Regulation 2025
What drives change in international civil aviation and maritime regulation?
A historical perspective
This paper is presented not as policy, but with a view to inform and stimulate wider debate. The opinions expressed in this paper are those of the author and do not necessarily represent the views of the Ministry of Transport. All reasonable endeavours are made to ensure the accuracy of the information in this report. However, the information is provided without warranties of any kind including accuracy, completeness, timeliness or fitness for any particular purpose.
EXECUTIVE SUMMARY and CONCLUSION

To determine the future state of maritime and civil aviation, it is useful to examine the key drivers of international maritime and civil aviation regulation. The maritime and aviation industries are of fundamental importance to New Zealand’s economy, as we rely on these transport modes to ensure our exports reach their destinations.

Due to the international nature of these industries, it is important that there is a forum for creating globally consistent regulations. The International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO) play significant roles in the technical regulation of their respective industries. The standards set by both organisations are critical to both sectors as without agreed international standards; it would be difficult to sustain a safe and viable international aviation and maritime industry.

The international nature of both industries encourages Member States of ICAO and IMO to cooperate in setting universally applicable international standards. Member States are responsible for incorporating these international regulations into their national laws and so the objectives of these organisations cannot be achieved without national legislation that promotes the application of these international regulations.

The drivers of regulatory change are often intertwined and not easy to separate. External shocks such as terrorist attacks or environmentally damaging events that create public outcry are the primary driver of international regulatory change. Shifts in societal expectations and technological innovations are also drivers.

The initial push for major regulatory change tends to come from leading or influential nations, such as the United States of America (the USA). The pace and scale of change tend to increase with the involvement of more influential nations. Responses to events or changes in less influential nations may be limited, unless other more influential countries also feel the impact or risk.

The international regulatory response to external shocks is likely to remain the same. How nations react, however, may change over time. From recent acts of terrorism and aviation incidents, we see public pressure for change and reactive regulatory responses. In the future, it is possible that regulators will not react to social expectations in such a responsive manner.

The three key players driving regulatory change are society (through their response to external shocks), the regulator and industry. Society creates expectations for regulatory change because of highly publicised adverse events causing death or environmental damage (eg. the grounding of the Exxon Valdez or the recent aviation incidents). In turn, this affects the role of the regulator, which is pressured to amend and create new regulations in response.
Regulators are also pressured by industry, which bears the costs of any regulatory changes (such as the proposal to more closely track aircrafts in flights).

The nature and pace of regulatory change may depend on the role and power of the three players. The international context of the civil aviation and maritime industries exacerbates this tension.

ICAO and IMO have a significant role in establishing international regulations, but national regulators are also important. Influential nations can affect the impact of international rules through their implementation speed or by the nature of their national regulations. Historically, the United Kingdom’s (UK) dominance of the world maritime fleet prior to World War II heavily influenced their power over regulatory change, as other nations would enact regulations to reflect UK regulatory responses. The IMO headquarters are in London, which reflects the UK’s influence at the time of the IMO’s establishment.

Similarly, the USA is a dominant driver of regulatory change in civil aviation. Its regulatory response to the September 11, 2001 terrorist attacks was an immediate tightening of its aviation security regulation, and all nations flying to the USA were required to implement matching regulation. In hindsight, some of these changes may have been knee-jerk and heavy-handed. It also raises a question about the regulatory response if the tragedy had occurred in a less influential nation, rather than the USA.

Shifts in social expectations drive regulatory change. Deregulation of civil aviation economic regulation in the late 1970’s and early 1980’s saw a shift in thinking about regulation. Its purpose shifted from protecting industry to encouraging a free market system. Recently, we have seen this shift continue with the encouragement of new disruptive technologies, for example New Zealand being a test bed for innovative technology and our regulatory response to small passenger vehicles services such as Uber.

In the maritime industry, there is a clear relationship between technological innovation and adverse events. New ships were often inadequately designed, resulting in catastrophic oil spills (e.g. the Torrey Canyon) which led to international regulatory change (MARPOL, 1973). In the civil aviation industry, there is a relationship between technology standards and environmental impacts. Designers invent new composite construction materials to improve both aircraft efficiency and to reduce noise and emissions.

The pace of international regulatory change is typically slow, unless external shocks create public outcry in powerful nations. The pace of regulatory change is affected by many factors. The international nature of ICAO and IMO imposes cumbersome processes to adopt or amend international standards, which usually requires involvement by all or a significant portion of the Member States. International regulatory change is also affected by a nation’s pace of change, as smaller or developing countries may wait for influential countries (in terms of fleet or wealth) to implement these changes.

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International coordination between Member States may hinder the pace of regulatory change. It also provides smaller countries, such as New Zealand, with an opportunity to create innovative national regulations or to showcase itself as a test bed. This might be a means for nations that otherwise have little influence over the development of international rules, to help shape these rules.

<table>
<thead>
<tr>
<th>Summary of key themes</th>
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<tr>
<td>► The ICAO and IMO, specialised UN bodies for their respective industries are similarly structured. Both are responsible for technical regulations while leaving economic regulation to the Member States.</td>
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<td>► Performance based regulatory change is becoming more common.</td>
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<td>► International coordination between Member States may hinder the pace of regulatory change. This may provide smaller countries, such as New Zealand, with an opportunity to create innovative national regulations or to showcase itself as a test bed for new technology, as a means of possibly influencing the development of international rules.</td>
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<tr>
<td>► It is common for nations to regulate ahead of international organisations. New Zealand has recently introduced rules for Remotely Piloted Aircraft Systems despite ICAO’s absence of technical regulations for the new technology.</td>
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<tr>
<td>► The pace of regulatory change increases in response to external shocks, e.g. events resulting in the loss of life or adverse environmental impacts.</td>
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THE DEVELOPMENT OF INTERNATIONAL CIVIL AVIATION AND MARITIME ORGANISATIONS

The International Civil Aviation Organization

Civil aviation regulation dates back to the 18th century and hot air balloons, when regulation was focused on the safety on ground, rather than safety on board. As aviation developed as an industry, countries passed national laws that were inconsistent with other countries and it became apparent that international regulation was required to ensure public safety.

It was not until 1944 that an international aviation regulatory system was developed after 54 countries met for a conference in Chicago to discuss the future of international aviation. The conference resulted in the Convention on International Civil Aviation, commonly known as the Chicago Convention. This Convention established the rules under which international aviation operates and came into force in 1947.

The Chicago Convention established the International Civil Aviation Organization (ICAO) with a vision to achieve sustainable growth of the global civil aviation system. The ICAO Council adopts Standards and Recommended Practices (SARPs) which are specifications to achieve “the highest practicable degree of uniformity in regulations, standards, procedures and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve air navigation”1.

ICAO Standards and Recommended Practices

ICAO works with its 191 Member States to develop the SARPs, which are contained in 19 Annexes to the Chicago Convention. Each Annex deals with a particular subject area:

► Annex 1 - Personnel Licensing
► Annex 2 - Rules of the Air
► Annex 3 - Meteorological Services
► Annex 4 - Aeronautical Charts
► Annex 5 - Units of Measurement
► Annex 6 - Operation of Aircraft
► Annex 7 - Aircraft Nationality and Registration Marks
► Annex 8 - Airworthiness of Aircraft
► Annex 9 - Facilitation
► Annex 10 - Aeronautical Telecommunications
► Annex 11 - Air Traffic Services
► Annex 12 - Search and Rescue
► Annex 13 - Aircraft Accident and Incident Investigation
► Annex 14 - Aerodromes
► Annex 15 - Aeronautical Information Services
► Annex 16 - Environmental Protection
► Annex 17 - Security
► Annex 18 - The Safe Transportation of Dangerous Goods by Air
► Annex 19 - Safety Management

1 Article 37 of the Convention on International Civil Aviation
Member States are encouraged to comply with SARPs and develop their national regulations accordingly. Articles 37 and 38 of the Chicago Convention require Member States to adopt SARPS to the extent practicable. Member States therefore have an obligation to secure, to the highest degree possible, compliance with these SARPs. New Zealand implements the SARPs wherever they are relevant in the New Zealand context and justified by cost-benefit economic analyses.

ICAO SARPs do not have the same legally binding force as the Chicago Convention itself, as Annexes are not international treaties. States are required to give notification of differences to SARPs. Conversely, IMO Conventions are legally binding on signatory States. It is not, however, compulsory for Member States of the IMO to sign up to IMO Conventions. This gives Member States the flexibility to adopt IMO Conventions, which are the most applicable to their nation.

