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Safe Transportation Systems for Sustainable Commercial Human Spaceflight / Small Launchers: Concepts  
and Operations (Part II) (9-D6.2)

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RISK MANAGEMENT FOR COMMERCIAL HUMAN SPACEFLIGHT

**Abstract**

The sustainability of commercial space activities is an important factor to consider as we continue to promote and develop the industry. Financial viability of space business is dependent not only on the development of sound, safe technologies, but also on regulatory certainty and risk management. The continuing legality of activities and the levels of liability possessed for that liability will determine if they are viable in the long term. While the space treaties lay out some basic rules for spaceflight, including rescue of astronauts, acting with due regard for the activities of other States, taking responsibility for space activities of a State's nationals, and maintaining liability for those space activities, it does not address liability with specific regard to commercial spaceflight participants. The Liability Convention expressly does not address liability for those individuals who are participating in a launch. Thus, remedies available will be dependent on the relevant domestic law.

One means of managing risk consists of liability waivers. Liability waivers allow participants to accept the risk of participating in dangerous activities and agree not to pursue financial remedies against the operator for injuries caused under circumstances covered by the waiver (which usually includes simple negligence). The legality of these waivers varies jurisdiction to jurisdiction, as does the permissible scope. Some jurisdictions expressly grant authority for liability waivers for spaceflight participants (within the United States, for example). This paper will address how and where liability waivers can be used to manage risk for commercial spaceflight participants, including both space "tourists" and those who may be participating for research or other purposes, in order to promote the financial viability of the industry.

This paper will then address opportunities spaceflight operators and individual spaceflight participants have to manage risk, with or without waivers, through insurance. Well-developed insurance exists for "hard adventure" activities like trekking, mountain climbing, and caving. Thus, this paper will analyze how those forms of insurance can be modified to most effectively apply to space activities, whether they are sought by the individual or provided as an option by the operator. The high net worth individuals likely to be participating in space activities will have a vested interest in their financial security in the case of an injury or death.