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SURFACE TO SPACE INTEGRATION: MIXED USE OF THE AEROSPACE DOMAIN

Abstract

Commercial space launch and reentry operations have increased in frequency over the past decade. The Federal Aviation Administration (FAA) has also granted an increase in the number of launch sites, or spaceports, in recent years. In order to fulfill plans for networked satellite systems in low earth orbit, there is projected to be an order of magnitude increase in the number of launches over the next five to ten years across a more geographically dispersed range.

This increase will strain the shared use of the national and international airspace. The passenger and commercial airline industries have worked closely with the FAA, NASA, and the national security establishment to accommodate the current launch needs. However, even the current schedule, with fewer than three launches per month on average, already exacts an economic toll on the airlines and passengers as huge swaths of airspace are closed to accommodate launch and reentry.

In this paper we establish a risk analysis framework focusing on strategic, operational, and tactical challenges associated with the shared use of airspace (alternatively these can be thought of as the requisite policies, procedures, and practices). The strategic or policy programs include categories like the regulatory framework; the operational procedures include details such as whether a launch is manned or unmanned; and the tactical practices relate to the best practices created across the civil, commercial and national security domains.

In creating this framework, we address some of the seminal questions for the successful development of this industry. First, what are the proper metrics for launch purposes and shared use of airspace? How can we mitigate risk without undue cost? What is the economic cost of clearing the airspace? Can FAA data be used for analysis? There are regulatory issues between an established market (airlines) and a fledgling new industry (aerospace).