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CONFRONTING THE WORLDWIDE THREAT TO AVIATION SECURITY

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Introduction

International civil aviation has been a preferred terrorist target for a variety of reasons. Whether it's rebelling against a national government or taking violent action against a particular sect or group of people, terrorists continue to attempt to exploit real or perceived vulnerabilities in the international civil aviation system. Despite many security enhancements brought to this system, particularly since 2001, terrorists continue to develop new techniques and weapons in hopes of circumventing security measures. As a result, national sovereignty is threatened whenever a country's registered airlines are at risk in international skies. We witnessed the world being shaken when Malaysian Airline flight 370 disappeared last year and was finally declared to have crashed somewhere in the Indian Ocean. This unfortunate incident was followed by another Malaysian Airline flight, MH17, which was destroyed as a result of being "hit by a missile fired from a Buk launcher located on territory controlled by pro-Russian rebels."[1] Without getting caught up in the conspiracy theories surrounding these events, this paper will focus on what has been done by regulatory agencies and the aviation industry since these events, and what measures have been taken to avoid a repetition, particularly with regard to conflict zones.

The International Civil Aviation Organization (ICAO), a specialized UN agency, is responsible for developing standards and recommended practices (SARPs) to ensure the safe and sustainable development of international civil aviation. In the field of aviation security, ICAO develops standards, recommended practices and guidance to

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[1] Tom Parfitt, The Telegraph, National Post: http://news.nationalpost.com/2014/11/15/russian-satellite-image-of-mh17-being-shot-down-by-fighter-jet-dismissed-as-crude-fake/ Accessed: 11 May 2015

States, and helps provide its Contracting States with a high level of situational awareness regarding existing security threats. Each State is required to constantly monitor the level of threat to civil aviation within its territory to attempt to prevent the occurrence of catastrophic events.[2]

This paper will ultimately investigate the types of defence mechanisms that can be put in place to minimize threats, and will argue that the most effective mechanism is a unity of effort between states. The major limitation on achieving this goal is geopolitical conflict between states, mostly due to historical influences and access to natural resources, such as the dispute in South China Sea "among several sovereign states within the region, namely Brunei, the People's Republic of China, Taiwan, Malaysia, the Philippines, and Vietnam."[3] Although most states share the same desire to work together in the field of civil aviation, some states with differing political agendas simply cannot cooperate in good faith, whether due to internal or external pressures.

Existing measures

One of the problems with managing aviation security relates to the millions of ground handlers and other airport employees having access to secured premises in and around airports. Earlier this year "a former Delta Air Lines Inc. employee and a then-current Delta baggage handler were caught in an alleged gunrunning scheme involving

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[2] International Civil Aviation Organization, *Annex 17 to the Convention on International Civil Aviation – Safeguarding International Civil Aviation Against Acts of Unlawful Interference*, Ninth Edition, March, 2011, p. 36

[3] Wikipedia, Territorial disputes in South China Sea: http://en.wikipedia.org/wiki/Territorial_disputes_in_the_South_China_Sea Accessed: 29 May 2015.

the use of the employee's access privileges to sneak firearms."[4] In another incident, "on December 25, 2009, passengers aboard a Northwest Airlines flight heard a loud noise on the plane[5]", a failed attempt to destroy the aircraft by Umar Farouk AbdulMutallab, popularly known as "the underwear bomber".

ICAO has attempted to address these and other terrorism-related incidents through the standards contained in Annex 17 to the Chicago Convention of 1944. This Annex is entitled *Security*, and is concerned with *Safeguarding International Civil Aviation Against Acts of Unlawful Interference.* Regardless of the constraints faced by individual States, the standards contained within Annex 17 represent requirements to be met by all ICAO Member States.

ICAO's security-related standards are worded in a general manner, and it is left to individual Member States to develop and promulgate the necessary regulations and ensure their implementation. General compliance by States with Annex 17 standards is measured by ICAO through the conduct of aviation security audits and an overview of the results are then published on a secure portal, visible to all other States. Although ICAO cannot sanction non-compliances directly, the audits help pressure States to address identified deficiencies.

