

1 AC: MARS - Asteroid Mining

Introduction and Resolution

Provide any specific introductions and provide resolution.

Because just one fairly small asteroid can contain trillions of dollars of valuable resources, we affirm the resolution: "The US federal government should commit to establishing a sustained human presence on Mars."

Definitions

Define vocabulary that is important to the resolution or the debate.

- Merriam-Webster's defines commit as "to obligate or pledge oneself."*
- NASA defines sustained human presence as a program using first robots and then astronauts to explore and create long-term bases beyond Earth.*
- We reserve the right to clarify these definitions or present new ones if necessary.*

Current Problem

Short tag line to help listeners know basics of problem.

ELEMENT SHORTAGE

Claim (inherency)

Make an argument about a problem that exists now that would be solved if we adopted the resolution.

On Earth right now there is shortage of important chemicals and metals that we need to create energy.

Evidence

Provide cited evidence and an explanation of how that evidence shows that the problem exists.

- New energy technologies, like solar, wind, and hydropower, are produced using very rare chemicals and metals! The American Physical Society calls these chemicals and metals, "energy-critical elements." They predict that a shortage of energy-critical elements could significantly inhibit the adoption of otherwise game-changing energy technologies. This . . . would limit the competitiveness of U.S. industries . . . and, eventually, diminish the quality of life in the United States."*

¹ APS Panel on Public Affairs & The Materials Research Society, Securing Materials for Emerging Technologies. February 2011, accessed at <http://www.aps.org/policy/reports/popa-reports/loader.cfm?csModule=security/getfile&PageID=236337>

Evidence cont.

- Demand for energy-critical elements has skyrocketed in the last decade. Popular electronics like cellphones and iPods contain many such elements, as do wind turbines and compact fluorescent light bulbs.² According to the US Department of Energy, clean energy technologies take up about 20% of the critical elements in use today.³ As more clean energy technologies are adopted to prevent global warming in future decades, the need for critical elements to produce them will increase as well. Without more of these energy-critical elements, the US will be unable to replace the pollution created by coal power plants and gas-powered vehicles that is causing global warming.

Resolution and Plan

Restate the resolution as a way to solve the problem you mentioned above; include a more detailed plan if necessary.

The U.S. federal government should commit to establishing a sustained human presence on Mars for the purpose of mining energy-critical elements from nearby asteroids and the surface of Mars.

Our plan has four parts:

1. Funding Increase:

Budget cuts by Congress reduced NASA's funds for human space exploration to about \$3 billion. We advocate meeting NASA's full budget request for space exploration of about \$7 billion per year.

2. Staying on the Moon and Robots to Mars:

NASA has experience sending people to the Moon and if something goes wrong, NASA will have less trouble rescuing the astronauts. On the Moon, NASA can test different ideas for mining and creating a sustained human presence away from Earth. The Moon is home

² Vastag, B. (2011, February 11). U.S. urged to safeguard supply of 'energy-critical elements'. Retrieved October 9, 2011, from Washington Post: <http://www.washingtonpost.com/wp-dyn/content/article/2011/02/11/AR2011021903274.html>

³ US Dept. of Energy. (2010, December) Critical Materials Strategy. Retrieved October 9, 2011, from U.S. Department of Energy: http://files.eesi.org/doe_materials_120010.pdf. Page 6.

to Helium-3, a valuable element not found naturally on Earth and used in nuclear reactions. This makes the Moon the perfect place to test automated mining in space. During this time, NASA will send robots to Mars to collect more information about its environment.

3. Human Spaceflight Beyond The Moon:

In the third stage, test animals and then astronauts will take flights beyond the Moon to test flying in space. These flights will eventually build up to a human flight around Mars and back to Earth.

4. Landing on Mars:

Once NASA is confident in sending flights to Mars and bringing them back, landing vehicles for astronauts will be sent to Mars along with life-support technology tested out on the Moon. Mars will be established as an outpost for astronauts to oversee robotic mining on nearby asteroids and possibly the surface of Mars.

How our plan solves the problem:

Short tag line to help listeners know basics of how the plan solves the problem

ASTEROIDS HAVE PLENTY OF ENERGY-CRITICAL ELEMENTS

Claim (solvency)

Make an argument about how your plan will solve the problem you mentioned above.

Establishing a sustained human presence on Mars will allow NASA to mine the important chemicals and metals that we need to create energy.

Evidence

Provide cited evidence and an explanation of how that evidence shows that the problem would be solved if the plan was adopted.

• Using very powerful telescopes, NASA has found that a large number of asteroids have a higher percentage of energy-critical elements than we can find in the Earth's crust. For example, some asteroids are believed to have nearly 1000 times more platinum

and similar metals than could be found in a similarly-sized part of the Earth.⁴ Platinum-group metals are needed to create modern electronics like cell phones, computers and solar power cells, hydrogen fuel-cells for green cars, cleaner gas for tractor trailers, and flat-screen televisions.⁵

- Near-Earth asteroids could be mined by robots with oversight and repairs performed by humans located on Earth, the Moon, and Mars.
- Many near-Earth asteroids move closer to Earth's orbit than the Moon for short times.⁶ A spaceship returning from a near-Earth asteroid at the right time needs only 1% of the energy needed to leave the Earth. This means that spaceships won't need a lot of fuel to carry back large amounts of valuable metals and chemicals from near-Earth asteroids.
- Asteroids get an orbit that brings them close to the Earth when the gravity from Jupiter on the outside or Mars on the inside push them out of the asteroid belt. The asteroid belt is a large area where many asteroids orbit the Sun. When near-Earth asteroids move away from the Earth on their own orbit, they move closer to Mars. By having a sustained human presence on Mars, astronauts can continue to monitor the mining operation on the asteroid and be fairly close if robot mining equipment needs repairs.

⁴ Shane D. Ross, Virginia Tech Engineering Professor, Near-Earth Asteroid Mining, December 14, 2001.

⁵ Martin Creamer, Publishing Editor of Engineering News and Mining Weekly, The uses of platinum-group metals, November 10, 2006.

⁶ Brad R. Blair, Consultant to NASA, The Role of Near-Earth Asteroids in Long-Term Platinum Supply, May 6, 2000. <http://www.nss.org/settlement/asteroids/RoleOfNearEarthAsteroidsInLongTermPlatinumSupply.pdf>

Set Up 2AC

My partner and I will give more in-depth explanations of our plan as the round continues.

Closing

I now stand ready for cross-examination.