

## 出國報告(出國類別:其他-國際會議)

# 出席國際飛航管制員協會聯盟 亞太地區第 33 屆年會出國報告書

服務機關：民航局飛航管制組

姓名職稱：熊時平科長

派赴國家：蒙古

出國期間：105 年 8 月 20 日起至 105 年 8 月 25 日

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# 壹、目的

## 一、國際飛航管制員協會聯盟簡介

「國際飛航管制員協會聯盟」(International Federation of Air Traffic Controllers' Associations，以下簡稱 IFATCA)為一非政治性之獨立專業組織，1961 年 10 月 20 日在荷蘭阿姆斯特丹成立，主要發起國為奧地利、法國、盧森堡、比利時、西德、荷蘭、丹麥、冰島、挪威、芬蘭、愛爾蘭及瑞士等 12 個國家，均為歐洲國家，其他國家陸續加入。IFATCA 設立之主要目標為：

1. 有效率及有規律地提昇國際間之飛航安全。
2. 協助發展飛航管制之安全有序制度。
3. 促進國際飛航管制員間之學術交流。
4. 維護飛航管制員之應有權益。
5. 擴展與其它相關國際組織間之相互利益。
6. 致力發展泛世界管制員協會聯盟事業。

IFATCA 總會設於加拿大蒙特婁，主要分成四大地區：歐洲、美洲、亞太、非洲/中東，發展迄今已有 131 個會員國、5 萬名管制員為 IFATCA 會員。

## 二、中華民國飛航管制員協會簡介

我國於 1978 年首度應邀以觀察員身份參加在丹麥哥本哈根舉辦之 IFATCA 第 17 屆年會，開始瞭解 IFATCA 之宗旨並邁出我飛航管制國際化之腳步。1979 年我國獲邀參加在比利時布魯塞爾舉行之第 18 屆年會，並進一步與 IFATCA 理事會討論我入會之可行性。1980 年「中華民國飛航管制協會」正式成立，並以 ROCATCA ( Republic of China Air Traffic Controllers' Association )名義正式申請加入 IFATCA，註冊名稱為” ROCATCA (TAIWAN) ”，目前會員約有 244 名，均為交通部民用航空局現職或離職及退休飛航管制員。

### **三、參加 IFATCA 亞太地區年會**

IFATCA 除每年定期召開全球性年會，四大地區(歐洲、美洲、亞太、非洲/中東)亦針對區域性的作業辦理定期的地區性年會，亞太地區第一屆年會於 1984 年在斐濟舉行，爾後即由亞洲地區及太平洋地區之會員國輪流主辦，我國曾於民國 75 年(1986 年)、民國 83 年(1994 年)及民國 99 年(2010 年)分別舉辦亞太地區第 3 屆、第 11 屆及第 27 屆年會，亦於民國 86 年(1997 年)及 95 年(2006 年)兩度舉辦第 36、45 屆國際飛航管制員協會聯盟年會，每次會議均極為成功，與會各國代表肯定我方表現，後續參與年會或地區會議時，均有會員主動表示對臺灣印象良好並期待我方再次辦理會議。

我國自退出聯合國以來，國際空間被壓縮，參與國際民航組織事務管道或國際會議相對減少，民航相關資訊取得不易，雖然從網路可以取得部分資料，惟相關作業討論過程均無法得知，藉由參加 IFATCA 相關會議，可瞭解在飛航管制作業最新資料及狀況，並能與其他國家進行交流討論，對於提升飛航安全與服務品質有所助益，爰本局每年編列預算，積極參與 IFATCA 事務，強化與各國之交流與合作，培養國際會議人才，拓展國際視野。

### **四、行程**

105 年 8 月 20 日    自桃園機場搭乘長榮航空 107 班機至韓國首爾仁川機場。

由韓國首爾仁川機場搭乘蒙古航空 302 班機至蒙古烏蘭巴托成吉思汗機場。

105 年 8 月 21 日    辦理註冊手續。

105 年 8 月 22-24 日  出席亞太地區第 33 屆年會。

105 年 8 月 25 日    自蒙古烏蘭巴托成吉思汗機場準備返台。

## 貳、過程

### 一、開幕

亞太地區第 33 屆年會地點在蒙古烏蘭巴托 BEST WESTERN PREMIER Tuushin Hotel 飯店會議廳舉辦(圖 1)，開幕典禮由蒙古道路及交通建設部副部長及蒙古民航局局長致詞，另 IFATCA 協會理事長因故未能親自參與，以影片方式致詞。



圖 1-會議現場

截至 2016 年有關 IFATCA 在亞太地區的會員國家計有 18 個，根據統計，本次與會的會員國為澳洲、日本、伊朗、澳門、香港、蒙古、尼泊爾、紐西蘭、新加坡、斯里蘭卡、臺灣及韓國共 12 個會員國，約 110 位會員代表，「航空公司駕駛員協會國際聯盟 International Airline Pilots Association (IFALPA)」亦派有國泰航空公司及新加坡航空公司駕駛員參加。其中新加坡管制員協會本次有 19 位管制員參與會議，在交流過程中瞭解，原來新加坡民航局主管相當支持所屬管制員積極參與此類會議，今年度提供 10 位公費名額，新加坡管制員協會借力使力、居中協調，由所屬會員以自費方式負擔機票費用，協會贊助會議註冊費，然後與公費的同仁一同住宿，省下住宿的費用。

## 二、會務報告

### (一)日本

日本管制員協會於今(2016)年辦理了「第 9 屆非正式東亞飛航管制協調小組(EATMCG/9)」，該協會也參與 IFATCA 的兩個工作委員會，包括技術操作委員會(TOC, Technical Operations Committee)與專業及法律委員會(PLC Professional and Legal Committee)。

### (二)尼泊爾

2015 年第 32 屆亞太地區年會原規劃在尼泊爾舉行，惟在同年 4 月 25 日發生大地震後，尼泊爾忙於災後重建，尼泊爾管制員協會提出已無法辦理該次會議，IFATCA 及各會員國均表達關心，並臨時由澳門接手，尼泊爾管制員協會感謝大家的關心，並以簡報方式報告該協會如何運用 IFATCA 提供的協助基金，後續亦會在 IFATCA controller 雜誌有相關報導。

### (三)臺灣

特別感謝 IFATCA 在復興 GE222 事件對於管制員的關心，該事件目前已經進入司法程序，ROCATCA 亦將隨時關注後續的情況。

桃園機場因為先前跑道道面整建工程影響，而需對鄰區實施流量管理，感謝鄰區對我們的協助，跑道整建工程已經在 2015 年 12 月 24 日完成。惟後續將分階段進行滑行道施工作業，屆時如有流管需求，會儘早與鄰區協調溝通。

### (四)香港

香港民航處規劃於 2016 年 10 月底啟用新航管系統以取代現有系統，此時程的規劃也是考量到冬季班表在此期間生效，11 月亦為淡季，產生的衝擊及影響相對其他月份要少一些，而在這 1 個月的轉移過渡期間，香港民航處已主動與航空公司協調，規劃以減班方式因應，並與鄰區協調適時實施流量管理，以兼顧飛

安並確保新系統轉移順遂。

## (五)澳門

澳門因賭場業蓬勃發展，在市區有直昇機作業停機坪，目前一天最多可以管制到 150 架次直昇機，而直昇機飛行路徑與澳門機場儀器飛航作業護有影響，因此對於澳門管制員來說，提供目視飛航跟儀器飛航隔離相對複雜。澳門管制員協會亦提出香港區管中心對澳門機場常常實施 8-10 分鐘流管作業，無法理解香港流管運作模式，造成雙方航管作業協調困難及複雜。

澳門管制員歸屬與澳門機場管理，澳門機場目前委託澳洲 RMIT UNIVERSITY 的語言中心辦理所屬管制員的航空英語檢定 RELTA (RMIT English Language Test for Aviation)，與會代表反映 RELTA 考試相當困難，即便從國外念書回來的管制員頂多也只能取得 LEVEL 5，目前已經有管制員未能通過檢定，在未取得航空英語檢定資格前，暫時無法支薪，因此詢問各國辦理情形。

## (六)蒙古

蒙古曾經在 2006 年辦過一次亞太地區年會，此次會議有許多代表曾經參加過該次會議，因此會上或是會後的交流互動非常熱絡。

蒙古最主要機場為成吉思汗機場，距離烏蘭巴托市區約 18 公里，一天起降架次約 50 架，在旺季(夏季)時可達 80 架，惟該機場受限於地障影響，14 跑道僅供落地使用，32 跑道供離場使用，考量航行量持續成長，為增加機場運作效益，蒙古已經興建另一座新的機場(圖 2)，距離烏蘭巴托市區約 60 公里，預計在 2017 年啟用，屆時就可以解決因地障因素導致跑道使用上的限制。



圖 2-蒙古新機場

蒙古因幅員廣大，雷達涵蓋未能包含全區，部分區域提供非雷達隔離服務，為提升服務品質，蒙古民航局在 2015 年啟用東部及南部兩座新架設的雷達，以提高雷達覆蓋率和準確性，以目前 7 做雷達站臺作業已可涵蓋到 75%高空空域(圖 3)。