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[4] Suzan Carey, Closing an Airport Security Gap: Employee Screening, The Wall Street Journal: http://www.wsj.com/articles/closing-an-airport-security-gap-employee-screening-1422396346 Accessed: 26 May 2015

[5] David Ariosto and Deborah Feyerick, CNN Breaking News, Christmas day sentenced to life in prison: http://www.cnn.com/2012/02/16/justice/michigan-underwear-bomber-sentencing/ Accessed: 26 May 2015

After the downing of MH17 in Ukraine last year, ICAO began to also publish information on a "website distributing warnings about risks to aircraft in conflict zones."[6] This conflict zone information repository, an excerpt of which is shown in Figure 1 provides information on threats in a defined airspace, as provided by one ICAO Member State, and is available to State representatives, airlines, and the public.

Post Affecting Iraq Reported by United Kingdom:

Reporting State:	United Kingdom
Information Source Type:	NOTAM
State Affected:	Iraq
Information Source Reference:	15-03-0472/AS6
Information Title:	POTENTIAL RISK FROM ANTI-AVIATION WEAPONRY
Content:	HAZARDOUS SITUATION IN IRAQ. POTENTIAL RISK FROM ANTI-AVIATION WEAPONRY. OPERATORS ARE STRONGLY ADVISED NOT TO ENTER THE TERRITORY AND AIRSPACE OF IRAQ (INCLUDING THE BAGHDAD FIR)
Area Affected:	Iraq including the Baghdad FIR
Link to Information:	
Valid From:	2015-03-30
Valid To:	2015-06-12
Status:	The State Affected has indicated an objection.

Figure 1
Excerpt from the ICAO Conflict Zone Information Repository
Potential Risk from Anti-Aviation Weaponry

States with airspaces identified as conflict zones may decide to close them or not, but the information provided through the ICAO Conflict Zone Information Repository system can be used by airlines to plan routes avoiding such areas. It should be noted that a State with an airspace identified as a conflict zone can be severely penalized economically and lose a lot of face as a result. Similarly, acts of unlawful interference perpetrated against an airline or airport can also be financially devastating to the company concerned. Consequently, ICAO States and the aviation industry pay close attention to the provisions in Annex 17, and in particular on how other States develop and implement security regulations and procedures to comply with them.

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[6] Victoria Bryan, Reuters Canada, New U.N. site for flights in conflict zones issues warnings on Libya, Egypt: http://ca.reuters.com/article/topNews/idCAKBN0N60PP20150415 Accessed, 27 May 2015

Identifying past and present threats to civil aviation

Ever since the 9/11 attacks, the ICAO aviation security panel has paid close attention to new and emerging threats to aviation security, with the "objective of stopping, preventing and eradicating acts of terrorism against international civil aviation."[7] A baseline for identifying what constitutes a new and emerging threat can be established by studying past incidents, such as the Air India Flight 182 attack, where "a bomb exploded … killing all 329 people aboard."[8] This unfortunate event led to various inquiries and research initiatives, such as the Kanishka Project sponsored by the Canadian government to understand terrorism and develop strategies to prevent and counter such attacks.

Enhancing situational awareness of global aviation security threats

All national aviation systems are linked to global aviation networks. National authorities must therefore take into account how the threat to civil aviation is developing globally. This does not mean that threat levels are identical around the world. There are regional, national, and even local variations of threat, including those linked to conflict zones. ICAO's Annex 17 manages to cover all such threats with one definition for acts of unlawful interference, which are "acts or attempted acts such as to jeopardize the safety of civil aviation."[9] This concept can be generalized as forcefully or unlawfully seizing or interfering with aircraft operations; it may include damaging the aircraft, jeopardizing its

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[7] Working paper on *High-Level, Ministerial Conference On Aviation Security*, Montreal, 19 to 20 February 2002. p2.

