出國報告（出國類別：其他）

出席 2009 年「國際飛航管制員協會亞太地區年會」出國報告書

服務機關：交通部民用航空局
姓名職稱：許智婷　科長
派赴國家：印尼巴里（峇里）島
出國期間：自 98 年 11 月 2 日至 11 月 6 日
報告日期：98 年 12 月 17 日

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目錄

壹、 前言與目的

國際飛航管制員協會聯盟（International Federation of Air Traffic Controllers' Associations ,FATCA）爲一非政治性及營利性之獨立專業組織,於 1961 年 10 月 26 日於荷蘭之阿姆斯特丹正式成立,主要發起國爲奧地利、比利時、丹麥、芬蘭、西德、冰島、愛爾蘭、盧森堡、荷蘭、挪威及瑞士等 11 個國家，均爲歐洲國家。聯盟之主要目標爲：

一、 有效率即有規律地提升國際間之飛航安全。

二、 協助發展飛航管制之安全有效制度。

三、 促進飛航管制員間之學術交流。

四、 維護飛航管制員之應有權益。

五、 擴展與其它國際組織之互利關係。

六、 致力發展成爲泛世界之飛航管制員協會聯盟事業。

總會設於加拿大蒙特婁，分爲歐洲、美洲、亞太、非洲/中東等四大地區，該組織遍及全球，發展迄至今(2009)年 11 月爲止，全世界已有 137 個會員國及地區成爲該聯盟之正式會員，超過 50,000 個飛航管制員已被納入聯盟之中。亞太地區計有：伊朗、印度、澳大利亞、斐濟、香港、印尼、日本、澳門、馬來西亞、蒙古、尼泊爾、紐西蘭、新加坡、斯里蘭卡、韓國、泰國及台灣等會員，中國近來有加入該協會聯盟之意圖，屆時是否會排擠我既有之代表性，須及早防範及因應。

我國自退出聯合國以來，國際空間頓然被壓縮，參與國際民航組織事務管道減少，獲得民航相關資訊不易，爲因應此一現象，民用航空局遂於民國 69 年 3 月（西元 1980 年）成立「中華民國飛航管制員協會」，將全體飛航管制員納入；同年 5 月以 ROCATCA（TAIWAN）名義加入國際飛航管制員協會聯盟爲正式協會聯盟會員國，至今已 29 年。

由於國際飛航管制員協會聯盟係目前國際間唯一經認證之全球性飛航管制機構，在航管領域中自有其權威性。因此，ICAO 有關飛航管制法之規或技術方面若有需，均以國際飛航管制員協會聯盟爲其諮詢對象。我國爲國際飛航管制員聯盟之會員，秉持積極負責之態度，參與該聯盟之相關活動，除可保持與該聯盟會員國之密切友好關係，建立國際協調溝通管道之外，並可瞭解世界各國民航事業之發展趨勢，吸取航空新知與經驗，有效提昇飛航安全與服務品質，促進飛航管制員間之技術交流並提昇水準，維護飛航管制員應有之權益，拓展與其他國際組織之協調與聯繫等。本局每年均編列預算，即爲積極參與航管國際事務，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。

貳、行　程

11 月 1 日	自桃園國際機場搭乘長榮航空公司 BR255 班機至印尼巴里（峇里）島。
11 月 3 日至 5 日	報到暨出席年會。
11 月 6 日	搭乘長榮航空公司 BR256 班機返回桃園國際機場。

參、 會議過程

一、 會議地點巴里島

(一) 巴里島(峇里島,Bali)地理資訊：

巴里島是印尼群島一萬七千多個島嶼中的一個小島，緯度在赤道以南 8 度，位於爪哇(Java)與隆坡(Lombok)兩島之間，如果你尚未進入南半球，巴里島是跨越赤道很經濟的途徑。

巴里島和台灣同樣屬於 GMT+8 小時，所以台灣到巴里島不必調整手錶時間，生活作息完全一致，不會有生理時鐘的困擾，巴里島雖然屬於印尼的國土，但印尼群島橫跨三個時區(GMT+7 到 GMT+9)，印尼首都雅加達屬 GMT+7, 巴里島則是 GMT+8，國際上時區貫用 GMT+幾個小時表示，GMT 是 Greenwich Mean Time (格林威治平均時間) 的縮寫，台灣屬於 GMT+8 小時。

