# International Civil Aviation Organization

Chair:
Nicholas Buhne

Vice Chairs:
Maripaz Fernandez
Same Salameh
Alexis de la Tour

## International Civil Aviation Organization

Dear Delegates,

Welcome aboard SSUNS 2015, we'll be taking you the centre of one of the United Nation's most active and technical agencies. In keeping with SSUNSS' efforts to bring in-depth debate to committee we'll have the privilege of running our committee the International Civil Aviation Organisation's headquarters here in Montréal. Part of this approach to this committee will focus on content driven debate that will inevitably dip into the technical language of many SARPs (Standards and recommend practices). We hope that this committee will provide delegates with an opportunity to dig their teeth into much of the behind-the-scenes policymaking that underlies international cooperation.

The first of our veteran vice-chair is Maripaz Fernández from Costa Rica and has been neck-deep in Model United Nations since 8th grade and looks set to continue that journey. While her history of flying has been mercifully predictable and safe (much like her spirit plane the Boeing 737) if you dug past her initial answer of "interesting committees" as to why she loves SSUNS you would strike on her story of the Godzilla crisis of '14. When asked what her favourite airline was Maripaz simply responded with "NOT american airlines".

Samer Salameh plans on leveraging his Neuroscience major in committee session not only to ensure our delegates are at their best but also to pull the Dias through 10 hours of committee session. Hailing from Beirut, Lebanon Sameer has been Doing MUN since 10th grade with selfies all along the way, culminating in last year's selfie with 300+ delegates. This is not to be confused with his favourite thing about SSUNS, which is captivating high quality debate. His experience with flying has been almost anything but predictable with a perchance for flights through lightening storms and with the Lockheed Martin F-22 Raptor as his spirit plane.

Alexis de la Tour started his MUN career at SSUNS in a rather compromised position, but since being taken hostage he has worked himself up the organisation with a potent mix of bilingualism, a charming smile, and razor sharp political acumen as befits a political science major. As a frenchman raised in London it's not surprising that his favourite Airline is Virgin Atlantic and the Rafale Jet Fighter is his spirit plane; but not for the reason you might think, it's because he lives and breathes sports. While Alexis' experience with flight has been anything but smooth and comfortable (especially being moved to hospital) he'll ensure that this committee combines all of the factors that make the SSUNS environment.

My name is Nicholas Buhne and I'll be your chair for the duration of the conference. This will be my fourth year at SSUNS and 7th year of MUN after having participating in and being trained in the South Asian and European circuits. Born in Islamabad, Pakistan to Swiss parents and raised in Asia and Eastern Europe;I'm now in my final year of an Honours in International Development Studies. When I'm not following the latest turn in Kyrgyzstan's hydro-electrical disputes with its neighbours you're likely to find me sailing, giving skiing lessons, taking advantage of Montréal's late-night eateries, or more realistically catching up on my studies in the library. My history with air travel has been chequered, the highlight being my detention in Warsaw Airport en route to Minsk under suspicion of smuggling chemical weapons in the form of a lava lamp. My favourite is Swiss, maybe because they provide chocolates.

We're looking forward to ICAO in November,

Nicholas Buhne
Chair, International Civil Aviation Organization Committee

## Topic 1: Economic Development of Air Transport

### Introduction

The travel industry has democratized travel in a way that allows people from almost all income levels and nationalities to fly. This has fueled a growth of over 5% annually, 6 billion international flights, and over 2.9 billion international travelers[1], creating enough of a population to be considered a continent on its own. Technological innovations have allowed for increased airplane capacity, allowing more people to travel at once, as well as increase the frequency of flights, turning more and more airports into hubs of flight connections to destinations around the world. This expansion of the commercial travel industry represents a strong economic frontier for the global economy, but also a great challenge as airports must quickly adapt their infrastructure capacity to accommodate this growing industry. Airports as well as aircrafts themselves must strive to become more cost effective and time efficient to keep up with growing demand, all without sacrificing security policies and regulations to ensure travelers safety. This growing industry is growing fast enough that it could even contemplate the possibility of commercial space travel in the near future.

As the industry doubles its size every 15 years, it now contributes to over 2.2 trillion of the world's GDP[2]. ICAO aims to drive global economic prosperity and social development while facing these strong traffic growth projections paired with the need for sustainable and effective climate-related efficiency.

### ICAO`s Mission

*"To develop policies, standards, undertake compliance audits, perform studies and analyses, provide assistance and build aviation capacity through the cooperation of Member States and stakeholders."[3]*

### Global Air Navigation Plan

To achieve this mission, ICAO has developed a 15 year Global Air Navigation Plan (GANP) spanning 2013-2028 to integrate existing technological advancements and

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1. "Statistics Programme." *Statistics Programme*. International Civil Aviation Organization, 2009. Web. 15 June 2015. <http://www.icao.int/sustainability/Pages/eap-sta-excel.aspx>.
2. "Economic Analyses and Forecasting." *Economic Analyses and Forecasting*. International Civil Aviation Organization, 2015. Web. 15 June 2015. <http://www.icao.int/sustainability/Pages/Analyses-and-Forcasting.aspx>.
3. "2013-2028 Global Air Navigation Plan." *Global Air Navigation Plan* Document 9750-AN/963.Fourth Edition (2013): n. pag. *International Civil Aviation Organization*. International Civil Aviation Organization, 2013. Web. 15 June 2015. <http://www.icao.int/sustainability/GANP%20library/GANP.pdf>.

foresee future advancements to strive for operational efficiency and sustainable development. Among their highest priorities include:

- Performance Based Navigation
- Continuous Descent Operations (efficient airplane landing models)
- Continuous Climb Operations (efficient airplane take-off models)
- Runway Sequencing Capabilities

The effective implementation of these plans relies not only in the engineering and development of technologies allowing airports to execute them. It is also a matter of investment of resources into the projects as well as development of adequate training courses for operators of these models to ensure effective implementation.

**System Block Upgrades Model**

This system was created during the creation of GANP to provide a methodology focused on flexible global systems engineering to allow countries to enhance their Air Navigation capacities. The main goal of the Model is to lead aviation into global harmonization, increased capacity, and improved environmental efficiency while facing the growing demand of the travel industry.

