

COMSTAC Topics for High-Speed Aerospace Transportation

Background

The United States is moving into a renewed era of high-speed aerospace transportation (HSAT), including flight research, development, test, and operations. Many of these evolutions will be flown through space and will utilize FAA-licensed spaceports for departure and arrival procedures. These operations, like orbital launch and reentry operations, will also need to be seamlessly integrated into the National Airspace System (NAS) to ensure minimal impact on other, non-involved commercial flight operations in the NAS.

Several aspects of NAS integration and spaceports were highlighted in the COMSTAC's recent R&D survey. These and other HSAT considerations present themselves as topics worthy of the COMSTAC's exploration and recommendations to the FAA and DoT.

National Airspace Considerations

The most ambitious of these planned high-speed projects, including rocket-based and/or boost-glide profiles, blur the lines between orbital and point-to-point flight. In these examples, flight paths may be exoatmospheric, and the energies related to launch and reentry will nearly equal those of orbital flight.

Through its Space Data Integrator (SDI) and Joint Space Operations Group (JSpOG) the FAA is currently developing several new capabilities to safely integrate commercial space vehicles into the NAS. Looking beyond today, the FAA is investigating concepts around dynamic hazard areas to further increase safety and efficiency to keep pace with the increasing frequency and complexity of commercial launch and reentry operations.

HSAT operations, the dynamics involved, and integration into the NAS should be considered in the SDI/JSpOG follow-on planning.

Spaceport considerations

In its National Spaceport Network Development Plan, published in June 2020 (available on the COMSTAC website [here](#)), the Global Spaceport Alliance makes the following observations and recommendations:

- *The ability to conduct high-speed, long-distance transportation, specifically point-to-point transportation through space, will be a major game-changer, both for national security, and for economic competitiveness. This is an area that the United States needs to lead.*
- *The Office of Spaceports could be a focal point for these initiatives, in anticipation of the day when point-to-point transportation through space is routinely available.*
- *The U.S. Government should establish a goal of leading the world in Point-to-Point transportation through space. Accomplishing this challenging goal will require a partnership between government, industry, and academia, and will involve not only advances in engineering and technology, but also work in policy, law, regulations, customs and security, flight and ground operations, market analysis, and economics.*

Further, language contained in the FY 2021 National Defense Authorization Act (NDAA) also highlights the value of commercial spaceports, and specifically “encourages the Department of Defense to leverage existing inland spaceports with accompanying range and airspace for land-based testing” of hypersonic platforms. The NDAA goes on to note that “these facilities and complexes could improve the resiliency of U.S. launch infrastructure and help ensure consistent access to space.”

Spaceports may find support of HSAT activities complementary to sometimes sporadic orbital launch and/or other flight operations, making returns on investments in these facilities more attractive. As orbital operations ramp up to become weekly or even daily occurrences at many of these sites, experience conducting dynamic HSAT operations will provide a baseline for these ever-dynamic evolutions.

Future regulatory framework

FAA AST, in its role to “facilitate the strengthening and expansion of the United States space transportation infrastructure,” is in a unique position to help encourage, facilitate and promote this segment of commercial spaceflight.

It is likely that human-rated HSAT concepts will need to move beyond an informed consent regulatory construct to something more akin to traditional regulation in order to begin routine commercial operations. At the same time, the regulation and licensing of HSAT vehicles will need a greater degree of flexibility to keep up with an ever-increasing pace of innovation and iteration.

In the spirit of making this regulatory burden as light as possible, while providing the requisite certification, oversight, and safety of paying passengers and the public, discussion should begin now to determine the best paths forward for these unique HSAT architectures and operations. The role of AST in this process should be explored and defined.

Recommendation

COMSTAC should examine HSAT and associated spaceport operations as well as their integration into the NAS as discussed above and make recommendations to AST regarding regulatory considerations.