(二) 巴里島簡介：

巴里島是印尼群島一萬七千多個島嶼中的一個小島。她是亞洲最漂亮而有特色的觀光勝地之一，其特有的文化風采與自然風光每年吸引上百萬位來自全球各地的旅客。

巴里島東西橫向約有 140 公里；南北縱向約爲 80 公里。總面積 5,632 平方公里，相當於台北、桃園、宜蘭三個地區面積之總和。由東至西，一連串的火山於本島中央偏北處橫亙其中。最高（標高 3,142 公尺）也是近期最活躍的火山是阿公山（Gunung gung），最後一次爆發是在 1963 年。

巴里島緯度位於赤道以南 8 度，地屬熱帶氣候，一年只有兩個季節（五至十一月爲乾季，十二月至四月爲雨季），

全年平均溫度約爲攝氏 28 度。由於廣大的火山土壤以及有利的印度季風，致使本島擁有肥沃之土地以及多種農作物。南邊廣闊而略爲傾斜的地域是巴里島聞名於世的梯田米倉，靠近北岸主要的作物有咖啡、椰子乾、香料、蔬菜、牛畜與稻米。

巴里島在西元五、六世紀時還深受佛教之影響，巴里島王子 Airlangha 於 1011 年左右統一爪哇與巴里，此時印度教就產生了全面而深入的作用。此後之兩百年間，巴里與爪哇 Majapahit 王朝時而合併，時而獨立。1343 年爪哇名將 Gajah Mada 征服巴里島，派任爪哇貴族 Kapakisan 爲巴里島首長，在 Gelgel(位於 Klungkun 南方)建立其皇宮 Kapakisan 與其繼任者開始使用 Susuhunan(偉大的蘇丹)或 Dewa Agung(偉大的天神)之名號，名義上擁護 Majaphit 王朝，但獨立統治巴里，回教勢力進入蘇門答臘與爪哇，1515 年 Majaphit 王朝滅亡，大量的貴族、軍人、藝術家、工匠與僧侶大量逃避至巴里島，開啓巴里島的『黃金時代』，其統治力量及於東爪哇與巴里島東邊的 Lombok 島。十六世紀中葉到十七世紀，葡萄牙、西班牙、荷蘭與英國等歐洲國家積極到亞洲尋找貿易據點，與巴里 Dewa Agung 時有往來之紀錄。1639 年爪哇 Mataram 王朝入侵巴里，巴里新皇宮遷至 Klungkung，開始巴里島的『銀色時代』。其後在 Dewa Agung 的威權漸弱時，產生十二個小公國，其中存留到近代的有八個：位於中南部的 Gianyar、Badung、Bangli、Tabanan、Klungkung，北邊的 Buleleng(最重要的據點就是 Singaraja)，西邊的 Negara 和東部的 Karangasem (現在地圖上改名爲 Amlapura)Gianyar 此時爲重要的文化重心。十八世紀初期，荷蘭與英國開始在巴里島產生利益之爭。1841 年荷蘭船隻在 Kuta 觸礁，爲當地土著掠奪，荷蘭人由北邊

之 Buleleng 登陸與巴里部族會商未果，此時著名的民族英雄 Gusti Ktut Jelantik 領導族人與荷蘭對抗。直到 1849 年，Jelantik 部族全部犧牲，荷蘭取得巴里島北部，次年又掌握西部的 Negara。1894 年荷軍在 Lombo 島受襲，1904 年荷蘭船隻在 Sanur 觸礁又被土著所掠。1906 年荷軍登陸 Sanur 直闖 Denpasar，Badung 酋長與族人在荷軍之前自殺，這種國王戰死殺場的 Puputan 儀式接二連三發生，此時期所攝之照片真是另人觸目心驚。荷軍接著進攻 Tabanan 和 Klungkung，Dewa Agung 國王一樣在 Puputan 儀式中自殺。1908 年巴里王朝正式滅亡。荷蘭人統治巴里島期間最重要的措施是保護當地農夫不受外來民族的侵害，並維護當地文化原貌，同時也開始巴里島的觀光事。1917 年 Batur 火山爆發，1926 年再度爆發。1942 年日軍循著荷蘭人的老路線，由 Sanur 登錄，攻佔 Denpasar 並控 Singaraja。1945 年印尼宣布獨立，同年日軍撤出巴里島。1946 年荷軍擊敗巴里島之抗軍。1949 年在國際壓力下荷蘭同意印尼獨立，巴里島劃入印尼版圖。1956 年巴里島建爲印尼的一省。