The dynamics of the model[4] work as follows:
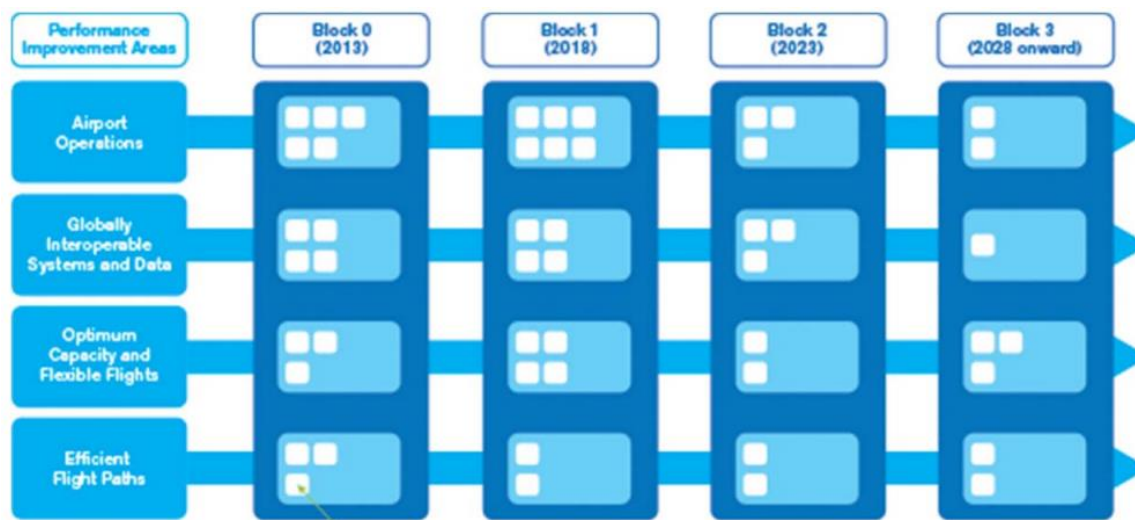


Each Block Upgrade (blue columns) refers to the target availability timelines for a group of operational improvements (technologies and procedures) that ICAO hopes to fully harmonize as a global Air Navigation Procedure. The "modules" (smaller white

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[4] *Global Air Navigation Plan and Aviation System Block Upgrades (ASBU) Methodology.* H. Sudarshan. Air Navigation Bureau. July 2013.

squares) represent the technologies and procedures necessary for that area of development.

For example, Block 0 (2013) describes operational improvements that have already been implemented in many parts of the world today and has an implementation deadline of 2013-2018. Its starting date, 2013 refers to the availability of all its components (technologies, investments, permissions, development) and its deadline for implementation is 2018. Each subsequent module builds upon completion of the previous one.
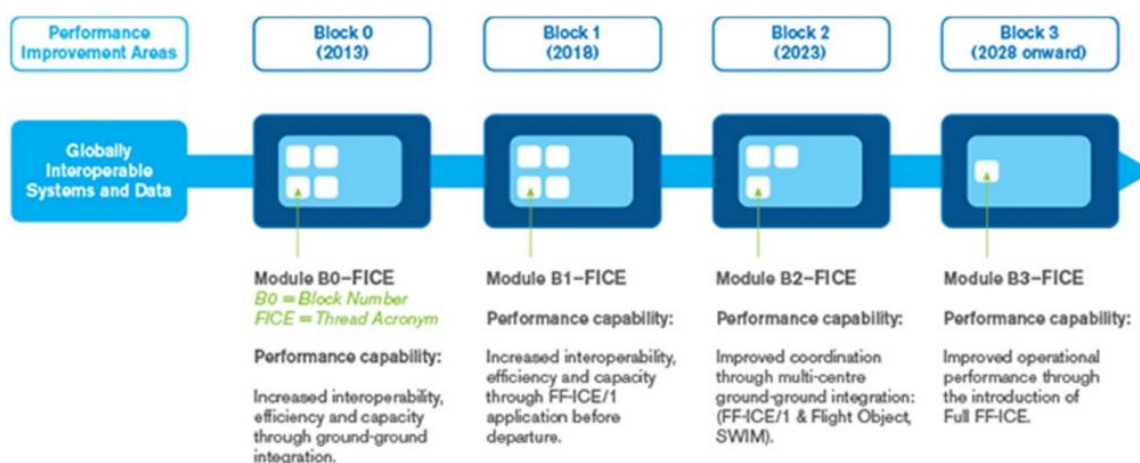


This model developed under GANP[5] is highly important for member states as it provides a planning tool to reach a goal of a harmonized global Air Navigation system. It aims to identify potential performance improvements that are available with today's technology and forecast next generation of technologies that could be implemented worldwide. This strategic planning also aims to give investment certainty to member states ensuring the increased efficiency and interoperability of global aviation.

**Infrastructure Management[6]**

This program aims to enhance and promote advancements in aviation infrastructure such as airport operations and air navigation services, all keeping in line with a clear view of sustainable development. Through several panel sessions and conference discussions, ICAO has put in place diverse policies and guidelines to optimize the costs of air navigation facilities and services. These strive to offer solutions for issues like: improving organizational and managerial capability, reducing the financial burden of building airports to governments, protecting user interests, seizing the benefits of technological developments, and facilitating access to funding for long term investments.

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5    Ibid.

6.   "Airlines, Airports and Air Traffic Control: Serving the Ever-growing Demand for International Traffic |
     International Transport Forum's 2015 Summit." *International Transport Forum 2015 Annual Summit*. OECD,
     2015. Web. 15 June 2015. <http://2015.internationaltransportforum.org/airline-traffic>.

Because of the rapid growth of the airline industry as described above, solutions to airport infrastructure around the world must address the pressure of both commercialization of air flight as well as the privatization of aviation infrastructure.

As explored during the International Transportation Forum of 2015, an annual summit on developments in the industry and key issues: Airlines, airports and air traffic must serve the fast growing demand for international traffic. And this traffic is not limited to travellers and tourism; it also encompasses the ever-growing need to ship products overseas in an almost immediate fashion. This is challenged by high congestion driven by this demand as well as severe environmental effects of optimizing these processes too much.

