走向安全
ICAO邁出全球追蹤作業第一步

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受到2014年的2次重大空難－3月份馬航MH370離奇失蹤事件及7月份馬航MH17遭到防空火力擊落事件－影響，國際民航組織(ICAO)在些許異議聲中決議即刻展開全面性航機全球追蹤作業概念及即時性的衝突地區警告服務。

針對MH17遭擊落之議題，今年2月間，共有118個會員國及84個觀察員組織齊集加拿大蒙特婁舉行一次高階安全會議，會中決議「立即」建置一個「集中式的資訊網站」，以對飛航服務提供者及航空公司提供飛越或前往潛在衝突區域所有可能威脅與安全資訊。該網站的初步原型由歐洲航管組織(Eurocontrol)提供，並由ICAO負責後續運作。

截至目前為止，雖然荷蘭失事調查機構並未對MH17提出最終調查報告，僅在初步報告中提及該機遭受來自外部的爆炸力量；但一般咸信係由俄羅斯支持的武裝烏克蘭分離運動份子，以長程地對空飛彈擊落了這架正在高度33,000呎的烏克蘭東部空域巡航的波音777-200ER型客機。事發地點雖然處於衝突地區，但該區域的高層空域及國際航路仍然保持開放。

ICAO隨即成立了「衝突區域航空風險」的專案任務編組(Task Force on Risks to Aviation in Conflict Zones, TF-RCZ)以研究如何以適切方式分享風險資訊並建立執行風險評估的作業指引，以利各國決定應在何時關閉空域或提出警告。提供資訊的網站將由ICAO維持運作，但資料係由各會員國輸入，預計每年將耗費250萬美元左右的維運經費。ICAO並表示，將不會對所提供內容中的匿名資訊負責。

如何降低民用航空器於衝突區域飛航風險的典範實務則由ICAO航空保安專家組(Aviation Security Panel)下由21國專業人員組成的威脅與風險工作小組(Working Group on Threat and Risk, WGTR)提供。以MH17案件為例，該工作小組列出下列風險因素：

· 當地發現防空飛彈布署
· 武裝衝突的地區
· 軍用或無人航空器執行戰鬥任務
· 航空器被用來運送武裝人員或軍事裝備
· 「無經驗或未經訓練」之人員操作防空飛彈
· 因衝突發生，該空域已無「有效」空域管理機構

‧航路經過或接近「重要戰略機敏」位置

雖然MH17不幸事件已經發生，但WGTR仍然認定民用航空器在有意或無意間被防空飛彈擊落的可能風險為低，雖然已有70餘個國家擁有防空飛彈，沒有國家的也想都要擁有。

WGTR表示作出這種認定是基於:「雖然已發現種種可能的跡象，但以硬體能力及人員素質而言，還是難以有足夠證據去證明這些推斷。」故即使存有軍用目標與民用航空器相混淆導致無意間對民航發動攻擊的可能，該工作小組仍然認為這種事情發生的機率實在不高。

來自俄羅斯的代表則質疑對不提供相關資訊的國家作出懲罰的提案是否有充分法律基礎，該提案將在2016年的ICAO大會中討論，也預計可望通過。ICAO秘書處不同意該國的質疑，並表示該提案係在大多數會員國支持下所提出，並可解決實際執行時所衍生的問題。

MH370失蹤案在無盡的搜索、打撈卻一無所獲情況下，ICAO提出「全球航空遇險及安全系統」(Global Aeronautical Distress and Safety System, GADSS)之概念，並強烈建議各家航空公司應主動、自願參加這個每15分鐘即可更新位置的新系統。ICAO表示，藉由衛星、合約式自動相依監視系統(ADS-C)及機載通信與定址報告系統(ACARS)的協助，啟動救援的時間可由目前的89分鐘縮短至44分鐘。

全功能的GADSS系統預計在2021年可望安裝於新型民航機上，其功能包括:

‧在正常情況下每15分鐘將位置傳送給地面航空公司及飛航管制單位

‧在緊急情況下，可自動、飛航組員啟動、甚至地面啟動裝置上的遇險模式，並每隔1分鐘發送含有位置、時間和飛機編號等資訊的信號

‧改良座艙通話紀錄器及飛航資料紀錄器，以有效保存資料

ICAO規劃在2021年以後出廠的新航空器都必需安裝這套標準化的遇險追蹤系統，2019年以後出廠的航空器也必需安裝自動施放式的飛航資料紀錄器(Automatic deployable flight Data Recorder, AFDR)，或者在2016年前將航機上記錄的飛航資料以即時方式傳送回地面，以為另一種變通的符合方式。

為達成上述目標，ICAO將在本年8月間舉行一場由多國參加，綜合航機監控、飛航管制、搜索救援等課目的軍民聯合作業測試。　◢

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Stepwise Safety

ICAO takes small steps first as it navigates path to global tracking

John Croft

Spurred in large part by two disasters in 2014—the disappearance of Malaysia Airlines Flight 370 in March and the shootdown of the carrier's Flight 17 (MH17) in July—the member-states of the International Civil Aviation Organization (ICAO) have agreed with few exceptions to implement a comprehensive suite of global tracking and conflict-zone warnings over time but to take interim steps almost immediatey.

