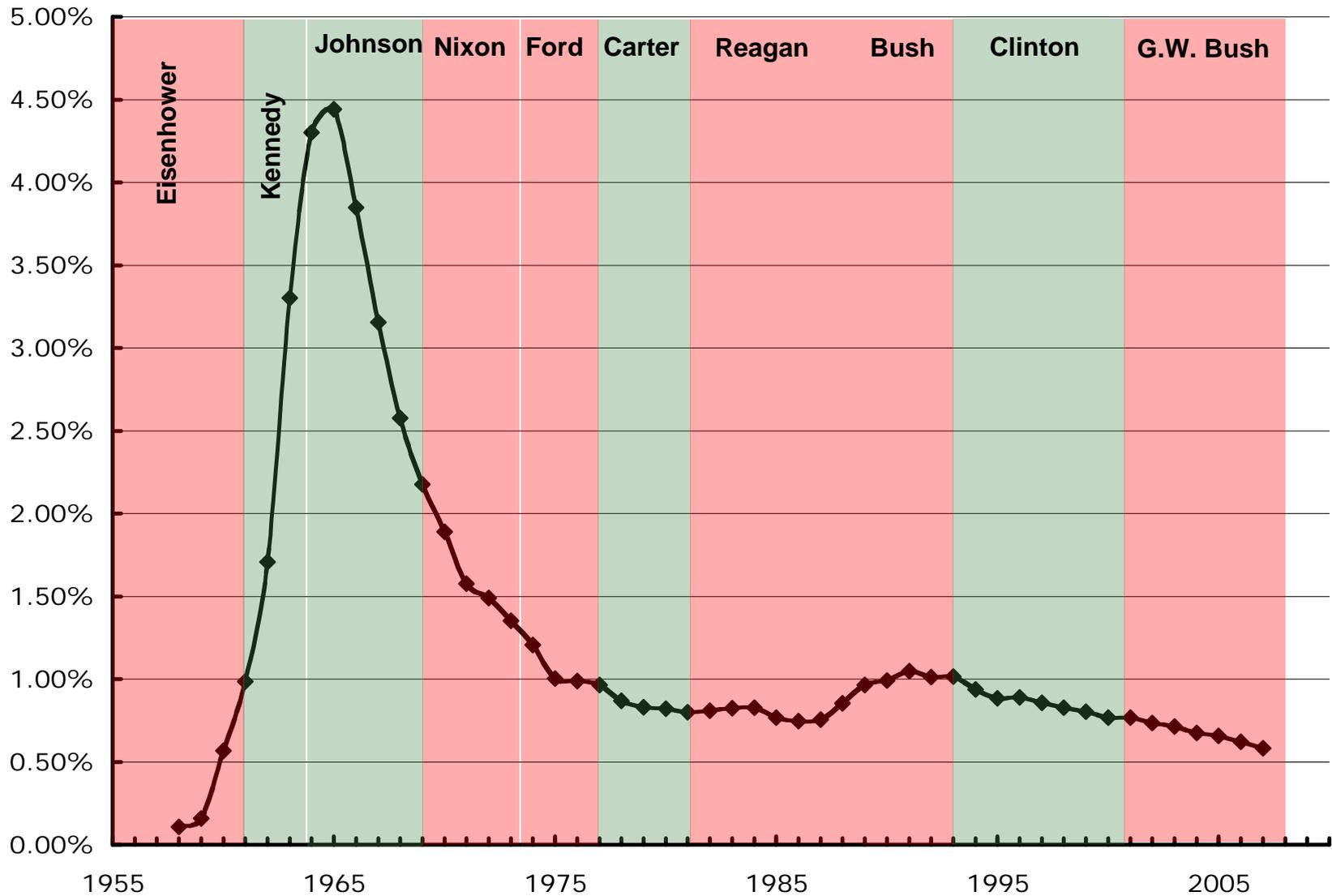
The Apollo Decision

“Fill ‘Er Up—I’m in a Race”