巴里島的宗教融合了印度教、佛教、爪哇以及當地古老的信仰而成爲一個獨特的宗教。它和印度現在之印度教徒所遵行的傳統形式有很大的差異。十五世紀時，其鄰近的爪哇島因有伊斯蘭教（回教）的加入，許多朝臣、藝術家、音樂家與雕刻師傅流入巴里島，造成了一次文藝復興。
巴里島人基於宗教目的充份發揮他們的天賦。此處所見之美麗作品大都是依據 Ramayana 以及其他印度史詩所激發而成。遊客可以透過各種舞蹈與戲劇領會這些文化之精髓。另外奇特而耀眼的火葬儀式以及每日商店、的祭品是如此的精緻而引人注目，這也充分表露巴里島人與自然之間所維繫的融洽與智慧。

巴里島有三百萬人口，大部份的村落由多個家庭組成，組織龐大而關係緊密。巴里島近年爲歐亞人士喜愛之熱門觀光景點之一，惟這一、兩年之恐怖爆炸事件，讓人記憶猶深，多少影響其觀光產業，因地屬度假勝地，尤其開會地點離庫塔（KUTA）海灘不遠，因此其物價消費並不便宜，對於來自島國臺灣的管制員代表成員，35 度之溫度，熱的只想躲在室內。

二、 會議過程

(一) 本次會議協會出席代表計有副理事長顧大偉、常務理事長金新民、本組查核科科長薛少怡及國際事務聯絡人鄢夢凡加上本人共 5 位出席會議，本次會議係由理事長陳服平帶隊，遺憾的是因其於出發日突感身體不適，醫生囑其住院觀察，無法成行，於會上多國有人均熱誠表示關切。

本國代表合影：

(二) 由於所搭航班之故，本人與薛科長於 11 月 1 日先行搭乘長榮航空

公司班機抵達峇里島，下了飛機，先辦理落地簽證，辦落地簽及出關領行李費了些時間，所幸從機場至飯店約莫不過 5 分鐘車程，只不過我們在出關的時候遍尋不到主辦國之服務櫃檯，薛科長說陳理事長事有安排主辦國管制員前來接機，於是趕緊一一查看，有無寫著我們名字的紙牌，很快地找到了接機人員，由其帶領我們回飯店，其他人則陸續於次日抵達飯店與我們會合。

1. 11 月 3 日（0800-1700）係報到日。本國代表一行人於 1000 時左右抵達開會地點 Hotel Adhi Jaya，報到櫃檯非常地陽春，很符合印尼人慵懶溫和之個性，完全就是個度假勝地之模樣。晚上（1900-2100）爲歡迎酒會(Welcome Cocktail)酒會地點在 Hotel Adhi Jaya 中庭，會上嘉賓雲集，十分熱鬧，當晚亞太地區副理事長 Raymond Tse（香港人）致詞，揭開本（26）屆亞太年會之序幕，歡迎酒會向來只有果汁飲料及小點心，讓各國與會管制員先行暖身寒暄，很多人於寒暄過後大都會另行尋覓正餐或唱歌聊天，而峇里島是有名之度假勝地，可正是越夜越美麗。

會議報到處：

2. 11 月 4 日 0800-0830 讓遠到或因航班原故之與會者仍可辦理註

冊。0830 開幕式，先由穿著華麗之印尼舞者，跳著傳統印尼舞蹈爲大家祝福，接著是由印尼交通部部長 FREDDY NUMBERI 致詞，熱烈地歡迎所有嘉賓與會，並提到現今之天空是無縫隙之天空，需要由各個地區及國家共同合作以達到及完成這個安全理念，根據 CASR 研究指出管制員最理想之工作情況如下：

