

The following documents consider issues related to international law. Read them **both** in order to answer **all** the questions on the paper.

Document 1: adapted from *Floating Treasure: Space Law Needs to Catch Up with Asteroid Mining*, written by Dr Jesse Dunietz in 2017. The article was published by 'Scientific American', a US magazine. The author is a senior academic for Technology, Energy, and Society at SAFE. SAFE unites US military and business leaders to develop policies that improve America's energy security.

The 1967 Outer Space Treaty (OST) forbids the nearly 100 states that have signed it from colonizing objects in outer space or using them for military operations.

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Document 2: adapted from *If space is ‘the province of mankind’, who owns its resources?* written by S Mallick and R P Rajagopalan in 2019. It was published by the Observer Research Foundation, New Delhi, an independent think tank based in India. Mallick was a Law Researcher in Outer Space law at the High Court of Delhi and has published academic articles on Space Law. Rajagopalan is Technical Adviser to the UN Group of Governmental Experts on Prevention of Arms Race in Outer Space.

Unlike the lunar missions of the past, present explorations are led mostly by the private sector eager to exploit mineral resources in outer space. Technological innovation — primarily brought about by commercial players such as Elon Musk — is changing space exploration. Elon Musk is the founder and lead designer of SpaceX, an American aerospace company focused on manufacturing and space transportation services.

Both private international companies, such as Ispace and Kleos Space, and government organisations, like NASA (US) and JAXA (Japan), are researching the feasibility of human and robotic missions to asteroids. Analysts predict that asteroid mining activities could turn into a multibillion-dollar industry. NASA estimates that the value of asteroids could be around USD 700 quintillion — that is roughly USD 95 billion for each of us here on Earth.

This raises the issue of who really owns asteroids. Can anyone simply venture into outer space with a flag and stake a claim? This legal question is critical. Nations must combine their efforts to establish clear globally acceptable regulations for space mining to avoid anarchy.

The present space agreements contain legal loopholes. For example, the 1967 Outer Space Treaty has defined outer space as the “common heritage of mankind”. However, this treaty is insufficient, as it does not provide clear regulations for newer space activities such as asteroid mining. The 1979 Moon Agreement is more helpful. It prohibits countries from commercially exploiting outer space without internationally agreed regulation. However, it doesn’t cover private industry. Also, only 18 nations signed the Moon Agreement none of which have a major space programme. This makes the agreement a failure from the international law perspective, according to Michael Listner, attorney in space law.

Using these loopholes, both the US and Luxembourg have allowed companies exclusive ownership over extracted resources. Their national laws could provide one answer to the problem of ownership — “finders, keepers”. A space lawyer explains, “In terms of the law, yes it’s true that no country can claim any part of outer space as national territory — but that doesn’t mean private industry can’t mine resources.” Luxembourg justifies their space law by quoting maritime law — “owning the fish, not the sea”. However, this is not a fair comparison. Fish can reproduce quickly, whereas minerals cannot.

These new national laws violate the principles of the Outer Space Treaty, which sees outer space as the “common heritage of mankind”. Answers could lie within existing international legal measures. For example, according to Priyank Doshi, author of *Asteroid Mining and The Need For A New Regulatory Regime*, old mining law principles could be used. Before mining the deep seabed, countries have to seek permission from the International Seabed Authority. We could create an international space authority to regulate asteroid mining in the same way.

The UN Legal Committee on the Peaceful Uses of Outer Space met in 2018 and concluded that countries are not against space mining as such. All agreed the need for international coordination and regulation efforts. This gives a lot of hope for an international space agreement to enable the legitimate mining of space resources.

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