

# Lunar and Asteroid Resources Economics and Policy Survey

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**Introduction:** With the looming advent of space resources as an industry, there are several key ethical, political, and economic questions which need to be determined. While historically new industries and exploration guidelines have been left to the elite of society, space is currently in a unique position of being beholden to public opinion, and it is worth accessing the public's feelings in deciding how our society adapts to these new frontiers.

**Design:** Therefore, I will be creating a survey designed to answer 3 main questions relevant to the field of space resource extraction. 1: What does the general population think about looming economic and policy questions, such as property ownership in space, defense of property in space, funding for space resource extraction, and space mining's effects on global and domestic issues? 2: How do these opinions vary among 4 groups: general population, armatures, initiates, and experts? 3: Are surveys like this a good way to engage the general population in space research and make them feel more included or feel more positive about NASA or space exploration?

While these research questions are fascinating, an additional main goal of the project is to provide a voice to the general public and those in the space field whose opinions are not always solicited when making decisions about policy.

**Interactive components:** This talk is meant to be interactive, and due to processing time on approval from my home Institutional Review Board (IRB), I will not be distributing the survey at the conference. However, I will give a 5 minute talk on some context for the survey, project the current survey questions, and open the floor for comments from the audience on what questions or issues they would like to see added to the survey /addressed by the survey. Included below is a list of current questions. If you want, you can

take the mini survey below for some conference-only data.

**Link to mini (13 questions), non-publishable survey:**

<https://s.surveypal.com/EYY1YofZA>

**By clicking the link above, you confirm that you are over the age of 18, a US citizen or permanent resident, and that you allow your anonymous responses to be used only as data for this conference (LunGradCon).**

**Acknowledgments:** All the space news articles out there that have crazy graphic art I used. Thank you for doing this.

Including:  
21<sup>st</sup> Century Tech  
IEEE Spectrum  
Ubergizmo  
LunarLand.com  
Sen

**References:**

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# 2020 LunGrad- Con – Lunar and Asteroid

## Resources Economics and Policy Survey Question List

### Raw Data

#### Age:

18-25  
25-35  
35-45  
45-55  
55-65  
65-75  
75-85  
85+

#### Gender:

Female  
Male  
Nonbinary

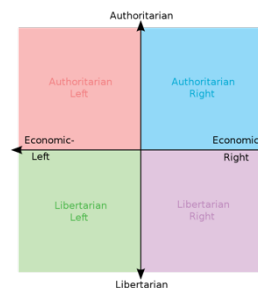
#### Highest level of education:

Some Highschool  
Highschool  
Trade school/Associates degree  
Undergraduate degree  
Masters degree  
Doctoral degree

Broadly, which of the following most closely matches your degree or degrees?  
You can select multiple answers if needed:

Nonspecific  
Art  
Business  
Beauty  
Communications  
Construction  
Culinary  
Education  
Engineering  
Language  
Law  
Mathematics  
Medicine  
Philosophy  
Psychology  
Science  
Sociology  
Transportation

The political compass is based on the classification of Authoritarian (More government) vs Libertarian (Less government) and Economic right vs left. A picture is included on the right. Based on this classification system, which would you most identify with?



Authleft  
Authright  
LibLeft  
Libright  
Center

Do you or someone you are close with work in a Space related field (NASA, Research, industry)?

Yes  
No

## **Survey specific data**

### **Where did you hear about this survey?**

Academic conference  
Space related social media  
Social media  
Referred by friend/family/acquaintance  
Large survey site

### **How do you feel about the phrase “space is the final frontier”?**

Positive, Neutral, Negative

### **What is the first word that comes to mind when I say “asteroid mining”**

Free response

### **Have you ever heard of Asteroid mining before?**

Yes  
No

### **Have you heard that the Moon has valuable resources that can be mined?**

Yes  
No

Asteroid mining is the extraction of resources of value from small bodies in orbit of the sun. These resources can be transported back to earth if they are rare, like platinum, or used in space by astronauts or robots as food, fuel, and building materials. Similarly, the Moon poses resources such which can be used as food, fuel, and building materials, or be transported back to Earth for a profit.

### **Will you seek out more information about asteroid mining on your own?**

Yes  
No  
Maybe

### **Will you seek out more information about Lunar mining on your own?**

Yes  
No  
Maybe

### **On a scale of 1 to 10, with ten being the most interested, rate your interest in asteroid mining as a topic:**

-1-10 scale of

### **Would you consider yourself an expert in space resources or some aspect of space mining?**

Yes  
Not an expert, but I know more than most  
No

## **Start of economics questions**

**What year of this list do you think it is most likely we will mine the first asteroid?**

2025  
2035  
2045  
2055  
2100

further in the future.