ICAO is also faced with a need for planning of new air routes to create new trade flows as a large portion of flights are cargo shipments. This planning encompasses the establishment of new aviation hubs that must be negotiated at a governmental level, as they must be integrated into the vision for economic development for every country.



*Figure 1 Air routes scheduled in 2009*

**Policy and Regulation[7]**

Developments along the lines of new aviation routes and flight connectivity among countries' infrastructure must work hand in hand with government's vision of connectivity. "Open Skies" policies have been the main method for growing air connectivity. These policies although increasing the accessibility to travel, can also lead

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7. "2013-2028 Global Air Navigation Plan." *Global Air Navigation Plan* Document 9750-AN/963.Fourth Edition (2013): n. pag. *International Civil Aviation Organization*. International Civil Aviation Organization, 2013. Web. 15 June 2015. <http://www.icao.int/sustainability/GANP%20library/GANP.pdf>.

to congestion, leaving airspace capacity at subpar. ICAO places strong importance in methods of forecasting travel demand in order to accurately plan for airport capacity and air traffic management.

A strong obstacle to this harmonious capacity regulation and planning exists in the airline network dynamics, as investments made into airports also play a negotiation role with the privatized aspect of numerous airlines. This leaves little leeway for airport developers and planners to focus on the overall growth and wellbeing of the industry, as they must worry about attractive business models for airlines.

**Emerging space activities and civil aviation[8]**

This strong effort to build harmonized and effective Air Navigation systems can foster the technological efficiencies necessary to lift commercial travelling into space transportation. One of ICAO's goals with unifying the air navigation development leads to commercial space transportation as a means of facilitating travel. It currently holds summits, conferences and research programs to explore the existing technologies and the necessary steps to impulse them into sub-orbital commercial flights.

Satellite based navigation systems and advanced digital communications should result in increasing airspace capacity, allowing new and more technological aircrafts to transit on wider ranges of the Earth's atmosphere. This represents an exciting step for the air navigation industry but also a necessary relief for the congested air traffic routes of present time.

**Overall Challenges:[9]**

The Block Upgrades system has delineated necessary upgrades and modifications to the current air navigation system around the world. However, it has set a logical timeline sequence, which outlines the dates at which each module should have been completed and follows the next logical module on that timeline. This has proven to be ineffective at a universal level as many countries lack not only the economic infrastructure, but also an educational one to redefine the methods that have been used for decades.
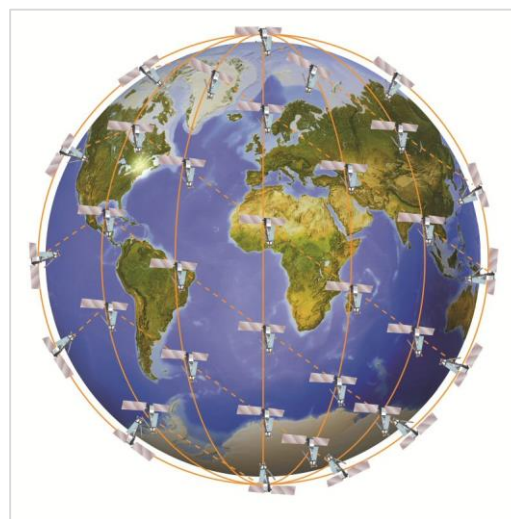


*Figure 2 The Blocks Upgrades System*

8.  "Space Transportation - Preparing for the Future." *International Civil Aviation Organization*. ICAO - UNOOSA, 2015. Web. 15 June 2015. <http://www4.icao.int/space>.

9.  "2013-2028 Global Air Navigation Plan." *Global Air Navigation Plan* Document 9750-AN/963.Fourth Edition (2013): n. pag. *International Civil Aviation Organization*. International Civil Aviation Organization, 2013. Web. 15 June 2015. <http://www.icao.int/sustainability/GANP%20library/GANP.pdf>.

This system although complete and organized, must fine-tune its processes to include flexibility scenarios and aid options to allow aviation harmonization around the globe. The Block Upgrades model depends highly on the existing infrastructure and operations systems that are currently in place by each member state. Therefore the modules system highly relies on adapting the extent of its development to each member state while trying to achieve harmonious and global air navigation system that efficiently serve to satisfy the growing demand of travel and shipping.

There are also several risks associated to investments in expanding existing airport capacity[10]. Aside from legal issues regarding safety concerts, the privatized airline industry possesses complex and restrictive new airline business models and short-term airline partnerships. This increased competition allows them to switch their operations between airports more easily, making the airport business less stable and investments more risky. A greater challenge is placed upon airport planners as they seek to obtain investments to grow their operations and cater to the growing demand of travellers while being granted little to no investment initiatives because of the volatility of the airline business model.

Thus, ICAO's main overarching challenge lies in trying to serve the needs of a growing public, eager to travel, while keeping impeccable safety systems, sustainable environmental practices, as well as creating an attractive and exciting business model for investors. Airport planners must cater to the efficiency and operational concerns of airlines, airports, air navigation service providers, governmental regulators, investors, and ultimately, the travellers.

**Conclusion**

Given that the market dynamic of air transportation has dramatically changed over the past years, the industry must reshape its infrastructure to uphold the growing demand, establish strict airline safety procedures to ensure risk mitigation, as well as explore new realms of aeronautical transportation and even space exploration. These all serve to cater to a better airline transportation service to the consumer, expanding business opportunities for the diversified and competitive airline industry, as well as thriving economic prosperity as a result of interconnected globalization.

**Questions to Consider**
1. How can ICAO ensure the timely compliance of all its system Block upgrades given the threat of economic constraints and recessions?
2. How can ICAO ensure cooperation between all nations to participate and invest in the development of this global industry?
3. As the airline industry becomes even more privatized, fostering competition among key players, how can we ensure unified progress for the industry?

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10. "Airlines, Airports and Air Traffic Control: Serving the Ever-growing Demand for International Traffic | International Transport Forum's 2015 Summit." *International Transport Forum 2015 Annual Summit*. OECD, 2015. Web. 15 June 2015. <http://2015.internationaltransportforum.org/airline-traffic>.

