

Development of Laws and Regulations for Range Safety, Flight Safety, and Accident Investigation in the Era of Commercial Passenger Spaceflight

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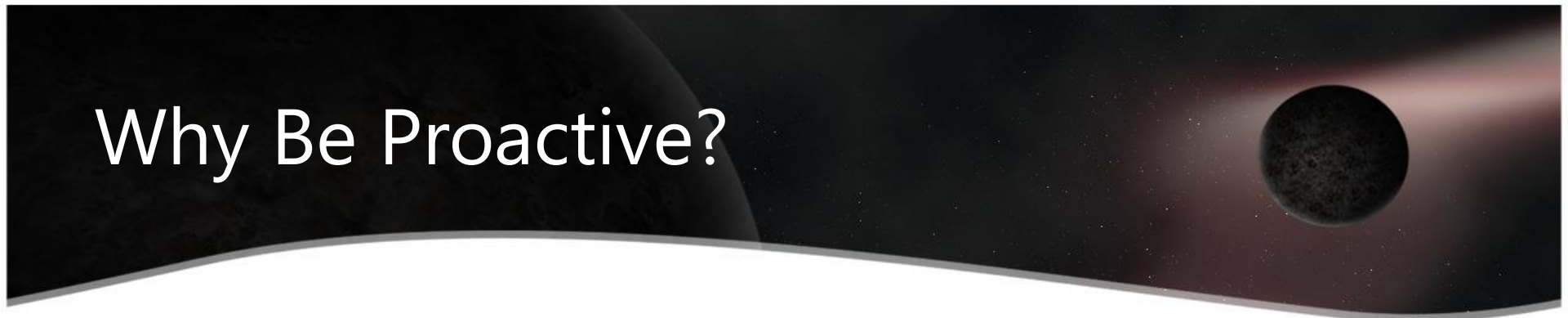
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Commercial Passenger Spaceflight

The background of the slide features a dark space scene with a large, dark planet on the left and a smaller, cratered planet on the right, set against a gradient of dark colors.

- Assumptions in relation to the evolution of the commercial passenger spaceflight industry
 - Birth of the commercial passenger spaceflight industry is imminent
 - Service would begin as novelty flights marketed (erroneously) as “space tourism”
 - Passenger service would become scheduled point-to-point travel between cities on Earth
 - Eventually, spacecraft would ferry humans between the Earth, Earth orbit or the Moon

Why Be Proactive?

The background of the slide features a dark, starry space scene. On the left, a large, dark, curved shape represents the edge of a planet or moon. On the right, a smaller, dark, spherical planet is visible against a reddish-brown nebula or light gradient.


- Why not the “fly-crash-fix-fly” approach?
 - Space industry is multinational in nature and so there is a need for international action
 - Modern society is far more litigious than the 1930s at the beginning of civil aviation
 - Civilisation needs to evolve over time – we must learn from past mistakes

Industry Requirements

The background of the slide features a dark, space-themed image. On the left, a large, dark, curved shape represents a planet or moon. On the right, a smaller, dark, circular object represents a moon or planet. The background is a gradient of dark colors, with a subtle light source on the right side.

- Essential elements for a spaceflight industry
 - Jurisdiction and control
 - Rescue and recovery obligations
 - Liability
 - Formulation and enforcement of safety standards, regulations and procedures
 - Range safety regulations to ensure safety at spaceports and security of operations
 - Accident investigation procedures
 - Implementation, audit and enforcement

Jurisdiction and Control

The background of the slide features a dark, starry space scene. On the left, a portion of a planet is visible, showing a curved horizon. On the right, a smaller, dark sphere, likely a moon, is seen against the starry background.

- Article VIII of the Outer Space Treaty
 - If on Earth, territorial jurisdiction would prevail over jurisdiction of the State of registry
 - In outer space, the State of registry maintains jurisdiction and control over a space object

Rescue and Recovery

The background of the slide features a dark, starry space scene. On the right side, there is a large, dark, spherical object, likely a planet or moon, with a lighter, textured surface. The overall color palette is dark with subtle gradients and star-like speckles.

