

SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES (D6)
Commercial Space Flight Safety and Emerging Issues (1)

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SATELLITE BEACON STUDY FOR SAFETY AND TRAFFIC MANAGEMENT OF COMMERCIAL
SPACE TRANSPORTATION

Abstract

This paper will present the conclusions of an Individual Project entitled “Satellite Beacon Study: Space Traffic Management” of the International Space University’s (ISU) Master’s Program 2012 (MSc 2012), held in Strasbourg, France.

The main aim of this paper is to investigate whether a beacon or a transponder is needed to continuously transmit the location and the identity of commercial space launch vehicles, in-space transportation vehicles, and reentry vehicles for the purpose of public and on-orbit safety.

Commercial space flight is a new and potentially highly profitable market. By 2013, space travel will begin to increase its impact, and in less than 15 years’ time its volume and complexity will have multiplied. The current infrastructure, such as Communication, Navigation and Surveillance (CNS), has significant limitations in following the ever more complicated space vehicles that are being designed by companies engaged in heavy competition. It is the operator’s responsibility to track their space vehicle, even though real-time surveillance and tracking data cannot be performed on the vehicles constantly without problems. An equally important problem is the ever-growing debris field that will be even more hazardous in the future. Those are the main motivations that have generated the need for a satellite beacon or transponder -that can support frequent travel- to be developed for space safety reasons, and subsequently, for this paper.

A survey was held among stakeholders, beneficiaries and key members of the industry, in order to receive input on the feasibility and the use of the beacon. Important aspects like the most appropriate entity to receive the information from the beacon were addressed. Existing similar systems that could be used as a baseline were considered and private and government entities were examined. Implications of the implementation of the scheme were investigated, taking into consideration issues such as national security, competition amongst companies, and design constraints. All those factors were part of the input of the subsequent cost/benefit analysis that concluded on the feasibility of such a transponder, and its potential to overcome or not the private and military difficulties related to proprietary and security issues. Finally, recommendations were made for the regulation and the cost downsizing.