## Topic 2: Aviation Security

**Introduction**

The International Civil Aviation Organization (ICAO) has been committed toward safeguarding global civil aviation security since its inception on April 4th, 1947, the day that the *Chicago Convention on International Civil Aviation* went into effect.[11] The preamble of the Chicago Convention states that "Whereas the future development of international civil aviation can greatly help to create and preserve friendship and international understanding among the nations and peoples of the world, yet its abuse can become a threat to the general security;".[1] On May 13th, 1947, an agreement was made between the ICAO and the UN Security Council, whereby Article VII of the agreement states, "The International Civil Aviation Organization agrees to co-operate with the Economic and Social Council in furnishing such information and rendering such assistance to the Security Council as that Council may request, including assistance in carrying out decisions of the Security Council for the maintenance or restoration of international peace and security".[1]

The ICAO started to make serious strides toward preserving global aviation security in the 1960's, starting with the *Tokyo Convention on Offences and Certain Other Acts Committed On Board Aircraft* in 1963.[1] However, the most fundamental legislative works that are produced and implemented by the ICAO are the *Standards and Recommended Practices* (SARPs) for international civil aviation, which were added to the Chicago Convention in the form of 19 annexes.[12] The SARPs pertaining to international aviation security were instituted by the ICAO as Annex 17 and added to the Chicago Convention in March 1974.[2] Annex 17 has since been amended fourteen times, with the most recent amendment adopted in November 2014.[2] In September 2013, the ICAO adopted "Enhancing Global Civil Aviation Security and Facilitation" as one of its five *Strategic Objectives* for 2014-2016 in a focused effort to combat the evolving threats to international aviation security.[1] This objective encompasses "policy initiatives, audits focused on the capability of States to monitor their aviation security activities, and assistance to States that are unable to address security deficiencies of their own".[1]

**Historical Background**

I.      *Security Threats until and Including 9/11:*

Although the tragic attacks that occurred on September 11th, 2001 in the United States of America are the most well-known instance of aviation terrorism, attacks on

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[11] United Nations Security Council, Counter-Terrorism Committee Meeting, *Counter-Terrorism Global Strategy Civil Aviation Sector - ICAO's Contribution*, 27 June 2013, available from http://www.un.org/en/sc/ctc/docs/2013/2013-06-27_ICAO_Presentation.pdf

[12] United Nations, International Civil Aviation Organization, *Aviation Security Policy Section*, available from http://www.icao.int/Security/SFP/Pages/default.aspx

commercial airlines have been a reality since the 1930's. One of the oldest examples was on October 10th, 1933, when a United Airlines Boeing 247 exploded mid-flight over Chesterton, Indiana due to a nitroglycerin bomb, killing ten people.[13] Curiously, terrorism was not a prominent motive for airline attacks until the 1960's, with most incidents before that resulting from suicide attempts and insurance scams.[3] An often controversial threat to commercial airlines is being shot down – intentionally or by accident – by foreign or hostile military forces. One of the most famous examples is the shooting-down of Libyan Arab Airlines Flight 114 by Israeli fighter-jets in 1973, killing 108 people.[14] This particular incident was investigated by the ICAO, which held Israel responsible for the attack. Israel would later apologize and provide compensation to the families of the victims.

When the Popular Front for the Liberation of Palestine committed a succession of aircraft hijackings and bombings during the late 1960's and early 1970's,[3] the international community and the ICAO started to take notice. However, despite the ICAO's best efforts to safeguard global aviation security, the threat of airline terrorism continued to evolve and thrive throughout the 1970's and 1980's, culminating in the bombing of Pan Am Flight 103 on December 21st, 1988.[3] The aforementioned incident involved the destruction of a Boeing 747 by around 400 grams of plastic explosives over Lockerbie, Scotland, resulting in the deaths of 270 people.[3]



Figure 3: Crash site of Pan Am Flight 103

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[13] Aerospaceweb.org Staff, "Commercial Airline Bombing History," *Aerospaceweb.org*, 2012, accessed May 30, 2015, http://www.aerospaceweb.org/question/planes/q0283.shtml
[14] BBC Asia, "MH17 Crash: History of passenger planes shot down," *BBC*, July 20, 2014, accessed June 1, 2015, http://www.bbc.com/news/world-asia-28361223

The tragedy of Pan Am Flight 103 prompted the ICAO Council to convene in order to establish the Aviation Security (AVSEC) Mechanism in February 1989.[15] The AVSEC programme provides states – upon request – with a complete technical evaluation of their security framework based on Annex 17.[5] Furthermore, AVSEC develops *Aviation Security Training Packages* (ASTPs) designed for global implementation, as well as workshops and seminars in order for states to meet security training requirements.[5] A network of *Aviation Security Training Centers* (ASTCs) was established in order to provide aviation security training worldwide consisting of courses based on the ASTPs.[5] The network currently consists of twenty-eight centers found in cities such as Buenos Aires, Moscow, Montreal, Amman, Beirut, and Kuala Lumpur among others.[5]

Although the AVSEC programme faced the threat of terrorism with relative success throughout the 1990s,[5] it would not be prepared for the series of terrorist attacks that are known today as *9/11*. On September 1st, 2001, a group of nineteen Islamic extremists linked to the terrorist group Al-Qaeda managed to hijack four commercial airliners and launch a series of suicide attacks in the United States.[16] Two of the hijacked planes were used to target the World Trade Center in New York City, as American Airlines Flight 11 and United Airlines Flight 175 (both were Boeing 767's) were crashed into the North Tower and South Tower, respectively, causing both towers to collapse within hours of the attack.[6]



*Figure 4 The Twin Towers during 9/11*

Another plane, American Airlines Flight 77, was crashed into the western side of the Pentagon Headquarters in Arlington County, Virginia.[6] The fourth plane, United Airlines Flight 93, was headed toward Washington D.C., but crashed into a field in western Pennsylvania after the passengers in the plane attempted to overcome the hijackers.[6] The attacks resulted in a total of 2,996 deaths and billions of dollars of damaged property and infrastructure.[6]

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[15] International Civil Aviation Organization, AVSEC Meeting, *The ICAO Aviation Security Programme*, available from http://www.icao.int/Meetings/FAL12/Documents/Biernacki.pdf