**ICAO standardises technical requirements, leaving economic regulation to Member States**

The Chicago Convention was influenced by the desire to protect national interests. Discussions between the USA and the UK the two big aviation powers at the time, on the economics and regulation of international air transportation dominated the Conference. The UK, whose air fleet had been largely destroyed during World War II, wanted to protect their airlines and advocated for an intergovernmental regulation of civil aviation with bilateral agreements between States. Civil aviation was a new and developing industry and many nations wanted to protect and promote the development of their own national carriers. The USA favoured a more liberal approach and was committed to establishing multilateral open skies agreements, which would enable carriers to freely offer services with minimal government intervention.

The USA’s view did not succeed and the protectionist notion was incorporated into the Chicago Convention. Article 1 holds that ‘the Signatory States recognize that every State has complete and exclusive sovereignty over the airspace above its territory’. This contrasts with maritime law, where ships are free to operate between the ports of their choosing. Aviation routes must be pre-approved by governments and the State is able to restrict access to certain airports. Article 1 has a significant impact for the development of multilateral agreement on international traffic rights and still provides a basis for regulation of aviation markets today.

Initially the International Airline Transport Association (IATA) regulated airlines frequencies and fares. This heavily regulated system broke down in the 1970s and traffic rights are now regulated through “open skies” and other liberal regimes. New Zealand has 30 plus open skies agreements signed or ready for signature by other countries. Route restrictions remain at the will of the New Zealand Government and other foreign governments entering the agreements. As ICAO is tasked with standardising the technical requirements of civil aviation and largely leaves the economic regulation to Member States, it has little oversight of bilateral and open skies agreements.

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2 A signatory State is a State, which has consented to be bound by a certain treaty. This differs from the term Member States, which for the purposes of this paper are States party to the IMO or ICAO respectively.
The International Maritime Organization

International maritime safety concerns encouraged the development of a permanent international maritime body, but it was not until the establishment of the United Nations (the UN) that such a body became a reality. An international conference in Geneva adopted the Convention on the International Maritime Organization (the Convention), which created the Inter-Governmental Maritime Consultative Organization (IMCO) in 1948. The Convention came into force in 1958 and IMCO met for the first time in the following year. IMCO was renamed the International Maritime Organization (IMO) in 1982.

The primary objective of the IMO is to improve the safety of international shipping and to prevent marine pollution from ships. It achieves this by adopting the highest practicable standards of maritime safety and, more recently, maritime security, through the preparation and adoption of conventions and codes. The IMO provides a forum for multilateral government cooperation on regulations and practices relating to ships engaged in international trade. It facilitates the adoption of international treaties on a number of technical matters such as safety, environmental protection and liability. To date, the IMO has adopted approximately 60 conventions on maritime safety, security, pollution prevention and liability for pollution damage and training of seafarers.

International conventions did exist prior to the formation of the IMO, however there was no international body responsible solely for maritime safety concerns. The League of Nations developed the Convention and Statute on the International Regime of Maritime Ports in 1923. Members to the Convention agreed to allow all ships the freedom to treat ships equally, regardless of the nationality of the ship. This important notion forms the common expectation in international law of equal treatment in maritime ports, and still prevails throughout the IMO. The IMO assumed responsibility for existing conventions, such as the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution of the Sea by Oil (OILPOL 1954), as well as developing new conventions to promote marine safety.

The IMO’s focus has broadened over time. Its initial objective was to develop a comprehensive body of conventions, codes and recommendations to improve the safety of international shipping and to prevent pollution from ships. Once a number of significant conventions were in force, the IMO focused on promoting, monitoring or upgrading these.
Table 1: Summary of IMO and ICAO

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<th>ICAO</th>
<th>IMO</th>
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<tbody>
<tr>
<td>Convention in force</td>
<td>1948</td>
<td>1958</td>
</tr>
<tr>
<td>Type of international obligation</td>
<td>International Conventions and Standards and Recommended Practices(^3)</td>
<td>International Conventions and Protocols(^4)</td>
</tr>
<tr>
<td>Headquarters</td>
<td>Montreal</td>
<td>London</td>
</tr>
<tr>
<td>Member States</td>
<td>191</td>
<td>171</td>
</tr>
<tr>
<td>Purpose</td>
<td>ICAO strives to improve aviation’s safety performance while maintaining a high level of capacity and efficiency.</td>
<td>The safety and security of shipping and the prevention of pollution by ships.</td>
</tr>
<tr>
<td>Safety Oversight</td>
<td>Universal Safety Oversight Audit Programme allows ICAO to evaluate safety oversight capabilities.</td>
<td>Voluntary IMO Model Audit Scheme developed in 2002. Mandatory from 1 January 2016.</td>
</tr>
<tr>
<td>Key countries driving regulatory change</td>
<td>USA, UK, the Economic Union (EU) and China.</td>
<td>USA, UK and open registry states such as Liberia, Panama and the Marshall Islands.</td>
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The implementation of and compliance with IMO Conventions

The IMO is mandated to establish international Conventions and protocols. Member States are responsible for incorporating these international standards into their national laws, and enforcing them domestically. The vast majority of IMO conventions have been ratified by Member States however, implementation is not globally consistent. The level of implementation and compliance prevents international regulation from being truly effective.

The IMO is tasked with gaining almost global consensus on issues that are often technically complex and politically sensitive. Due to these complexities, global agreement is difficult to achieve which significantly affects the time taken to implement and update international standards. The number of nations required to ratify an IMO Convention, and the share of the world tonnage that they must represent, varies depending on the Convention. Each protocol, code, or recommended practice must be negotiated and adopted by Member States before they enter into force. In some countries, particularly developing countries, ratification can be a burdensome process, especially when the IMO Convention is entirely new and dissimilar to national law.

\(^3\) Standards and Recommended Practices (SARPs) are Annexed to the Chicago Convention and are not strictly legally binding.

\(^4\) A protocol complements and adds to a Convention. A protocol is used either to further address something in the original Convention, address a new or emerging concern or add a procedure for the operation and enforcement of the Convention.
The IMO developed a “tacit acceptance procedure” in 1981 as a response to the difficulty it had in obtaining the support of two-thirds of Member States to bring amendments into force. “Tacit acceptance” enables amendments to automatically come into force, unless a certain percentage of Signatory States object to the amendment by a given date. Technical amendments to most IMO conventions can now enter into force after one to two years, as opposed to the five or ten years it previously took.

Signatory States are responsible for complying with Conventions and protocols to which they sign up. The UN Convention on the Law of the Sea (UNCLOS) sets out the obligations that a State needs to fulfill when allowing ships to fly its flag. These obligations include maintaining a register of ships, assuming jurisdiction over the ship, taking measures regarding safety of navigation and seaworthiness of the ship, and ensuring that these measurements conform to international rules and so on.

Inconsistent implementation of flag state responsibility continues to be a concern. In 2002, member states proposed the development of an IMO Model Audit Scheme, a voluntary audit scheme aimed at providing member states with an objective assessment of how effectively they administer IMO instruments. The framework for this scheme provided the IMO with a tool to achieve consistent global implementation. The audits identified areas for improvement and led to member states committing additional resources to their maritime administrations.

From 1 January 2016, audits of all Member States will become mandatory. This will help determine the extent to which Member States give effect to their obligations in a number of key instruments.\(^5\)

**The slow pace of international regulatory change presents an opportunity**

Due to the complexities and structure of ICAO and IMO, international regulatory change is generally slow. The exception to this is external shocks that create public outcry (often from leading and developed nations), which drive fast (and possibly knee-jerk) regulatory change.

While international coordination between Member States may hinder the pace of regulatory change, it also provides smaller countries, such as New Zealand, with an opportunity to create innovative national regulations or to showcase itself as a test bed for new technology. This will enable smaller countries that do not usually have a large voice in these international organisations to further influence the development of international rules.

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\(^5\) The mandatory IMO instruments include in the scope of the mandatory audit scheme include SOLAS, MARPOL, STCW 1978, load lines (LL 66 and its 1988 Protocol); tonnage measurement of ships (Tonnage 1969) and regulations for preventing collisions at sea (COLREG 1972). New Zealand is a party to SOLAS, MARPOL and STCW.
**Open registry States**

Open registry states allow foreign ship owners to register their ships under their flag state. The foreign owners then abide by the safety regulations in the jurisdiction where the ship is registered. This system provides financial benefits for both the open registry State (due to an increase in the number of vessel registrations) as well as the ship owner (most open registry States have relaxed tax regulations and decreased costs due to more relaxed safety, labour and environmental regulations).

