

IAF BUSINESS INNOVATION SYMPOSIUM (E6)
Strategic Risk Management for Successful Space & Defence Programmes (4)

Author: Mr. Marc Vales
Dassault Aviation, France

Patrice Desvallées
NASA Ames Research Center, Blue Marble Space Institute Of Science; BioServe Space Technologies,
University of Colorado Boulder, France

Mr. Pierre Georges
Dassault Aviation, France
Mrs. Marie-Christine Bernelin
Dassault Aviation, France

Mr. Alexandre Israel
King's College London, United Kingdom

CERTIFICATION OF A POINT TO POINT SPACE TRANSPORTATION VEHICLE

Abstract

Certification of Point-to-Point space transportation system remains an ambitious goal, as there are no currently applicable regulations in existence that would provide a regulation framework allowing an actual "certification" of the aircraft as understood under the International Civil Aviation Organization existing rules. Indeed, for a commercial transport system with long range, hence flight within several national airspaces, and possibly international airspace (with potential extension to outer space), to develop, it would be necessary to find a way to integrate this type of operation into some sort of extension of the Chicago Convention, and then move to detailed certification specifications for the vehicles. The issue has been recognized at ICAO level and the subject of suborbital operations has been put under preliminary study:

- 1) a "Space Learning Group on commercial space transport" was created late 2014 under the ICAO Air Navigation Bureau to coordinate preliminary work with international participation of experts,
- 2) a series of three symposia, starting with "Space 2015" in Montreal in March 2015, were organized by ICAO and UNOOSA.

The legal status of such vehicles is itself still uncertain, as different laws apply within the atmosphere and in space: for example up to now responsibility for damage in case of mishap lies with the State of Launch under space law and on the air carrier under aviation law.

One very important aspect of the requirements will be the level of safety that Society is ready to find acceptable. In commercial aviation today the probability objective of a catastrophic event is 10^{-7} per flight hour, leading to individual failures at a rate of 10^{-9} /fh. Conversely, the current track record on space missions since the beginning is around 10^{-2} catastrophic event /mission, but current regulations of space launches include safety objectives for people on ground (expected casualty of around 10^{-4} to 10^{-5} /launchspace operation).

The chosen safety objective will have drastic effects on the design process, so it is of extreme importance to make clear decisions early in the development program as to what is acceptable to the customer community, at least. One may expect that an acceptable goal should be at least of the order of what is achieved in light aviation (10^{-5} to 10^{-6}). For reference, in another point to point transport domain, the current fatality rate in automobile (with human driver) in Europe is cited at around 10^{-6} /hour on regular roads, 10^{-7} /h on highways.