

Resolved: The United States Federal Government should substantially increase space exploration.

Space exploration fires the imagination of people like little else. The 1969 moon landings rank as one of the highest achievements of modern civilization. There is something uncanny about the human need to explore their world, and little captures people's minds like looking up at the stars and wondering.

As a debate topic, space exploration would do the same thing. Like it or not, cross-examination debate participation numbers are declining. A topic like this could fire the imagination of potential debaters, and the easy accessibility of this topic would make the learning curve on the subject less steep than other topics which often require a more detailed background.

It has been an interesting year for the United States space program. President Barack Obama announced in February 2010 that the Constellation program, which was supposed to replace the retiring Space Shuttle program as the US's manned space-flight vehicle, would be cancelled. With this, the fate of the International Space Station (ISS) is very much in doubt, with US reliance on Russian built and operated Soyuz capsules as the only way to send astronauts to the orbiting platform.

Budget concerns loom large for NASA, giving the Affirmative lots of room for potential action by the United States Federal Government. As of June 2010, the coming budget for NASA stands at \$19 billion; however, President Obama has already requested an amendment from Congress to remove \$100 million from the proposed budget to help offset job losses incurred by the ending of the shuttle program.

Meanwhile, debate rages in the Obama Administration, Congress, and outside agencies over the direction of the National Aeronautic and Space Administration (NASA). The two biggest questions are 1) whether space exploration should continued with a focus on manned spaceflight, or if robotic exploration is a better option, and 2) whether the Moon or Mars should be the next target of the agency, especially manned exploration. The answer to each of these questions will set the direction of space policy for the coming decades, as programs take longer to develop with associated costs increasing as well.

Affirmative ground

The topic has pretty large affirmative ground. There are lots of things that qualify for "space exploration," and since 1958, the National Aeronautic and Space Administration has been the United

State's leading organization in space exploration. Ultimately, the affirmative has to decide which way to go. Affirmative ground shouldn't be based on the technology per se, or the vehicle used; instead, each affirmative case should have some ultimate goal in mind, or a particular scientific goal/answer in mind to answer. Here are several possible affirmative cases:

Case Area One: SETI

The Search for Extraterrestrial Intelligence, or SETI, has been done using radio telescopes since 1959 at universities, NASA, and government facilities, such as the Arecibo facility in Puerto Rico. Scientists use the data collected to determine if signals recorded are from natural or artificial sources. Other examples of SETI research include the gold plaques and records carried by the Pioneer and Voyager spacecraft. An example of non-technological SETI research includes the famous "Drake" equation, a mathematical attempt to quantify the number of possible intelligent civilizations in the universe by Frank Drake.

Case Area Two: Resource mining

While life may be the rarest resource in the universe, other materials are far more abundant. Iron is one of the ten most common elements in the universe (hydrogen is the most common), and scientists think that other valuable metals exist in asteroids, along with water in comets. Likewise, carbon is an abundant element in both asteroids and comets. "It has been estimated that the mineral wealth resident in the belt of asteroids between the orbits of Mars and Jupiter would be equivalent to about 100 billion dollars for every person on Earth today," said researcher John Lewis in 1996.

Case Area Three: New Space Vehicles

After the retirement of the Space Shuttle program in late 2010, the United States will not have its own spacecraft available to send astronauts to the International Space Station (ISS), and will be relying on Russia's Soyuz capsule. With the fate of the Constellation program still undecided (the program has been recommended for cancellation by the president but not by congress, and is effectively in limbo), the United States does not have a manned spaceflight vehicle available, with only the Orion CEV (Crew Exploration Vehicle) from the Constellation program in development by 2015. There are private spacecraft, such as Virgin's Spaceship One, which could fill part of the void, but the private craft are currently limited to low-Earth orbit and not capable of docking with the ISS.