圖 3-蒙古 7 座雷達站臺

為能更精進飛航服務品質，蒙古民航局期望雷達涵蓋範圍能遍及全區，因此已建置廣播式自動回報監視(ADS-B Out)，目前已架設 10 座 ADS-B 站臺，藉由

全球性導航衛星系統、航機機載設備和地面基礎設施，讓航機和地面接收站之間準確和迅速自動地傳送飛航訊息，包括航機的識別、位置、高度、速度和其他數據或資訊，使航管據以提供飛航管制服務。依據蒙古民航局規劃期程，在 2018 年在其飛航情報區內的航空器均應配置 ADS-B 裝備(圖 4)。

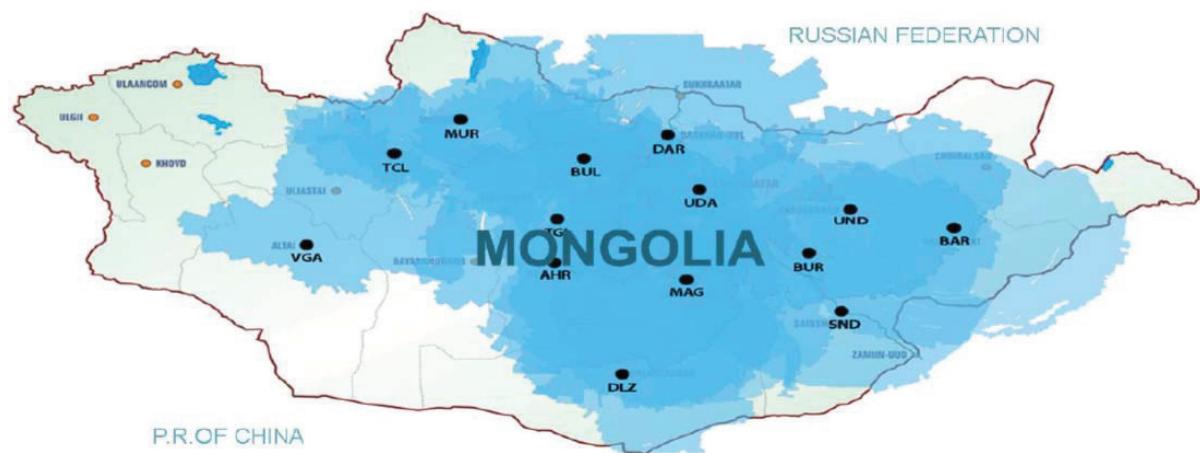


圖 4-蒙古 10 座 ADS-B 站臺

### (七)紐西蘭

紐西蘭將舉辦 2017 年亞太地區年會，會議時間暫定為 2017 年 10 月 19 日到 21 日，會議地點在威靈頓的 AMORA HOTEL。

### (八)伊朗

伊朗提到因烏克蘭空域情勢緊張，許多往來歐洲與亞洲的航班因此改道由伊朗上空過境，使得伊朗的航行量大增。目前伊朗雷達涵蓋情況良好，伊朗民航局亦規劃要汰換新的雷達系統，以提升服務。

### (九)新加坡、斯里蘭卡、澳洲及韓國

提報協會在 2015 年到 2016 年之間辦理的會務，如交流活動、運動賽事等。

### 三、專題報告

#### (一)安全文化-什麼是安全文化，各協會如何協助建立安全文化？

Safety Culture - What it really means and how as an MA can you help establish such culture ?

正確的安全文化包含了態度、價值、行為及個人責任。而如何建立安全文化，首先應建置一個「非懲罰性」且「保護訊息來源」的自願報告系統，這也是國際民航公約第 19 號附約一直推廣的重點工作，第二步要與管理層建立信任關係，信任不是自然而然存在或無中生有，而是需要雙方建立相互信任，保持溝通渠道。

管理階層應積極主動推動安全文化，當同仁對安全有一致的想法、認知，且對追求及維護安全有共同的理念時，即能凝聚安全共識，使工作環境充滿了嚴謹、認真的氛圍，進而落實在工作紀律與作業標準化，使整個團隊能各司其職、善盡職責。

在簡報中引用了 5 起管制員被起訴的案例：

- 1、 2014 年 10 月 20 日，一架私人飛機在莫斯科機場準備起飛時，在跑道上撞到除雪車而墜毀，塔臺管制員被指控在頒發起飛許可時，未仔細檢視跑道淨空狀況。
- 2、 2001 年 1 月 31 日，兩架日本航空的航機在靜岡縣上空發生空中接近，兩機在最後一刻作出迴避動作，最近距離為 40 公尺，但仍造成其中一航班機上 100 人受傷。調查後確定為管制員人為疏失，2 名管制員因此被起訴。
- 3、 2011 年 1 月 21 日，兩架實施目視飛航的 Cessna 172 飛機，在韓國 Uljin 附近空中相撞，本案應為駕駛員(學生)錯誤，但是塔臺管制員仍被起訴。
- 4、 2012 年 12 月，一架軍用 AN72 在哈撒克落地階段墜毀，經調查因飛機故障及飛行員人為錯誤導致事件發生，但管制員仍被起訴、定罪並判刑。
- 5、 2013 年 7 月 23 日一架 ATR 72 在馬公機場附近墜毀，駕駛員在低於最低下降高度後還持續進場，本事件的管制員亦被起訴。

管制員的工作是高風險的工作，當發生事件時，即使根據規定及作業提供服務，外界仍以最高標準來檢視整個作業過程，因此 IFATCA 也跟會員宣導，管制

員遇到事件或事故後，如果發現媒體引用錯誤資訊並直接影響到當事人時，管制原應請單位出面協助糾正錯誤的訊息；另外管制員也應該做好自我管理，尤其是大家普遍使用社交媒體，雖然帶來便利，但也可能帶來負面的影響，一旦社交媒體上的相關資訊被錯誤引用，很難再去扭轉外界的觀感。

(二) TCAS (Traffic alert and collision avoidance system, 空中防撞系統)：為什麼在 Überlingen 空中相撞事件發生後 14 年，仍然有駕駛員未依照 RA (Resolution advisory, 避撞諮詢)指示操作，且仍然有管制員在航機執行 RA 期間給予指示？

TCAS: Why 14 years after Überlingen some pilots still maneuver against an RA( and some controllers still issue instructions during an RA?

2002 年 7 月 1 日 Bashkirian Airlines 2937 航班（機型 Tupolev Tu-154M），搭載 57 名乘客及 12 名機組人員，由俄羅斯首都莫斯科飛往西班牙的巴塞羅納；另一架 DHL 貨機 611 航班（機型-波音 757），機上共有 2 名飛行員，從巴林國際機場經義大利的貝爾加莫國際機場（Aeroporto di Bergamo-Orio al Serio）飛往比利時的布魯塞爾，這兩架航班在德國南部毗鄰瑞士邊界的康斯坦茨湖上空相撞並墜毀，造成 71 人罹難，其中包括 50 名未滿 18 歲的青少年。

本案由德國聯邦航空失事調查局（Bundesstelle für Flugunfalluntersuchung, BFU）進行調查，在花了 22 個月時間，BFU 於 2004 年 5 月 19 日公布了事件調查報告。經還原事件原貌，事發當晚蘇黎士區域管制中心由管制員 Peter Nielsen 管制這兩架航班，Peter 擔任管制員 8 年，工作經驗豐富；事發當時另一位管制員在休息室休息，這情況不符單位的規定，但長久以來在夜間航行量較少時，管制員會合併席位，讓大家輪流休息，而管理單位也默認及忽視這樣的行為。

當晚區域管制中心正進行相關裝備檢修，Peter 需要負責兩具雷達螢幕上的空中交通，兩具雷達螢幕相距約 1 公尺，Peter 則以椅子滑行於兩個席位間提供服務，約於晚上 8 時 11 分，兩位技術人員告訴 Peter，Skyguide 公司已經授權他們對主雷達進行維修，維修期間雷達螢幕運作將變慢，如果期間有飛機接近，系統也不會發出警告，另外他們還必須關閉通話系統，但是會切換到備用系統，這

影響部分監控和通訊功能，此時 Peter 仍未請求支援，而獨自一人在席位上提供服務。

在事件發生前，鄰近的德國航管中心早已發現異狀，但是 4 條通信線，有 3 條因維修而切斷，唯一剩下的 1 條因占線，讓鄰近的德國航管中心無法聯絡上 Peter。

調查指出，Skyguide 公司以 1 名管制員執勤為常態，但卻不符安全規範，而事發當時 Peter 管制 15 架飛機，承受極大壓力；如當時 2 名管制員均在席位上，應有機會避免這場空難。另外，Bashkirian Airlines 航班俄羅斯籍機長聽從 Peter 的指示下降高度，而未遵照空中防撞系統的指示爬升避讓，而同時間 DHL 駕駛員卻是遵照 TCAS 指示爬升高度，造成兩個航跡交錯的航班在同一個高度擦撞。