[16] History.com Staff, "9/11 Attacks," *History.com*, 2010, accessed May 28, 2015, http://www.history.com/topics/9-11-attacks

Directly following the events of *9/11*, the 33rd session of the ICAO Assembly convened to unanimously adopt Resolution A33-1, titled the *Declaration on misuse of civil aircraft as weapons of destruction and other terrorist acts involving civil aviation*.[5] This resolution effectively recognizes that an aircraft can be misused as a weapon of destruction, condemns such acts as inhumane and demands severe punishment for those who commit such acts.[5] In February 2002, the ICAO Council convened a *High level, Ministerial Conference on Aviation Security*, which led to the support of a "global strategy for strengthening aviation security worldwide".[5] At the forefront of this strategy was the *AVSEC Plan of Action*, which came into effect in June 2002.[5] The AVSEC Plan of Action stressed on implementing frequent, mandatory security audits in all pertinent states, bolstering the existing AVSEC Mechanism and providing assistance to states through the ICAO *Technical Cooperation Programme*.[5]

## Regulatory Responses of World Governments

The *9/11* attacks ignited a dramatic response from the United States government, which declared a global war on terrorism and publically pioneered a new era of rigorous aviation security measures by placing airport security under federal control. On-flight security measures have included the hardening of cockpit doors, and the placement of air marshals and flight deck officers on-board the aircraft.[17] In terms of airport security, advanced detection methods have been employed using state-of-the-art equipment, such as advanced imaging technology and explosive trace detection.[7] Moreover, travelers and cargo have been exposed to far more rigorous screening. Travelers have had to go through full body "patdowns", behavioural detection officers, and passenger profiling based on specific – and often controversial – criteria.[7] More importantly, terrorist watch lists have been established using government intelligence in order to simplify the process of identifying suspects during airport screening, thus preventing them from boarding flights.[7] In the years that followed *9/11*, many nations around the world followed suit and tightened restrictions on travelers in an effort to ensure global aviation security.



*Figure 5 Airport security measures have become far more stringent*

The aforementioned measures have played an important role in not

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[17] Ben Brandt, "Terrorist Threats to Commercial Aviation: A Contemporary Assessment," *Combatting Terrorism Center at West Point*, November 30, 2011, accessed May 28, 2015, https://www.ctc.usma.edu/posts/terrorist-threats-to-commercial-aviation-a-contemporary-assessment

only limiting the success of airline terrorism plots, but also in capturing suspects and information that have proven essential to fighting global terrorism. Nevertheless, rigorous airport security has drawn extensive complaints from travellers and policy makers alike. Travellers complain that screening measures such as full body patdowns and being forced to remove shoes, jackets, and belts are excessive, inconvenient, and often unnecessary.[18] Furthermore, the criteria used for passenger profiling have frequently been called into question, with accusations of prejudice originating from some circles.[8] Meanwhile, some policy makers and airlines argue that excessive amounts of time, money, and human resources are being wasted on the implementation of screening measures on "low-risk passengers".[8] They argue that airports should not be spending billions of dollars on unnecessary screening procedures for passengers who "pose no threat to planes".[8]

### Post-*9/11* Security Threats

Although the response of governments around the world toward the events of *9/11* was swift and severe, this did not deter the unrelenting terrorist plots targeting commercial airlines, with a significant portion of these plots being linked to Al-Qaeda. A notable bombing attempt occurred in December 2001, when a radical Islamist boarded American Airlines Flight 63 carrying 100 grams of plastic explosives in his shoes.[3] The perpetrator was caught mid-flight, shortly before he was able to detonate the explosives.[7] Similar attempts include the "liquid explosives plot" in 2006, the "underwear/Christmas Day plot" in 2009, and the "cargo bomb plot" in 2010.[7] While none of these plots succeeded, they demonstrated the ever-changing ways through which explosives can target airlines. Furthermore, there were numerous terrorist attacks that could not be prevented. On August 24th, 2004, two Russian airliners were destroyed by bombings leading to the deaths of 89 people.[3] Other incidents include the 2007 attack on Glasgow International Airport, and the 2011 shootings at Frankfurt Airport.[7] Consequently, it was becoming increasingly evident that as aviation security threats continued to evolve, airports were becoming just as susceptible to attacks as airlines. Other unfortunate incidents – unrelated to terrorism – have occurred such as airliner shoot-downs. The most recent example was the shooting-down of Malaysia Airlines Flight 17 on July 17th, 2014 over the Ukraine, killing 298 people.[4]

### Current and Future Threats to Aviation Security

More than a decade has passed since the fateful *9/11* attacks, and it is clear that the global efforts of terrorism continue to target civil aviation. As previously mentioned, explosives can now be delivered in many different ways, and airports have become strategic targets for militant groups. Furthermore, a variety of new tactical threats have emerged in recent times resulting from the ongoing evolution of modern warfare.

An emerging security risk in recent times involves the ability of terrorists to infiltrate airport and airline staff, giving them access to secure areas. This is known as the

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[18] Dan Milmo, "After 9/11: airports 'wasting billions' on needless security checks for passengers," *The Guardian*, September 7, 2011, accessed May 28, 2015, http://www.theguardian.com/world/2011/sep/07/airports-wasting-billions-needless-security

"insider threat", and it is particularly concerning since gangs and terrorist groups can bypass background checks via new recruits or members without criminal records who are undetectable by criminal or terrorist databases.[7] Accordingly, the "insider threat" can cause considerable damage since hired airport/airline employees endure little to no security screenings when entering the workplace.[7] It is noteworthy that this threat is not limited to terrorism, as insider criminals permit widespread baggage theft, drug-trafficking, and prostitution in airports.[7] The 2009 "Air Cocaine" incident highlighted two major "insider" security breaches, the first by drug cartels in Venezuela and the second by Al-Qaeda – who had been collaborating with the aforementioned cartels – in West Africa.[19]



In February 2011, a violent civil war broke out in Libya causing widespread turmoil in the country. In the midst of the chaos, Islamic extremists linked to Al-Qaeda were able to capture a large number of surface-to-air missiles from the Libyan military's man-portable air defense system (MANPAD) arsenal.[7] Since then, these MANPADs have been distributed to many parts of Africa and the Middle East, and have emerged as a potential threat to commercial airlines.[7] While these missiles cannot target airlines at the highest cruising altitudes, they are a serious danger at certain stages of the planes' ascent or drop.[7]

