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Expert Analysis

Mining Outer Space: Who Owns the Asteroids?

Over the last two years, U.S. business and policy makers have focused afresh on the commercial possibilities of the asteroids—the solar system’s minor planetary objects. Most of these are located between Mars and Jupiter, while some are closer to Earth. Some have large deposits of precious metals and other potentially valuable substances.¹ In the last few years, some private operators have announced plans to mine them commercially, a concept that, until now, has been exclusively the realm of science fiction.²

In apparent response to these initiatives, the House of Representatives recently passed the “Space Resource Exploration and Utilization Act of 2015,” H.R. 1508, part of a broader SPACE Act of 2015, H.R. 2262. The proposed legislation aims to assure private companies of title over “[a]ny asteroid resources obtained in outer space”³—assuming, of course, that they are eventually able to get there. Although this initiative only began in the late part of the last congressional session, with relatively brief hearings, it was sponsored by key members of the House Committee on Space, Science and Technology.⁴ The bill now goes to the Senate (where it already has at least two potential adherents, including presidential candidate and Senator Marco Rubio).⁵ If enacted, this will be a bold, if controversial, development in U.S. space policy.

By
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The ‘Law’ of Space

Until the Sputnik launch in the 1950s, few steps had been taken in defining the legal rules relating to outer space. Indeed, the only circumstance in which “ownership of space minerals” was relevant was if someone was fortunate (or unfortunate)

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enough to encounter a meteorite, i.e., the remnants of a meteoroid (a solid body traveling through space) that has survived collision with the Earth. One pre-“space age” case involved a property dispute over a meteorite that landed in Forest City, Iowa, in 1890; another dealt with disputed claims to the “Willamette” meteorite situated in Oregon. Both were decided in favor of the owner of the land in which the rock was found.⁶

In 1967, there was a successful effort to define the basic principles of space law. The Outer Space Treaty of 1967,⁷ drafted during the “space race” and rapidly embraced by the community of nations, contains a series of general rules intended to promote the peaceful use of

outer space. Most relate to navigation and space flight—reflecting the aspirations (and limits) of the era. Two, however, are potentially relevant: Article I of the OST states that “[t]he 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.”⁸ Article II states that “[o]uter space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.”⁹

Together, these articles mean that space cannot be subdivided into national “colonies,” in the manner of 19th century European powers. But there is a difference between appropriation of territory (in this colonial sense) and appropriation of mineral resources, as occurs in commercial mining—and OST says nothing in particular about the latter.¹⁰ Attempts to fill this “gap” in the 1970s, in the form of a further treaty to regulate commercial exploitation of celestial bodies, resulted in open ideological confrontation.

In 1979, the United Nations Committee on the Peaceful Uses of Outer Space finalized and circulated for signature the “Moon Agreement”—whose principles would have applied not only to the moon but also to “other celestial bodies within the solar system,” including the asteroids, unless “specific legal norms” were implemented regarding “any of these celestial bodies.”¹¹ Under this treaty, all lunar mining activities would have been carried out

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under the supervision of an international licensing body.¹² In addition, the Moon Agreement stipulated that the moon (and all celestial bodies) were “the common heritage of mankind”¹³—an expression that, for some, reflected a socialized/collectivist mind-set.

Although initially supported by the Carter administration and signed by a few states, the Moon Agreement met stiff resistance within the United States, with one critic (a future Secretary of State) warning it would “doom any private investment directed at space resource exploration.”¹⁴ The United States withdrew support for the Moon Agreement, and eventually it garnered only 16 ratifications, with none from spacefaring nations.¹⁵

The furor over the Moon Agreement coincided with heated debate over what was then a draft of the U.N. Convention on the Law of the Sea (LOSC). The 1978 draft contained a chapter, known as “Part IX,” seeking to regulate the mining of the deep seabed by establishing an international “authority” to license and regulate such activity. When “Part IX” found its way into the final text of the Law of the Sea Convention as enacted in 1982,¹⁶ the Reagan administration refused to ratify the treaty. To this day, despite a deal in 1994 that reformed many aspects of Part IX (including provisions that had been criticized as collectivist),¹⁷ the United States still has not ratified the LOSC. All the same, the LOSC does state that, for licensed seabed operators, “[t]itle to minerals shall pass upon recovery in accordance with this Convention”—an assurance that finds echoes in the current draft asteroids legislation.¹⁸

Another “faraway” place, Antarctica, was the subject of a proposed mining regime: the 1988 Convention on the Regulation of Antarctic Mineral Resource Activities, which would have permitted licensed operators to conduct mining on the southern polar land mass.¹⁹ Environmental pressures led this treaty to be shelved in favor of a long-term moratorium on mineral activities in the Antarctic.