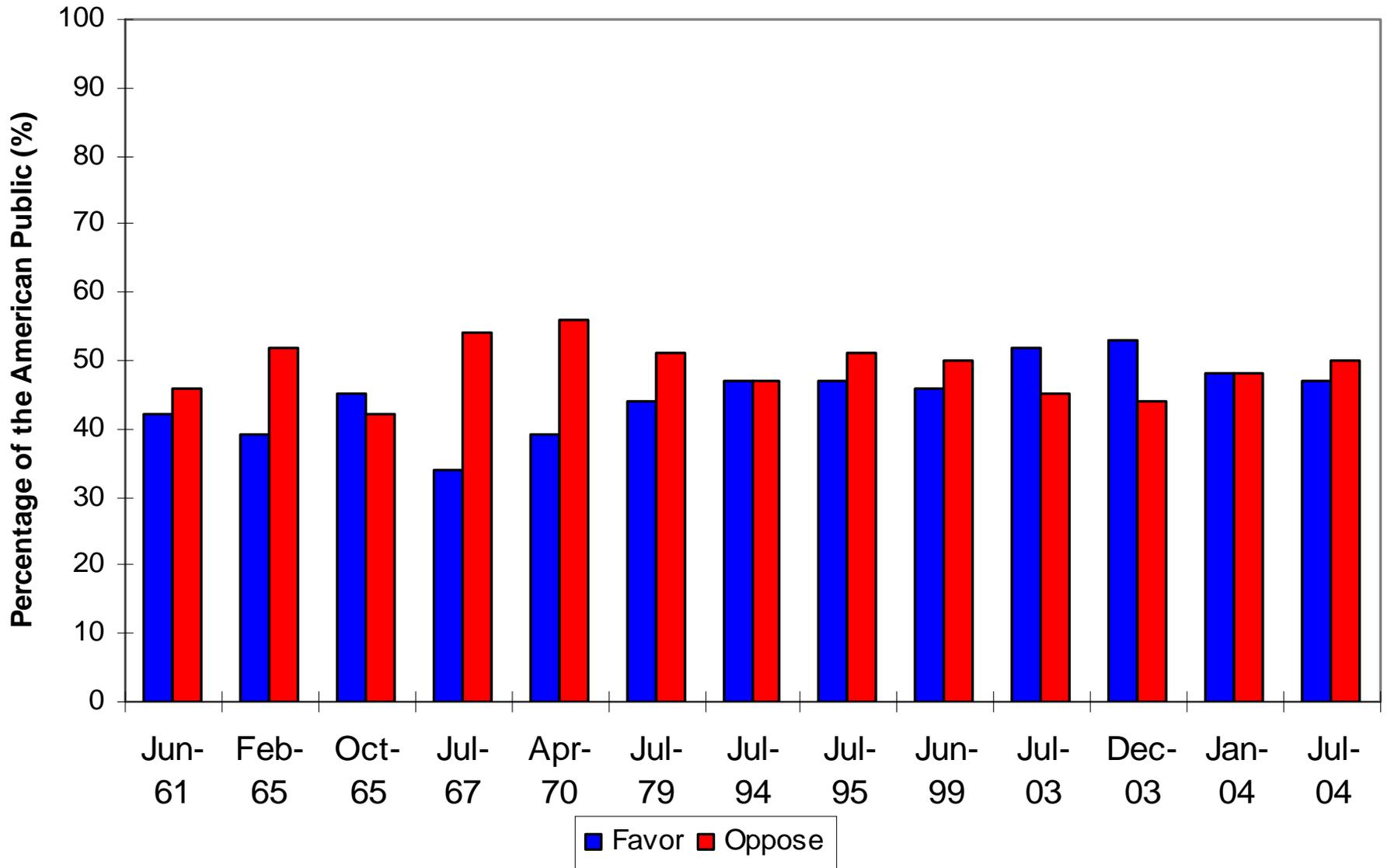


- Project Apollo was in large measure a result of Cold War rivalry
- JFK announcement, May 25, 1961
- “I believe this Nation should commitment itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to earth. No single space project in this period will be more impressive to mankind, or more important for the long-range exploration of space; and none will be so difficult or expensive to accomplish.”