As the global aviation industry seeks to enhance its already improved safety record, it must begin preparing for a new age of terrorism that differs from explosives and

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[19] Afua Hirsch, "Cocaine flows through Sahara as al-Qaida cashes in on lawlessness," *The Guardian*, May 3, 2013, accessed May 30, 2015, http://www.theguardian.com/world/2013/may/02/cocaine-flows-through-sahara-al-qaida

hijacking. As the aviation industry grows increasingly dependent on computer technology, it becomes increasingly vulnerable to *Cyberterrorism*.[20] Furthermore, the increasing presence of "wi-fi" and other internet related services on airplanes exacerbates the danger of Cyberterrorism.[10] More money and resources will have to be invested by the aviation security industry during the next few years to quell this imminent threat. Another burgeoning threat to aviation security is the widespread use of unmanned aerial vehicles (UAV's), also known as "drones".[10] The proliferation of "drones" for various uses has increased the likelihood of collisions with aircraft due to accidents (namely technical difficulties such as signal interference).[10] Additionally, should military "drones" fall into the wrong hands, they can be misused to launch attacks on commercial flights.[10]

In October 2010, the ICAO Council adopted Resolution A37-17, titled the *Consolidated statement on the continuing ICAO policies related to the safeguarding of international civil aviation against acts of unlawful interference*.[21] This resolution reaffirms the ICAO's disapproval of the misuse of aircraft as weapons of destruction, stressing on the continued need to upgrade aviation security to protect international civil aviation from acts of unlawful interference.[11] Resolution A37-17 would once again be emphasized when the ICAO convened in September 2012 for the *High-level Conference on Aviation Security*, during which many of the aforementioned threats – Cyberterrorism and "insiders" – were acknowledged.[22]

**The ICAO Security Policy under the "Strategic Objectives for 2014-2016**

In September 2013, the 38th ICAO Assembly convened to outline its *Strategic Objectives* for the 2014-2016 triennium which were:

1. Enhance global civil aviation safety.[1]
2. Increase the capacity and improve the efficiency of the global civil aviation system (Air Navigation).[1]
3. Enhance global civil aviation security and facilitation.[1]
4. Foster the development of a sound and economically-viable civil aviation system.[1]
5. Minimize the adverse environmental effects of civil aviation activities.[1]

The Strategic Objective regarding security and facilitation highlighted the ICAO's intention to lead a global improvement in aviation security via its Aviation Security Policy (ASP) Section.[1] The ASP Section updates and amends the Standards and

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[20] Flight Safety Australia Staff, "Cyber terrorism and drones emerging as aviation threats," *Flight Safety Australia*, December 5, 2014, accessed May 30, 2015, http://www.flightsafetyaustralia.com/2014/12/cyber-terrorism-and-drones-emerging-as-aviation-threats/

[21] International Civil Aviation Organization resolution A37-17, *Consolidated statement on the continuing ICAO policies related to the safeguarding of international civil aviation against acts of unlawful interference*, a37_res_prov (8 October 2010), available from http://www.icao.int/Meetings/AMC/Assembly37/Documents/ProvisionalEdition/a37_res_prov_en.pdf

[22] United Nations, International Civil Aviation Organization, *Communiqué of the ICAO High-level Conference on Aviation Security*, September 14, 2012, http://www.icao.int/Newsroom/Pages/communique-of-the-ICAO-high-level-conference-on-aviation-security.aspx

Recommended Practices (SARPs) in Annex 17 of the Chicago Convention – in other words, the SARPs pertaining to aviation security – and oversees their execution.[23] It also updates the ICAO *Security Manual for Safeguarding Civil Aviation Against Acts of Unlawful Interference* as well as the *Technical Annex to the Convention on the Marking of Plastic Explosives for the Purpose of Detection*.[13] More importantly, it provides support for the ICAO Council and Assembly, cooperates with the Committee on Unlawful Interference (UIC), the Air Transport Committee (ATC), and the UN Counter Terrorism Committee, and manages the various functions of the AVSEC Panel.[13]

The AVSEC Panel directly oversees the global enhancement of civil aviation security via its three main working groups:
1. Universal Aviation Security Audit Programme: Its objective is to "validate the oversight capability and implementation of SARPs" in a particular state via continuous monitoring and auditing operations.[1]
2. Implementation Support and Development Programme: Its objective is to "assist states to achieve compliance with security related SARPs" by providing ASTPs, AVSEC training, and workshops.[1]
3. Technical Cooperation Bureau: Its objective is to conduct "remedial assistance projects" by providing experts, funding, and long-term assistance.[1]

In recent years, the ICAO has managed to establish a "risk-based approach" to aviation security, encouraging member states to use a *Risk Context Statement* as a means to evaluate their own national risk.[12] Furthermore, it has encouraged member states to upgrade their standards of aviation security by adopting a consistent format for travel documents that can be read by an electronic validation service called the Public Key Directory (PKD), as part of the Machine Readable Travel Documents (MRTD) Programme.[1]

**Conclusion**

In October 2014, the ICAO held the *Symposium on Innovation in Aviation Security* to encourage and begin a dialogue regarding the strategic future of aviation security.[24] As the first of its kind, this event focused on innovative, sustainable, and efficient technologies/procedures that could – and should – be implemented to face the latest security threats to international civil aviation.[14] Research and development, technology innovation, sustainability, and strengthening partnerships were among the many themes of this event.[14] Accordingly, the path to safeguarding future aviation security is clear, but the objective is to articulate a precise, effective, and sustainable strategy to follow this path. Airline terrorism will proliferate and evolve so long as new methods such as *Cyberterrorism* and new groups like the *Islamic State* continue to appear. Furthermore, a variety of new threats will continue to emerge due to political,

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[23] United Nations, International Civil Aviation Organization, *Aviation Security Policy Section*, available from http://www.icao.int/Security/SFP/Pages/default.aspx

[24] *ICAO Symposium on Innovation in Aviation Security*, Montreal, 21-23 October 2014, *ICAO Journal*, Issue 2, 2014, available from http://www.icao.int/Meetings/SIAS/Documents/SIAS_7418_ICAO_Journal_Vol69_No2_ANG_v8-20140626.pdf

economic, and social changes around the world. Thus, the challenge of the ICAO will be to evaluate the effectiveness and evenness – among its member states – of its current security strategy, and devise sustainable strategies that can protect the future of global civil aviation.

