

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)  
Commercial Human Spaceflight Programs (2)

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DEVELOPMENT OF A NOVEL SPACE MEDICINE REVIEW FRAMEWORK TO FACILITATE  
SAFE PUBLIC ACCESS TO SUBORBITAL SPACEFLIGHTS**Abstract****Purpose:**

Commercial suborbital spaceflight companies are drawing closer to launching operations. These operators will presumably seek to maximize participant numbers whilst maintaining flight safety. Space agencies have historically operated a comprehensive process of medical flight certification. However, these have been designed to be stringent and involve a range of invasive, expensive and time-consuming assessments. As yet, no appropriate and streamlined medical flight certification has been developed to define and prepare passengers for short-duration commercial suborbital spaceflight. Therefore, the space industry must consider how medical evaluation can be performed that meets the needs of commercial suborbital spaceflight operators and its customers. This is particularly given the possibility of inclusion of aged or individuals with disabilities and people with pre-existing medical conditions. Thus, this project aimed to develop a conceptual framework to guide rapid pre-flight medical optimisation and inflight solutions for space tourists on commercial suborbital flights.

**Methodology:**

Literature review, critical analysis and narrative synthesis of space medicine methods, countermeasures and medical risks, followed by shaping suborbital flight profiles and an artificial intelligence-based clinical support system (CDSS), leading to guided risk assessment and clinical practice.

**Results:**

We developed a conceptual framework of a pre-flight medical examination and classification process with corresponding concepts for in-flight countermeasures and flight profile adjustments. This framework consists of screening and risk assessment tools and processes, streamlined medical review, passenger classification, passenger optimisation and in-flight countermeasures, all in the context of an engaging

customer experience. We defined risks and conditions likely to be encountered in suborbital flyers, designed a concept of a CDSS for individual medical risk assessment and screening, and generated a framework of medical support and countermeasures to maximise flight safety. Our framework proposes the assessment of passengers using a CDSS tool to predict health risks using pre-flight medical examination and demographic data. The application of a novel CDSS tool is likely to deliver benefits when used in the early stages of flight assessment, resulting in time and cost savings by reducing the workload of the medical team and improving the informed consent process. The application of a CDSS allows medical experts to focus on the addressing the latter stages of the evaluation cycle.

Conclusion:

We present a streamlined space medicine review framework designed to safely facilitate broader access to space on suborbital flights. This framework streamlines, optimises and improves the space medicine review process. It incorporates established space medicine methods, inflight countermeasures and CDSS tools.