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Public-Private Partnerships for Outer Space: Challenges for Future Regulation

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SYNOPSIS

While public-private partnerships for outer space are increasingly common in both the civilian and military spheres, the development of relevant regulations has lagged. Strengthening regulatory frameworks, particularly to achieve space sustainability and manage the militarisation of outer space, will be crucial for space powers regardless of their size and capabilities.

COMMENTARY

Since the end of the Cold War, the outer space domain has undergone significant transformation, with more states joining the race and private companies increasingly entering the field. Commercialisation has led to heightened competition, driving down costs. The expansion of the private space industry in many states has also given governments more options to advance their space capabilities, resulting in the rise of public-private partnerships (PPPs) for both civilian and military space activities.

While states remain significant actors, they increasingly collaborate with and [rely on](#) private companies through PPPs. For instance, the US Space Force (USSF) has formed [partnerships](#) with private entities to enhance its strategic capabilities while minimising costs. Notably, SpaceX has been actively involved in [launching](#) military satellites for the USSF, using its Falcon 9 and Falcon Heavy launch vehicles.



A SpaceX Falcon 9 rocket was launched on 14 Feb 2024 as part of a classified US Space Force (USSF) mission sending six satellites to orbit. States are increasingly collaborating and relying on such private companies through public-private partnership partnerships (PPP) for both civilian and military space activities.

Image by Wikimedia Commons.

Beyond the major established space-faring states, emerging space powers too increasingly utilise PPPs to advance their capabilities, including for military space activities. For instance, the Indian Air Force is [transforming](#) to become the Indian Air and Space Force, and the Indian Armed Forces has signed five contracts with private companies, with four more being drafted. In addition, the Indian government plans to award [contracts amounting to about US\\$3 billion to the private sector to make the Indian space sector more independent and competitive](#).

However, the private space industry's growth and greater involvement in military space activities brings significant regulatory challenges. Outdated space treaties and slow progress in domestic regulatory frameworks in both major and emerging space powers mean that there are few enforceable restraints on state behaviour in outer space and greater risk for escalatory behaviour in the military context.

Current Limitations of the Space Legal Regime

The regulatory framework governing outer space activities is complex, encompassing national laws, international treaties, and specific regulations addressing security and military concerns. At the international level, the 1967 Outer Space Treaty and other related treaties, including the 1972 Liability Convention, form the cornerstone of space law. These treaties have not been updated since the Cold War and are stuck in a time when the nature of global politics and the level of commercialisation of outer space activities were vastly different.

According to the 1972 Liability Convention, [responsibility](#) for outer space activities falls on the state that carried out the launch. There are [two categories](#) of state responsibility: direct and indirect. Direct state responsibility involves a state being responsible, through either its actions or omissions, for a wrongful act that contravenes an international treaty, customary international law, or both.

On the other hand, indirect state responsibility takes place when a state is held responsible for the wrongful actions of non-state actors or entities within its jurisdiction. This may include situations where a state fails to prevent or punish the actions of

private individuals or companies whose conduct violates international law. Given how liability under international space law is currently framed, states are the main entities accountable for space activities, including those of private companies and activities operating under PPPs, despite private companies' increasing involvement and influence in the space sector, especially military space activities.

The lack of a comprehensive space legal regime also creates uncertainties around the militarisation and weaponisation of space. While current treaties prohibit nuclear weapons in orbit, they do not explicitly ban conventional weapons or military bases on celestial bodies. This legal ambiguity allows for varied national interpretations and implementations, leading to a fragmented approach to military space operations. The increasing role of private companies complicates accountability as these entities are not directly bound by international treaties but have direct influence in space activities.

While there have been attempts to establish some form of governance involving soft laws or norms through international and regional organisations (e.g., the United Nations Committee on the Peaceful Uses of Outer Space, the European Union Code of Conduct, International Code of Conduct for Outer Space Activities), as well as industrial standards, progress has been slow. Also, these mechanisms are not binding and therefore not enforceable.

Consequently, states remain the key bearers of responsibility for safety and sustainability in space. As international space law dictates that all commercial activities in space must obtain authorisation from and ongoing supervision by a state, states [exercise their responsibility](#) through the use of domestic policies and regulations – often in the form of licences.

However, the development of domestic regulatory frameworks differs among space-faring states, with overall progress remaining slow. Furthermore, many states have not progressed beyond general licensing and registration, which raises concerns about how the gap can be bridged between space activities conducted by the private sector and the need for adherence to international laws. Bridging this gap is especially important for addressing the urgent issue of safety and sustainability in space, which affects all outer space activity, whether civilian or military in nature.

For instance, despite pioneering initiatives for space sustainability and debris removal, Japan does not have a [specific law](#) that expressly mandates orbital debris removal. The government has established guidelines for licensees to limit debris, but there are no legal implications for non-compliance. The absence of legal accountability therefore leaves a significant gap that cannot be entirely filled by soft governance processes such as norms.

Paths Forward

A sustainable and peaceful future for outer space activities will depend heavily on whether states can leverage domestic regulatory frameworks while the international space legal regime catches up.

Enhancing existing domestic regulations and developing new targeted ones could help public and private entities navigate collaborative operations in space, particularly with

regard to sustainability. A critical area requiring urgent attention is debris, which poses a [significant threat](#) to all existing and future space missions. Regulations focused on debris mitigation would be beneficial if they can encourage the development and deployment of technologies to actively remove space debris and maintain a safe and sustainable orbital environment.

Mandating end-of-life disposal plans for satellites and other space assets is another area of concern. Regulation to address this issue would ensure that defunct space objects are safely de-orbited or moved to graveyard orbits, reducing the risk of generating additional debris. Tackling debris and implementing end-of-life disposal for satellites would also contribute to the development of more effective [space traffic management](#) and coordination for a safer operational environment.

Space-faring states – regardless of their size and capabilities – will need to consider how to address these issues as part of an effort to strengthen their domestic regulatory frameworks. The growing involvement of the private sector and of PPPs will add an additional layer of complexity beyond what domestic registration and licensing can solve. When it comes to sustainability, for example, private companies could be required to provide detailed plans for debris mitigation and end-of-life disposal of their space assets.

In the future, states may also explore the possibility of establishing stronger enforcement mechanisms, including but not limited to hefty fines for non-compliance with regulations. Stronger enforcement would simultaneously allow space companies to be held responsible and liable, paving the way towards reconsidering the state-centric conceptions of responsibility and liability in space treaties.

At the international level, maintaining meaningful communications and collaborations among space-faring states and potentially private companies would be essential for ensuring stability within this common realm. If participants in such communications can exchange their objectives and plans for military space activities, they can help minimise strategic miscalculation and avoid unnecessarily fuelling an arms race in space.

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