The use of open registries states began in 1920, when American shipping companies used Panama’s flag to avoid the prohibition regulations for cruise ships in the USA. (Boczek, B; 2005). Open-registry states have grown in number significantly since then.

Today, Panama, Liberia and the Marshall Islands are the largest open registry nations in terms of gross registered tonnage. Open registry States are powerful players within the IMO and the largest open registry States are major contributors to the IMO budget. In 2014, Panama contributed approximately $5.5 million of assessed contributions, or 18.1% of the total assessment, as the amount paid by each Member States depends on the tonnage of its merchant fleet (International Maritime Organization, 2014).

The development and acceptance of open registries created safety, labour and environmental concerns as ship owners circumvent their own nation’s regulations. Open registry States traditionally have sub-standard regulations, ineffective enforcement mechanisms and are perceived to lack real control over the vessel. Historically, open registry States were slow to implement IMO conventions. While both traditional maritime States and open registry States became Signatory States to the major IMO Conventions (such as MARPOL 1973, SOLAS 1974 and STCW 1978), only traditional States would implement these Conventions into their national laws. The IMO lacked powers to enforce open registries to comply with the conventions.

The sinking of the MV Amoco Cadiz in 1978, an open registry vessel flying a Liberian flag, sparked the beginning of port state control. Due to the political and public outcry over this vessel, the Paris Memorandum of Understanding (MOU) was signed, introducing port state control. Ships in international trade became subject to inspection by the states that they visited. This made it difficult to escape inspection and helped incentivise regulatory compliance. The Paris MOU was followed by the implementation of several other regional MOUs.

The vast increase in open registry States and their connection with substandard conditions drove the UN to establish strict regulations on ship registration. In 1986, the UN Convention for Registration of Ships attempted to define the mandatory requirements for registration of vessels in a national registry. Provisions include references to a genuine link, ownership, management, accountability and the role of the flag State. To date, this treaty has not come into force and the open registry status quo remains.
The IMO has taken several steps to ensure that open registry states comply with IMO conventions. MARPOL highlights the importance of port state control which enables port states to manage their coastal waters nationally by enforcing provisions of a convention on a flag state if the port state is a signatory party and the convention is in force. Shifting the enforcement of marine pollution and seafarer rights regulations to port state governments diminished the vessel owner’s ability to avoid liability by the use of open registries.

The implementation of ICAO Standards and Recommended Practices
ICAO faces the same implementation issues as the IMO. To overcome this problem, ICAO launched the Universal Safety Oversight Audit Programme (USOAP) in 1999 with the objective of promoting global aviation security by auditing ICAO Member States. USOAP determines the status of States, establishes safety oversight measures, as well as associated procedures and provides guidance material. In 2005, USOAP was expanded to cover provisions contained in all safety-related Annexes to the Chicago Convention.

In 2011, USOAP developed from periodic audits to a new approach based on continuous monitoring, the Universal Security Audit Programme Continuous Monitoring Approach. The audits allow ICAO to evaluate safety oversight capabilities and achieve a comprehensive understanding of issues relating to air transport’s growth and development. This proactive risk based approach to monitoring provides ICAO with the ability to perform audits as well as additional activities, such as ICAO Coordinated Validation Missions that help States resolve safety deficiencies.

ICAO also assists States to implement its SARPs. The “No Country Left Behind” campaign seeks to ensure that SARP implementation is globally harmonised. This recognises that some States may struggle to meet the requirements for some SARPs, and that large discrepancies remain in how some States implement them. ICAO now plays a more direct role in assisting developing countries to implement SARPs by taking an active coordination role between States.

There is potential for reputational damage on behalf of Member States if they fail to implement IMO Conventions and ICAO SARPs. The potential for economic loss due to reputational damage can create pressure to comply with international regulations. This can act as an effective enforcement tool to ensure that signatory States implement and enforce IMO Conventions and ICAO SARPs.

Safety Management Systems
ICAO and IMO require Member States to have safety management systems. The IMO has adopted Guidelines on Management for the Safe Operation of Ships for Pollution Prevention as a response to serious incidents in the late 1980’s caused by human error (eg. the sinking of the Herald of Free Enterprise). These Guidelines provided a framework for the development, implementation and assessment of safety and pollution prevention management. In 1993, the IMO adopted the International Management Code for the Safe Operation of ships and for Pollution Prevention (the ISM code). This became mandatory for all member States in 1998. The Code established safety-management objectives and requires a safety management system to be established by the ship-owner or management who has assumed responsibility for operating the ship.
Prescriptive regulations need to be frequently updated to keep pace with the latest technologies. Some prescriptive regulations found in IMO conventions inhibited innovation and have become less relevant over time. The IMO is shifting towards performance based regulatory action following a joint proposal from the governments of Bahamas and Greece in 2002 on goal-based regulation. As a result, Member States now approach safety from a goal and performance orientated approach as opposed to prescriptive methods.

**Aviation safety management systems**

Aviation safety is one of ICAO’s core objectives. ICAO collaborates with the air transport community to continuously improve aviation’s safety performance by the development of SARPs, the global strategies outlined in the Global Aviation Safety Plan (GASP), audit programmes and implementing safety programmes to address safety deficiencies. GASP establishes safety objectives and initiatives, and safety management SARPs assist Member States to manage aviation safety risks. These safety management provisions provide proactive strategies for improved safety performance.

Safety management systems allow for the proactive identification of hazards to encourage the improvement of safety performance and help avoid the negative consequences of serious incidents. From November 2013, the ICAO safety management provisions are contained in Annex 19 (Safety Management).

**THE IMPACT OF SOCIAL AND ECONOMIC CHANGE**

**The economic liberalisation of airlines**

The Chicago Convention resulted in a high degree of safety regulation but failed to create a structure for air services competition and economic regulation. Deregulation of domestic air services by individual nations led to the economic regulatory system we have today.

Before air services deregulation in the 1980s, the International Air Transport Association (IATA), founded in 1945, represented the interests of airlines. IATA counterbalanced the role of ICAO, which was primarily concerned with government’s interests in aviation. IATA brought together the airline industry to coordinate and standardise most aspects of the airline operation and effectively acted as a cartel for the airline industry by applying rigid rules and regulations around airline fares and cargo rates. IATA held traffic conferences that established the tariff structure for specific regions and set rigid conditions right down to the number of meals served and charges for headphones. All airlines had to unanimously agree. This was considered acceptable practice, as governments had to approve airline fares negotiated through the IATA process.

This was a time-consuming practice as services were often limited to a specified number of flights by one or two carriers from each of the two countries involved. This resulted in high fares and competitive pressure, and the system began to break down in the 1970s. Charter air services, as non-scheduled traffic, were not regulated under bilateral air services agreements but instead States had discretion to authorise non-scheduled services (Article 5 of the Chicago Convention). The growth of charter air services proved that the IATA tariff system was too rigid to deal with new developments.
The US Government faced pressure to address IATA's tariff procedure. In 1978, the US Civil Aeronautical Board (CAB) required IATA to show why the USA should not withdraw its approval of IATA's Traffic Conferences. If the USA withdrew its approval, then no airlines flying to the USA could be parties to IATA tariff agreements. In 1980, CAB reported that IATA agreements reduced competition and excluded US airlines from participating in IATA pricing agreements. This considerably undermined IATA's influence and saw all US airlines withdraw from IATA membership.

At the same time, there was public pressure for domestic deregulation in the USA that led to the Carter administration deregulating domestic airline services. Prior to the late 1970s, the CAB imposed rigid controls on airlines including restricting market entry, pricing, meals and all other aspects of air services operations. The US Airline Deregulation Act 1978 shifted the control over air travel from governmental to the markets by abolishing federal controls over flight schedules, airfares and the quality of services. While pricing was deregulated, the safety standards remained.

Deregulation allowed low cost carriers to enter the market. Southwest Airlines initiated the 'no frills' concept by offering flights at lower prices than major carriers. These low cost carriers had flexible labour agreements, a single aircraft type and point-to-point services. They offered services from secondary airports to avoid the high prices that major airlines were charged by metropolitan airports. By using secondary airports, these airlines were able to avoid congested airports and flight delays, making for more affordable flying.

