

# Op-ed | Practical applications of a space mission authorization framework

spacenews.com (<https://spacenews.com/op-ed-practical-applications-of-a-space-mission-authorization-framework/>) · by Kevin O'Connell, et al. · April 11, 2023

The National Space Council recently completed three public listening sessions on the issue of In-Space Authorization and Supervision, often described broadly as mission authorization. These terms seem vague and bureaucratic, and mainly the purview of regulators and lawyers. However, given the importance that mission authorization plays in encouraging innovation in a rapidly growing space economy, it's too important to be left to those folks alone.

Let's demystify the concept and explain some of the practical aspects that we expect to happen as exciting new space activities come to market. Satellite refueling, human spaceflight, space nuclear power, and even asteroid mining are only a few examples of the missions that will drive the space economy from the half-trillion dollars it is today to between \$1-3 trillion dollars over the next two decades. If today's rapid pace of change continues, the space economy of 2040 will involve over 100,000 space objects in multiple orbits, include a robust set of permanent lunar activities, and extend benefits to us on Earth far greater than we've seen heretofore. Government regulation, including mission authorization, needs to enable these missions rather than hinder them.

## **Why are we discussing mission authorization?**

U.S. government oversight of space activities is critical to fulfilling its requirements under the United Nations (UN) Outer Space Treaty and also to ensure that space remains sustainable for continuing commercial, civil, and

defense activities. Yet the legal and policy tools that government has currently deployed for oversight of space activities are fractured, limited, and sometimes serve as a brake on American innovation. Within the established regulatory regimes, the National Oceanic and Atmospheric Administration (NOAA) regulates commercial remote sensing, the Federal Aviation Administration (FAA) regulates launch safety and reentry, and the Federal Communications Commission (FCC) regulates use of radiofrequency spectrum by space operators. Additional technical, policy, or process requirements may be required by NASA, the Department of State, or the Department of Defense. Ideally, in such a fast-moving sector, where both industry and government are learning, government oversight should focus on developing an approach that has a light touch and is transparent and highly efficient.

Bureaucratic uncertainty almost always leads to process delays without consideration of the business impact, potentially prompting U.S. companies to move their activities overseas where regulatory hurdles do not exist.

The U.S. government has the most historical familiarity with traditional space mission areas, hence the basis for regulation. However, the rate of change in space technologies often creates uncertainty for regulators because proposed new activities deviate from past experience, triggering caution, especially when it comes to safety and security. As new space capabilities come into the market, they'll invoke concepts and technologies where the government has no necessary advantage, and by necessity, they'll involve other U.S. agencies that have no space experience whatsoever. Bureaucratic uncertainty almost always leads to process delays without consideration of the business impact, potentially prompting U.S. companies to move their activities overseas where regulatory hurdles do not exist. An effective mission authorization framework needs to balance U.S. innovation and market leadership interests against legitimate safety,

foreign policy, and security concerns, as well as establish mandatory timelines for and transparency in government decisions. The framework should also include appropriate loops between industry and the U.S. government.

## **Examples of how mission authorization would work**

Let's posit that a commercial company develops the ability to refuel satellites, both those with and without designs that anticipated such a possibility. The first service, refueling satellites that are designed to easily accommodate the process, is already in the market, while the refueling of satellites without an inherent facility is more futuristic, but certainly in the realm of possibility given rapid advances in space robotics, materials, and manufacturing. Appropriate traditional government management of this activity would include oversight of:

- Safety of maneuvering, rendezvous, and docking activities, including coordination of planned maneuvers with nearby space operators and formal permissions to approach orbiting objects
- Orbital debris mitigation requirements for all parties, including the fuel depot
- Use of onboard cameras to support rendezvous and docking operations, as well as incident space situational awareness
- Radiofrequency allocations
- State responsibility and liability for multi-national ventures
- Protection and reuse licensing for non-client space objects collected during the mission

What if a commercial company wants to launch and maintain an orbital hotel in low Earth orbit that will accommodate six customers and one company employee for stays of up to one week? The facility will have the capability to fly

autonomously when no one is on board, and transportation to and from will be handled by a commercial launch provider. Traditional government oversight and also some novel questions might include:

- Certification of the orbital vehicle for human occupation, including occupant safety and well-being
- Frequency and manner of monitoring activities to ensure compliance with government certifications
- Safety of rendezvous and docking operations, as well as reentry operations. Is there a difference between crewed and uncrewed operations?
- How are issues related to liability and export controls dealt with, and are they different for U.S. and international customers?
- How will medical emergencies and crime in space be handled?
- What Earth-based certifications and regulations should apply, such as those related to food safety?