調查報告亦指出，在 Überlingen 事件發生前約 1 年半，日本上空曾差點發生一場空難(即前面提到 2001 年 1 月 31 日，兩架日本航空航班在靜岡縣上空發生空中接近)，兩架共載有 677 人的巨無霸噴射機在空中擦身而過，猛烈的回避動作造成 100 人受傷，而其中部分人員傷勢嚴重。如果當時飛行員的反應慢上幾秒可能會造成史上最嚴重的空難。當時某位飛行員也是聽從管制員指示，而非依照 TCAS 的指示，事件發生後，ICAO 對這件事卻未有任何回應或處置。

Überlingen 事件，同樣也是 ICAO 未明確規定 TCAS 的使用原則，如果 ICAO 曾詳細調查前述日本的事件，並提議修正 TCAS 相關程序，這起空難也許就不會發生。

在 Ueberlingen 事件之後，民航界終於有相關積極作為：

- 1、 ICAO 明確訂定 TCAS 程序，要求駕駛員應遵循 RA 指示與管制員頒發的許可相互衝突。
- 2、 歐盟(the European Commission)要求在歐盟境內最大起飛重量在 5700 公斤以上或搭載 19 名以上乘客之民航機，應配置 TCAS II 7.1 版。

TCAS II 7.1 版提供 2 項新功能，第 1 項是防止駕駛員錯誤的反應，在 7.0 版原本的指示為 ” Adjust vertical speed, adjust(調整垂直速率，調整) ” ，在 7.1 版已修正為 “Level off, level off(平飛、平飛) ” ，明確指

示駕駛員將垂直速率調整為 0 呎/分(圖 5)，避免駕駛員在操作過程中將高度調整至下一個千呎。

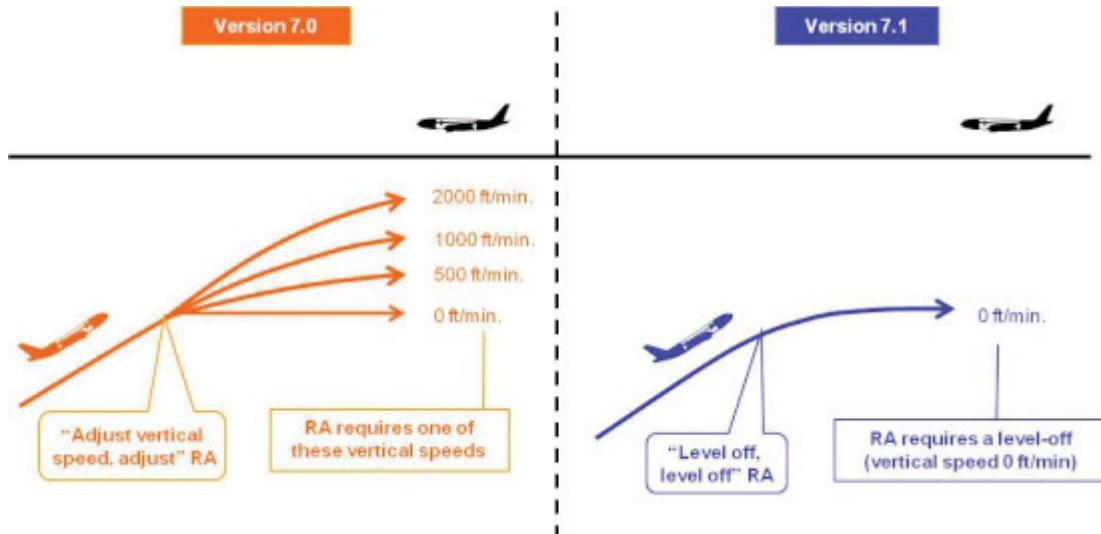


圖 5- TCAS II 7.0 版與 7.1 版

TCAS II 7.1 版提供第 2 項新的功能，在運算過程中新增加反向邏輯功能(reversal logic)，舉例來說(圖 6)，當兩架配備有 TCAS 裝備的 A 及 B 航班，在飛航過程中，A 航班獲得 TCAS 指示為下降、B 航班被指示爬升時，如 A 航班偵測出 B 航班沒有正確地依據 RA 爬升而是下降，兩航班即可能發生碰撞，此時 A 航班的 TCAS II 7.1 版會重新指示 A 航班反向操作改以爬升避免碰撞。

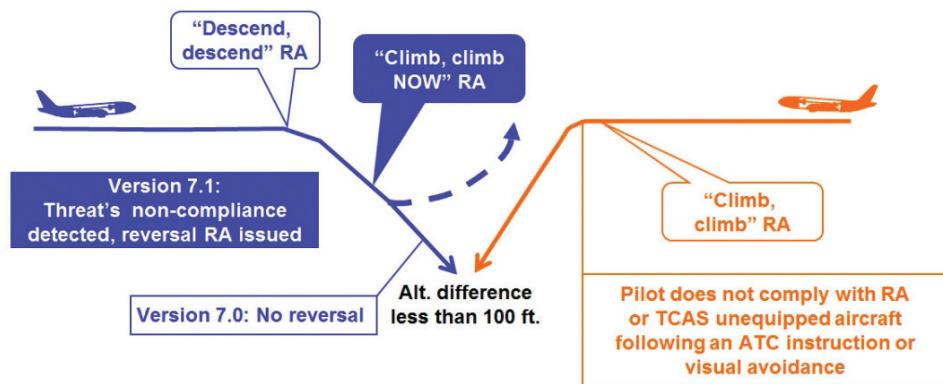


圖 6- TCAS II 7.1 版反向邏輯功能(reversal logic)

3、要求管制員在接獲駕駛員報告執行 RA 時，管制員不可頒發有違 RA 之指示，並適時提供相關地形或障礙物之安全警示及相關航情資料。

#### 四、閉幕

由亞太地區執行副理事長 Mike O'Neill 主持閉幕典禮，並宣佈下屆亞太地區年會訂於 2017 年 10 月中旬於紐西蘭威靈頓舉行(圖 7)。會後與會人員於成吉思汗廣場合影留戀(圖 8)。



圖 7- 亞太地區年會會旗交接



圖 8-2016 年亞太地區年會參加人員合影留念

## 叁、心得與建議事項

- 一. 航空人員的工作一向給予外界相當專業的形象，也因此外界會以嚴格的標準來檢視航空人員的一舉一動，在專提報告中，IFATCA 不斷向我們宣導要自律及維護專業的形象，尤其在現今網路發達的情形下，常常會有所謂肉搜的情況將個人資訊一下子傳播開來。在簡報中有一案例發生在 2014 年 10 月 20 日，法國石油道達爾公司(Total)總裁搭乘私人飛機在莫斯科機場準備起飛時，在跑道上撞到除雪車而墜毀，造成 4 員死亡，新聞報導指出塔臺管制員是新進人員，在頒發許可時，未仔細檢視跑道淨空狀況，亦提及除雪車駕駛員可能飲酒等，隨之網路上即出現該名管制員搔首弄姿生活照片，讓外界普遍認為該名管制員不夠專業，進而影響到公眾對於管制員的評價。因此 IFATCA 呼籲所屬會員要自重跟自律，尤其在社交媒體上維持專業的形象。
- 二. 波音航空公司發布預測報告指出，未來 20 年(2015 年到 2034 年，圖 9)，亞太地區將增購 12,500 到 15,000 架新飛機，遠高於歐洲 7,310 架及北美洲 7,890 架，使得亞太地區將成為全球航空業增長最快區域，而中國大陸亦將成為世界上最大的國內航空市場。IFATCA 在這次會議中，也宣導亞太地區各會員，要針對在人力、設備、訓練等預為規劃，以因應大幅成長的航行量。

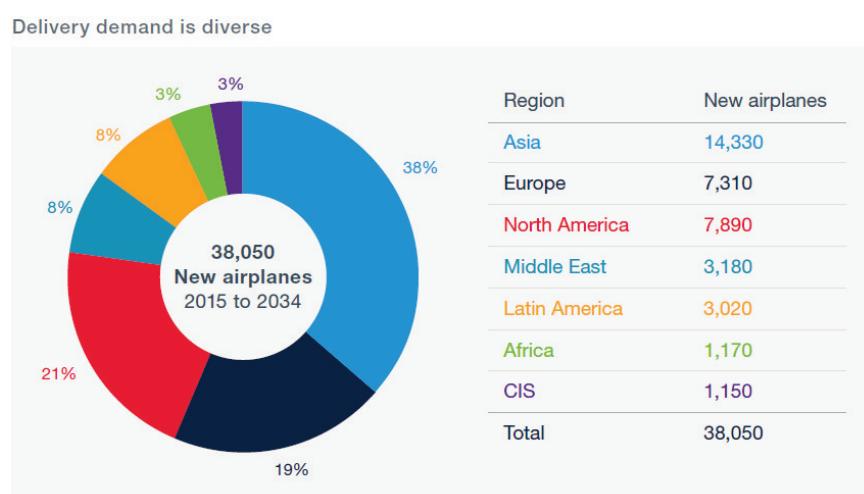


圖 9

三. 民航事業包括航空人員培訓及執照認證、管理當局對航空業者監督及管理、民用航空器登記適航及維護、機場設計及建造、航空站營運與管理、儀航程序規劃及設計、飛航服務提供等，顯見民航事業的運作相當精細及複雜，整個系統連結相當緊密且涉及不同專業領域。而 IFATCA 主要著重在飛航服務裡的飛航管制服務，自成立以來持續不斷研議如何提升及精進飛航管制服務作業及效率，也關注管制員工作的權利及義務，IFATCA 在民航事業中扮演著相當重要的角色，國際民航組織 ICAO 也相當重視 IFATCA 的專業與意見。在這次會議中，我們積極與其他國家管制員建立聯繫及溝通的管道，也因為社群網站的普及，當下就利用臉書成立了 Asia Pacific Regional Air Traffic Controllers 的群組。我們觀察到來自不同國家的管制員彼此相當熟悉，像認識多年的好朋友，經瞭解其他國家都是指派固定 2-3 名成員每年參與 IFATCA 會議，再搭配 1-2 名成員參與學習，目前我們每年都能以公費派 1 員參與 IFATCA 的會議，以維持和國際間聯繫及獲取最新的航管資訊，惟 IFATCA 年會均固定分 3 組會議同時進行，IFATCA 地區性會議會視情況進行分組，爰建議未來調整公派 2 員參與會議，以有效掌握相關資訊。