The low costs carriers led to an increase in competition and efficiency gains, and allowed airlines to optimize their networks. The competition, forced major airlines to reduce prices and to restructure their operations to create a competitive advantage. Deregulation led to the development of hub-and-spoke route systems, which ensured greater access to a number of destinations and an increase in scheduled flights and of cheaper point-to-point services (e.g. SouthWest Airlines, JetStar and RyanAir). This act of domestic deregulation created a global liberalisation trend and led to a change in international air transportation. New Zealand deregulated its domestic air service market in 1984.

**Liberalisation through air service agreements**

International air services operate under bilateral air service agreements negotiated between the two countries. Air service agreements protect national airlines from foreign competition laws; however, they are often politically influenced to regulate every aspect of the international air service.

The USA's attempt to create a more liberal free market approach to international air services failed during the creation of the Chicago Convention. As a result, international air services continued to be regulated by agreements between countries.

One of the first air services agreements facilitated by ICAO was the Bermuda Agreement between the USA and the UK. The Bermuda Agreement determined rules relating to the third, fourth and fifth freedoms6 and was a framework for future bilateral agreements with other nations.

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6Refer to Annex 1
The Agreement was relatively open and did not restrict capacity. The UK terminated the Bermuda Agreement and negotiated a new agreement with the USA, known as Bermuda II. This Agreement was much more restrictive in order to level the playing field between the USA and UK.

The USA sought to create a free market approach to international aviation based on its lessons from deregulating the domestic market. After the domestic deregulation in the late 1970s, the USA introduced the concept of ‘open-skies agreements’ which provided a greater role for the market in decision making on prices and other aspects of their operation. The USA signed the first open skies agreement with the Netherlands in 1992. This allows carriers from the two countries to operate any routes between the countries without significant restrictions on capacity, frequency or price. This led the way for other countries, including New Zealand, to renegotiate their bilateral agreements.

The Multilateral Agreement on Liberalization of International Air Transport signed by 2001 by Brunei, Darussalam, Chile, New Zealand, Singapore and the USA promotes open skies air services arrangements. The Protocol to the Agreement signed by Brunei, Darussalam, New Zealand and Singapore provides for parties to exchange seventh freedom passenger and cabotage rights (MALIAT, 2015).

**Alliances and code sharing overcome barrier imposed by air service agreements**

International airlines often cover routes between their home country and another country and often from that country to a third (e.g. Air New Zealand route Auckland - Los Angeles – London). However, airlines are required by bilateral air service agreements to abide by certain routes that often do not give them the freedom to go between two foreign countries.

Airline alliances are arrangements between airlines that, importantly, allow airlines to expand their network in ways not possible due to limitations imposed by bilateral air service agreements. Alliances overcome this barrier by code sharing whereby a single airplane can have flight numbers from more than one airline. Currently, the three main alliances are Star Alliance, Oneworld and Skyteam. Alliance membership with other carriers allows airlines to expand their network and provides customers with more itinerary combinations.

**The protection of national interests**

Prior to the 20th century, the oceans were subject to the doctrine of the freedom of the seas – limiting each nation’s rights and jurisdiction over the ocean to a narrow area surrounding its coastline. The issue of sovereign control over the oceans became a growing concern in the mid 20th century.

Evolving technology meant oil exploration occurred further and further from land. The rapid exploitation can be illustrated by offshore oil production in the Gulf of Mexico. In 1947, oil production was less than 1 million tons. By 1954, production had grown to 400 million tons (United Nations, 2012). To protect local resources and raise revenues, nations began expanding their sovereignty beyond the 3-mile limit.

In the 1940s the USA, in partial response to the pressure from the domestic oil industry, extended its jurisdiction over all natural resources on its continental shelf. Other nations followed suit.
This resulted in sovereignty disputes, exploitation of the oceans resources and continuing inconsistency with the ocean governance regimes.

It took nearly 20 years of debate for the UN to adopt the UN Convention on the Law of the Sea 1982 (UNCLOS III) in 1973, (after UNCLOS I in 1958, and UNCLOS II in 1960). UNCLOS III adopted a unified governance regime of the rights of nations to the world’s oceans. It provides a constitution for the oceans and establishes the legal framework within which all activities in oceans and seas must be carried out. UNCLOS III took 12 years to come into force. Members were reluctant to ratify it due to Article 309, which prohibits nations from taking out reservations1 to any party of the treaty. This process illustrates how slow the creation of international agreements can be.

**International labour regulations on board ship**

As outlined above, open registry states are now big players in the IMO, as they represent more than 50 percent of the world’s fleet. Seafarers7 on ships flying the flag of an open registry State that does not exercise effective jurisdiction over the vessel, are often required to work in unacceptable working conditions. Problematically, countries that provide seafarers with decent safety and labour regulations face unfair competition from foreign-flagged open registry ship owners which have lower costs due to substandard regulations.

Representatives of international seafarers sought to overcome this problem in 2001 when they called on the International Labour Organization (ILO) to develop an instrument to consolidate current standards to ensure the creation of a global standard applicable to the entire industry. Both Member States and industry felt that the large number of existing maritime Conventions, many of which were very detailed, made it hard for Members States to ratify and enforce. The standards were out of date and did not reflect the contemporary working and living conditions on board ships.

In response, the ILO adopted the Maritime Labour Convention 2006 (MLC). The MLC sets out seafarers’ rights to decent working conditions and aims to create conditions of fair competition for ship owners. It consolidates and updates a set of global standards based on maritime labour instruments (Conventions and Recommendations) previously adopted by the ILO. The MLC is a significant achievement by the ILO. Importantly, the MLC applies to ships even if their flag state has not ratified the convention. This ensures a ‘level playing field’ in the shipping industry so ships whose nations have ratified the MLC are not placed at a competitive disadvantage. The MLC required ratification by 30 member States to enter into force and came into force in 2012. New Zealand is on track to ratify it in 2016.

The chartering of foreign owned and flagged vessels by New Zealand companies to catch quota in New Zealand’s Exclusive Economic Zone (EEZ) has highlighted problems around the treatment of their crew and the limited jurisdiction available under international law over the on-board management of these vessels. A 2012 New Zealand Ministerial Inquiry into the use and operation of Foreign Charter Vessels identified problems relating to employment conditions, crew welfare and health and safety.

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7 Seafarers are defined as “all persons who are employed or are engaged or work in any capacity on board a ship”
In response, the New Zealand Government introduced legislation that will allow only New Zealand-registered vessels to catch quota in New Zealand’s EEZ with effect from 22 May 2016. Any foreign charter vessel that operated in New Zealand’s EEZ before that date will need to be re-flagged as a New Zealand ship if it is to continue to do so. As a New Zealand-registered ship, a re-flagged vessel is subject to all New Zealand’s employment, health and safety and maritime law. This ensures that New Zealand operators using foreign-crewed fishing vessels are subject to the same legal regime as operators that employ New Zealand crew, and cannot take advantage of lower standards applied by the vessels’ former flag States.

**IMPACTS OF TECHNOLOGY ADVANCES**

**Technological innovation in air transport**

Technological innovation in air transport centers on the continued improvement in air transport efficiency and safety. The emergence of larger and more powerful engines and composite construction materials has resulted in improvements to aircraft size and speed, resulting in higher productivity for the airline industry.

**The introduction of the Concorde and jumbo jet**

The Anglo-French Concorde represented a major technological breakthrough that was economically flawed. It was the first aircraft that could fly faster than the speed of sound, and was seen as a status symbol for the wealthy. The first scheduled flight occurred on March 2, 1969 and the forecast for the aircraft’s future was bright. However, the Concorde lacked capacity unlike other planes, such as the Boeing 747 or ‘jumbo jet’. It therefore had lower levels of productivity, making it more expensive and less commercially viable for airlines. In conjunction with a steep rise in oil prices in the early 1970’s, the introduction of the jumbo jet outweighed society’s desire for supersonic flight.

Jumbo jets, introduced in the early 1970s, helped relieve air traffic congestion during a time of vast increase in air travel. Airports could only handle a limited number of takeoffs and landings and the jumbo jet’s ability to carry significant numbers of passengers than previous aircraft reduced the need for immediate expansions of most airports.

**ICAO’s technology standards have a clear interface with environmental protection**

New aviation technology (such as the components of aircraft) creates noise, pollution and safety concerns. Aircraft are required to meet environmental certification standards adopted by the ICAO Council, which are contained in Annex 16 to the Chicago Convention. Annex 16 consists of two volumes, Aircraft Noise and Aircraft Engine Emissions.