[8] Public Safety Canada website, Remembering Air India Flight 182: http://www.publicsafety.gc.ca/cnt/ntnl-scrt/cntr-trrrsm/r-nd-flght-182/index-eng.aspx Accessed: 27 May 2015.

[9] International Civil Aviation Organization, *Annex 17 to the Convention on International Civil Aviation – Safeguarding International Civil Aviation Against Acts of Unlawful Interference*, Ninth Edition, March, 2011, p. 15.

safety, or harming anyone onboard or on an aeronautical facility from which an aircraft is functioning.

In order to enhance situational awareness of global threats, ICAO has developed a secure portal called the "*Acts of Unlawful Interference database*", which includes information relating to reported acts of unlawful interference. An example of this de-identified database is demonstrated in Figure 2 below.

	Details	Date ↓	Category	Operation Type	Airline/Airport	Routing Location	Passengers	Crew	Deaths	Injuries	Perpetrators	Information Source	Region
1	ℹ	2015-02-03	Attempted facility attack	International			0	0	0	0		Unofficial	
2	ℹ	2015-01-26	Attempted sabotage	International			154		0	2		Unofficial	
3	ℹ	2014-10-12	Other acts of unlawful interference		Airports with occurrences	States of occurrences	0	0	0	0	1	Unofficial	ICAO Regions
4	ℹ	2014-09-26	Facility attack	International			0	0	0	2	1	Unofficial	
5	ℹ	2014-09-21	Facility attack	Domestic			0	0	0	1	4	Official	

Figure 2: Acts of Unlawful Interference Database

ICAO States have also adopted a new standard for the global tracking of commercial aircraft every 15 minutes, and every minute whenever a plane encounters difficulties flying over oceans or remote areas. This was proposed by a study done by the ICAO "*Task Force on Risks to civil aviation arising from Conflict Zones* (TF RCZ)"[10] established last year as a result of the downing of flight MH17 and disappearance of MH370. The initiative emphasizes the requirement to track aircraft in regions where threats are anticipated.

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[10] International Civil Aviation Organization, News Room, ICAO Conflict Zone Task Force to Meet on 14-15 August: http://www.icao.int/Newsroom/Pages/ICAO-Conflict-Zone-Task-Force-to-meet-on-14-15-August.aspx Accessed: 27 May 2015

Iraq, Syria, Libya and, most recently, Ukraine have all been identified as conflict zones in the new Conflict Zone Information Repository. However, one of the difficulties in implementing security measures in conflict zones is that already underfunded civil aviation authorities, combined with corrupt governments, do not necessarily have aviation security as one of their priorities.

Confronting the threat: what are ICAO and Contracting States required to do?

The AVSEC panel understands that preventative measures need to be developed based on an analysis of traditional, new, and emerging threats. Using this understanding, ICAO annexes and manuals require that States amend their own procedures to identify obstacles and develop counter-measures to prevent or respond to any and all acts of unlawful interference.

Since States are responsible for what happens in their airspace, they are required to implement ICAO Annex provisions, and to report all acts of unlawful interference that take place on and above their territories, or on board their registered aircraft. As discussed earlier, this information is fed into the ICAO Act of Unlawful Interference Database and is made available to all ICAO States.

ICAO Annex 17 states that, "Each Contracting State shall establish an organization and develop and implement regulations … against acts of unlawful interference…"[11] Article 38 of the Chicago Convention also requires States to notify to ICAO any differences between their national regulations and the International Standards

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[11] International Civil Aviation Organization, *Annex 17 to the Convention on International Civil Aviation – Safeguarding International Civil Aviation Against Acts of Unlawful Interference*, Ninth Edition, March, 2011, p. 19.

developed by ICAO. So, if a State does not have the capacity or resources to perform security management tasks, as required by ICAO provisions, then it needs to notify the global aviation community as to this inability. States do this by filing differences with ICAO, which then provides this information to other States through secure channels.