# SAFETY CULTURE

What it really means and how as an MA can  
you help establish such culture ?



Philippe Domogala  
Ulaanbaatar IFATCA Regional Meeting October 2016

# SAFETY CULTURE DEFINITION

## MANY DEFINITIONS

Most come from the medical field



## What Safety culture is not :

- It's not a "thing" with an objective existence
- It's not a policy, program or procedure

**Safety culture is an environment within which individual safety attitudes develop and persist and all kind of safety behaviors are promoted.**

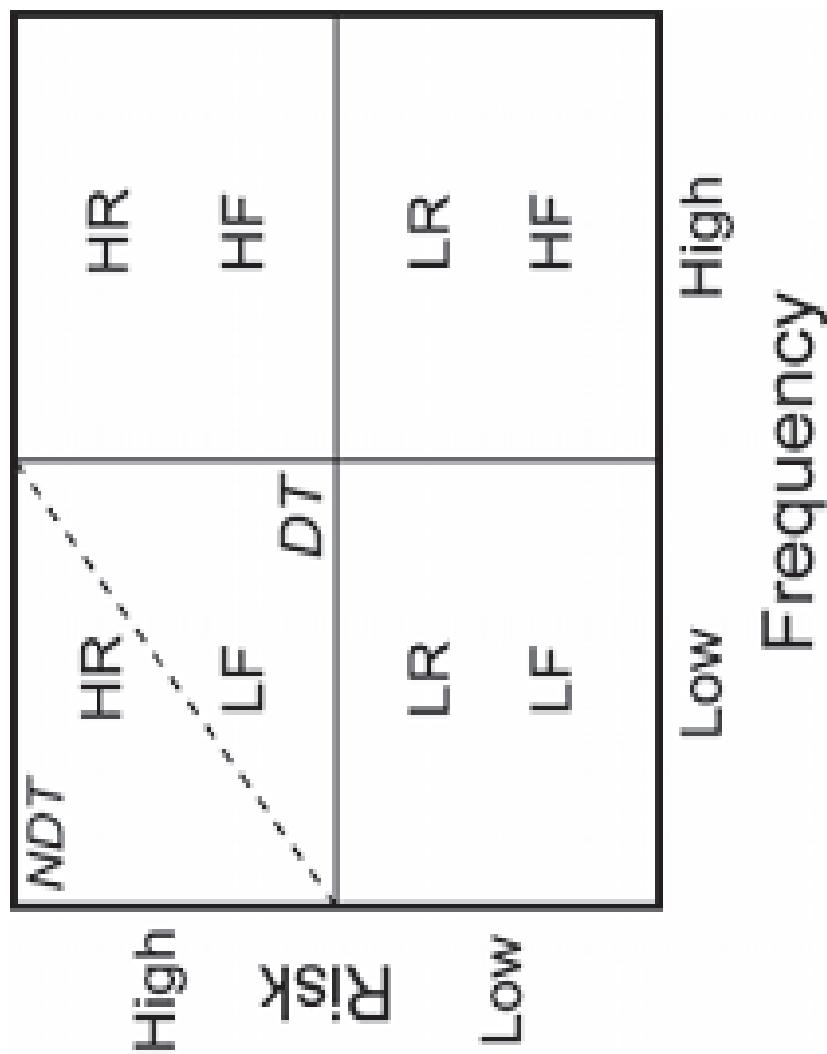
# SAFETY MANAGEMENT

## First Step of a Safety Culture



# Gordon Graham

High risk, Low frequency events  
( with No Time to Think it Through )



# ASK FOR TRAINING ON HIGH RISKS, LOW FREQUENCY EVENTS

- Training controllers properly by asking for :
- Refresher courses
- Unusual events training using good simulators





## TRAFFIC GROWTH

Deliveries per region	2014	2034
Asia	5.850	<b>16.180</b>
N.America	6.700	9.350
Europe	4.450	7.560
Middle East	1.260	3.480
Latin America	1.470	3.620
C.I.S.	1.180	1.720
Africa	690	1.650
<b>World</b>	<b>21.600</b>	<b>43.560</b>

# TRAFFIC GROWTH



# AIRBUS

Forecast	2014	2034
Passenger aircraft	17.354	35.749
Dedicated Freighters	1.633	2.687
<b>Total</b>	<b>18.987</b>	<b>38.436</b>

# IATA FORECAST BY PASSENGERS (2014-2034)



North America : 651 million

Europe 577 m

**Asia Pacific**

**1.753 m**

Latin America 328 m

Africa 190 m

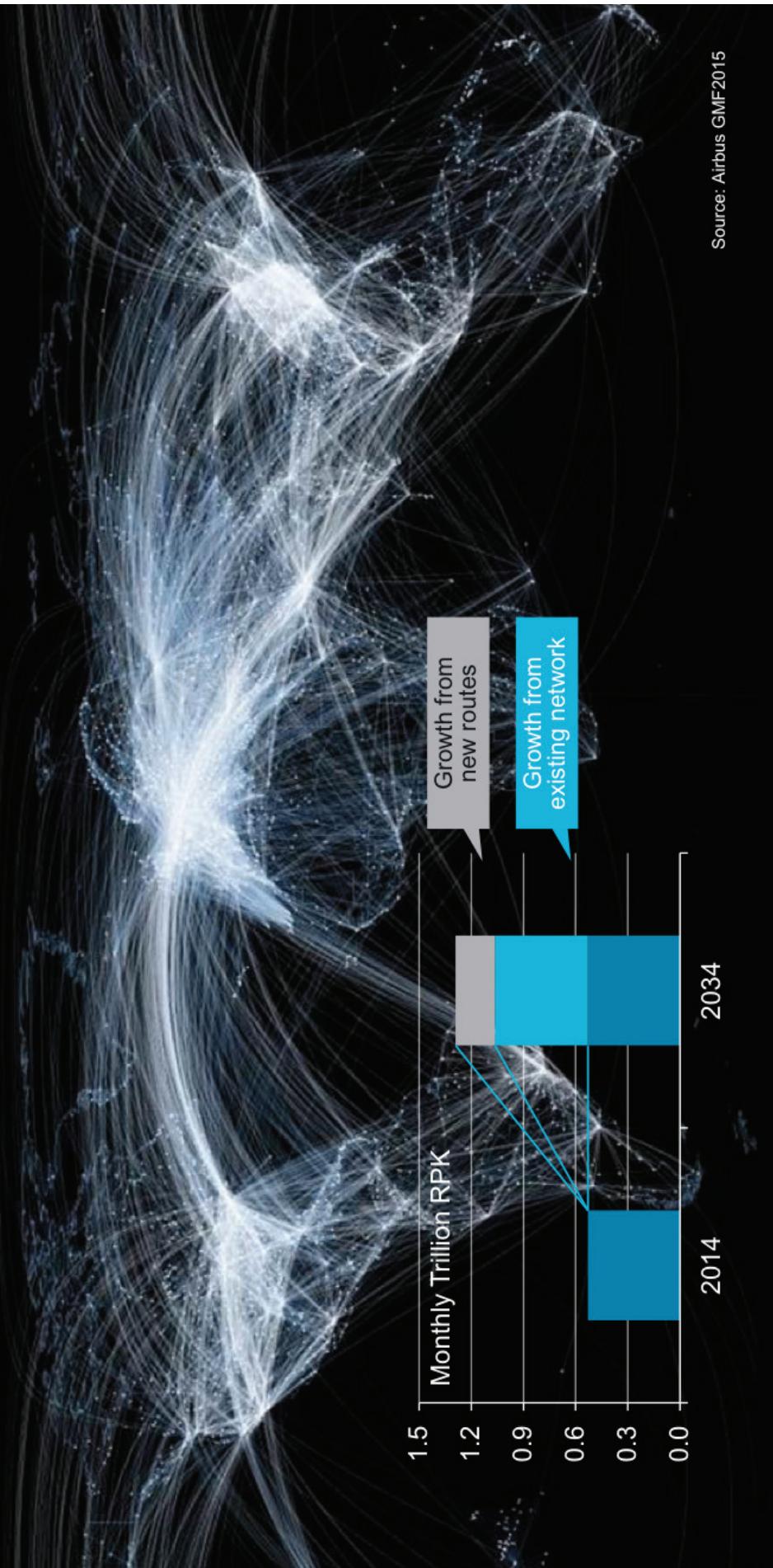
Middle East 250m

In 20 years Asia Pacific same as

North +Latin America +Europe combined !