In sum, the legal status of mining in remote, extra-national areas such as outer space remains opaque, even con-

tentious. As distinguished space expert Professor Joanne Gabrynowicz of the University of Mississippi testified to Congress (when commenting on an earlier iteration of the present asteroids legislation), the space treaty regime “is unclear and contradictory regarding the appropriation of natural resources.”²⁰

U.S. Legislation Is Unveiled

Inherent in the U.S. opposition to the Moon Agreement and the debate over Part IX of LOSC was a concern that private actors, and indeed state-owned enterprises, need to be incentivized if they are to conduct the hazardous and capital-intensive activities associated with remote mining. One such incentive

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is legal: to guarantee that minerals are the title of those who extract them, thus allowing them to be freely sold once they reach market.

In this vein, the proposed Space Resource Exploration and Utilization Act states that “[a]ny asteroid resources obtained in outer space *are the property of the entity that obtained such resources*, which shall be entitled to all property rights thereto, consistent with applicable provisions of Federal law and existing international obligations.”²¹ The proposed act furthermore requires the Executive to “promote the right of United States commercial entities to explore outer space and utilize space resources, in accordance with the existing international obligations of the United States, free from harmful interference, and

to transfer or sell such resources.”²²

The bill further provides that “[a] United States commercial space resource utilization entity,” defined as either a U.S. operator or a foreign operator that has “voluntarily submitted” to U.S. jurisdiction, must “avoid causing harmful interference in outer space”²³—an obligation that mirrors the United States’ own obligation, in the OST, to safeguard against activity by its own nationals that “would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the Moon and other celestial bodies.”²⁴

An operator that submits to the statutory framework may bring a civil action in U.S. federal court against “another entity subject to United States jurisdiction causing harmful interference to its operations with respect to an asteroid resource utilization activity in outer space.”²⁵ In such claims, a “first in time” principle will apply, such that the claims of an operator will be upheld if: (1) the operator—(A) acted in accordance with all existing international obligations of the United States; and (B) was first in time to conduct the activity. Claims would also be upheld if “the activity is reasonable for the exploration and utilization of asteroid resources.”²⁶

By these mechanisms, the bill’s sponsors evidently intend for U.S. operators (and those of friendly nations) to achieve clear legal title over any resources mined from the asteroids.

Similar legislation was proposed (but not passed) in the 2013-2014 congressional session, in the form of the “American Space Technology for Exploring Resource Opportunities In Deep Space Act,” or “ASTEROIDS” bill.²⁷ This bill was the subject of hearings held in September 2014 before the House Subcommittee on Space (now referenced in the House Committee report endorsing the current legislation).²⁸ Although several industry and think tank representatives testified in favor of the ASTEROIDS Bill, others were more guarded, with one private operator saying that there should have been more consultation with business (as opposed

to scientific/academic groups).²⁹ For her part, Professor Gabrynowicz opined that the bill (as then drafted) needed some further refinement³⁰ (this now seems to have occurred, at least in part).³¹ She also warned that, while the bill's immediate impact on space law would be "modest," its "political" consequences (i.e., the reaction of rival spacefaring nations) would be "sizable."³²

The "political" complications bear reflection, especially if rival space powers such as Russia, India and China were to enact rival legislation. Still, in the absence of clear international rules, U.S. policymakers have a somewhat plausible case for taking unilateral action. The Senate is likely to consider all of these points, if and when it takes up the issue.

To date, and despite some well publicized (and quite awe-inspiring) private planning initiatives, the only spacecraft to reach the asteroids have been government-funded scientific probes. Whether and to what extent private operators can "mine" them is mainly still a technological question (how to do it); however, recent advances in space and robotic technology, exemplified by the recent Rosetta comet probe and New Horizons Pluto mission, suggest the project may become technologically feasible. Should this occur, then legal incentives, as contained in the proposed Space Resource Exploration and Utilization Act, may become relevant. At that point, this policy area will morph from mildly significant to very significant. At the very least, the bill's sponsors should be commended for promoting awareness of this issue.



1. See Susan Thomas, "Gold rush in space? Asteroid miners prepare, but eye water first," Reuters, Nov. 21, 2013, <http://www.reuters.com/article/2013/11/21/us-space-mining-asteroids-idUSBRE9AK0JF20131121> ("some platinum-rich asteroids just 500 meters across could contain more than the entire known reserves of platinum group metals. Studies based on observation and meteorites suggest space is even richer in iron ore.").

2. See, e.g. "Asteroid Mining Venture Backed

by Google Execs, James Cameron Unveiled," space.com (April 23, 2012), <http://www.space.com/15395-asteroid-mining-planetary-resources.html> (last visited July 22, 2015) (describing formation of Planetary Resources, Inc., which "plans to mine near-Earth asteroids for resources such as precious metals and water").

3. H.R. 2262 §51303(a), 114th Cong. (2015) (bill text); see also Press Release, posey.house.gov, House Passes Posey's Bipartisan Legislation to Promote Commercial Space Ventures (May 21, 2015), available at <http://posey.house.gov/news/documentsingle.aspx?DocumentID=394240> (press release by the bill's sponsor, Representative Bill Posey). This originally was a stand-alone bill, H.R. (H.R. 1508), but was folded into a broader "Space Act" that passed the House in May 2015.