(1) 每週最多不超過 32 小時。

(2) 從事飛航管制活動每天最多不超過 6 小時。

(3) 一天最多工作 7 小時 30 分。

(4) 若需要，一組飛航管制組員含一名管制員，一名助理，一名督導，及一名資料處理人員。

而印尼亦有管制員短缺之困擾，目前印尼雖然有 1420 個飛航服務人員（包含 1126 個管制員及 294 個航詢員），雖然如此，印尼仍缺少約 400 名飛航服務人員，而人員素質之維持也是非常必要，因爲天空是很大但是卻無犯錯之空間。最後其亦預祝本次會議之成功。

緊接著爲印尼民航局局長 HERRY BAKTI 致詞，他提到本次會議主題爲「飛航管制工作表現」，就今日民航運輸迅速日增，在空中交通領域，助導航科技、空域整合及對空中運輸之高度需求發展是正確之一步，即是對專業管制員知識及能力之要求，才能保障有序、安全及有效率之飛行。印尼和大多數的國家一樣，仍然面對管制員短缺之問題，而這狀況，將直接影響飛航服務管制員之服務。機載裝備之性能複雜等亦使國際民航組織（ICAO）要求管制員無線電溝通英語須達到 LEVEL4 之等級，這使得印尼須讓其本島及本島以外之管制員及相關之人員經由不斷之訓練以達到此一標準。其除感謝印尼航管協會舉辦本次會議，並希望藉由本次會議，能激盪出更多之火花以提昇亞太地區之飛航服務，進而發展整合成一個服務網路。

再來是由亞太地區理事長 RAYMOND TSE 博士致詞，除了感謝各會員國之參與、感謝印尼主辦本次會議，並宣布本次會議之主題爲討論「飛航管制工作表現」。

貴賓致完詞後，由亞太地區理事長 RAYMOND TSE 博士擔任主席，依慣例先唱名，本次澳門、伊朗及印度並未派員出席。最令我國代表雀躍的是，主辦國對我們的友善，於桌排上寫的是「REPUBLIC OF CHINA」。讓我們覺得應多多參與類似之會議以提高本國之知名度，爭取國際友人於各項會議上之支持。

主辦國爲我國所準備寫有中華民國（REPUBLIC OF CHINA）之桌牌：

三、 會議議題如下：

(一) ENAV 公司簡介

ENAV 公司係一家義大利公司，其主要業務項目包括飛航服務（飛航管制、飛航諮詢及守視服務）、航空情報出版、航空氣象服務及雷達服務等。

該公司還支援空域設計、航機容量規劃、流量管理系統定義、航查服務及飛航流量管理人員訓練。該公司表示其很樂意將相關經驗與分享各國。

(二) EVPP 工作報告：

1. 請各國更新網站上之相關資料。
2. 報告 ICAO 原規定會員國至 2008 年 3 月 8 日止，駕駛員、管制員及相關之飛航服務人員無線電溝通英語須達到其所規範之第 4 級，惟施行成效不理想，可能延至 2011 年達成。目前 195 個會員國中，54 個國家已符合，96 個國家提出其替代方案，45 個國家尚未對 ICAO 提出其解決方案。
3. 由於各國管制員人力短缺，EVPP 請各國提出其人力現況資料，俾利統計及分析。

(三) 工作績效表現（PERFORMANCE）

此簡報內容，IFATCA 表示強烈支持公正文化（JUST CULTURE）並以此爲信念，公正文化使從事第一線工作者不因其疏失行爲而受處分，但對於故意違反規定等一些破壞行爲則無法忍受，案件之調查係要使人員避免犯同樣之錯誤，以致能從經驗及訓練中學習。並舉例說明爲何航空業更需要此種文化，ICAO 第 13 號附約有關案件調查之精神即在於防止類似案件之發生，因此須與處罰分開，因大部分的人都非故意真正要犯錯。處罰制度或政策並無法產生安全。

(四) 飛航管制工作績效表現（ATC PERFORMANCE）

牛津字典有關工作表現之定義爲：「戲劇裡之表演、執行一項任務、機器之性能」。ICAO 則將其定義設定爲組織將其企業合夥人爲了共同目標所須達成之結果。

工作表現來自於飛航管理，飛航管理又包括：飛航管制工作表現、人因表現、安全表現、航機性能表現及性能航行。

飛航管制之好與壞很難測量；至於人因表現則可由工作量測量。安全表現則可用可接受之安全水準來展現。飛機之性能則可由其可飛多遠，可節省多少燃油來展現。

(五) 持續向前的性能航行（PBN）

簡報首先介紹性能航行之發展：從 1980 年代之 FANS 到 1990 年代之 RNP 進而至 2006 年開始發展 PBN 之整合世界性 RNAV 與 RNP 之概念。PBN 將使空域更有性能概念。