**Questions to Consider**

1. How effectively has the ICAO approached its current "Strategic Objective" for aviation security?
2. What aspects of aviation security does the current ICAO Security Policy fail to address properly?
3. What are some potential security methods that can be implemented in the near future? Can the necessary assistance and infrastructure to implement these methods be provided to all member states?
4. What strategies must be adopted in order to ensure the protection of future civil aviation security?

## Topic 2: Aviation Safety

**Introduction**

Flight safety is paramount to all actors in aviation including airline operators, regulation authorities, and naturally passengers. The International Civil Aviation Organization's (ICAO) role is to act as they center point for these efforts and establish standards and recommendations in the signatory countries of the Chicago Convention. For example, Annex 10 of the Convention on international civil aviation sets standards and recommendations applicable to aeronautical telecommunications for everything from frequencies, standardized spelling to emergency radiotelephony procedures.

Air 'security' should not be confused with air 'safety' that includes all measures taken to counter intentional malice such as acts of terrorism. Much of aviation security is focused on devices brought on board civil aircraft unlawfully, through any number of means (in checked luggage, hand luggage via cargo carried in the hold, introduction by a crew member or mechanic etc.). It also aims to prevent the carriage of weapons of all kinds in the cabin and the cockpit of the aircraft (on persons and hand luggage) in particular when weapons can be used for malicious purposes such as air piracy. This falls under what is commonly termed airport security. Since 2009, many aviation safety concepts and techniques have been transposed into health care sector.

Today, the global air-transport network consists of several interconnected networks that are different in terms of geopolitics, are technologically complex and resolutely multidisciplinary. Given the complexity and the continuous expansion expected in this sector, it is essential that we continue our efforts to improve safety.

In ICAO's history aviation safety has greatly improved, yet there are still substantial gaps in safety that need to be addressed. We focus on the fact that often safety issues are rooted in technology failure and aircraft maintenance but nearly two-thirds of reports list "human factors" as the root cause[25], according to an analysis by the nonprofit "Investigative Newsource" in San Diego. While there are many high-profile aviation incidents and accidents including MH 370 they are just a few of the thousands of examples of near-misses, bad communications, equipment failures, wildlife hits and sometimes just silly but dangerous errors contained in an aviation safety database collected and analyzed by NASA[26].

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[25] Clinton V. Oster Jr., John S. Strong, C. Kurt Zorn. *Analyzing Aviation safety: Problems, challenges, opportunities.* Research in Transportation Economics 43 (2013) 148-164.

[26] L. Michel. *The World Health Organisation Surgical Checklist. A surgeon's viewpoint. Acta Chirurgica Belgica 2010; 110:423-431.*

**Management of aviation safety**

Air transport is a complex system that has many interactions between different actors (airlines, air traffic control, airports, aviation broker...) and involves multiple human interventions in an uncertain and changing environment (impact of weather on air traffic, fluctuating activation of military areas).

The management of air safety is part of a broader framework, the security management of complex transportation systems. Indeed, a psychology professor at the University of Manchester, James Reason,[27] showed by focusing on the concepts of human factors and organizational issues as systems as being different to those of health (patient safety), the Nuclear (personal safety), finance (security accounts) or air transport (safety of persons) had similarities in terms of risks and failures. He therefore attempted to define a theoretical model that can guide the implementation of effective safety management.

Having outlined the Reason model and its implementation in the management of aviation safety, this section discusses the implementation of the management of aviation safety at different scales. Indeed, the management of aviation security in the world adopts a "pyramid" approach[28] in the sense that each level of the safety management system delegates to the lower level security management within its perimeter while controlling the power of the level to manage security. This approach allows each manager accountable for the safety chain and multiplies the effects of global management of aviation security by deploying to the final air transport operators and nested responsible for safety management systems.

## DANGER

- o **Lightning**: A plane is on average struck by lightning every 1000 hours flight[29], twice a year on average for an airliner. Although the bright flash and loud noise that results can alarm the passengers and crew, aircraft are designed to be insensitive to lightning: When lightning touches a plane, the current flows around the cabin through the metal skin and then continues its route.

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[27] "Aviation Safety". http://www.icao.int/anb/safetymanagement (accessed June 1, 2015).
[28] L. Michel. *The World Health Organisation Surgical Checklist. A surgeon's viewpoint. Acta Chirurgica Belgica 2010; 110:423-431.*
[29] « Simulation de la répartition des courants lors du foudroiement », Onera, 30 May 2015

o **Bird Hazard**: The "bird hazard" means the risk of collisions between birds and aircraft. These shocks will not generally present a fatal risk for a device (for example an engine), but they can sometimes cause air disasters. Serious accidents happen when the bird hits the windscreen or is sucked through the reactors (jet turbines).



*Figure 7 Instance of bird collision*

Such collisions with civil aircraft generate each year in the world of estimated costs in 2000 at $ 1.2 billion[30]. To reduce this risk, devices are set up to keep birds away from airports, studies are conducted on bird populations around airports and aircraft manufacturers reinforce the most exposed parts of their devices and motors. One of the most famous incidents is US Airways flight 1549 Jan. 15, 2009 when an Airbus A320 taking off from LaGuardia Airport hit a group of geese, which almost disabled the two reactors and forced the plane to land on water in the Hudson River.[31]

o **Aircraft Problems:** This include Engine Failure, Structural Failure on the Plane, Metal fatigue, and a number of other failures in multiple aircraft systems. All these factors contribute to the danger a plane can have and so put into danger the safety of all passengers. EX: The Ermenonville accident in 1974 due to a bad door lock of the rear cargo by grounds staff[32]



*Figure 8 Aircraft failure is a major concern in aviation safety.*

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[30] Ibid.

[31] Ibid.