# NOT MANY NEW AIR ROUTES PLANNED

70% of traffic growth until 2034 will be coming from existing network

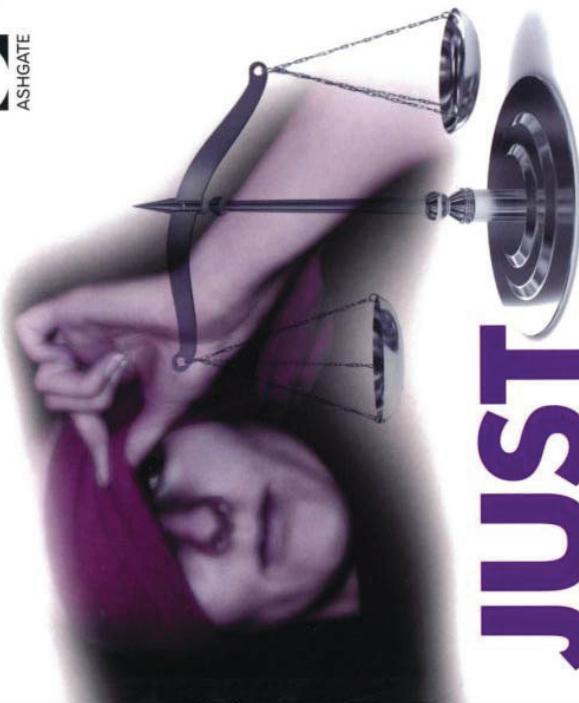


Source: Airbus GMF 2015

# JUST CULTURE IS AN INTEGRAL PART OF THE SAFETY CULTURE .

**SECOND EDITION**

a] ASHGATE



# JUST CULTURE

Balancing Safety and Accountability

**SIDNEY DEKKER**

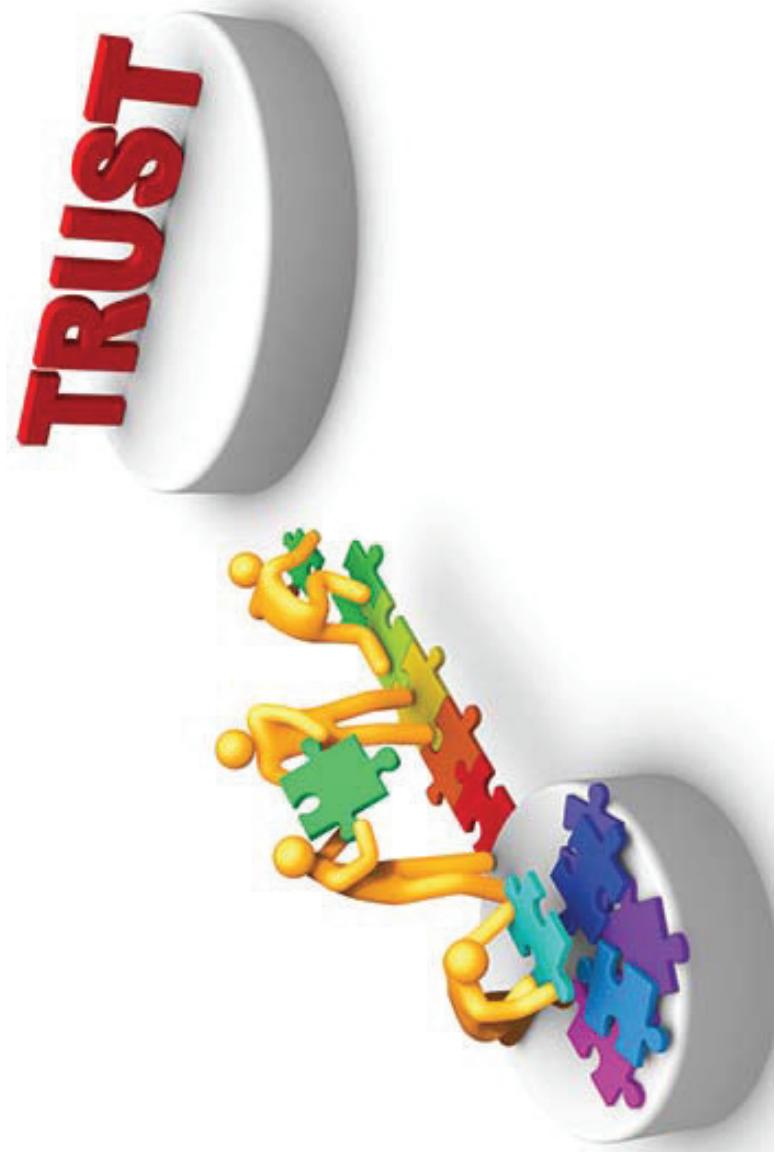
# FIRST STEP OF JUST CULTURE

- Implement a VOLUNTARY , NON-PUNITIVE,  
CONFIDENTIAL incident reporting system



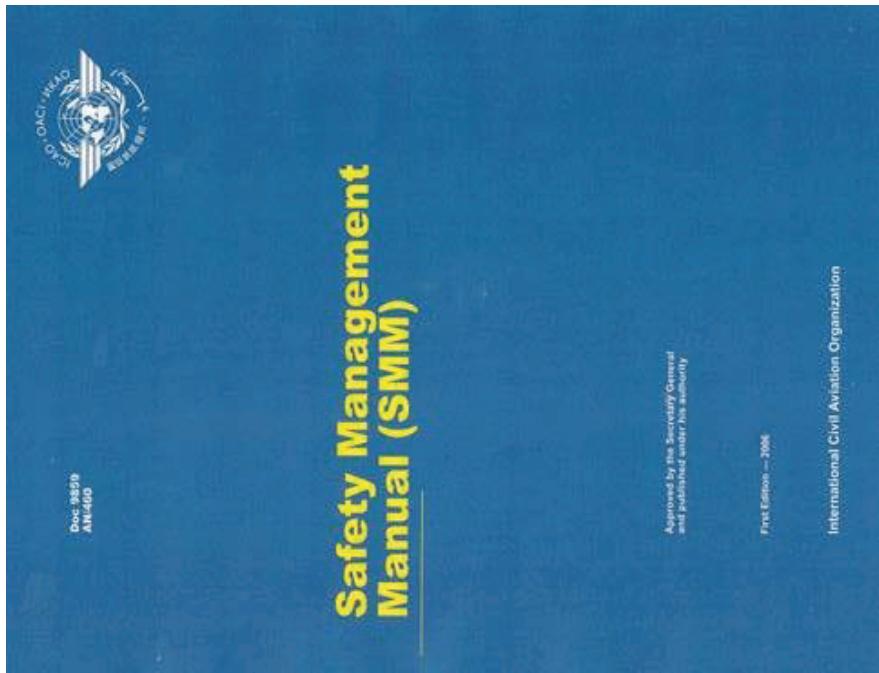
## SECOND STEP OF JUST CULTURE

- Build a Trust relation with your management.
- Trust will not come automatically , it needs to be built by both sides



# ICAO Safety Management Manual (Doc 9859)

Contains the Just Culture  
principles and  
Implementation  
Recommendations



# PROSECUTION-CRIMINALISATION of Incidents and Accidents

- MOSCOW October 2014 .crash Business jet DA50.  
Charged: Trainee Air traffic controller Svetlana Krivsun, 23, pictured arriving in court, faces up to seven years in jail if found guilty



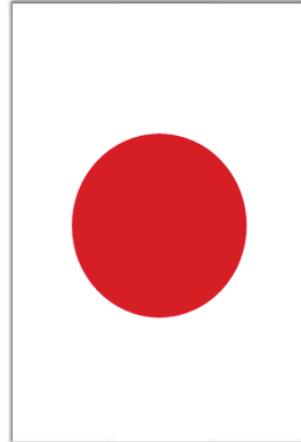
© AFP/Getty Images



© AFP/Getty Images

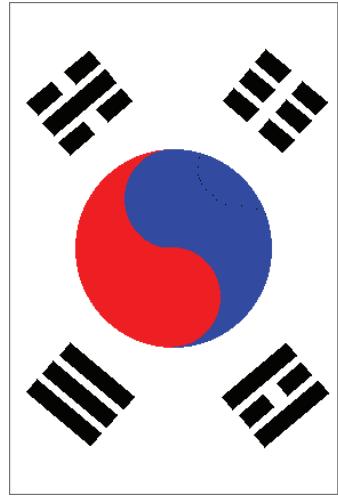
# **PROSECUTION-CRIMINALISATION of Incidents and Accidents .**

- Recent cases in ASIA-PAC region :
- JAPAN : January 2001 : Japan Airlines Boeing 747 and DC-10, airprox above Yaizu. 2 controllers prosecuted charged and convicted.