Annex 17 (Standard 2.4.2) states that "Each Contracting State shall cooperate with other States in the development and exchange of information concerning national civil aviation security programmes."[12] Unfortunately, there is no means to force a recalcitrant State to comply, and in practice such exchanges happen infrequently in much of the developing world. As a whole, there is simply not enough collective global and regional security management collaboration amongst states. Even though most States comply with most ICAO requirements, less developed States provide tempting targets to would-be perpetrators.

In order to take reactive and preventative measures, the ICAO Aviation Security Panel has established strategic security objectives. These objectives are managed by working groups composed of various industry experts engaged in the development and implementation of Security requirements, applicable both to aircraft in-flight and on the ground. As an additional initiative, a separate study group has also been established to focus on "New and Emerging threats to Civil Aviation" and will be discussed in the latter section of this paper.

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[12] International Civil Aviation Organization, *Annex 17 to the Convention on International Civil Aviation – Safeguarding International Civil Aviation Against Acts of Unlawful Interference*, Ninth Edition, March, 2011, p. 20.

In August 2014, during the 203rd ICAO Council meeting, the Minister of Transport of Malaysia, Mr. Liow Tiong Lai, commended ICAO for taking such positive steps towards developing model security programmes to help Member States and the aviation industry. He also pleaded to other States and industry counterparts for the "establishment of stronger measures for safety and security in international civil aviation"[13], and requested enhanced collaboration amongst them. He requested ICAO to provide States with more security information on regions of concern or conflict zones, which led to the development of the Conflict Zone Information Repository.

Generally, following an accident or a serious incident, an investigation is conducted by the State of occurrence in order to determine the root cause and to inform ICAO and its Contracting States. However, in the MH17 case, the investigation was severely hindered "due to the geopolitical situation on the ground."[14]Ukraine is an ICAO Contracting State, and being the "State of occurrence, instituted the investigation."[15], but also recommended a thorough independent, international investigation due to its lack of control over the area. Even though the Dutch Safety Board, requested by the Ukrainian Civil Aviation Authorities, took the lead in the investigation, it was deemed crucial during the last ICAO Council session, "to review existing guidelines for investigations in cases where an air crash occurs in a conflict zone."[16]

As a result, ICAO reinforced supported the UN Security Council resolution 2166 on July 2014, which "deplored the downing of a civilian aircraft on an international flight

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[13] International Civil Aviation Organization, 203rd Council session meeting minutes, Dec 2014, p.5.

[14] International Civil Aviation Organization, 203rd Council session meeting minutes, Dec 2014, p.6.

[15] Ibid, p.6.

[16] Ibid, p.6

and reaffirmed the rules."[17] It also condemns the act of violence against the MH17, and supports decision by all ICAO Council Contracting States in support of an independent, non-biased investigation and not affected by the regional influence. This incident, though extremely painful, brought the Aviation world together once again in hopes for a continuous effort towards common security objectives.

Understanding zones of armed conflict

Similar incidents to MH17 have happened in the past, where a civilian aircraft was shot down by military or non-military forces, either deliberately or by mistake. It therefore becomes crucial to understand how to treat these conflict zones and how to safely fly around them. Prior to the MH17 incident, the airspace over Eastern Ukraine was considered a no fly zone up to 32,000ft (9,754m)."[18] The airliner in question was flying at 33,000ft (10,058m). This illustrates that it is no easy task to clearly delineate a conflict zone, and prevent the use of airspace above it.

The Gaza strip is a prime example of a controlled zone for security threats, where "Israel continues to maintain exclusive control of Gaza's airspace."[19] Constant watch over the area by the Israeli forces and around the clock monitoring of the situation minimizes the likelihood of serious incidents. However, risks do remain and overflights are limited.