The growing demand for air travel has significantly outpaced technological innovations to mitigate the increase in environmental impacts. This has resulted in the aviation sector being a significant source of greenhouse gas emissions. ICAO is mandated to develop a range of standards, policies and guidance material for measures to address a range of environmental problems, such as aircraft engine emissions, aircraft noise and alternative fuels.
ICAO has taken a number of steps to address emissions, such as urging States to promote scientific research to address the issues. These policy measures have been criticised for making slow progress in developing market-based mechanisms to deal with carbon dioxide emissions. Virtually all of ICAO’s work in the area of climate change has been in the form of resolutions or guidance.

In 2012, the technical committee of the ICAO Council, the Committee on Aviation Environmental Protection (CAEP), reached an agreement on a carbon dioxide (CO2) metric system to underpin the CO2 standard. This represents a consensus between the States on the Committee as well as major airlines and stakeholders who observed the process. ICAO seeks to develop an appropriate regulatory limit for the aircraft CO2 standard using ICAO criteria. While no standards have been developed, this is a significant step for ICAO.

The CAEP made it clear that emissions regulations will be stricter only when the need is recognised; the move is technically feasible; and the impacts economically fair.

**Remotely Piloted Aircraft Systems (RPAS)**

The regulatory response to the introduction of RPAS is an example of nations amending their regulations ahead of ICAO developing SARPs. Aviation regulators have struggled to address the challenges posed by increased RPAS activity, which has the potential to disrupt the current aviation system. Significant safety risks include mid-air collisions with aircraft or a mid-air failure, posing a threat to the people and property below.

New Zealand has recently updated its rules applying to RPAS, as the existing rules were not fit for purpose for the safety risks that modern RPAS bring. However, it has yet to develop a comprehensive set of rules to fully integrate RPAS into New Zealand’s aviation system. This approach appears similar to other countries which have addressed the immediate safety risks and continued to monitor international developments at ICAO. In Europe, national safety rules apply to RPAS but these differ across the EU and key safety issues are not addressed in a consistent or coherent manner.

There is currently no international uniformity of RPAS rules. ICAO faces a number of key challenges in adopting SARPs for RPAS, such as the rapid evolution of technologies and the high variability of systems (RPAS Panel, 2015). ICAO’s RPAS Panel is focusing “on development of SARPs for adoption by the Council of ICAO in 2018 related to airworthiness, operations (including RPAS operator certification) and licensing of remote pilots” (Carey, B 2015).
Maritime Technology

Failures of new technology in the maritime sector have led to a number of highly publicized incidents. These technology advances have driven regulatory change at both a national and international level. The steam engine and other technological advances during the industrial revolution are early examples. This trend continued into the 20th and 21st centuries with the development of oil tankers, container ships, and passenger ships.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1894</td>
<td>Introduction of the Plimsoll Line</td>
<td></td>
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<tr>
<td>1912</td>
<td>International Convention for the Safety of Life at Sea (SOLAS I)</td>
<td>External shock: Sinking of the Titanic</td>
</tr>
<tr>
<td>1948</td>
<td>Convention on the International Maritime Organization</td>
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<tr>
<td>1954</td>
<td>International Convention for the Prevention of Pollution of the Sea by Oil (OILPOL 1954)</td>
<td></td>
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<tr>
<td>1969</td>
<td>International Convention on Civil Liability for Oil Pollution Damage Convention (CLC)</td>
<td>External shock: Torrey Canyon disaster</td>
</tr>
<tr>
<td>1978</td>
<td>Protocol to MARPOL 1978</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>International Convention on Standards of Training, Certification and Watchkeeping of Seafarers (STCW)</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Maritime Labour Convention</td>
<td></td>
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</tbody>
</table>

The Industrial Revolution

Britain is often credited with starting the industrial revolution and introducing many of the important globalising changes during the 19th century, when the British maritime fleet accounted for half of the world’s tonnage. The British fleet, which dominated the market, had considerable influence over the principles and legal concepts that underpin the maritime sector. Britain was the leader in regulatory change during the 19th century prior to the development of international organisations as it would often legislate and other nations would shortly follow suit. Efforts from international organisations in the early part of the 20th century had limited success compared to the regulatory regime of Britain and its colonies.

The industrial revolution’s technological advances transformed the global economic system and drove fundamental changes in maritime transportation. The key change in the maritime sector was the introduction of the steam engine and improvements in steel construction. The first successful steamship the Charlotte Dundas, built in 1802, was used as a tugboat on the Forth-Clyde canal. While initially only useful for short and regular services, innovation in the later part of the 19th century introduced a more efficient engine. By 1870, over 100,000 steam engines were at work throughout Britain.

During this time, the British government followed a laissez-faire doctrine by leaving maritime businesses alone to ensure safe, responsible operations. Many believed that it was better to let business be regulated by the free market, as opposed to laws and regulations. During the early 19th century, the government let businesses adopt new inventions with little or no regulation.
However, the technological advances and laissez-faire approach to regulation was quickly accompanied by an increase in risks at sea. During the winter of 1820, more than 2,000 ships were wrecked in the North Sea, resulting in the deaths of 20,000 people.8

Growing concern for the safety of crew and ships led to a shift in focus towards safety at sea, with British legislators seeking to improve the safety of maritime transport. This was resisted by many in the maritime industry. By 1836, public concern grew to the point where Parliament was forced to investigate the growing number of shipwrecks. The Parliamentary Select Committee drew attention to 10 determining factors, including improper and excessive loading, incompetency of masters, inadequate equipment and defective ship construction. The first regulations were introduced after the publication of this report. The first rules on lights and traffic at sea were introduced in 1840 and from 1846, passenger ships has to be inspected by approved surveyors.

Britain’s first comprehensive legislative response to maritime safety was the Merchant Shipping Act 1850. This Act created a Board of Trade tasked with monitoring, regulating and controlling issues relating to merchant shipping and the safety of ships and working conditions of seafarers. This regulatory response had little effect on the number of casualties in the maritime sector.

**Classification Societies develop technical standards for the construction of ships**

Classification Societies developed technical standards for the construction and operation of commercial ships and approved ship designs against these standards. The first Classification Society was formed in 1760 with the Register Society, which subsequently became Lloyds Register. The Register Society attempted to classify the condition of ship’s hull and equipment on an annual basis. In 1834, the Register Society published the first rules for the survey and classification of vessels.

The rules published by Classification Societies, as well as requirements in IMO Conventions and marine legislation of flag states, forms a comprehensive set of standards for design, construction and maintenance of ships. SOLAS permits Member States to delegate the inspection and survey of ships to a Recognized Organisation (i.e. Classification Societies). This recognises that many Member States do not have the adequate technical experience to undertake all the necessary inspections and surveys.

**The Plimsoll Line helped prevent overloading of ships**

The rapid growth of British trade during the 19th century led to an increase in the transport of goods by sea. Ship owners saw the benefits of loading their ships efficiently to reduce costs and maximise profit. Ship owners would sometimes run the risk of overloading ships due to the higher profits from more cargo and the ability to claim insurance if the ship was lost at sea. This became a common occurrence in the late 19th century and overloading and poor maintenance of ships created what were known as ‘coffin ships’.

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Overloading was a serious safety problem. One way to prevent overloading ships was by requiring ships to have load lines. Load lines were not a new concept at this time, as ship owners had marked ships as long ago as the 12th century.

The Lloyds Register attempted to ensure ships had loading marks, however this only applied to ships classed by the Lloyds Register itself. It was not until 1870’s when British MP Samuel Plimsoll investigated the effects of overloading, that the load line became a possibility. Plimsoll was defeated several times in Parliament but he became famous for compulsory load lines. The Merchant Shipping Act of 1876 required a series of ‘lines’ to be painted on the ship to show the maximum loading point. These became known as the Plimsoll lines. Unfortunately, the Act gave ship owners the discretion to paint the line where they saw fit. The position of the line was not fixed by law until 1894.

The introduction of containerisation necessitated international standardisation
Malcolm McLean, a New York truck company owner, is credited with developing the modern multimodal system by the use of specialised shipping containers. The same container with the same cargo could be transported with minimum interruption via different transport modes (sea, road and rail). Containerisation appealed to many ship owners as their single largest expense at this point was the labour costs associated with loading and unloading individual crates. By the 1960’s there was a rapid increase in the use of the more efficient container.