# PROSECUTION-CRIMINALISATION of Incidents and Accidents .

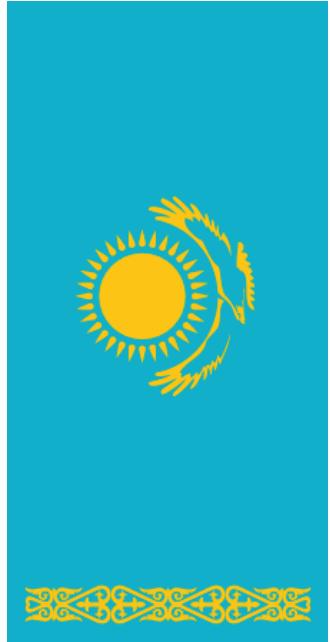
- KOREA : ( January 2011)
  - In January 2011 two C172 in VFR were involved in a midair collision at ULJIN a training airfield. Complete (student) pilots error, but TWR controller prosecuted,



©EnchantedLearning.com

# PROSECUTION-CRIMINALISATION of Incidents and Accidents

- KAZAKHSTAN ( December 2012)
  - A Military AN72 crashed while attempting to land in **Shymkent**, due Technical failures on aircraft and major errors by pilots . But the civil controller who last talked to the aircraft was prosecuted, convicted , sentenced .



# PROSECUTION-CRIMINALISATION of Incidents and Accidents

- TAIWAN : (July 2014 )
  - a TransAsia ATR72 crashed near Magong Airport , because crew decided to continue below minima. Nevertheless the 2 TWR controllers are prosecuted .

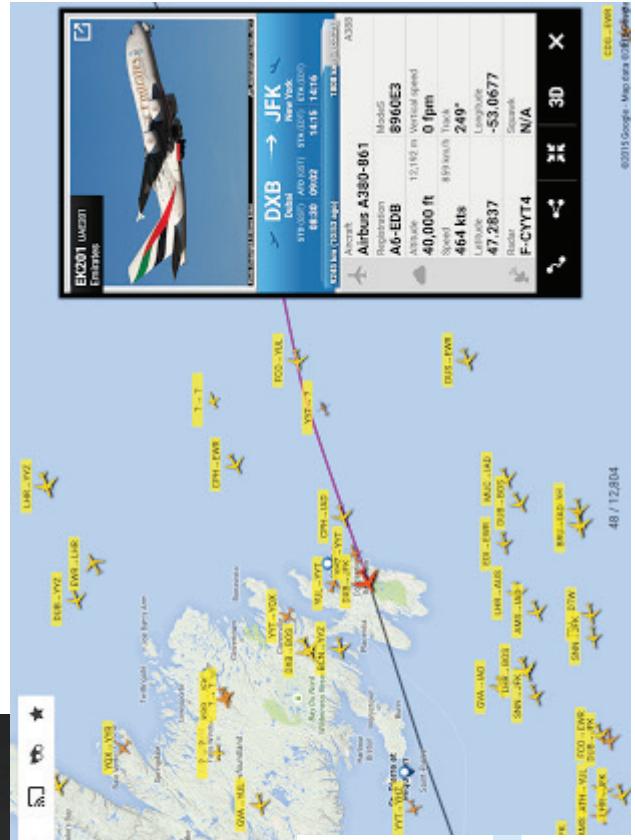


**REMEMBER HER ?**



© AFP/Getty Images

# SOCIAL MEDIA DANGERS



**LiveATC.net**  
Live Air Traffic – From Their Headsets to You.

**LiveATC News**

Lots of new and exciting feeds coming online! If you would like to expand coverage in your region of the world please contact us.

**Find LiveATC Audio Streams**

Airport/ARTCC Code  
EDDF Frequency 124.255 Site-wide search

**LiveATC Apps**

LiveATC Air Radio  
For iPhone/iPod Touch  
(Also works on iPad)  
Buy on iPhone App Store  
Buy on Google Play  
Buy on Amazon App Store

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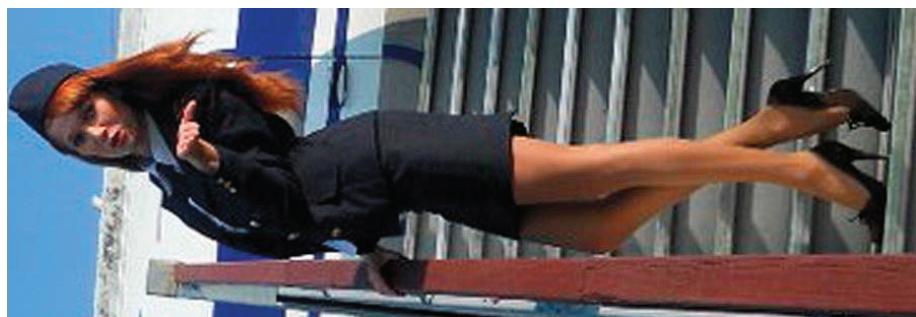
29 October 2014

# GLAMOROUS ROOKIE AIRCRAFT CONTROLLER WHO WAS ON DUTY WHEN TOTAL OIL CHIEF WAS KILLED IN RUNWAY CRASH IS FORMALLY CHARGED OVER HIS DEATH



Svetlana Krivsun, 23, charged with causing death  
She is suspected of having given the order for the private jet to take off

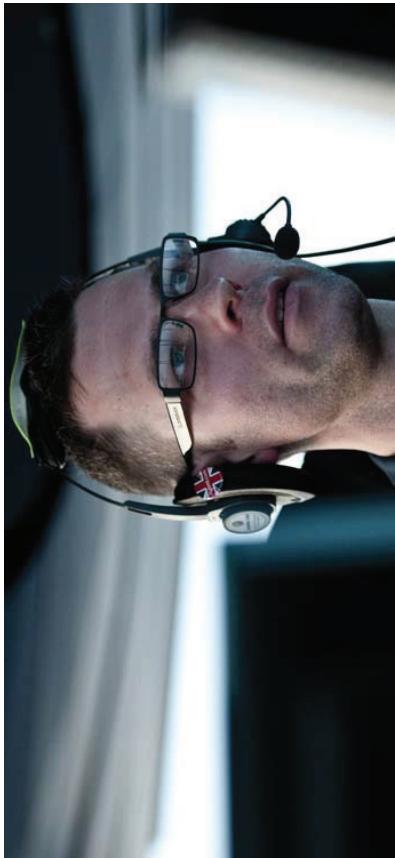
**PHOTOS COURTESY OF**



# AVOID POSTING PARTY PHOTOS ON SOCIAL MEDIA

You want to show this  
in a Safety Culture :

**Not this :**



# CONCLUSIONS (1)

- Make sure your employer has a sound Safety management in Place , according ICAO Annex 19
- Make sure you get (refresher) training to cover High risks low frequency events. Those will be the dangerous ones.
- Make sure to have Just Culture principles in place .  
That include Implementing a VOLUNTARY , NON-PUNITIVE, CONFIDENTIAL incident reporting system .and building trust between management and controllers

# CONCLUSIONS (2)

- Be aware of the increasing prosecution of controllers in incidents and accidents , even if you did everything according to the book, remember the duty of care and inform your members about his.
- Learn to talk to media to win general public in your favor.
- Make sure , after an incident/accident that you follow Social media in case of wrong things being posted about ATC and ask your management ( not you ) to correct this. .
- Binform your members to be careful of what they post on social media . especially photos.



**TCAS: Why 14 years after Überlingen some pilots  
still maneuver against an RA and some controllers  
still issue instructions during an RA?**



Philippe Domogala  
Ulaanbaatar IFATCA Regional Meeting October 2016

Opening quote (and probable answer)

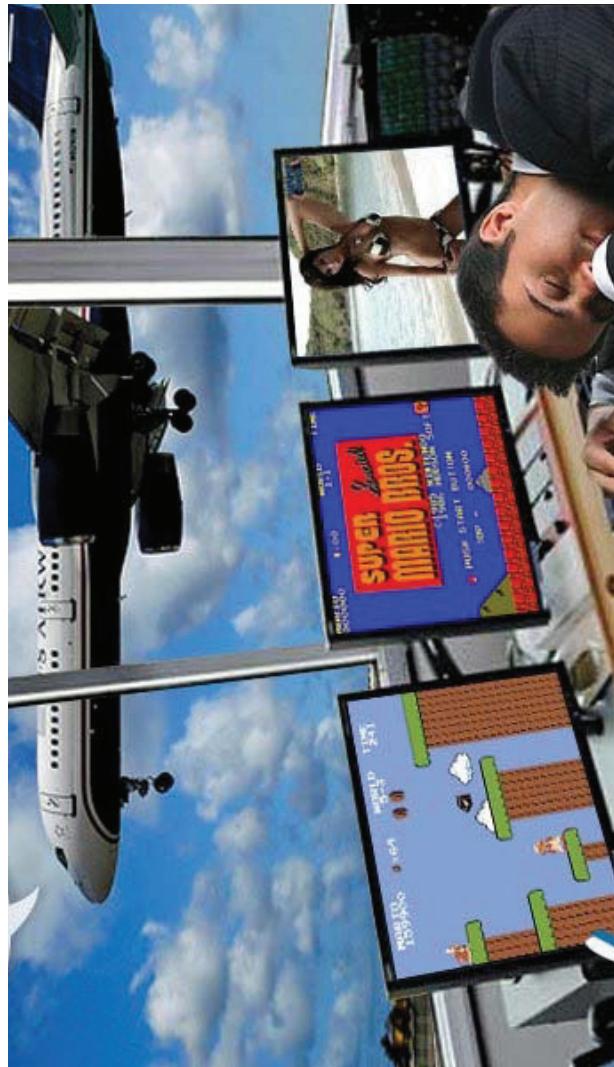
**“It is always easier to deal with things than to  
deal with men”**

