

TRESPASSING ON THE FINAL FRONTIER: REGULATORY CHALLENGES FOR NEW SPACE ENTRANTS

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Issue Brief

There is increased demand across the globe for governments to find ways to improve the efficiency and effectiveness of service delivery. The space regulatory environment is not an exception to this trend. Ensuring that U.S. space policy is agile enough to evolve with a growing commercial space industry can help ensure both access to space for all and safety in space for all. This issue brief revisits topics addressed in *Navigating the Policy Compliance Roadmap for Small Satellites (November 2017)* in light of recent events.

Introduction

On March 10, 2018, *IEEE Spectrum* broke the news that four small satellites, built by Swarm Technologies, were launched into space by an Indian Polar Satellite Launch Vehicle rocket, despite being denied frequency approval by the Federal Communications Commission. The news resulted in a flurry of commentary from across the industry and an examination of United States space policy for launch approval. Our recent paper, *Navigating the Policy Compliance Roadmap for Small Satellites*, delves into the intricate web of U.S. space policy and its impact on small satellite missions seeking approval for launch. This brief revisits several subtle points of U.S. space policy relevant to the Swarm Technologies launch.

Policy Challenges

The first point we examine is the role of the launch provider. In most launches today, the launch provider is not the final policy authority for the satellites it deploys. Free-flying satellites, once separated from their launch

vehicle, must adhere to the policies of their country of origin or registration, not the country from which they are launched. The Swarm satellites, built in Menlo Park, California, must therefore follow U.S. space policy, despite being launched from an Indian rocket. At the same time, the Indian launch provider is under no legal obligation to ensure or enforce such compliance. Many launch providers do indeed review their manifests to ensure that satellites have met applicable policy guidelines, but this is complicated when multiple satellites from multiple agencies (and multiple countries) launch together on one rocket. It is impractical to ask launch

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providers to fully understand the regulations of potentially dozens of agencies or to assume responsibility for the legal compliance of

satellites from around the world, but it behooves launch providers to be good stewards of space. It is likely that future launch vehicle providers will pay closer attention to the certification status of the missions they are launching.

Another subtle point of policy relates to debris mitigation regulations. The Swarm satellites were denied a frequency license because of concerns over their trackability. Title 47 of U.S. Code, which governs commercial satellite frequency licensure, requires satellites to demonstrate compliance with many specific debris mitigation guidelines, but trackability—the ability of ground assets to locate and track objects in space—is not mentioned. U.S. space policy and the U.S. Government Orbital Debris Mitigation Standard Practices also have no guidelines related to trackability. The Swarm satellites are very small—a quarter of the size of the smallest standard CubeSat—and this may make them difficult to track, but it is not clear if Swarm Technologies understood that its license approval might be contingent on the size of the satellites. To avoid such problems in the future, clear guidelines on satellite size and trackability should be published. The Federal Communications Commission and other approval agencies could spell out such guidelines in filing instructions, without the need to change U.S. law or national space policy.

The fact that the Federal Communications Commission is the regulatory approval agency for space debris compliance for U.S. commercial satellites also leads to potential loopholes. Unlike the Department of Defense or NASA, which route frequency approval and debris compliance packages through different offices, the Federal Communications Commission examines commercial satellite debris mitigation plans as part of the frequency approval process. The assumption is that any satellite requires radiofrequency communications with the ground to function, and thus the denial of a frequency license effectively grounds the satellite. However, one could conceive of satellites with no need to transmit or receive data at all—art projects, for example, or calibration satellites for optical tracking systems. Such satellites have no need to apply to the Federal Communications Commission for a frequency license and, under current commercial regulations, would therefore undergo no review for debris compliance.

The Federal Communications Commission’s denial of Swarm’s frequency license also came less than a month before launch. By this time, many CubeSats are already assembled into deployers, and some are already integrated onto the launch vehicle. It is not clear if this was the case for Swarm, but feedback timelines for Federal

Communications Commission approval are routinely very long compared to the short development cycles of CubeSats. A company faced with a denial of its frequency application might choose to launch the satellites anyway and never command them, rather than de-integrate from the launch vehicle and risk delaying the launch (or incurring financial penalties from the launch provider). This technically does not violate any policies, but it does not serve the interest of reducing untrackable objects in space. A better approach might be for satellite companies not to integrate onto the launch vehicle at all if their frequency approval is not in hand—or for launch providers to require proof of compliance before integration. The U.S. might also consider whether such approvals should be required before shipment of U.S. satellites overseas for foreign launch. But in all cases, prompt feedback is key. An early, high-level review of a satellite’s frequency application by the Federal Communications Commission, identifying potential problem areas and providing timely and actionable feedback, could help prevent such dilemmas in the future.

Time for Change

It is time to reexamine the framework of U.S. space policy in light of the dramatic changes in the space enterprise over the last decade. A better standardization of regulations across military, civil, and commercial sectors would help close loopholes and reduce confusion. A central government gateway for all space policy licensing could also ensure that compliance packages are routed correctly and receive prompt feedback, providing greater consistency and certainty for new entrants.

Consistent with direction from the National Space Council, the Department of Commerce has announced efforts to simplify the regulatory environment for commercial space, including assessing reforms that would make the Department a “one-stop shop” for commercial space regulatory processes. The House and the Senate are each working on legislation that focuses on regulatory reforms. Secretary of Commerce Wilbur Ross has stated, “Right now, if you think about it, it takes longer to get all the regulatory approvals than it does to go from design to launch. We don’t think that the regulatory process should be the gating element of a launch. It should be the technology and the production of the equipment.” (*Space News*, March 5, 2018)

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