In 1961, the International Organization for Standardization set standard sizes for container ships. The most common standard was the 20 foot equivalent unit (TEU) which became the industry standard for cargo volume and vessel capacity. In 1967, the IMO studied the safety of containerisation and drafted the International Convention for Safe Containers, which was completed in 1972 and entered into force in 1977. This Convention aims to maintain a high level of safety in the transport and handling of containers and to facilitate the international transport of containers by providing uniform international safety regulations.

Passenger ships
The IMO has adopted specific regulations for passenger ships and in particular RO-RO (roll on, roll off) ferries. The IMO is now taking a proactive approach to new regulations by undertaking risk and safety assessments, although many of these regulations have been adopted in response to major accidents, such as the Herald of Free Enterprise. This vessel, a RO-RO car and passenger ferry capsized in 1987, moments after leaving the Belgian port of Zeebrugge, killing 193 people. The IMO’s proactive risk and safety assessments seek to analyse what might go wrong and to fix the identified issues prior to an incident.

In 2000, the IMO undertook a comprehensive review of passenger ships’ safety to assess whether the current regulations were adequate, taking into consideration today’s large cruise ships. The review took the view that the regulatory framework should emphasise the prevention of casualty from occurring. In 2006, the Maritime Safety Committee adopted a package of amendments to SOLAS in light of the review.
EXTERNAL SHOCKS DRIVING INTERNATIONAL REGULATION

History shows that improvements to international marine safety are almost exclusively driven by maritime disasters. Such change is usually reactive, slow and affected by industry-driven agendas. The list of maritime disasters is long and number of casualties is high, however there are specific incidents that have occurred that stand out in terms of creating international agreement on safety, liability and environmental controls.

*The Titanic and the safety of life at sea*

The sinking of the Titanic in 1912 continues to be the most notorious maritime disaster in history. Public outcry escalated and accelerated the regulatory response and standard setting process but the latter was not reactive by today’s standards. In 1914, maritime nations gathered in London for the first international conference on the safety of life at sea, which drafted the International Convention for the Safety of Life at Sea (SOLAS). SOLAS ensures that signatory States comply with minimum safety standards in construction, equipment and operation of ships. This 1914 version was ratified by only five states. Many countries, including the USA, suspended the ratification process due to the commencement of World War I. As a result, the 1914 Convention never came into force.

SOLAS I was eventually superseded by a second version in 1929, a third in 1948 and a fourth in 1974. The updated versions of SOLAS illustrate a shift in the perceived importance of safety. SOLAS forbids the carriage of goods that are likely to endanger the lives of passengers or the safety of the ship. The 1914 version left the decision as to which goods were ‘dangerous’ to the signatory States. This same attitude was maintained in the SOLAS 1929, but this may reflect the relatively small quantity of dangerous goods carried by sea at the time. However, in the aftermath of World War II, the perception had visibly changed. More cargo considered dangerous was being carried by sea. SOLAS 1948 provisions stressed the importance of international uniformity in safety precautions for the transport of dangerous goods by sea. The Convention established that goods should be considered dangerous on the basis of their properties and characteristics, instead of being left to the decision of individual States.

SOLAS was the IMO’s first major achievement and is generally regarded as the most important of all international maritime treaties on the safety of merchant ships. SOLAS 1974 includes a tacit acceptance procedure that provides that an amendment shall enter into force on a specified date unless objections to it are received from a certain number of parties before that date. SOLAS 1974 has thus been updated and amended several times.

Amendments to SOLAS 1974 include the introduction of the International Safety Management (ISM) Code, developed in response to the Herald of Free Enterprise disaster. The ISM Code became mandatory for passenger ships, high-speed craft, oil tankers, and other cargo ships and to mobile offshore drilling units of 500 gross tonnage. This was an important step in international regulation as it focused on the human element of shipping and providing standards for the safe management and operation of ships and for pollution prevention.
The Code does not create specific operating rules and regulations, but provides a broad framework for vessel owners and operators to ensure compliance with existing regulations and codes, to improve safety practices and to establish safeguards against all identifiable risks.

**Table 2: External shocks resulting in international maritime regulatory change**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>International regulatory change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1870-1894</td>
<td>Overloading and poor maintenance of ships resulted in high numbers of deaths.</td>
<td>UK required all ships to be painted with a Plimsoll line.</td>
</tr>
<tr>
<td>1912</td>
<td>Sinking of the Titanic</td>
<td>International Convention for the Safety of Life at Sea (SOLAS I) ensures that signatory States comply with minimum safety standards in construction, equipment and operation of ships.</td>
</tr>
<tr>
<td>1948</td>
<td>Global agreement to create what became known as the IMO</td>
<td>Convention on the International Maritime Organization</td>
</tr>
<tr>
<td>1954</td>
<td></td>
<td>The International Convention for the Prevention of Pollution of the Sea by Oil (OILPOL) attempt to protect the sea from pollution by prohibiting tankers from the discharging oil, or any oil mixture within specified prohibited zones.</td>
</tr>
<tr>
<td>1961</td>
<td>Introduction of container ships</td>
<td>The International Organization for Standardization set standard sizes for container ships.</td>
</tr>
<tr>
<td>1967</td>
<td><em>Torrey Canyon</em></td>
<td>International Convention on Civil Liability for Oil Pollution Damage Convention (CLC) 1969</td>
</tr>
<tr>
<td></td>
<td></td>
<td>International Convention for the Prevention of Pollution from Ships (MARPOL, 1973)</td>
</tr>
<tr>
<td>1973</td>
<td><em>Herald of Free Enterprise</em></td>
<td>International Safety Management Code, which was added to SOLAS 1974</td>
</tr>
<tr>
<td>1989</td>
<td><em>Exxon Valdez</em></td>
<td>US Oil Pollution Act 1990 Amendment to MARPOL requiring all newly built tankers to have double hulls</td>
</tr>
</tbody>
</table>

**Environmental protection: pollution from oil discharge, and air pollution**

The oil boom in 1950 – 1970 meant the quantity of oil transported vastly increased, sparking the development of specialised oil tankers. In 1959, the first 100,000 tonne crude oil tankers operated from the Middle East to Europe and by the mid 1960’s tankers of 200,000 tonnes were on the market. As oil tankers increased in size, so did the potential risk for oil to pollute the marine environment.

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9 Prior to this, ships held general cargo that was stored in accordance with the characteristics of the ship. Oil barrels were often mixed up with other types of cargo. There were large risks of the oil barrels collapsing in heavy seas, resulting in ships being lost to fire.
International regulations for oil pollution existed prior to the creation of the IMO. Despite the IMO’s mandate to focus on marine safety, it undertook responsibility for International Convention for the Prevention of Pollution of the Sea by Oil 1954 (OILPOL).

OILPOL was an international response to pollution by oil tankers routine shipboard operations. Prior to the Convention, it was normal practice to wash tankers then pump the remaining oil/water combination into the sea. OILPOL attempt to protect the sea from pollution by prohibiting tankers from discharging oil, or any oil mixture within specified prohibited zones.

OILPOL was adopted during a period when pollution control was not a major concern and it did not prevent future oil spill accidents, such as the Torrey Canyon. While MAPROL 1973/78 made OILPOL obsolete, OILPOL was an important first step towards IMO’s environment regulations. Since OILPOL, the IMO has adopted a wide range of measures to prevent and control pollution caused by ships and to mitigate the effects of damage that may occur because of maritime operations and accidents.

The IMO recognises that air pollution can come from ships. While there is no direct effect on the maritime environment, air pollution contributes to overall air quality problems and affects the natural environment. The IMO has taken several steps to regulate air pollution from ships. The first step was in 1977 when Annex VI to the International Convention for the Prevention of Pollution from Ship (MARPOL) was adopted. Annex VI limits air pollutants found in ships exhaust gas (including sulphur oxides and nitrous oxides) and prohibited the deliberate emissions of ozone depleting substances. This Annex came into force in 2005.

In light of technological advances, the Marine Environment Protection Committee revised Annex VI to strengthen the emission limits. The primary changes to Annex VI include a progressive reduction in global emissions and the introduction of emission control areas to reduce emissions of air pollutants in designated sea areas. This came into force in 2010.

The Torrey Canyon disaster sparked the creation of MARPOL and the Convention on Civil Liability for Oil Pollution Damage

The Torrey Canyon oil spill of 1967 in the English Chanel was the world’s first major oil tanker disaster. This led to the development of international environmental regulations. The oil spill remains the UK’s worst as the wreck affected hundred of miles of coastline in the UK, France, Guernsey and Spain. The Torrey Canyon had been “jumboised” during the 1960’s This created manoeuvrability problems for the ship as it could not respond quickly enough to avoid the impending disaster.