Wilburg Wright, 1907



# OLD MYTHS

- “TCAS is there when ATC has failed”
- And : “In Ueberlingen the controller issued instructions contradictory to TCAS ”



# Killing the Myths(1)



- **ATC has Failed : NO !** in 2008 by French DGAC Studied 12.500 RAs involving 1029 a/c .(**PASS Study**)
  - Out of 350.000 TCAS RAs Mode S messages received , 96% RAs were brief “empty” Messages .  
From the rest ,Only a small proportion of all RAs (17%) were “real” coordinated TCAS RAs. ( TCAS-TCAS encounters)
  - **of those TCAS-TCAS encounters 70% are 1000ft level-off situations**
    - If you add the level busts , same a/c, Ghost a/c , etc:
  - **75-80 % of real RAs are not due to ATC “having failed ”**

# UEBERLINGEN COLLISION REMINDER

- July 2002 , Zurich ACC (Switzerland)
- A Tu-154 from Bashkiria collided with a DHL B-757 over Lake Constance (near the Swiss-German border)



# Timeline from collision minus 35 minutes

(time collision 23:35ICL)

- 23:00 The chief controller/supervisor leaves the centre without explaining the consequences of planned system maintenance to 2 controllers left on duty
- 
- 23:10 Six technicians enter the room to start system work
- 
- 23:10 Hardly any traffic is left: 2 aircraft on frequency; **3 expected in next half hour**. All 3 are at FL360, but **not in conflict according to the strips**
- 
- 23:15 One of the 2 controllers sends his colleague away on a break, as is customary. He leaves the room to go to bed.
- 
- 23:18 The main Radar system is disabled. No more visual STCA.
- 
- 23.23 Direct telephone lines are disabled
- 
- 23:29 Tu-154 shows up on the back-up radar, **EARLY**. He calls in one minute later
- 
- 23:30 An unplanned A320 (inbound to Friedrichshafen) calls on APP frequency; controller has no details.
- 
- it is a delayed inbound Friedrichshafen, **ATTENTION DIVERSION**
- 
- as NO FREQ. COLLAPSE POSSIBLE ON BACK UP SYSTEM he has to jump between 2 positions (APP and Area).
- 
- 23:31 Controller tries to call Friedrichshafen to discover the back up telephone was misconfigured. Focuses on this problem and loses precious time.
- 
- 23:32 B757 becomes visible on radar. **EARLY, NOW IN CONFLICT WITH TU154**
- 
- 23:33 until Adjacent ACC attempt to call on the main telephone system to warn him of the conflict. No joy.
-

# Timeline from collision minus 60 seconds

- 23:34:30 Captain B757 leaves cockpit for lavatory. **Single pilot, i.e. no more PF/PNF separation of duties**
- 23:34:40 Controller detects conflict and issues an expedite descent clearance to Tu-154. It's too late to get the mandatory 7 Nm separation, but approx. 1 minute before the collision
- 23:34:56 TCAS issues RAs to both a/c: 757 to descent, Tu-154 to climb. Neither reports it to ATC. Tu-154 captain decides not to follow RA but ATC, **in line with company procedures but contradicting international standards.**
- 23:35:03 Controller repeats the expedite descent clearance to Tu-154
- 23:35:19 B757 pilot informs ATC of RA but frequency blocked at same time, **but this is 23 seconds after starting the RA maneuver.** Not received by controller .
- 23:35:20 Aerolloyd A320 calls Zurich ATC on the APP frequency, blocking the R/T transmission of the B757. From then on until the collision, frequencies are constantly occupied .
- 23:35:31 Expo 5177 calls on ACC frequency also at FL 360.
- 23:35:32 **Collision.**

# Killing the Myths (2)



- **UEBELINGEN** : the controller issued first descent clearance to TU154 **16 sec before TCAS started**, as he should do.
  - When TCAS started none of the 2 crews informed ATC so he remained responsible and issued a 2<sup>nd</sup> instruction: “expedite” . **Correct**
  - When 23 second later the B757 pilot reported TCAS RA , another aircraft was transmitting and controller did not hear it. Was too late anyway.
- **Controller acted correctly as far as TCAS is concerned .**

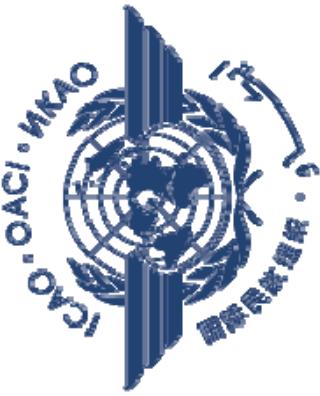
# What was done after Ueberlingen :

- ICAO modified the TCAS procedures: always follow RA even if it contradicts ATC
- Attempts to change the term “Advisory” (which suggests it’s optional) failed.
- Eurocontrol and RTCA developed TCAS V 7.1 (enabling reversals RAs)
- Awareness campaigns and training seminars to explains the changes to both pilots and controllers.
- Request to reduce vertical rate in last 1000ft before level off.
- Emphasis to controllers not to intervene after a pilot report an RA.
- Emphasis to pilots to always follow RA, regardless of ATC instructions .

**So problem should be solved in 2016, nearly 15 years later.**

## Unfortunately it is not.

- We still see both controllers interfering during a TCAS event and pilots still follow ATC instructions, going against the TCAS RA



## THE FACTS PILOT COMPLIANCE

- Total RAs followed correctly: 64%
- Not followed at all: 13%
- Excessive manner: 5%
- **Opposite direction 7%**
- (Unknown reasons 11%)



Source : UK NATS study during 2007-2008

# Same scenario as Ueberlingen over France in 2004

## Event 2: Opposite manoeuvre to an RA despite revised PANS-OPS

Due to a coordination problem between two sectors, a B737 is cleared to climb to FL320 against an A330 that has been cleared to descend to FL310 on a conflicting track.

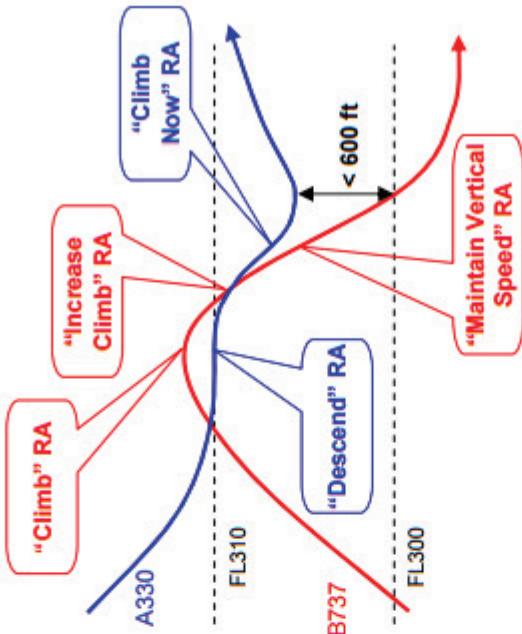
The controller issues late instructions, to the B737 to descend immediately to FL290 and to the A330 to climb immediately to FL320.

Simultaneously, both aircraft receive coordinated RAs: the A330 has a "Descend" RA and the B737 a "Climb" RA. The A330 flight crew immediately informs the controller and initiate a descent whereas the B737 flight crew decides to ignore their "Climb" RA "since [they] have intruding aircraft visual". Instead, they continue a steep descent while initiating an evasive turn.

The manoeuvre of the B737 in the opposite direction to the "Climb" RA forces both TCAS units to reverse the RA sense. As a result, the minimum distance is 0.9 NM at less than 600 ft according to radar data and 300 m at the same level according to the B737 pilot, who filed an Airprox.

Simulations indicate that if the B737 flight crew had followed the "Climb" RA, the vertical distance would have been greater than 800 ft, and there would have been no reversal RAs nor subsequent altitude crossing.

This event occurred in February 2004, after the PANS-OPS had been revised to avoid such scenario. Pilots should be aware of the updated ACAS procedures and know how to apply them correctly, through reinforced training.