Case Area Four: Threat detection

Many astronomers and scientists warn that the greatest threat facing Earth and humanity is not climate change or nuclear war, but an asteroid strike similar to the one thought to have struck the Earth over 65 million years ago and contributing to the demise of the dinosaurs. NASA does operate a Near-Earth Object (NEO) registry and detection program. "We know the threats are real," Representative Dana Rohrabacher (R-Calif.) said. "Earth has been hit many times with devastation ranging from local to regional, and even to planetary scales. It is just a matter of time until the threat appears again, and we must be ready." While there are eleven current national and international search programs for NEO's, they are thought to have discovered only about 45% of the estimated 2,000-plus bodies thought to be larger than one kilometer in diameter, and approximately 7,700 other objects in a near-Earth orbit.

Case Area Five: Colonization

Colonization of another planet is a long-term goal of most space programs and scientists. The two most likely choices are the Moon and Mars. Both have unique advantages and disadvantages, and both capture the public imagination. The Moon is closer, and most scientists suspect that it holds some water reserves frozen beneath its surface. It's proximity means the time to build and supply any colony would be lesser. Meanwhile, Mars, though farther away, has much more of an Earth-like environment (including a thin atmosphere that could offer potential colonists protection) and is thought to contain possible resources such as close access to the large asteroid belt between Mars and Jupiter. Many scientists also think that colonizing either the Moon or Mars would spur not just increased exploration, but also drive an economic expansion comparable to the discovery of the New World by Spanish explorers or the Gold Rush of 19th Century United States.

Case Area Six: Deep Space

One of NASA's more visible and successful programs has been its use of unmanned probes to explore deep space. Currently, the Hubble Space Telescope beams back astonishing images of our galaxy while the Cassini probe unlocks mysteries (and adds more) of Saturn, and the New Horizons space probe will visit Pluto in 2015. Meanwhile, both Voyager spacecraft continue to sail beyond the Sun's heliosphere and outside the known solar system. But there are plenty of options for future deep space missions. The moons of both Jupiter and Saturn, including Europa, Titan, and Enceladus, are of special interest due to the suspected presences of conditions thought to be optimal for life, such as water and organic atmospheric compounds.

Advantages realistically fall into just a few categories. These are large advantages which create significant impacts in the debate round. Wise affirmative teams will point out that many of these impacts can occur quickly and have long term effects.

Advantage One: Economy

The space industry is big business in the US. A common quote is that for every dollar spent on the space program, seven dollars are returned to the economy due to spin-offs and job creation. According to NASA, in 2008 over 18,000 people worked directly for NASA, with another 40,000 government contractors. In addition, thousands of secondary and tertiary jobs are connected to NASA; on July 10, 2010, the US Senate passed a bill calling for the delay of the shuttle's retirement because of its impact on "thousands of jobs" in Texas, Alabama, and Florida. Over 9,000 people work at Kennedy Space Center in Florida alone. But the economic impact of the space program isn't limited to government employees or subsidiaries. The commercial satellite industry reports growth across several fields in 2009 with estimated global revenues of over \$160 billion. Because the space industry is such a massive investment of resources, there is a huge potential for a positive economic impact in terms of employment and industry.

Advantage Two: Spin-off Technology

There are many technologies developed by and for the US space program that eventually found their way into commercial development. Examples include the "Fly-by-wire" technologies which allow more sophisticated aircraft to fly, satellite technologies which have improved weather forecasting, kidney dialysis machines, and medical technologies which helped develop heart pumps. Technologies such as Velcro and Tang, while not specifically developed for the space program, were popularized by their use by NASA.