This oil spill caused catastrophic damage to economic and natural resources and provided insight to the regulation necessary to prevent future disasters. The disaster was a major turning point for the IMO, as it expanded its mandate to liability and compensation. The disaster led to the creation of the International Convention on Civil Liability for Oil Pollution Damage (CLC) 1969, which was the IMO’s first move into regulating environmental and legal liability issues.
The CLC Convention ensures that adequate compensation is available to victims of oil pollution resulting involving tanker ships, and places the liability for such damage on the owner of the polluting ships. Ship owners became strictly liable, as opposed to liable only when proven negligent. ¹¹

The *Torrey Canyon* disaster was also the catalyst for the International Convention for the Prevention of Pollution from Ships (MARPOL) 1973. MARPOL attempted to prevent and minimise pollution from ships - both accidental and from routine operation. This occurred during a period of increased global awareness of environmental protection and so adoption of MARPOL was seen as a significant move on behalf of the IMO. MARPOL received only three ratifications and did not enter into force. ¹² As the 1973 MARPOL Convention had not entered into force, the 1978 Protocol absorbed the parent Convention and entered into force in 1983. A series of tanker accidents in 1976-78, including the grounding of the *Amoco Cadiz* off France in 1978, was a catalyst for the 1978 Protocol to the MARPOL Convention. ¹³

MARPOL 1973 remains the main international convention on the prevention of pollution of the marine environment by ships, from operational or accidental causes. Despite MARPOL 1973 not entering into force, that 1973 Conference laid the groundwork for IMO’s future work on environmental issues and thus its significance should not be underestimated. The combined instruments of MARPOL 1973 and the Protocol 1978 entered into force in October 1983 (for Annexes I and II).

**Exxon Valdez and the “double hull” amendments**

Major oil spills at the end of the 1980’s triggered a fundamental change in ship design and regulation. The *Exxon Valdez* disaster off Alaska in 1989 created vast public concern in the USA, which led to the adoption of the Oil Pollution Act 1990 (OPA) and eventually to new IMO regulations. Prior to the Deepwater Horizon oil spill of 2010, the *Exxon Valdez* was the largest single oil spill in US waters.

The significant economic and natural impacts of this spill created the opportunity to re-examine the regulations on oil spill prevention and cleanup.

The response to the *Exxon Valdez* highlights the influence of the USA in driving global regulation and industry change. The OPA made it mandatory for all tankers calling at US ports to have double hulls ¹⁴ and holds tanker operators in US waters fully liable for the environmental damage that they cause. Companies must have plans to establish detailed containment and cleanup plans for oil spills. The USA demanded that double hulls be a mandatory requirement of MARPOL. The oil industry was resistant to this due to the high costs of retrofitting existing tankers. In 1992, two years after the OPA, the MARPOL Convention was amended to require all newly built tankers to have double hulls or other designs ‘providing that such methods ensure the same level of protection against pollution’.

¹¹ Strict liability makes the owner legally responsible for the damage and loss caused by the act or omissions, regardless of culpability.

¹² A major obstacle in ratifying MARPOL 1973 was technical compliance problems with Annex II (chemicals)

¹³ MARPOL 1978 overcame ratification obstacles by allowing Parties to not be bound by Annex II for a period of three years which provided time to implement the regulations. Further, several nations made their commitment to ratification clear. This spurred on other maritime nations to ratify the Convention to protect their ship-owners’ competitiveness.

¹⁴ A double hull design requires the bottom and sides of the ship have two complete layers of watertight hull surface: an outer layer forming the normal hull of the ship and the second inner hull forms a barrier to seawater in case the outer hull is damaged.
International regulatory change is slow. It took the sinking of the single-hulled *Erika* off the coast of France ten years after the *Exxon Valdez* for IMO Member States to accelerate the global phase-out of single hulls to align with US regulations. Amendments to MARPOL in 2001 specifies that tankers of single hull construction should be phased out or converted to a double hull.

Following the 2002 sinking of the oil tanker the *Prestige*, a revised schedule for the phasing out of oil tankers and a new regulation banning the carriage of heavy grade oil in a single hull tanker entered into force in 2005. The provisional target date for the complete phase-out of all single hulled vessels was 2015. The phase out attempts to incorporate industries sunk cost of forfeiting alternative vessel designs, as well as the costs associated with retrofitting.

External shocks in the civil aviation sector

Aircraft hijacking has driven the creational of international aviation conventions

The rising trend in aircraft hijacking in the late 1950s led the international community to adopt the Convention on Offences and Certain Other Acts Committed On Board Aircraft of 1963, known as the Tokyo Convention. The Tokyo Convention, adopted under the auspices of ICAO, was the first international response to terrorism. It creates rules to address aircraft hijacking and has several objectives covering the protection of life and property on board aircraft, providing safety in aircraft and promoting the security of civil aviation.

The Tokyo Convention is limited in application. Specifically, it did not define air piracy or set rules for extradition of offenders.¹⁵ The Convention only applied to aircraft in flight, and not to aircrafts that were parked. These limitations, as well as the number of hijackings decreasing in the years after 1963, meant implementation of the Tokyo Convention was slow. A string of hijackings following 1967 highlighted that few States had signed up. Despite its flaws, the Tokyo Convention was still considered an important tool in combating terrorism. As a result, several Member States signed the Convention, which came into force in 1969.

The large increase in the number of aircraft hijackings in the late 1960s and the inadequacy of the Tokyo Convention led ICAO to adopt the Convention for the Suppression of Unlawful Seizure of Aircraft 1970 (the Hague Convention). This entered into force in 1971 and made hijacking an offence and called for punishment of the offender. As with its predecessor, the Hague Convention had several limitations. The Convention stated that each signatory State should make the offence punishable, but it did not list the exact penalties to be imposed. Both the Tokyo and Hague Convention deal with unlawful seizure committed on board aircraft, however did not consider sabotage committed on the ground or unlawful interference with air navigational facilities.

In 1970, the ICAO Assembly discussed concerns about acts of unlawful interference in civil aviation for political or criminal reasons. The Assembly resolved that ICAO adopt international standards and recommended practices to counter such acts. The Convention for the Suppression of Unlawful Act against the Safety of Civil Aviation (the Montreal Convention) was drafted to overcome the problems faced by the Tokyo and Hague Conventions and came into force in 1973.

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¹⁵ The state, which the aircraft was registered under, was given jurisdiction to prosecute, however if the aircraft landed in another state, that state was not under an obligation to prosecute or extradite the offender.
In 1974, the ICAO Council adopted Annex 17 (Security) to the Convention on International Civil Aviation. This requires members to develop their own security program and to coordinate efforts between governmental departments, airlines, airport authorities, pilots and crew. The continuing acts of terrorism in the late 1980’s highlighted that many of ICAO’s standards were not being applied at the same level by all Member States. Many States found it too expensive or time consuming to implement these standards into their law.

In 2010, ICAO adopted two new aviation counter-terrorism instruments for the suppression of unlawful acts relating to civil aviation - the Convention on the Suppression of Unlawful Acts Relating to International Civil Aviation (the Beijing Convention) and the Protocol Supplementary to the Convention for the Suppression of Unlawful Seizure of Aircraft (the Beijing Protocol). The Beijing Protocol replaces the Montreal Convention and the Beijing Protocol amends the Hague Convention. The Beijing Convention creates new offences such as using an aircraft as a weapon; using weapons of mass destruction or dangerous substances against, on, or from an aircraft; and transporting dangerous materials. It has a wider jurisdiction that the Montreal Convention to ensure than a wider range of perpetrators can be brought to justice. The Beijing Convention and Protocol are not yet in force.

The Montreal Protocol 2014 is the result of a four-year effort to modernise the Tokyo Convention. The Protocol makes three key improvements to the Tokyo Convention, including extending Signatory States jurisdiction over in-flight incidents, clarifying the definition of “unruly behaviour” and recovering the costs stemming from unruly passenger behavior. The Montreal Protocol requires 22 ratifications before it enters into force.

**September 11, 2001 terrorism attacks in the USA**

These attacks led to significant loss of life and property. The growing concern for transport security after this encouraged a rigorous transformation of airport security regulations at an international level. The urgency of implementing security standards after a terrorist threat often results in a rush of initiatives at both a national and international level. The aviation sector tends to make knee-jerk regulations, and only some of these have lasted.

