

57th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE  
ACTIVITIES (D5)

For a successful space program: Quality and Safety! (1)

Author: Dr. S.W. Chiu  
Viterbi School of Engineering, USC, United KingdomDIVERSITY AND ACCESSIBILITY SCIENCE FOR ENHANCED SAFETY AND RISK REDUCTION  
IN CRITICAL SPACE ACTIVITIES**Abstract**

The world is thrilled to learn of the European Space Agency's (ESA) announcement of John McFall's election as the world's first-ever parastronaut. Recently having commenced his training at the European Astronaut Centre in Germany, John is to contribute to a feasibility study programme at ESA that aims to explore the potential of sending individuals with diverse abilities to go to space in the future. This pioneering initiative has the prospect of making space more inclusive, ensuring that space continues to be a domain of collective aspiration and inspiration.

This paper identified that inclusivity and diversity of the space workforce could constitute a major risk mitigation measure to sustain public support and enhance safety for future space activities. Current space science and exploration rely heavily on a mono-sensorial approach (i.e. visual, with limited sonic supportive elements). However, evidence suggests that astronauts experienced reduced mobility and sensory input in micro-gravity. Astronauts have also reported experiencing temporary blindness while conducting spacewalk. In these critical moments, they have to turn to their other senses (e.g. tactile, sonic) to ensure the return to safety.

This paper contends that the integration of additional sensorial input (e.g. tactile and sonic alarm) could help enhance safety and mitigate risks for astronauts in extreme environments in orbit. Currently, instead of utilising all available human senses, path-dependent technological developments in technology-heavy sectors risk over-relying on visual cues in its innovative process.

This paper seeks to bridge the gap between outreach-oriented accessibility and diversity research with scientific efforts geared towards enhancing safety of critical missions and in mitigating the convergence of risks in the space sector. It proposes to develop a risk-reduction oriented research and policy framework for the holistic integration of accessibility science, enabling astronauts to utilise all their senses during critical missions.