**Do you think the first asteroid will be mined by a private company or government?**

Government  
Company

**Do you think the first lunar mining base will be run by a private corporation or a government?**

Company  
Government

**What do you think is the most valuable economic resource in space? If you don't have an option or estimate, please answer "No Answer"**

Open response

**From the list below, select which is the most valuable resource in space in your opinion. Your answer here may be different from the previous question:**

Rare earth elements (like gold)  
Water  
Organics, (like space sugar)  
Oxygen  
Helium 3 (Nuclear fuel)

**What do you think would be the most valuable thing we could gather in space for a Lunar or Martian colony?**

Water  
O<sub>2</sub>  
Organics  
Metals  
Nuclear fuel

**Do you think resources from space will be more valuable to use in exploration of space or to return to earth?**

Exploration of space  
Return to Earth

There is about 50 kg or 2.5 million dollar's worth of gold in a 10-meter metal asteroid. Psyche, a particularly large metal asteroid, is believed to be worth ~30 billion US dollars when accounting for all of its different metals, including gold.

**Would returning this amount of gold would cause an economic downturn of the world's economy?**

Yes  
No  
No answer

**Do you think that Asteroid and Lunar mining will increase the wealth gap between the Global North/First world/Developed countries and the Global South/Third world/Developing countries on Earth?**

Yes  
No  
No answer

**Do you think that Asteroid and Lunar mining would still increase the wealth gap if none of the mined resources ever came to earth/ I.E. if they all stayed in space?**

Yes  
No  
No answer

## Start of policy questions

**Do you think the US government should be investing research money in asteroid mining?**

Yes  
No  
No Opinion

**If no to previous question:**

**Why do you think the US government should NOT be investing research money in asteroid mining? Please select from the list the reason that best matches your opinion:**

Waste of funds  
Disagree with influencing private sector  
Better use of funds possible  
Not under scope of what US government should do  
Will benefit the wrong people  
Funds should go to other aspects of space research

**Should US government invest in asteroid defense?**

Yes  
No  
No opinion

**What actions would governments, companies, or people need to do to own a piece of property in space in your opinion?**

Be able to defend it  
See it first  
Touch it first with humans  
Touch it first with robots  
No property should be owned in space  
Property rights on returned to earth resources only

**Do you feel that Asteroid Property rights and Lunar property rights should be determined the same way?**

Yes  
No  
No Answer

**Would you support private ownership of space property?**

Yes  
No  
No opinion

**If private property existed in space, would you support turning important space exploration locations, such as the Apollo sites, or place of scientific importance, into conserved areas, like National Parks or World Heritage Sites?**

Yes  
No  
No Opinion

**What response is most appropriate to protect US property in space, such as an asteroid claimed by a US company:**

No action is appropriate, we should not try and claim property in space  
Pursuing legal action, ex: mediation through the UN  
Economic sanctions  
Military action in space  
Military action on the ground  
Nuclear strikes

**What response is most appropriate to protect US property in space, such as the Apollo landing site:**

No action is appropriate, we should not try and claim government property in space  
Pursuing legal action, ex: mediation through the UN  
Economic sanctions  
Military action in space  
Military action on the ground  
Nuclear strikes

**Based on current US energy prices per Megawatt hour, there is ~25 trillion dollar's worth of He3, a nuclear fuel, on the Moon.**

**What action best fits what you think the US should do in response to china's plan to extract He3 from the Moon?**

No action  
Build own moon base before China  
Build own moon base after China

**Should resources that remain in space be taxed?**

Yes  
No  
No Opinion  
Depends on circumstance

**Should colonists pay property tax?**

Yes

No

No Opinion

**If yes, should it be less or more than terrestrial property tax?**

\*More

\*Less

\*Approximately the same as terrestrial country of origin

**Should colonist be able to vote in terrestrial elections?**

Yes

No

No Opinion

**How long after the establishment of a Lunar colony should the colony be self-governing?**

\*When it becomes self-sufficient

\*When it pays back the investment that the Government or company that founded it contributed

\*When it asks to be

\*When it no longer adequately represented by terrestrial governments

## **Opinions on Survey/Effect of Survey**

**Do you think that getting a varied set of opinions from Experts and Non-Experts on these topics is important?**

Yes

No

No Opinion

**Do you feel more invested in this topic (Space resources/Space mining) knowing your opinions will be circulated among the Space field?**

Yes

No

No Opinion