[32] Lefefevre, Regis "Il y a 40 ans, le crash du DC-10 d'Ermenonville". http://www.leparisien.fr/espace-premium/oise-60/il-y-a-40-ans-le-crash-du-dc-10-d-ermenonville-03-03-2014-3637595.php (accessed June 1, 2015).

- o **Fire/Snow:** Fire is an important danger that is very difficult to solve due to the little space and so the spread of fire can be relatively fast. That is why important measures are taken to prevent this to happen. The important of the weather is also very important.

- o **Human Factor:** Human factor is also a danger in the safety of a flight only by the fact that most aviation accidents have a human cause. Very often accidents are called multifactorial, that is to say that the cause is not due to one person but to several people who have made mistakes, which if they were isolated have not caused accident. EX: March 24, 2015 with the crash of a plane in the French Alpes. The plane featured on board 144 passengers and 6 crewmembers, all 108 died[33]. This disaster is exceptional in the history of civil aviation due to the mental health of the co-pilot who seems to have decided to crash the plane and its passengers after enclosing the outside captain cockpit. This event showed that improvement in terms of the safety of the passenger have to be made



*Figure 9 Aircraft crash scene*

**Runway safety**

Historical observations have taught us that accidents are usually the result of contributing factors for multiple aspects of the system. ICAO initiatives, such as its runway safety program accordingly take a multidisciplinary approach, requiring collaboration among regulators and between players in air traffic management, airport operations, airline operations and design and construction sectors.

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[33] "'The plane is disintegrated': 150 dead as Airbus A320 goes down in Southern France" . http://news.nationalpost.com/news/world/survivors-unlikely-after-airbus-carrying-148-passengers-crashes-in-southern-france#_federated=1 (accessed June 1, 2015).
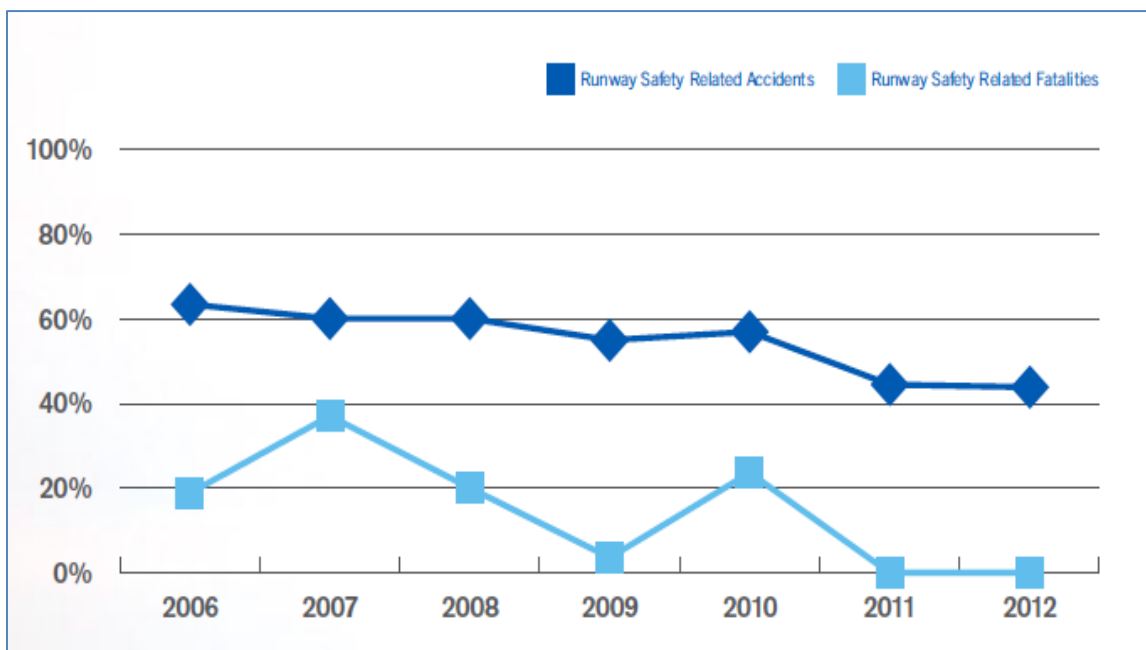
*Figure 10 Runway Safety Related Accidents and Fatalities*

That is central of ICAO's core mandate, in order to find solutions to these problems they created the "Montréal Declaration on Planning for Aviation Safety Improvement" [34] (see document on ICAO web site) that is dedicated to aviation safety. Among their priorities in that domain we can find:

o **Runway Safety**
o **Fatigue Management**: ICAO works to provide States and industry with provisions that will help them better manage the risks associated with fatigue.
o **Controlled flight into terrain** (**CFIT**) describes an accident in which an airworthy aircraft, under pilot control, is unintentionally flown into the ground, a mountain, water, or an obstacle. The pilots are generally unaware of the danger until it is too late.

Compared to 2011, the number of accidents decreased in 2012 by 21%[35] and the number of victims by 10%, making 2012 the safest year since 2004. Taking into account the decline in the number of accidents and increased the number of departures, we come to a significant decrease in worldwide accident rate of 3.2 accidents per million[36] scheduled commercial flights in 2012. The Organization is committed of improving the security of aviation and make possible cooperation and ongoing communication between stakeholders. It continues collaborate with established regional organizations such the Aviation Security Regional Groups (RASG) and Regional Safety Oversight

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[34] ICAO. http://www.icao.int/safety/Pages/default.aspx (accessed June 1, 2015).
[35] ICAO 2103 reports
[36] ICAO 2103 reports

Organizations (RSOOs) and to promote the training and support needed to address emerging security issues.



*Figure 11 Global accident rate (accidents per million departures)*

**Conclusion**

As we can see safety is a very important matter in the aviation due to the fact that various factors can cause an accident. Indeed you can go from a bird to technology problems to human factor that can cause a potentially fatal accident. This is why ICAO is very important in order to prevent these potential threats and ensure safety for every passenger and reduce potential air accident.

**Questions to Consider**

1.  How management fatigue and Human factors can be solve in order to reduce plane accident?
2.  In the past few years several plane accident, the disappearance of air planes… What should ICAO do in order to prevent it?

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