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IISL COLLOQUIUM ON THE LAW OF OUTER SPACE (E7)
Alternative Space Rules Setting (5)

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EMERGING TECHNOLOGIES: THE SFAIRP TEST AS AN EXPRESSED ADMINISTRATE INSTRUMENT FOR SAFETY ASSURANCE IN CREWED AND UNCREWED SPACE ACTIVITIES.

Abstract

Emerging technologies by their nature alter the scope of mission capability, and expand the scope for mission design. These expanded capabilities to mission design also fundamentally change the nature of what is possible for delivery and operation of spacecraft and launch vehicles. As a consequence of this, mission designers may be presented with capabilities and performance characteristics of their systems beyond the scope of what is anticipated by existing engineering standards and other compliance instruments that fall within the field of legislative schemes.

The requirement to reduce risks So Far As Is Reasonably Practicable ('SFAIRP') with relation to standards is already recognised in varying non-space industries internationally. This may be via express industry requirements set out via specific legislative instruments such as the rail industry in Australia; the nuclear industry in the USA and the health industry in Canada; or, via indirect mechanisms to mitigate risk such as through work health safety legislation that mediate industry safety, such as in the UK and Australia. The benefits of SFAIRP in these industries is to reduce risk of harm to personnel and the public, while also improving performance and reliability of equipment.

SFAIRP has emerged alongside the recognition of varied system redundancy and hierarchy of controls such as Heinrich's 'Domino Model'; or, James Reason's 'Swiss Cheese Model' as well as earlier administrative requirements to reduce risks As Low as Reasonably Practicable ('ALRP').

Given the advent of NewSpace and emerging commercial and research space actors that do not comprise traditional state-based activities, in addition to the advent of new techniques such as 3-d printing, low-cost PCBs and emerging trends in space usage, it is reasonably foreseeable that the principle of SFAIRP and its associated safety principles may need to be considered as part of the regulatory model towards space activities to mediate any gaps between existing standards and technology capability as a risk mitigation method.

This paper argues that the express application of SFAIRP principles to state and international regulatory schemes may improve mission performance, safety and reliability. As such, this paper will consider the challenges of implementing SFAIRP principles as part of alternative space rules overseen by UNOOSA, as well as its application within domestic regulatory environments. In addition to this, this paper will also propose applications of SFAIRP to the broader space industry as part of a safety assurance and regulatory approach to harmonise emerging technologies with established standards and practices.