(六) 績效導入（Introduction to Performance (2009-2023)PBN）

管制員尤其需要了解飛航管制表現，甚至安全亦是一種表現。要擅用表現之技巧，慎選測量之方式，亦可使用多種測量方式，以使測量結果較正確。

四、 各會員國會務狀況報告

(一) 印尼報告其管制員工作環境、雷達及無線電均非很理想，工作量大，作業手冊及協議書不足，工作及報酬不成比例。

(二) 尼泊爾報告其飛航情報區內儀器飛航及目視飛航航情複雜，單一跑道、複雜之天氣況態及地形，停機位不足等等，另報告其已與印度簽訂協議書，能有效地解決飛航服務問題。

(三) 紐西蘭報告其與航空公司間已完成新的雇用協議，增加所有管制員之報酬及年度休假，並已招募及培訓新的管制員。

(四) 本國報告南北航管園區之概況。

(五) 馬來西亞報告其飛航服務狀況並將提升其飛航管制設備。

韓國代表發言：

五、 主席詢問 2011 年亞太年會有哪個會員國有興趣主辦，新加坡增取獲選；接著本國於會上播放於行前向觀光局索取之「臺北城市之美」宣導影片，歡迎各會員國於 2010 年至臺北，大家相約明年在臺北再見面。主席最後宣布會議圓滿成功。大家於會後依依不捨拍照留念。相較於新加坡之宣導影片，個人覺得還有改善之空間，雖然海角七號電影在前 2 年是很夯，但比照其敘述手法，要對外國人宣傳可能應再作更多元化多面貌之呈現，且美中不足的是我們只拿到國語與日文版，若能有英文版則更完善，否則個人認爲臺北比新加坡更有許多值得宣傳之處，如美食、文化、景點及泡湯等。

本國代表與印尼新坡香港代表合影：

肆、 心得與建議

一、 印尼交通部長及其局長均提到其管制員人力不足，各國航管人力不足已是普遍現象，應是飛航管制係一高壓力之工作，且要日夜顛倒輪班，無法固定休星期假日，且其訓練及養成費時，而原本預期在全球金融風暴的影響下，航空業業績下滑，應能稍微紓緩全球管制員人力不足的問題，但卻在最近的調查中發現問題並沒有改善，甚至更糟。在最新調查中，歐洲各國管制人力約有 9%的不足，美洲區 8 國約有 22%的不足，而亞太區及非洲區(此兩區僅有少數國家提供資訊)各有約 15%及 25%的不足。

人力不足最直接之影響就是值班時數偏高，進而造成管制員疲勞等之負面結果。雖然有研究報告建議管制員之值班時數及輪值休息時間，但各國仍可依其需求而有彈性調整。本區即將面臨 99 年至 100 年新一代航管自動化性統轉移，臺北區域管制中心將搬遷至桃園觀音北部航管園區，因該園區地處通不便，臺北區域管制中心之管制員對於通車費時，多所疑慮，飛航服務總臺已在調查如何提供接駁車供人員抵達上班地點，其實桃園機場捷運已開始興建，屆時應可所短通車時間，建議飛航服務總臺對其管制員多加宣導，並制定一套合理有效之值班制度，以安撫及解除航管人員新中之疑慮。

二、 會議一開始即安排私人公司 ENAV 做宣傳，本國代表覺得並不十分妥適要記取經驗避免本區在辦理下屆亞太年會時發生同樣錯誤。

三、 會中宣導議題之一，公平文化政策（Just culture policy ），並未如於年會時引起各國討論，或許因是地區性會議之故，亞太地區之民族性，相較於歐美確是有許多不同，而本區與飛航有關之相關單位，不論是政府或民間，大家也越來越有相同的體認，航空公司飛安管理部門及本局所屬飛航服務總臺，也都努力朝此方向邁進。

