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COMMERCIAL SPACE MINING: EVALUATING SPACE SUSTAINABILITY AND CORPORATE SECRECY IN THE NEW RACE FOR EXTRATERRESTRIAL RESOURCES

Abstract

From previous and current missions to study asteroids to the return of humankind to the Moon and eventually having the first astronaut landing on Mars, questions are being raised about how humanity will further its impact by harvesting the Moon and other celestial bodies in a sustainable manner. On the one hand, human presence on the Moon and Mars will only be possible, in terms of economy and feasibility, by utilizing the resources found there. For instance, water extracted from the moon would be more than a life-support consumable for astronauts; it could also be converted into oxygen and hydrogen, which, when combined, make a powerful rocket propellant. On the other hand, the growing interest in minerals found in these celestial bodies and asteroids has led governments and private companies to pursue a goal beyond space exploration per se. American companies like AstroForge and TransAstra are currently aiming for prospective M-type asteroids (rich in iron and nickel) and platinum group asteroids, especially in near-Earth orbit, which are expected to be worth billions of dollars. But even as AstroForge is closer to starting this venture, the targeted asteroid is being kept secret to avoid competition.

Applying these two companies as a case study, this paper will address the ethical and environmental implications of what these potential commercial space mining endeavors would bring and highlight current international and national space law on these issues. This evaluation includes key considerations to analyze the beneficial and detrimental consequences of these activities, such as: loss of scientific opportunities, planetary protection, dust and debris streams, and asteroid trajectory changes, as a result of the same planned activities carried out by these two companies. Notably, a few nations like the United States, Japan, Luxembourg, and the United Arab Emirates have instituted legal frameworks to allow the growth of the space mining industry. This paper contributes to the discussion by assessing current ethical and policy frameworks and identifying relevant gaps for further consideration.