The USA took immediate regulatory action, which some commentators have perceived to be knee-jerk (Kayyem, J and Pang, R, 2003). The USA Federal Aviation Administration (FAA) immediately reacted by:

- expanding the ICAO Prohibited Items List to include many household items and items with a point or cutting edge.
- recommending strengthening of existing cockpit doors and accelerating the design, production and installation of new doors.
The US Congress passed the Aviation and Transport Security Act 2001 on November 19, 2001. It addressed preventative hijacking strategies and prescriptive components of the aviation security system such as air cargo security and passenger and baggage screening. The Act also created the Transport Security Administration, which became the sole agency responsible for securing US commercial airports.

New Zealand’s response was just as immediate as the USA’s.

► The NZ government required screening of all domestic passengers on jet services with more than 90 seats.

► When US air space reopened on September 15, the FAA required New Zealand’s Aviation Security Service (AVSEC) to comply with new FAA standards, including screening of all hold-stow luggage on aircraft bound for US destinations, pat down searching, shoe removal demonstrations by passengers, special searching of electronic equipment and detailed aircraft searches.

AVSEC recognised that some unreasonable internationally determined standards were applied to New Zealand, which has a low-level terrorism threat. However, as an ICAO signatory, New Zealand had to comply with these standards.

In October 2011, ICAO adopted the Declaration on misuse of civil aircraft as weapons of destruction and other terrorist acts involving civil aviation. This recognised a new type of threat that required concerted efforts and policies of cooperation on the part of States. It urged Signatory States to intensify their efforts in order to implement and enforce conventions on aviation security and SARPs relating to aviation security. In 2003, ICAO introduced requirements for flight compartment doors to resist intrusion and ballistic force in aircraft with more than 60 passenger seats.

The IMO also reacted to the September 11 tragedy within a similar timeframe to ICAO. In 2002, the IMO adopted the International Ship and Port Facility Security Code (ISPS Code) which provides a standardised framework for governments, ships and port facilities to co-operate and detect acts which threaten security of the maritime transport sector.

**Recent high profile civil aviation incidents: MH Flight 370 and MH Flight 17**

Recent high profile civil aviation incidents have caused public outcry and pressured regulators to improve safety regulations, for example, the disappearance of Malaysian Airlines Flight 370 en route from Kuala Lumpur to Beijing, the shooting down of Malaysian Airlines Flight 17 over eastern Ukraine, and the GermanWings Flight 9525 incident.

On 8 March 2014, Malaysian Airlines Flights 370 disappeared en route from Kuala Lumpur to Beijing. It is not the first aircraft in civil aviation history to have disappeared, but this incident dominated global news and generated public pressure for the creation of international regulations on flight tracking.

ICAO responded by convening a special meeting in May 2014, to discuss technologies and capabilities to accomplish better real-time tracking of airliners.  

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It concluded that this tracking of flights should be pursued as a priority. ICAO developed the Global Aeronautical Distress and Safety System (GADSS) including 15 minutes tracking objectives for normal flight operations and a 1-minute distress and abnormal flight-tracking requirement.

These requirements may place considerable costs on industry and problems for countries such as New Zealand due to areas in the Pacific Ocean where tracking may not be possible. Member States recommended the adoption of GADSS in February 2015. The requirements are projected to become applicable in 2016 and 2021 respectively. As little is known about the MH370 incident, it is hard to draw conclusions about the appropriate regulatory responses.

Shortly after MH370, on 17 July 2014, Malaysian Airlines Flight MH 17 from Amsterdam to Kuala Lumpur was shot down over Ukraine while flying in unrestricted airspace. All 283 passengers and 15 crew perished. This incident exposed a large safety gap in the regulation of international civil aviation and raised concerns about aircraft operating to, from and over conflict zones. Currently, the airlines and the relevant national regulator jointly decide an aircraft’s route. There is no international system for alerts of elevated risks or plans for what airlines should do when an area is deemed too risky to fly.

Soon after the incident, the UN Security Council unanimously passed a resolution condemning the attack and calling on those responsible to be held to account. In July 2015, Russia used its veto power to stop an international tribunal being set up to prosecute the people who shot down MH17 over Ukraine.

In response to the MH 17 shooting, ICAO, IATA, Airports Council International (ACI), and the Civil Air Navigation Services Organization (CANSO) met to address risks to civil aviation arising from conflict zones. ICAO formed a senior-level Task Force on Risks to Civil Aviation Arising from Conflict Zones. This aimed to strengthen mechanisms to ensure the safety and security of aircraft operation near or over conflict zones. Three projects were identified to address the immediate problems of effectively circulating information to support States and industry stakeholders.

An ICAO conference in February 2015 discussed emerging safety issues, such as global tracking of aircraft and risks to civil aviation arising from conflict zones. The Conference supported the development of a web-based information-sharing platform and recommended the review and update of existing information on best practice for the development of risk assessment processes related to conflict zones.

**GermanWings Flight 9525, 24 March 2015**

The GermanWings Flight 9525 crash prompted regulators to amend the rules to require two crew members to be in the cockpit at all times because the co-pilot was responsible for the incident, which killed all 150 people on board, after he locked the captain out of the cockpit.

The European Aviation Safety Agency, Europe’s air-safety regulator, immediately recommended temporary rules requiring two crew members to be in the cockpit at all times. Several countries followed suit. New Zealand’s Civil Aviation Authority (CAA) immediately tightened flight deck procedure requiring at least two crew members to be present in the cockpit of large jets at all times. This applies to domestic and international flights.
This incident highlights the unintended consequences of regulations imposed after the September 11 terrorist attacks. After them, systems that lock a cockpit door became standard in regulation to prevent terrorists from taking control of an aircraft.

In this case, the GermanWings A320 was designed to allow emergency entry into the cockpit via an override code if the pilot was unresponsive; however, in this instance the co-pilot was able to override entry. This standardised safety regulation, which has been in place for several decades, fails to account for a pilot’s own error or misjudgment.

Airlines have raised cost concerns about ICAO’s recommendation to more closely track airliners in flight and concerns about requiring a second person in the cockpit.
ANNEX: FREEDOMS OF THE AIR

ICAO established the nine Freedoms of the Air which broadly relate to a country’s airlines privilege to enter and land in another country’s airspace. Only the first five “freedoms” have been officially recognized as such by international treaty.

► **First Freedom of the Air** - the right or privilege, in respect of scheduled international air services, granted by one State to another State or States to fly across its territory without landing.

► **Second Freedom of the Air** - the right or privilege, in respect of scheduled international air services, granted by one State to another State or States to land in its territory for non-traffic purposes.

► **Third Freedom of The Air** - the right or privilege, in respect of scheduled international air services, granted by one State to another State to put down, in the territory of the first State, traffic coming from the home State of the carrier.

► **Fourth Freedom of The Air** - the right or privilege, in respect of scheduled international air services, granted by one State to another State to take on, in the territory of the first State, traffic destined for the home State of the carrier.

► **Fifth Freedom of The Air** - the right or privilege, in respect of scheduled international air services, granted by one State to another State to put down and to take on, in the territory of the first State, traffic coming from or destined to a third State.

► **Sixth Freedom of The Air** - the right or privilege, in respect of scheduled international air services, of transporting, via the home State of the carrier, traffic moving between two other States. The so-called Sixth Freedom of the Air, unlike the first five freedoms, is not incorporated as such into any widely recognized air service agreements such as the “Five Freedoms Agreement”.

► **Seventh Freedom of The Air** - the right or privilege, in respect of scheduled international air services, granted by one State to another State, of transporting traffic between the territory of the granting State and any third State with no requirement to include on such operation any point in the territory of the recipient State, i.e the service need not connect to or be an extension of any service to/from the home State of the carrier.

► **Eighth Freedom of The Air** - the right or privilege, in respect of scheduled international air services, of transporting cabotage traffic between two points in the territory of the granting State on a service which originates or terminates in the home country of the foreign carrier or (in connection with the so-called Seventh Freedom of the Air) outside the territory of the granting State (also known as a Eighth Freedom Right or “consecutive cabotage”).

► **Ninth Freedom of The Air** - the right or privilege of transporting cabotage traffic of the granting State on a service performed entirely within the territory of the granting State (also known as a Ninth Freedom Right or “stand alone” cabotage).
REFERENCES


Dogania, R (2002) Flying off course: the economics of international airlines. Routledge, New York, USA

International Transport Forum, Air service agreement liberalisation and airline alliances http://www.internationaltransportforum.org/pub/pdf/14AirServiceAgreements.pdf