四、 外交部刻正積極推動加入國際民航組織之工作，本局每年均派員參加國

際飛航管制員協會聯盟所舉辦之年會，從參與會議中，確實可獲知最新國際航管趨勢之資訊，並可加強與國際民航界之交流，有助於未來國際航管業務之協調與合作。但參與國際會議並不容易，除了專業素養外亦需有優異之語文能力，更需於事前充分準備，方能有效掌握會議內容並參與討論，此次看到鄰國之日本及韓國，參與會議大多非常年輕，且與文能力都不錯，反觀本區之年輕管制員，似乎並無多大之熱誠，鑑於國際事務人才之培植不易，其養成需要時間及經驗之累積，建議政府能編列固定預算，積極培養對國際事務有興趣且專業之人才（惟目前政府財政困難，每年出國經費一再被刪減，實是培養人才之一大阻礙）。

五、 我國曾於1997年由協會在臺北舉辦之IFATCA的第36屆世界年會及2006年在高雄第45屆世界年會，與會會員國高達80餘國，超過千人參加，會議之辦理均極爲成功，深受與會各國代表之肯定及好評，故在聯盟略負盛名。我國將主辦2010年亞太地區年會，對提昇我國國際能見度有正面意義。爲了延續我們與世界國際航空專業組織既有的良好關係，擴大參與國際航空專業會議，2010年在臺北舉辦之亞太地區年會相關之籌備工作，中華民國管制員協會已組成籌委會，而本次參加此一會議，亦特別抱著觀摩學習之心態，來了解會議議程安排、交通住宿、旅遊行程、後勤支援等，於必要時，本局航管組可鼎力相助。另經由這次會議，本人對於明年將舉辦之地區性年會深具信心，因爲世界年會都辦過兩次了，地區性年會則應無多大問題。

六、 由於主辦國並未於會場外，準備有讓下一屆主辦之國家之宣傳位置，所以本國代表只得利用中間休息時間，將帶去的宣傳品，利用自我介紹之方式，發送給其他國家，明年我國主辦時，建議可爲來年之承辦國設置宣傳桌位。

本國代表分送文宣品

伍、 附件

一、 ENAV 公司簡介（Exhibition Presentation）

二、 工作績效表現（Performance）

三、 飛航管制工作績效表現（ATC Performance）

四、 持續向前的性能航行 GOING FORWARD WITH PERFORMANCE BASED NAVIGATION (PBN)

五、 績效導入 Introduction to Performance (2009-2023)

ENAV

附件一

ENAV is Italian company for air navigation services which controlled airspace, movement and hour of flight, investment in technology innovation and R&D. This company managed 2 million flight/year, 39 airports, 4 ACC, and has 3.345 employees. Core Business : planning, management, provision of Air Navigation Service. ENAV also participated in Europen R&D programmed and SESAR is one of the new generation ATM system. SESAR program timing start from 2004 to 2020, which divide in 3 stage, there are definition (2004-2008), development structure (2008-2015) , deployment (2011-2020).

The Basicly program of ENAV is to share the experiences with the partners in terms of air traffic management, methodology, and with regard to the latest innovations that are being implemented in Europe. For example, we can be able to exchange the manager, pilot, etc in Europe to asia pacific region.

Questions :

1. What is the project of ENAV to provide safety management, are there any components to improve the safety in ENAV?
2. How the experiences of (ENAV) in Europe can aplicate in Asia Pacific?
3. The airlines in Indonesia growth rapidly, how to reduce the stress of economic and how to apply the management in Indonesia?

Answered :

1. SELEX provide new tools to enhance the Air Traffic Management (ATM) for Europe area. The invention of this tools can improve the safety. ENAV has technicians which always works together.
2. It depends on the legislation of each country. We must involve the other part such as : industries, airline companies, etc. In Europe, all of the airlines system work together. The leaders, and politicals must sit together to discuss the concept of integration system.
3. Indonesia has a very large airspace, so we must study all of the airspace and get details to ensure the controllers. It’s not enough only repair the infrastructure or sell the equipments, we also have to improve the knowledge.