Advantage Three: Preservation of the Human Race

Lots of disadvantages have terminal impacts of nuclear war, genocide, death by various diseases, even death from the impact of a comet/asteroid. Exploration of space could eventually lead to human colonization of another planet, which makes it more likely that the human population could survive some massive, extinction level event. Likewise, the spin-offs from the space program could lead to this as well. Noted scientists such as Carl Sagan and Stephen Hawking have both argued that humanity risks extinction is confined to a single planet. Sagan said in his book *Pale Blue Dot* in 1994,

“Since hazards from asteroids and comets must apply to inhabited planets all over the Galaxy, if there are such, intelligent beings everywhere will have to unify their home worlds politically, leave their planets, and move small nearby worlds around. Their eventual choice, as ours, is spaceflight or extinction.” Hawking said to the BBC in 2006, “Sooner or later disasters such as an asteroid collision or a nuclear war could wipe us all out. But once we spread out into space and establish independent colonies, our future should be safe.” Ray Bradbury recently said, ““We must move into the universe. Mankind must save itself. We must escape the danger of war and politics. We must become astronauts and go out into the universe and discover the God in ourselves.”

Advantage Four: US Hegemony

The United States military relies heavily upon satellite technology to wage war, from Global Positioning System-guided munitions to precise situational mapping allowing pinpoint deployment of ground forces. Cellular technology allows instantaneous communication between forces in the field and command units across the globe. Unmanned drone aircraft are seeing an increase in deployment. Continued space superiority is a top priority of the US armed forces, specifically the Air Force. Recent developments by other countries, especially China’s demonstration of anti-satellite technology in 2009, and rumored Soviet-era anti-satellite weapons, means that there are possible threats to the US space superiority that could affect US power projection. The satellite, rather than the aircraft carrier, is the current key to American force projection, and any reduction in US space power could affect its ability to conduct global operations. One current and particular concern is the European Union’s desire to set up its own GPS system, called Galileo.

Advantage Five: Discovery

Science still has many unanswered questions, and some of those answers lie in space. In addition, many people claim that the need to explore, to have a frontier, is essential, not just for great powers, but for humanity itself. “Throughout history, the great nations have been the ones at the forefront of the frontiers of their time. Britain became great in the 17th century through its exploration and mastery of the seas. America's greatness in the 20th century stemmed largely from its mastery of the air. For the next generations, the frontier will be space,” said former NASA Administrator Michael Griffin. “It is part of our nature as human beings that we want to explore and try to better understand the world in which we live. Space exploration is the logical extension of that need,” said Janet Wood of

the Jet Propulsion Laboratory. "Through the exploration of the solar system, we can begin to unravel the mysteries of our universe, and to better understand our place in the cosmos."

Advantage Six: Education

The challenges of the Cold War and President John F. Kennedy's declaration that the US would put a man on the Moon drove students of the 1960's into fields of science and mathematics, subjects that current American students perform less well in compared to students from other developed countries. As the National Academy of Sciences' *Rising Above the Gathering Storm* report concluded, a "danger exists that Americans may not know enough about science, technology or mathematics to contribute significantly to, or fully benefit from, the knowledge-based economy that is already taking shape around us." Any increase in a space program will increase educational and job opportunities for engineers, physicists, chemists, mathematicians, and experts in other scientific fields. Since there is a strong tie between level of education and earning power, any program that boosts educational goals could do the same for economic goals.

Negative Cases

Even though the topic appears wide open on the affirmative, any negative can mount an effective attack on the affirmative and resolution itself. I believe this topic will allow stock issue teams to be just as competitive as more progressive teams which use disadvantages, counterplans, and kritiks.

Stock Issues: Topicality

What defines "Space exploration"? Is it limited to our solar system? Beyond it? Are research satellites in Earth orbit monitoring climate change within the definition? And for something to be explored, does it require human exploration, or just robots? Also, I think the question of what is actually substantial is important. Is a single probe or technology substantial?

Inherency

Well, the US federal government is currently funding NASA to the tune of approximately \$100 billion over the next five years. And there has been consistent budgetary support for NASA since the agency's founding in 1947. The affirmative is going to have to work hard to show that there either a structural or attitudinal barrier to their current plan.

Harms

I think there is some overlap with the harms and disadvantage arguments. There is the significant investment of resources that the plan will require, both in money, time, people, and materials. There is a strong trade-off argument that any support of the space program will take away needed resources from other important policies.

