2022 ICM
Problem F: All for One and One (Space) for All!

Background

Most of the world's nations signed onto the United Nations' Outer Space Treaty of 1967, agreeing that "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"[1]. The United Nations (UN) aims to promote global peace and reduce inequities. As the foundation of international space law, the Outer Space Treaty has provided the legal underpinnings for projects that have promoted multinational access to space, such as the International Space Station and the use of satellites to browse the Internet in even the most remote locations. But will this international promise of **equity** hold as humankind looks to harvesting space-based resources?

Consider the possibility of **asteroid mining**. There are many open questions about asteroid mining, such as whether it is technically feasible, whether the high initial cost is worth the benefit of what we might find and bring back to Earth, and whether it should be private companies, national governments, or international collaborations that fund these operations, do the mining, and/or receive the financial gains. These questions have yet to be answered, but for the purposes of this problem, let's assume that asteroid mining is feasible at some point in the future and could allow humans to bring valuable minerals back to Earth relatively safely and at a cost that is financially worth the investment.

This problem asks your team to address the following overarching questions: What is global equity, and how will asteroid mining impact it? What are the factors that influence that impact, and how? And what policies could the United Nations propose to increase global equity in a future with asteroid mining?

Requirements

Specifically, to address the above questions, your team should consider the following guiding questions:

- *What is global equity, and how might we measure it?* In other words, develop a definition of global equity. Use your definition to develop a model (e.g., tool, metric) that allows you to measure global equity. Validate your model; this might involve historical and/or regional analyses.

- *What might asteroid mining look like in the future, and how might asteroid mining impact global equity?* One of the challenges in answering this question is that we don't know what the asteroid mining sector will look like in the future; in other words, there are unknown *conditions* including, but not limited to, who is doing the mining, how it is funded, or who will get the benefits in terms of the minerals themselves or the profits from the sales of those minerals. Present, describe, and justify one likely vision for the future of asteroid mining, and determine the impact of mining on global equity with an analysis that includes the use of your team's global equity model.

- *How do changes in the conditions that you selected in defining a vision for the future of asteroid mining impact global equity?* To do this, you may need to develop and implement an analytical approach to explore how changes in the asteroid mining sector could impact global equity differently.

- *What policies could be implemented to encourage the asteroid mining sector to advance in a way that promotes more global equity?* Suppose the UN is considering updating its Outer Space Treaty to specifically address asteroid mining and ensure its benefit to all humankind. Use the results of your analyses to make justified policy recommendations so that the asteroid mining might truly benefit all humankind.

Your PDF solution of no more than 25 total pages should include:

- One-page Summary Sheet.
- Table of Contents.
- Your complete solution.
- Reference List.

Note: The ICM Contest has a 25-page limit. All aspects of your submission count toward the 25-page limit (Summary Sheet, Table of Contents, Reference List, and any Appendices). You must cite the sources for your ideas, images, and any other materials used in your report.

References

[1] *The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies*, of 27 January 1967, United Nations RES 2222 (XXI).

Glossary

Asteroid mining: the process of extracting minerals from asteroids for human use.

Equity: the quality of being fair. Unlike *equality* which promotes providing identical inputs (e.g., resources and opportunities), *equity* focuses on allocating those resources and opportunities in a way that supports a goal of similar outcomes.