# And again over Evreux, France in 2006

## Event 6: Opposite manoeuvre to RA to follow ATC avoiding instruction

A B767 is maintaining FL290 heading West. An A319, heading South-East, is at FL270 on a converging track. The aircraft are controlled by two different ATC units (the vertical boundary is FL285).

The A319's pilot requests for a higher cruising level. Due to a coordination error between the two ATC units, the A319 is cleared to climb to FL290 with the B767 whilst in confliction.

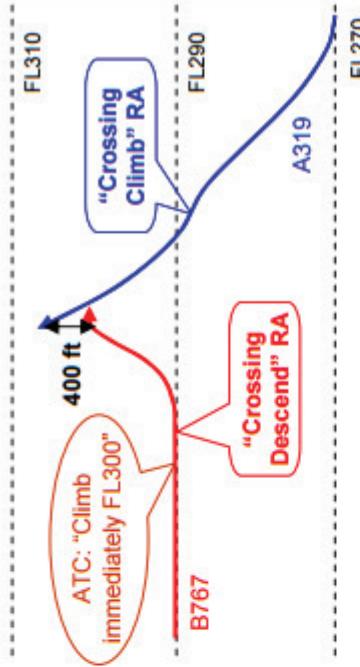
Following Short Term Conflict Alerts triggered in both ATC units, the **B767 is instructed to climb immediately to FL300** and the A319 to "expedite descend FL270".

However, almost at the same time, each aircraft receives a coordinated RA opposite to the ATC instruction.

- The B767 receives a "Crossing Descend" RA.  
The pilot disregards the RA and follows the ATC instruction to climb.
- The A319 receives a "Crossing Climb" RA.  
The pilot correctly reacts to the RA by increasing the rate of climb.

Because of the B767 pilot's opposite manoeuvre to the RA, the very small vertical separation between the aircraft does not increase. Consequently, the A319 receives an "Increase Climb" RA and the pilot increases the rate of climb to 5000 fpm. The B767's pilot eventually recognises the "Descend" RA and stops the climb just before the "Clear of Conflict".

Despite the large vertical deviation of the A319 (3000 ft), the aircraft passed at **400 ft and 0.3 NM**.



### Pilots must follow all RAs!

The ACAS Bulletin n°4 describes several hazardous events where some pilots reacted in the opposite direction of the RA for different reasons (ATC instruction, visual acquisition, stress, etc.).

Previously, the ICAO regulation was not sufficiently explicit. Therefore, ICAO revised the ACAS procedures and pilot training guidelines to require pilots to follow all RAs. The ICAO PANS-OPS Doc 8168 was updated in November 2003 and as described in the ACAS Bulletin n°5, the ACAS procedure now clearly states that:

"Pilots shall respond immediately by following the RA as indicated, unless doing so would jeopardise the safety of the aeroplane"

However, Event 6 shows that there are still some pilots who do not follow RAs, and who even manoeuvre in the opposite sense of the RA, whereas the ICAO PANS-OPS Doc 8168 also states that:

"Pilots shall not manoeuvre in the opposite sense of an RA"

# JULY 2014 – Houston (USA)



- B777 Houston- Moscow. Departed Houston on INDIE SID specifying to maintain 4000ft. A/C climbed above, which created a conflict with an inbound descending to 6000ft opposite. ATC detected it and instructed B777 to descend back immediately to 5000ft. When passing 5600ft both a/c got RAs: B777 got a CLIMB-CROSSING-CLIMB RA and the intruder to (Continue) DESCEND
- **Pilot B777 did not follow RA and continued descending as instructed.** TCAS issued a new RA: LEVEL OFF-LEVEL OFF, again pilot continued descending, as did the intruder following his own RA.  
**Aircraft passed 0.6 Nm laterally and 200ft vertically.**
- PIC B777 did not notice the altitude restriction on his chart and put FL310 (the requested level) on the MCP. He did not tell ATC he was climbing to FL 310 after his initial call to departure.
- 3 crew on board B777, incl 2 captains. All 3 said they knew RAs should be flown regardless of ATC instructions but did not think it applied here. For two of them, it was their first real RA event and the 3rd one only ever experienced one, but never a Crossing Climb. All had experienced RAs in Simulators sessions.

# INVESTIGATION REPORT RECOMMENDATIONS



- More demanding TCAS RA scenarios as mandatory training requirements for pilots in both the roles of PF and PM, particularly the scenarios where there are conflicting ATC instructions and TCAS RA commands

**The operator shared the following lessons learnt from this Occurrence:**

- more demanding TCAS RA scenarios and the critical need for crew to execute the RA commands as Recall Actions.

**The operator also issued circulars to remind flight crews to:**  
be aware of altitude restrictions as indicated on the SID charts, and adhere to the RA command, even when there is a conflict between the RA command and ATC instructions.

# WHY still following ATC and not RA ?

Because humans are involved!

- CONTROLLERS:** Duty of care. They are trained to intervene in a developing conflict.
- PILOTS:** Between a machine and a human “order”, one prefers to follow the human one

## Possible Solutions

- BAD :** RA/Downlink to controller positions
- GOOD :** Airbus solution on A380 and A350

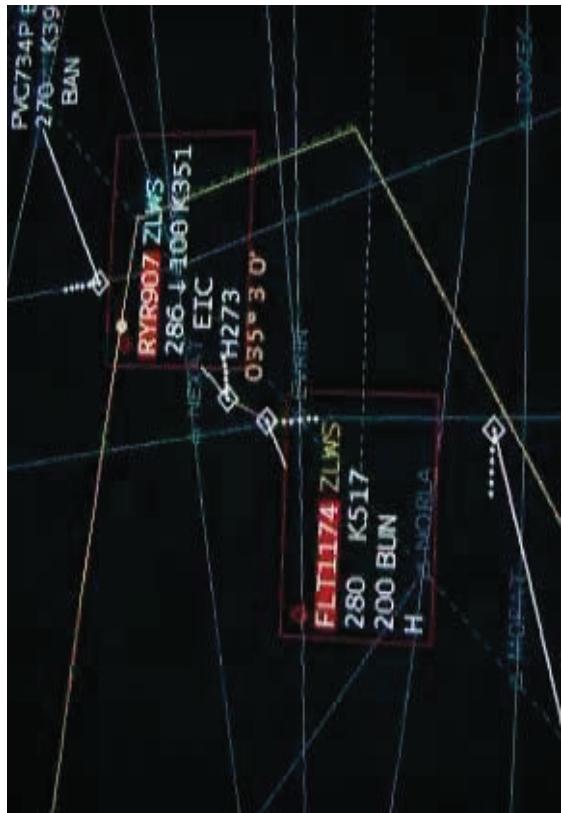
# WHAT IS RA D/L ?

- At first sight, downlinking RAs would improve a controllers' awareness that an RA is ongoing.
- **But it will also create new errors situations.**

## Another Al Wiener's Law

**Whenever you solve a problem you usually create one. You can only hope that the one you created is less critical than the one you eliminated.**

- IFATCA not really in favour of RA D/L
- We'll consider supporting if and only if, **global procedures and legal responsibilities** are clearly established and technical and HF issues are addressed and solved



# RA D/L: IFATCA POLICY



- 1. Clear and unambiguous legal responsibilities for the controllers (Who is responsible when)**
2. No delay in downlink (e.g. due to antenna rotation)
3. Displayed at the appropriate controller position(s)
4. Must be fully compatible with ground safety nets (STCA, APW, etc..)
5. Nuisance and false alerts must be kept to an absolute minimum. (currently over 80% of the Mode S RA messages downlinked are nuisance).

# AIRBUS Initiative (1)



- Autopilot/Flight-Director (AP/FD) TCAS auto mode for the Airbus A380 and A350

## AIRBUS Initiative (2)

With AP/FD TCAS mode activated, when a TCAS RA is received, the pilot no longer needs to disengage the A/P or Flight Director before conducting the TCAS RAs. **The RA is flown automatically by the autopilot.**

Certified by EASA in Sept 2009.

**This is most probably and hopefully the future.**



# MY RECOMMENDATIONS TO CONTROLLERS

- In last minute anti-collision maneuvers, always try and **issue a (large) turn instruction if you can**.
- **Do not discuss RAs reported with pilots – let them fly first and talk later – simply acknowledge by saying “Roger”.**
- **Never, ever issue contradictory instructions to an RA.** (especially if the RA reported goes against your last clearance). Give traffic information, using relative vertical distance (xxx ft above/below, rather than an altitude/flight level)
- **Once an RA is reported you are no longer in charge**

# MY RECOMMENDATIONS TO PILOTS

- **Reduce vertical rate** to max 1500ft/min in last 1000ft before a level off.  
*Note that this can also create problems, if this interferes with the alt cap mode of your aircraft!*
- **Always follow the RA** if you decide not to, never, ever move opposite to an RA.
- **Do not assume** the aircraft you see outside is the one on the TCAS display .
- **Report following RA** to ATC as soon as possible (within 10 seconds)
- If you receive an instruction before you've reported the RA, let the controller know: "**Unable due to RA**".  
*This is official phraseology (that to my knowledge has NEVER been used by anyone!)*