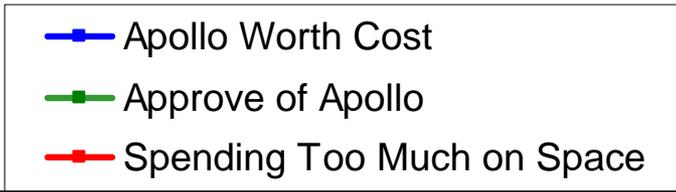
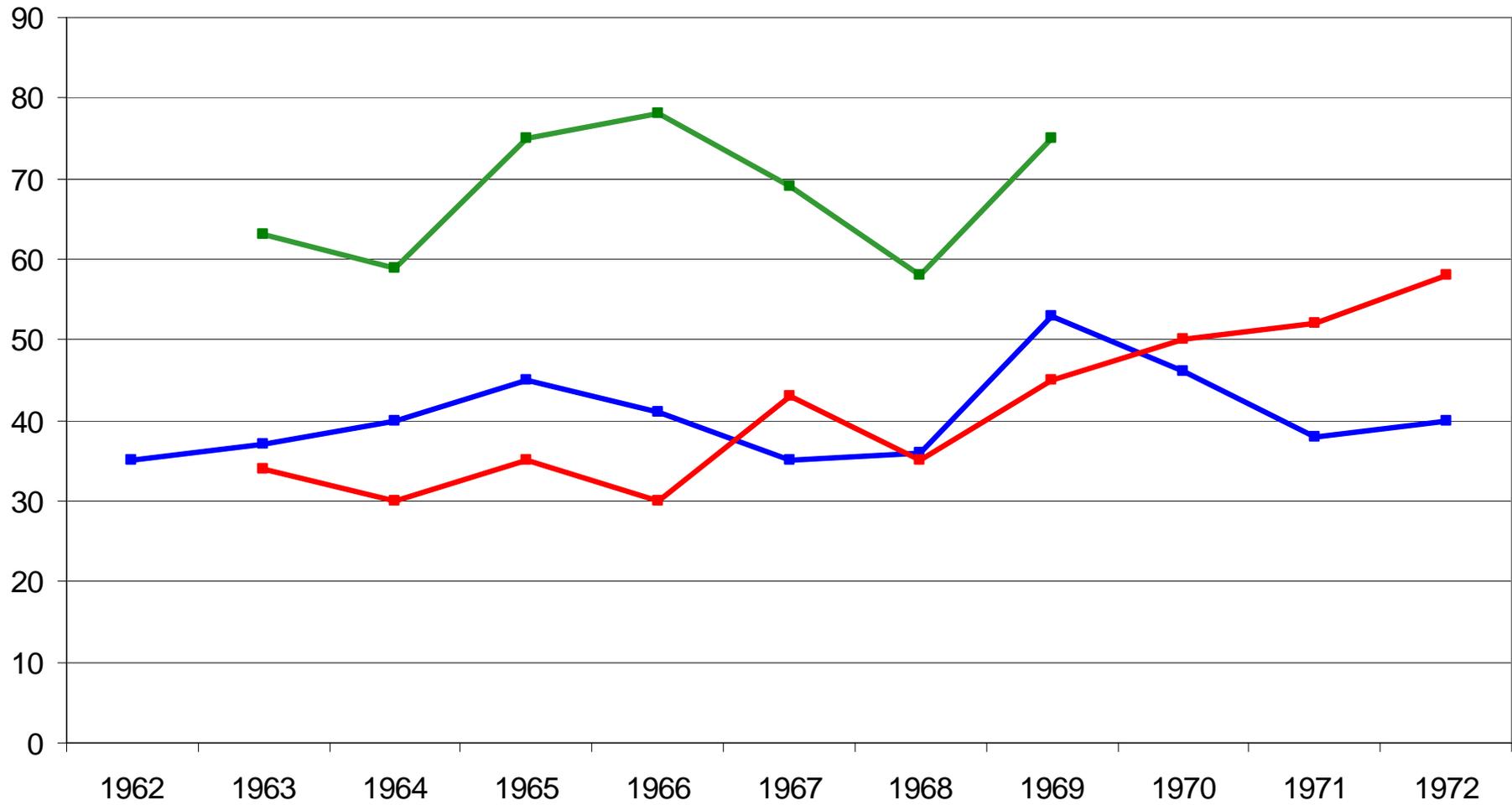
NASA Percentage of Federal Budget



SHOULD THE GOVERNMENT FUND HUMAN TRIPS TO THE MOON?



Public Support for Apollo





Legacies of Apollo



- Strong belief that visionary presidential leadership would overcome all political challenges and ensure success.
- Faith in ability of presidents to dominate the political system.
- All major human spaceflight initiatives predicated on this belief.
- Misplaced belief that practical justifications are unnecessary as long as president announces endeavor.

Making the Moon a Second Home

- Space Task Group Report, 1969.
 - Post-Apollo program included:
 - Space Shuttle.
 - Space Station.
 - Moon base.
 - Human expedition to Mars.
 - Nixon approved Space Shuttle, January 1972.
- Space Exploration Initiative, July 20, 1989.
 - Moon base.
 - Human expedition to Mars.
 - Died by 1991 because of \$400B price tag.
- Vision for Space Exploration, January 2004.
 - Retire Space Shuttle and build new human launch system.
 - Complete ISS.
 - Moon base.
- None of these initiatives addressed the “why” of lunar exploration and/or colonization.

