

## Commercial Space Operations

IFALPA believes that whether an industry is emerging or well established, it should comply with the development of safety risk mitigations that would limit the impact to users. Freedom of navigation and equality of use must be maintained.

The increased frequency of commercial space launches, the recovery of expended stages, and reusable launch vehicles and their associated debris fields have created the need for clearly defined safety standards. These activities and their associated restrictions have placed an undue burden on international airspace. Launch providers and airspace managers must control the unpredictability of flight efficiencies and the way airspace restrictions are organized. These issues have created an imbalance with airspace being restricted in a manner that promotes one industry over another.

Transit over high seas and to and from higher airspace has implications for all airspace users. Therefore, the development of guidance, Standards and Recommended Practices for these operations should engage the entire aviation community.

Current approaches toward commercial space launches have included the designation of restricted areas which encompass the launch area, debris field and, depending on the type of vehicle, possibly a re-entry area as well. These areas have predominantly been contained over high seas, with varying areas being protected. The size of the areas, the amount of time these areas are restricted, and the process used to notify civil operators is non-standard.

### ICAO ANNEX 11 DEFINITIONS

**Restricted area.** An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions.

**Danger area.** An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.

The application of restricted airspace only applies to the land areas or territorial waters of a State. It cannot be applied over the high seas where commercial space operations will also take place. Prohibited areas have a similar definition.

A danger area could be applied anywhere and should be used to encompass commercial space operations over the high seas. This doesn't seem to be ideal as a danger area and could be interpreted as less restrictive.

A typical airspace establishment for rocket launches will be restricted airspace around a land-based launch site then a change to a danger area as the rocket trajectory enters airspace over the high seas.

There are two main concerns with the current approach. The operations are conducted over international waters but are not based on international procedures, and the lack of harmonized procedures and standards do not ensure a safe and efficient operation.

As a possible means to initiate discussions regarding the establishment of a more robust and efficient process, existing provisions contained within regional air navigation agreements could be used as the vehicle to address both high altitude and commercial launch operations. In particular, existing airspace configurations and forecasted airspace requirements need to be considered. This will assist in ensuring that only those areas that require protection from potential hazards would be segregated from civil aviation operations. Another consideration is that airspace for commercial space operations should be selected to take place away from aircraft activity such as busy airports and flight corridors.

At minimum, international standards for commercial space launch processes should ensure that safety levels for commercial aviation are not compromised. Airspace that contains space launch activities, and from which commercial aviation should be moved away, needs to be drawn using conservative boundaries to ensure no degradation of commercial aviation safety standards. Finally, activities should be started to develop operational concepts and ANSP capabilities that support true integration of commercial space with commercial aviation, including space vehicle airworthiness standards, separation standards, and development of real-time information sharing and status between space operators and ANSPs, so that airspace can be managed in real-time for most efficient airspace utilization.

As commercial space operations are expected to increase, development of SARPs and guidance material from ICAO is critical in ensuring this growth is accommodated in a safe and orderly manner.