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[17] ICAO news room, ICAO Applauds Adoption of UN Security Council Resolution 2166: http://www.icao.int/Newsroom/Pages/ICAO-applauds-adoption-of-UN-Security-Council-Resolution-2166.aspx Accessed: 29 May 2015
[18] BBC News, Who, what, why: How often do planes fly over conflict zones?: http://www.bbc.com/news/blogs-magazine-monitor-28364306 Accessed: 27 May 2015.
[19] B'Tselem – The Israeli Information Center for Human Rights in the Occupied Territories, Israel's control of the airspace and the territorial waters of the Gaza Strip: http://www.btselem.org/gaza_strip/control_on_air_space_and_territorial_waters Accessed: 27 May 2015

Not all conflict zones are so obvious. Therefore, having situational awareness around all existing and potential conflict zones is critical. As a result of a proactive measure, "On 29 October 2010, agencies in the United Kingdom and United Arab Emirates, acting on intelligence, seized and examined an air freight shipment[20]". Information regarding this incident was then shared by ICAO with its Member States, leading to the development of new rules on air cargo security.

Conclusion

Aviation has connected the world in a way no other means of transport is capable of doing, with the skies having no boundaries. As much as aviation has connected people and reduced national frontiers, it also provides a prime target for people trying to make a statement by killing as many innocent people as possible in a single attack. For most sovereign States, the protection of their citizens and infrastructure constitutes the primary reason for implementing aviation security measures. Most States also have a flag carrier or an international airline which carries an element of national pride. Perpetrators know that an "attack against a State's aviation assets is an attack against its national interests"[21] and that is why it is so crucial to defend ourselves collectively. As a result of the above, national sovereignty is directly threatened whenever conflict zones are not avoided and when proactive measures are not taken to reduce threats in the air and on the ground.

ICAO, together with its UN and aviation counterparts, has taken significant proactive measures and has recommended that States share information amongst

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[20] ICAO Electronic Bulletin, EB 2010/53, *Attempted Acts of Sabotage of Cargo Aircraft Necessitate Urgent Review of National Risk Assessments and Further Security Measures.* [1 Dec 2010]. p1.
[21] ICAO High-Level, Ministerial Conference on Aviation Security: Working paper on *New and Emerging Threats to Civil Aviation.* [February 2002]. p1.

themselves. ICAO has also amended its Annex 17 and the related Aviation Security Manual to provide Member States with the information required to develop and implement aviation security-related regulations and programmes. Since ICAO cannot impose compliance with its standards, influence from the international aviation community in the form of sanctions and other action is needed. States are all responsible for acting to improve aviation security on the basis of thorough and continuous risk-based assessments. In order to categorize risk, there needs to be an assessment of known incidents. Each State needs to do this analysis independently, and keep ICAO informed of known aviation-related incidents which occur on and above their territories so that ICAO can make this information available to other States.

Sharing of intelligence is the only way the AVSEC community can understand the issues and come up with mitigating measures. It will also allow the aviation industry to become more proactive and impose obstacles against new and emerging aviation threats and known perpetrators. At the end of the day, guidance material and SARPs from ICAO will always be made available to States, but unless a collective effort is made by ICAO Contracting States, there will always be gaps in aviation security.

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11. International Civil Aviation Organization, 203rd Council session meeting minutes, Dec 2014.

12. BBC News, Who, what, why: How often do planes fly over conflict zones?: http://www.bbc.com/news/blogs-magazine-monitor-28364306.

13. B'Tselem – The Israeli Information Center for Human Rights in the Occupied Territories, Israel's control of the airspace and the territorial waters of the Gaza Strip:
http://www.btselem.org/gaza_strip/control_on_air_space_and_territorial_waters.

14. ICAO Electronic Bulletin, EB 2010/53, *Attempted Acts of Sabotage of Cargo Aircraft Necessitate Urgent Review of National Risk Assessments and Further Security Measures,* 1 dec 2010

15. ICAO high-level, ministerial conference on aviation security: working paper on *new and emerging threats to civil aviation.* [February 2002]

Figures:

Figure 1: NOTAM by United Kingdom - Potential Risk from Anti-Aviation Weaponry: http://www.icao.int/czir/Pages/posts.aspx?state=Iraq

Figure 2: ICAO Secured portal: https://portal.icao.int/AUID/Pages/default.aspx