

IAF SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES (D6)

Enabling safe commercial spaceflight: vehicles and spaceports (3)

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Abstract

Commercial Space Transportation (CST) becomes an international business and requires landing opportunities all over the world. Hence the integration of space vehicles in other airspace than the US NAS is an important topic to be considered. The Single European Sky ATM Research Programme (SESAR) is preparing the implementation of a new ATM system in Europe. With the commercialization of Space Operations under way, the number of Space Vehicle Operation is expected to increase significantly in the upcoming years. Areas of operation will expand from the current established and well known space ports (e.g. Cape Canaveral, Vandenberg AFB, etc) towards new operational sites. A development not only expected to take place in the United States but as well in other countries. If the expected cost reduction for space vehicle operation can be realized and commercial space operation established beyond support of national research and space programs, the number of launch and reentry activities will increase together with the number of possible launch and landing sites. Operating a space port at a remote area with low density population might be an adequate approach in the early stages of expanding commercial space vehicle operation. However, the business of CST reaches Europe which has a high density population as well as a busy airspace in most areas. Launch and reentry trajectories of space vehicles will most probably have to interact with air traffic operations. As air traffic has increased over the last decades and is expected to continue its growth, this aspect will gain further importance, and integrating both kinds of operations should be as seamless and efficient as possible. A study was conducted at the Air Traffic Validation Center of DLR using real and fast time simulations. The simulations calculated the impact of a trajectory of a space plane for landing operations at a spaceport in the center of Europe. The results show how the impact of the trajectories to the other air traffic can be minimized by an active dynamic planning to avoid conflicts without having too much impact on commercial aircraft operations.