

Who owns the moon?

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The first successful moon landing of a private lander, Odysseus, last week came a month after Japan and six months after India touched down on Earth's natural satellite.

As more states and private companies reach the moon, some experts say,

adequate legal framework and [international agreements](#) may be needed to avoid conflicts.

"Many hundreds of billions of dollars have been invested over the last several decades with the hope that the moon will turn out to be a resource for [commercial activity](#), commercial development of the minerals and the water ice on the moon," says Anthony Grayling, a British philosopher and founder of New College of the Humanities in London. NCH finalized its merger with Northeastern in 2019.

"Exploration of new frontiers will produce new ways of imagining, new challenges, new technologies that can be of tremendous utility," says Grayling, who moderated a fireside chat Monday that was part of Northeastern's "Thinking the Future" series and recently published a book, "Who Owns the Moon? In Defence of Humanity's Common Interests in Space."

Commercialization can also create friction and rivalries between different parties, he says, that can lead to potential conflicts.

However, Mai'a Cross, dean's professor of political science, international affairs and diplomacy and director of the Center for International Affairs and World Cultures at Northeastern, does not see companies or states taking advantage of the lack of regulations and starting something conflictual.

"The reason is because we have international norms and we have space diplomacy going on," says Cross, who was on the panel Monday.

Historically, interaction of humans in space, she says, has been highly cooperative and peaceful.

Space is a really difficult and expensive area to operate in, she says. The

Artemis accords, for example, support creation of notifications and coordination zones, because landing two objects within a kilometer of each other can cause significant damage.

"It makes much more sense for us to continue this track record of a peaceful presence and cooperation in space," Cross says.

The example of Odysseus, created by Houston-based company Intuitive Machines, shows that private companies can benefit from cooperative missions with such state entities as NASA, and as businesses progress into space they will be interested in protecting and growing their profits rather than getting involved in conflicts.

"They're more worried about safety and the ways in which they can operate," Cross says.

Michelle Hanlon, co-director of the Air and Space Law Program at the University of Mississippi School of Law and its Center for Air and Space Law who participated in the panel discussion, says that although there might be a robust framework for exploration of outer space, a stronger, specific and more detailed framework is required for activities on the moon.

She says the landscape of legal regulations of any activities on the moon is untouched, but she does not see any new treaty being signed anytime soon in the current political climate around the globe.

The Outer Space Treaty, a multilateral agreement signed in 1967, provides some guidelines, Hanlon says, rooted in the principles of free exploration and use of the celestial bodies exclusively for peaceful purposes.

Under current agreements nobody can claim territory on the moon by

sovereignty, user occupation or other reasons. The treaty also stipulates that no [nuclear weapons](#) or weapons of mass destruction can be brought to outer space.

Cross does agree that there is a big risk and the world is at a critical juncture in terms of whether space might become weaponized. But so far, she says, governments have prevented weaponization of space from happening.

"It has almost reached the level of taboo," she says. "I do think that militaries will plan for worst case scenarios, such as a potential arms race in space, but this doesn't mean that it will happen."

In an ideal world, Cross says, there would be an international organization, a global space agency, that would enable everyone to share all of the resources and discoveries that come from space exploration.

For now, space diplomacy regulates the ongoing dialogue, Cross says, which involves communication, transparency and persuasion.

"If you're worried that an actor is taking something too far, diplomacy is a process where you actually try to curtail some of these misunderstandings that lead to self-fulfilling prophecies," she says.

The U.S. has been building up allies around the Artemis accords, a non-binding multilateral agreement to return humans to the moon by 2026, with the ultimate goal of expanding space exploration to Mars and beyond, signed by 36 countries but not Russia and China.

Russia and China have joined forces to build the International Lunar Research Station on the moon, welcoming several other countries that are not part of the Artemis accords into their alliance.

A controlled landing of a spacecraft on the lunar surface without significant damage to either the lander or the scientific instruments it carried, i.e. [soft landing](#), is still a true challenge. Only five countries have been able to soft-land on the moon in the last 60 years: the United States, Russia (USSR), China, India and Japan. The moon has gravity but no atmosphere, which makes a gradual descent challenging because a spacecraft landing is entirely dependent on engines and not parachutes.

India's successful soft landing of Chandrayaan-3 spacecraft consisting of a lander and a rover on the [moon](#) in August broke the stronghold of Russia, China and the U.S., Hanlon says, and opened access to space to everyone at lesser cost.

"The achievement of India was fantastic, not only because it heralded the entry of a new major space actor, but also because it inspired all of the [young people](#) and the citizens of India to think about science and space," Cross says.

Humans should cooperate and engage in adventures, she says, push boundaries and get new knowledge from exploration together.

"Seeing Earth from space, it's fragile," Cross says. "We all live there. That's our only home."

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