Is a Return to the Moon in Next Generation a Likelihood?



- Pres. George W. Bush's commitment to return to Moon, January 2004.
- Generated some momentum toward acceptance, but little support for increases in NASA's budget.
- No presidential emphasis since announcement.
- Without active presidential support large initiatives are guaranteed to engender little political support.

Challenges for Return to the Moon



- Ensure public support.
- Build on initial experiences; broaden international activities.
- Emphasize military, civil, and commercial operations in Earth orbit as part of the pathway to lunar operations.
- Interweave exploration, science, technology development, commerce, and infrastructure development.
- Explain the “why” of a return to human lunar exploration.

Historic Drivers for Exploration



- God
- Gold
- Glory

Are there Commercial Drivers?

• Beyond

- Asteroid Mining
- Martian Habitats/Settlements
- Outer Planet ^3He Propellant Harvesting



• Lunar Surface

- ^3He Harvesting
- In-Situ Manufacturing
- Lunar Tourism



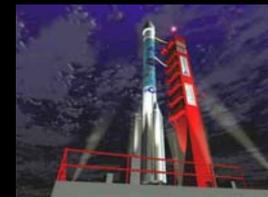
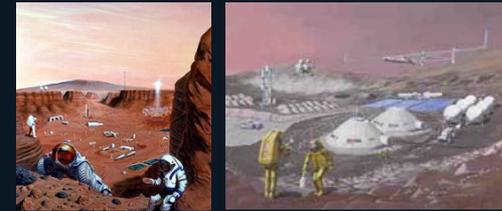
• Earth Orbital to Lunar Surface

- Communications Satellites
- Solar Power Satellites
- Orbital Tourism



• Terrestrial to Earth Orbital

- Earth to LEO Transport
- Space Ports
- Suborbital Tourism



Potential Lunar Long Duration Difficulties

Element

Sortie Outpost

Settlement

Frontier

Lunar Dust

Radiation

Hypogravity

**Synergistic
Effects**

Potential Lunar Long Duration Difficulties

Element	Sortie	Outpost	Settlement	Frontier
Lunar Dust				
Radiation				
Hypogravity				
Synergistic Effects				

Potential Lunar Long Duration Difficulties

Element	Sortie	Outpost	Settlement	Frontier
Lunar Dust	Green	Green with halftone pattern		
Radiation	Green	Red with halftone pattern EVA	Yellow Hab	
Hypogravity	Green	Green		
Synergistic Effects	Green	Green with halftone pattern		

Potential Lunar Long Duration Difficulties

Element	Sortie	Outpost	Settlement	Frontier	
Lunar Dust	Green	Green with dots	Wild Card		
Radiation	Green	EVA	Hab	Surface (EVA)	Depth
Hypogravity	Green	Green	Red		
Synergistic Effects	Green	Green with dots	Red with dots		

Potential Lunar Long Duration Difficulties

Element	Sortie	Outpost	Settlement	Frontier			
Lunar Dust	Green	Green with dots	Wild Card				
Radiation	Green	EVA	Hab	Surface (EVA)	Depth	Surface (EVA)	Depth
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Synergistic Effects	Green	Green with dots	Red with dots				

If spending had to be cut on federal programs, which two federal program(s) do you think the cuts should come from? (Harris Poll 4/10/2007)

Program	Total %	Republican %	Democrat %	Independent %
Space program	51	44	58	49
Welfare	28	43	18	29
Defense spending	28	8	45	28
Farm subsidies	24	29	25	22
Environmental programs	16	30	7	14
Homeland Security	12	3	14	21
Transportation	11	16	9	9
Medicaid	4	6	3	2
Education	3	4	1	2
Social Security	2	3	*	2
Medicare	1	2	*	1

Rationales for Lunar Exploration

- Prepare for future missions to Mars and other destinations, supported by both “government” and private initiatives.
- Pursue scientific activities to address fundamental questions about the solar system and our place in it.
- Strengthen existing and create new global partnerships.
- Expand Earth’s economic sphere to encompass the Moon and pursue lunar activities with direct benefits to life on Earth.
- Engage, inspire, and educate the public.
- Satisfy basic human instincts for exploration.
 - Freedom, betterment, curiosity.
 - New lands, trade, and knowledge.
- Perpetuate eventual settlements of beyond Earth.
 - Comparable to past migrations into our global habitat.
 - Opportunity for the expansion of free institutions.



Do We Choose to Return to the Moon?