- Rescue Agreement
 - (also article V of the Outer Space Treaty)
 - Must announce any knowledge of accident, distress or emergency involving a spacecraft and specifically notify the launching authority and the United Nations
 - Must rescue, assist and return personnel after emergency landing within State territory
 - Must rescue and assist in search and rescue after emergency ditching in the high seas

Third Party Liability

The background of the slide features a dark, starry space scene. On the left, a portion of a planet is visible, showing a curved horizon. On the right, a smaller, dark, cratered sphere, resembling a moon, is positioned against a reddish-brown nebula or light gradient.

- Liability Convention
 - (also article VII of the Outer Space Treaty)
 - Concept of “launching States” for each spacecraft
 - Absolute liability for damage caused to the surface of the Earth and to aircraft in flight
 - Fault liability for damage caused in outer space
 - Applies only to third party liability and only where more than one State is involved – does not have domestic application without legislation

Passenger Liability

The background of the slide features a dark, space-themed image. On the left, a portion of a planet is visible, showing a curved horizon. On the right, a smaller, dark sphere, likely a moon, is set against a reddish-brown nebula or star field.

- Article VI of the Outer Space Treaty
 - States bear international responsibility for their space activities and those of their private persons or entities
 - If passengers are from a different State to the State of the operator, then article VI may apply
 - No application if passengers are of the same State as the State of the operator
 - No limit as to liability as under Warsaw Convention
 - For novelty “space tourism” flights, can be limited or excluded by contractual clauses

Flight Safety

The background of the slide features a dark space scene. On the left, a large, dark, curved shape represents the edge of a planet or moon. On the right, a smaller, dark, spherical object, possibly a planet or moon, is visible against a reddish-brown nebula or star field.


- International standards require uniform and universal application and enforcement, or there would be the “flag of convenience” problem
- Maritime safety rules developed in modular form with different topics covered by different IMO treaties, e.g. SOLAS Convention
- Standards and rules developed by ICAO form a comprehensive safety regime for civil aviation under the Chicago Convention framework

Flight Safety

The background of the slide features a dark, space-themed image. On the left, a large, dark, curved shape represents the horizon of a planet. On the right, a smaller, dark, circular object represents a moon or another celestial body. The overall color palette is dark, with shades of black, grey, and a hint of reddish-brown in the upper right.

- Suggestion
 - A broad treaty with implementation and enforcement principles / mechanisms like the Chicago Convention
 - The first annex to be developed ought to be similar to the SOLAS Convention
 - Other areas of flight safety, such as the other annexes of the Chicago Convention, can be adapted to passenger spaceflight

Range Safety and Security

The background of the slide features a dark, starry space scene. On the right side, there is a large, dark, spherical object, possibly a planet or moon, with some surface detail visible. The overall color palette is dark with subtle gradients and star-like speckles.

- *Space Activities Act 1998* (Australia)
 - Requirement to appoint a “launch safety officer” responsible for ensuring compliance with standards and regulations, and to ensure range safety
 - Give notice to the public for launches and to ensure airspace clearance
 - Seize evidence in relation to accidents
- Later, adapting civil aviation treaties dealing with criminal acts, hijacking and terrorism

Accident Investigations

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- Chicago Convention, Annex 13; and the ICAO Manual of Aircraft Accident Investigation
 - Conduct of investigations
 - Rights of other relevant States to participate in the investigation
 - Template for Final Reports

Summary

AREA	SOURCE	MATTERS FOR ADAPTATION
Jurisdiction	Space Law	Outer Space Treaty, article VIII
Distress and Rescue	Space Law	Rescue Agreement; Outer Space Treaty
Third Party Liability	Space Law	Liability Convention; Outer Space Treaty
Flight Safety	Maritime Law	SOLAS Convention for the safeguarding of safety and welfare of lives onboard
	Aviation Law	Chicago Convention and SARPS
Range Safety	Domestic Space Law (Australia)	Range safety requirements
	Aviation Law	Tokyo & Hague Conventions, etc
Accident Investigation	Aviation Law	Chicago Convention, Annex 13

The top of the slide features a dark, space-themed background. On the left, a large, dark planet is partially visible. On the right, a smaller, dark moon is shown against a reddish-brown glow, possibly representing a sunset or sunrise on another planet. The background is filled with small white specks representing stars.

Thank You

For a copy of the paper, please email me!

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