The advent of space nuclear power and its importance for deep space exploration triggers a wholly different set of authorization questions, including the key involvement of the Department of Energy and the Nuclear Regulatory Commission. How will they factor into the FAA's payload review and launch licensing process? Beyond domestic regulations, the UN Outer Space Treaty, the 1992 UN Principles Relevant to the Use of Nuclear Power in Outer Space, the 1986 International Atomic Energy Agency (IAEA) Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency, and the IAEA Convention on Early Notification of a Nuclear Accident would be applicable to both the U.S. government's obligations as well as to a commercial space operator. Issues ranging from compensation for damages, notification of reentry, and assistance in the event of an accident are government issues covered by these international agreements, but the roles and responsibilities of commercial operators also will have to be defined.

Finally, lunar mining triggers an entirely different set of questions related to ownership and permissions needed under domestic and international law, commodity sales and taxation, and any proximity restrictions on the asteroid. Lunar mining will invariably involve multiple launches to create a mining capability. As we have seen in areas like space sustainability, current geopolitical tensions here on Earth are limiting productive international discussions about this and other badly needed norms for governing space activities.

For those who reject additional space regulation, the choice is between enabling U.S. industry with a comprehensive framework or being left with the current fractured system, which does almost nothing to encourage innovation in new mission areas.

For every one of the new activities mentioned and submitted by us as relevant case studies to the National Space Council, there are a dozen more, each demanding thoughtful consideration about complex issues and how and where regulation can enable innovative U.S. space activities. The examples cited here illustrate that a continuing whole of government approach is absolutely necessary to sustaining American leadership in the space economy. Many U.S. government agencies that have rarely or never been involved in space-related issues will inevitably have roles in enabling space exploration and space commerce.

For those who reject additional space regulation, the choice is between enabling U.S. industry with a comprehensive framework or being left with the current fractured system, which does almost nothing to encourage innovation in new mission areas. A new mission authorization framework can and should be enforced by Executive Branch and congressional oversight to ensure U.S. global leadership in space exploration and space commerce.

# Creating a broad and effective mission authorization framework

While the topic of mission authorization and how to implement it is challenging, historic bipartisanship on space issues — including the idea of incubating, evolving, and facilitating the creation of a world-class U.S. commercial space industry — has inspired thought leadership and entrepreneurship to make progress on these issues. Policy developments like the Biden administration’s Space Priorities Framework and the Trump administration’s Space Policy Directives have provided solid footing to inform a broad and effective mission authorization framework. Congressional leadership directed at encouraging private sector rights and advancing U.S. industry also have been helpful. Well-established industry certifications and standards are important sources to leverage. Private investors who have helped catalyze growth can also be helpful to government on the possible impacts of regulation in addition to encouraging responsible corporate behavior.

Finally, given the expected growth in the number of U.S. government organizations potentially involved in mission authorization, a single focal point — the Office of Space Commerce (OSC) — should be authorized, resourced, and organized to manage efficient processes focused on navigating complex government trade-offs to ensure that the U.S. commercial space sector can continue to thrive and innovate. As the U.S. government’s advocate for the economic growth and technological advancement of the U.S. commercial space industry, OSC and the Department of Commerce should work with industry to establish processes that meet the mission authorization requirements in a fashion that allows the space industry to continue to lead globally.

***Kevin O’Connell**, Space Economy Rising, and former director, Office of Space Commerce, U.S. Department of Commerce. **Ken Hodgkins**, International Space Enterprise Consultants, LLC. **Chris Kunstadter**, AXA XL. **Sandra Magnus**, AstroPlanetview, LLC, and former executive director, American Institute of*

*Aeronautics and Astronautics (AIAA). **Steve Oswald**, Association of Space Explorers. **Chris Stone**, Mitchell Institute's Spacepower Advantage Center of Excellence. **Brian Weeden**, Secure World Foundation.*

*This article originally appeared in the April 2023 issue of SpaceNews magazine.*

## ***Related***

[spacenews.com \(https://spacenews.com/op-ed-practical-applications-of-a-space-mission-authorization-framework/\)](https://spacenews.com/op-ed-practical-applications-of-a-space-mission-authorization-framework/) · by Kevin O'Connell, et al. · April 11, 2023