Significance

Is it still important to explore space? In light of a large number of problems facing our planet, should space exploration be a priority at all? This is a legitimate question that an effective affirmative should be able to answer. In front of some critics, the actual significance of the space program could be a good debate.

Solvency

Like any topic, there are legitimate questions as to whether or not any affirmative plan can solve their various problems. However, I think that past successes show that with enough funding and research, a particular goal is possible given whatever technology is available (see the Apollo program). The problems of the Constellation program, however, are a clear signal that time and money alone cannot address the challenges in space exploration and spaceflight.

Counterplans

This could potentially be the largest area of negative arguments and offense in a round. There are two basic types of counterplans – agent counterplans that advocate exploration by a different agent beside the USfg, or non-topical counterplans that argue the USfg should focus on a different problem area.

Agent counterplans could include using a different country, such as China, India, Japan, Russia, or the European Union/European Space Agency. Each of these governments has declared their desire to continue their space programs, and most see these programs as sources of national pride. Russia put the first satellite in space, Sputnik, and the first man in space, Yuri Gagarin, and once the shuttle is retired, the Russian Soyuz spacecraft will be the only craft capable of visiting the ISS until the possible development of the Orion capsule by NASA. China, the third country behind Russia and the US to independently put a man in space, has an ambitious space program that aims to put an astronaut on the

Moon by 2020. In addition, China demonstrated anti-satellite capabilities with a planned collision in 2007 that destroyed one of its own satellites, a test that alarmed most other space-faring countries and agencies.

Other possibilities for agents include private industry, such as Virgin Galactic and SpaceX. Over 24 orbital vehicles and rockets are either in development or testing by 18 companies, including the successful Spaceship Two from Virgin Galactic and Bigelow Aerospace's Genesis I inflatable space station, already in low-earth orbit. Nine companies currently launch spacecraft into orbit, led by the French company Arianespace.

Non-topical counterplans offer negatives a chance to show how opposite initiatives should compete with the space program. More is known about the surface of the Moon than the surface of the oceans that make up 70 percent of the Earth's surface. Regardless of its cause, climate change is a problem. Pollution continues to poison the Earth's air and water, and water shortages are a concern. There are an estimated 30,000 nuclear weapons in the world's stockpiles. One-sixth of the world's population lives in poverty. Any of these could offer an interesting policy clash in a round between how best the US's resources are spent.

Disadvantages and Kritiks

The standbys of spending and politics disadvantages are clearly applicable to this topic. In particular, the spending disadvantage should be important, since virtually every space program requires a substantial investment of money; the Apollo program cost over \$30 billion, and space shuttle Endeavour cost \$1.7 billion. Other disadvantages include various trade-off arguments; if the resources are going to the space program, they are not going to other programs. This would certainly tie in as net benefits to various counterplans.

Militarization of space is both a good disadvantage and critical argument. There is certainly a lot of literature that discusses what would happen if any nation, but particularly the US, placed weapons into space. Certainly, the use of GPS satellites could be argued to be weapons, but that certainly is debatable.

There is also a strong argument to be made about the disadvantages of colonization of space. The 1967 United Nations treaty governing space exploration state, "The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the

interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.” However, that certainly could change should one nation acquire significant power or control in space. And who would govern a potential Lunar or Martian colony? These questions could also form the basis of disadvantage arguments or Kritiks.

Another disadvantage could be US leadership. Who should take the lead in space exploration? Why should the US bear either the cost or make this a priority of its policy? What role should the international community, specifically the United Nations, play. The role and importance of US hegemony offers plenty of disadvantage and critical ground.

Possible Resolutions

The United States federal government should substantially increase space exploration.

The United States federal government should substantially increase exploration of space beyond the Earth’s mesosphere.

The United States federal government should substantially increase exploration of outer space.

The United States federal government should substantially increase incentives for space exploration.

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