In response to the MH17 stootdown, the conference of 118 states and 34 observer organizations meeting for a High-Level Safety Conference in Montreal during the first week of February decided to launch "without delay" a "simple centralized web-based repository" of threat and safety information to help air navigation service providers and airlines assess destination and overflight risks in conflict zones. Eurocontrol developed an early prototype of the system, but ICAO will operate the first implementation.

The Dutch safety board has not released its final report on the MH17 crash, only confirming in a preliminary report an external explosion, widely believed to have been caused by a long-range surface-to-air missile (SAM) fired by Russian separatists, that destroyed the Boeing 777-200ER in cruise at 33,000 ft. over eastern Ukraine. The downing took place in an active military conflict zone, but high-altitude air routes over it remained open.

In the aftermath, ICAO formed the Task Force on Risks to Aviation in Conflict Zones (TF-RCZ) to study concepts for sharing risk data and create guidance for developing risk assessments that states can use to decide when to issue warnings or close airspace. Estimated to cost as much as $2.5 million per year to operate, the web portal will be operated by ICAO and draw upon input from all member-states. Only certain users will be able to add data, and ICAO says it will not

be responsible for information from anonymous sources.

Threat-assessment best practices came from ICAO's Aviation Security Panel Working Group on Threat and Risk (WGTR) and input from 21 member-states. Risk factors to consider appear to mimic the MH17 scenario:

· Local presence of SAMs.

· An area of armed conflict.

· Military or unmanned aircraft being used in a combat role.

· Aircraft being used to transport ground troops or military equipment.

· "Poorly trained or inexperienced personnel" operating the SAMs.

· A lack of "effective" air traffic management caused by the state responsible for that airspace not having full control of its own territory.

· Routing that passes over or close to assets of "high strategic importance."

Despite the impact of the MH17 disaster, the WGTR considers the potential for intentional and unintentional long-range SAM attacks to be of low risk, despite 70 states having the weapons and others wanting them.

"The WGTR would assess the current risk from intentional attack as low, primarily due to the fact that where intent may exist, there is currently no evidence of capability in terms of hardware and trained personnel," says the group. While past events suggest a higher risk from unintentional attacks, in particular confusing a military target with a civilian aircraft, the group says such events are also rare and of low risk.

Russia expressed concern that legal assessments should be made regarding provisions that would penalize a state for not providing information, suggesting the concept should be approved at the next ICAO Assembly in 2016. The ICAO Secretariat disagreed, however, saying the "overwhelming majority agreed that these issues could be addressed as they arise during the implementation process."

Nearly one year after the disappearance of MH370, with no end in sight to the search for the aircraft, the ICAO members agreed to finalize plans for a Global Aeronautical Distress and Safety System (Gadss) while "strongly encouraging" airlines to voluntarily begin flight-tracking their aircraft with updates every 15 min. when in oceanic or remote regions. With 15-min. updates, typically provided through Automatic Dependent Surveillance-Contract (ADS-C) transmissions via ACARS over satellite links, the time to activate search-and-rescue services will be reduced to 44 min. from 89 min. today, according to ICAO.

A fully functional Gadss, likely available on new aircraft beyond 2021, is expected to include:

· Normal tracking updates every 15 min. sent to an airline's operational control center.

· An autonomous distress-tracking mode that transmits position, time and identification updates at 1-min. intervals, activated automatically or by the crew or ground when certain attitude or system health issues occur.

· An improved method for recovering flight data and cockpit voice recorders.

ICAO is proposing that the distress-tracking mode be standard on new aircraft built after 2021 and that automatic deployable flight recorders (AFDR) be installed on new aircraft from 2019. As an alternative to ADFRs, airlines could use a different form of data recovery, possibly data-streaming before a crash, as an option on all aircraft from 2016.

To improve its guidance to airlines, by August ICAO plans to complete a multinational test of operator flight monitoring, air traffic services, search-and-rescue and civil and military cooperation. ✦

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