4. See "U.S. House Passes Bill to Spur Commercial Ventures in Space," Wall Street Journal (May 21, 2015) (noting that the asteroids legislation was "controvers[ial]" among some House members because of a perceived lack of hearings and concerns that the language may "violate international space treaties"). The legislative history is discussed below.

5. See "Asteroid Property Rights Legislation Introduced in Congress," Parabolic Arc (May 10, 2015), <http://www.parabolicarc.com/2015/05/10/asteroid-property-rights-legislation-introduced-congress/> (last visited July 1, 2015) (describing support by Senators Patty Murray and Marco Rubio).

6. See *Oregon Iron Co. v. Hughes*, 81 P. 572 (Or. 1905) (rejecting claims by native Americans to the "Willamette" meteorite, a large iron-nickel meteorite located on company's property); *Goddard v. Winchell*, 52 N.W. 1124 (Iowa 1892) (holding that a meteoroid falling into private land belonged to the owner of the land) See also Douglas G. Schmitt, "The Law and Ownership of Meteorites," *Meteorites & Planetary Science* 37 (Supp.), B8 (2002) (surveying various countries' rules on meteorite ownership).

7. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, 18 U.S.T. 2410 (opened for signature Jan. 26, 1967) (hereinafter OST). One hundred one states have ratified, and a further 25 states have signed, the OST. See Status of International Agreements relating to Activities in Outer Space, U.N. Office for Outer Space Affairs, <http://www.oosa.unvienna.org/oosa/en/SpaceLaw/treatystatus/index.html> (last visited July 1, 2015).

8. OST, art. I.

9. Id., art. II.

10. See Congressional Testimony of Joanne Irene Gabrynowicz Before the Subcommittee on Space of the Committee on Science, Space, and Technology United States House of Representatives (Sept. 10, 2014), <https://science.house.gov/sites/republicans.science.house.gov/files/documents/Gabrynowicz%20Final%20Testimony%20H.R.%205063.pdf> (hereinafter Gabrynowicz Testimony).

11. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, G.A. Res. 34/68, U.N. Doc. A/RES/34/68 (Dec. 5, 1979), reprinted in 18 I.L.M. 1434 (1979) (hereinafter Moon Agreement), preamble. <http://www.unoosa.org/oosa/en/members/index.html>.

12. Id., art. 11(5) (international body shall "govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible"); see also id., art 11(7)(d) (calling on body to seek "equitable sharing" of resources mined from the moon).

13. Id., art. 11(1).

14. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies: Hearings before the Subcomm. on Science, Technology, and Space of the Senate Comm. on Commerce, Science, and Transportation, 96th Cong. 2d Sess. 12, 219-20 (1980) (statement of Alexander Haig, President, United Technologies Corp.).

15. Comm. on the Peaceful Uses of Outer Space, Status of International Agreements relating to activities in outer space as at 1 January 2015 (Apr. 8, 2015), http://www.unoosa.org/pdf/limited/c2/AC105_C2_2015_CRP08E.pdf.

16. United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397 (hereinafter LOSC).

17. Agreement relating to the implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, July 28, 1994, 1836 U.N.T.S. 42.

18. LOSC, supra note 15, Annex III, art. 1, 1833 U.N.T.S. at 528.

19. Convention on the Regulation of Antarctic Mineral Resource Activities, 27 I.L.M. 859 (1988) (hereinafter CRAMRA).

20. Gabrynowicz Testimony, supra note 9, at 7.

21. H.R. 2262 §51303(a) (emphasis added).

22. H.R. 2262 §51302(a)(3).

23. Id. §51303(b).

24. OST, art. IX.

25. H.R. 2262 §51303(c).

26. Id. §51303(d).

27. ASTEROIDS Act, H.R. 5063, 113th Cong. (2014).

28. H.R. Rep. No. 114-153 (2015) (Report of the Committee on Science, Space, and Technology on HR 1508), <https://www.congress.gov/114/crpt/hrpt153/CRPT-114hrpt153.pdf>.

29. See Jeff Foust, Hearing Raises Questions About Asteroid Mining Bill, SpaceNews (Sept. 10, 2014), <http://spacenews.com/41825hearing-raises-questions-about-asteroid-mining-bill/> (quoting Sept. 9, 2014, letter from Deep Space Industries "subtly critical that the hearing's witnesses were primarily scientists, with no representatives from industry. 'We suggest therefore that in the future the committee reach out into those communities more appropriate to this new realm of activity.'").

30. See id. (quoting Professor Gabrynowicz).

31. Among other things, the text of the "Space Resource Exploration and Utilization Act," particularly its key provisions concerning title to minerals and "harmful interference," makes greater allowance for the existing "international obligations" of the United States than the prior draft ASTEROIDS Bill, which did not flesh the issue out in detail.

32. Gabrynowicz Testimony, supra note 9, at 6.