Why do humans explore space?

Humans pursue space exploration for five basic reasons. The first emphasizes science, the second reason favors national defense. The third deals with what is called signaling.

Signaling is a relatively intangible process by which individuals and their governments display their economic, technological, and scientific capabilities. It is akin to showing up at a high school reunion in an expensive sports car. The display has symbolic value. In the international arena, it is often meant to demonstrate a nation's eligibility for superpower status. As such, it often confers national prestige. Although the value of the items displayed may be largely intangible and hard to specify, the meaning to displayers and their audiences is usually clear. The items displayed are worth a great deal to them – hence their symbolic value.[1]

Rooted as it is in works of imagination (popular science and science fiction), space travel presents many opportunities for national signaling. The Soviet leadership under Nikita Khrushchev was notoriously reluctant to reveal details about ballistic missile development and rocket launches. Then they saw the overwhelming international reaction to Sputnik 1 and 2. Whatever military advantages secrecy conferred were clearly outweighed by the propaganda value of the succession of Soviet Union "firsts" in space and the display of Soviet cosmonauts.[2]

President John F. Kennedy clearly understood the symbolic value of racing the Soviet Union to the Moon. "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," he told members of Congress in his 1961 proposal. Speaking at Rice University in 1962, Kennedy further explained:

> We choose to go to the Moon in this decade and do the other things, not because they are easy, but because they are hard; because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one we intend to win.

In the Rice University speech, President Kennedy characterized space as the "new sea" and "new ocean." The phrases were a direct reference to the use of naval capabilities to project power during previous eras of terrestrial discovery. Various nations sailed the oceans in search of wealth and power between the 1420s into the 1700s. Those that succeeded, Portugal and Spain among them, became the dominant superpowers of their day. Those that faltered or withdrew, including Russia and China (yes, China), were relegated to positions at the back of the room.[3]

---

[1] Alexander MacDonald, *The Long Space Age*. Yale University Press, 2017: 6-9.

[2] Roger D. Launius*, Reaching for the Moon*. Yale University Pres, 2019: 68-73.

[3] See J.K.S. Kung and C. Ma, "Autarky and the Rise and Fall of Piracy in Ming China." *Journal of Economic History* 74 (no. 2, 2014) 509-534.

Source: NASA Photo

Technological capability would likely determine the outcome of the Cold War and the cooperation of uncommitted countries. In the calculus of Kennedy's mind, signaling the willingness of the United States to engage the Soviet Union in a race to the Moon was worth whatever sum the commitment required. NASA cost estimators had not produced a precise number, but the cost of actually going to the Moon was likely to break $20 billion at a time when the US gross domestic product was pushing toward $600 billion.

Before his assassination, Kennedy made unrequited offers to the Soviet Union to participate in a joint mission – which had its own calculus. The United States would ultimately spend $25.3 billion setting six astronaut crews on the Moon, most of it in pursuit of national prestige.

Ten years after Kennedy's initial commitment, another presidential administration contemplated the future of the post-Apollo human space flight program. Members of the White house staff considered a proposal to cancel the last two missions to the Moon (Apollo 16 and 17) and deny NASA the funds needed to start work on a winged space shuttle. The moves would have effectively ended US human space flight and saved an estimated $9 billion. During the debate, President Richard Nixon received a critical memorandum from his deputy budget director Caspar Weinberger. In a masterpiece on the importance of signaling, Weinberger urged Nixon to refuse the cuts and continue the human flight program. Anything less would send a signal that "our best years are behind us." Wrote Weinberger:

> It would be confirming, in some respects, a belief that I fear is gaining credence at home and abroad: That our best years are behind us, that we are turning inward, reducing our defense commitments, and voluntarily starting to give up our super-power status, and our desire to maintain world superiority…"

Nixon effectively ended the debate by scribbling in the margin, "I agree with Cap."[4]

[4] Dwayne A. Day, "Negative symbolism, or why America will continue to fly astronauts," *The Space Review* (January 16, 2006).

As defense secretary a second decade later, Weinberger opposed NASA's proposal for a large $8 billion orbiting space station. Unlike the space shuttle, which the US Air Force had agreed to use to launch defense satellites, the defense establishment had little use for NASA's big space station and placed limited value upon it.

Because the specific requirements for exploratory success closely parallel the factors that confer superpower status, space exploration works especially well as a subject for national signaling. Superpower status requires a strong economy, military power, technological innovation, cultural imagination, diplomatic skill, and a workable ideology – the classic routes to national power.[5] Space exploration requires much of the same. National leaders seeking a quick route to superpower status that avoids war would be hard pressed to create a better alternative than space exploration – especially those activities that place human beings beyond the planet. Given a choice between space exploration and its more destructive options (such as war), national leaders are wise to invest in the former.

The Soviet Union and the United States could have met on the global battlefield to resolve their differences. Wisely, their leaders chose not to do so. They did compete in athletic events, proxy wars, and covert operations. Yet nowhere did their competition manifest itself more visibly than in space. Space activities created a methodology for measuring the strength of their two systems of governance. The methodology determined the outcome of the Cold War. Their national leaders invested in space for the display of strength and capability that those activities bestowed. A nation that could orbit an astronaut with a military rocket in a peaceful demonstration of technology could also propel a warhead from one continent to another in a hot war.

National wealth, a strong military, a scientific establishment, and a workable culture or national ideology – these are the factors that confer superpower status. They are the same forces that enhance national prestige and the same forces necessary for an effective space program. By directing resources into projects like trips to the Moon, national leaders acquire the power to protect their interests in the councils of government where international decisions are made. In 2019, the People's Republic of China landed a rover on the far side of the Moon and announced plans to place a research station near the lunar south pole – with Chinese astronauts.

The quest for national prestige and the geopolitical advantages it confers helps to maintain government investment in human space flight. The United States went to the Moon, built the Space Shuttle, and organized the construction of the International Space Station in large measure because these projects imparted an image of world leadership. Other nations followed. The desire for superpower status essentially guarantees that no nation that aspires to world leadership in space will ever abandon human flight.

Dr. Howard McCurdy, September 10, 2023

[5] Samuel P. Huntington, "The Lonely Superpower," *Foreign Affairs* (April 27, 2006).