International Federation ATC Association
26 IFATCA Asia Pacific Regional Meeting

ENAV presentation

BALI, 3-5 November 2009

ENAV S.p.A.
ITALIAN COMPANY FOR AIR NAVIGATION SERVICES

ENAV

ENAV S.p.A. is one of the major European ANSPs, in terms of volume of controlled airspace, movements and hours of flight, investments in technology innovation and R&D.

ENAV S.p.A. is a **joint-stock company** totally controlled by the Ministry of Economics and Finance and under the vigilance of the Ministry of Transport.

ENAV's numbers

- **2 million flights** managed each year
- **39** airports
- **4 Area Control Centres** (ACC)
- **752.832** Km2 of Airspace
- **30 million** ground/air/ground contacts/year
- **3.345 employees** - June 2008
- **315.000 hours** of **training** imparted in 2008
- **1.150 million €** invested in the 2005-2008 quadrennial

ENAV mission

- ENAV core business is the planning, management and provision of Air Navigation Services (ANS) including:
  - Air Traffic Services (ATS), including Air Traffic Control Service (ATC), Flight Information Service (FIS) and Alerting Service (ALRS);
  - Aeronautical Information Service and related publications (AIS);
  - Meteorological Services for Air Navigation (MET);
  - Communication, Navigation, Surveillance Services (CNS);

ENAV services

- ENAV supporting services:
  - Air Space Management Air space design and air traffic capacity planning;
  - Flight procedures design and obstacles analysis;
  - ATM system definition, acquisition, operation and maintenance of operational infrastructures;
  - Flight inspection services of radio navaids, broadcasting and surveillance systems for Air Traffic Services;
  - Training of ATM personnel.

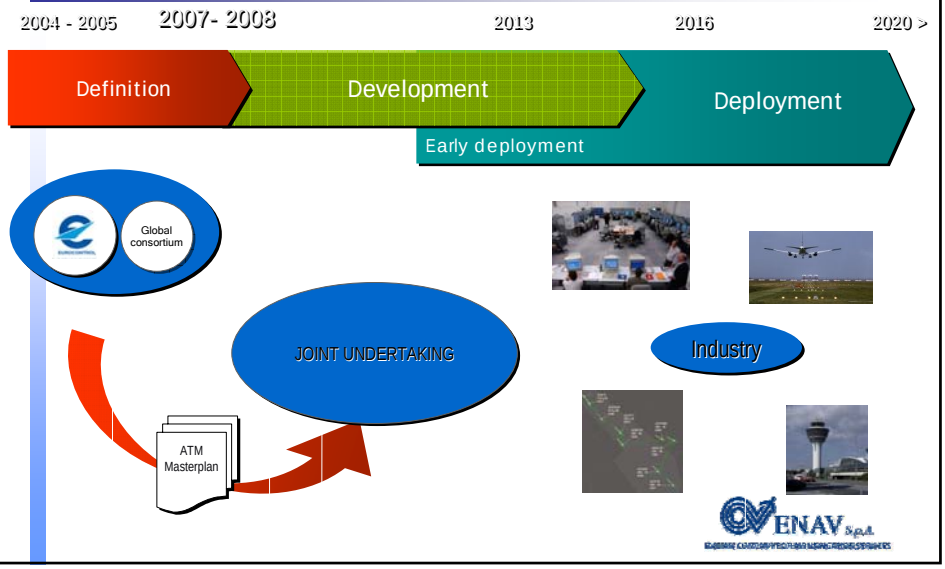
ENAV and the international ATM scenario

- ENAV S.p.A. participates, manages, coordinates and actively contributes to several **international projects** and **large scale research, development and validation activities** in cooperation with **major ATM players** among which EUROCONTROL, SESAR JU, CANSO and ICAO.
- ENAV experts are actively involved in the most important committees, working groups, expert panels dealing with CNS/ATM matters with special regard to ADS, ASAS, A-SMGCS, Satellite Navigation (EGNOS and Galileo), FDPS and SDPS.
- R&D projects and activities are aimed to CNS/ATM systems pre-operational implementation and to technical co-operation with international organisations and foreign countries for improving the service level provided.

ENAV and SESAR

- ENAV participates also in the major European R&D programme aimed at the development of the new generation European ATM system:
  - SESAR Single European Sky Air Traffic Management Research
- SESAR objectives:
  - ✓ Create paradigm shift
  - ✓ State-of-the-art innovative technology
  - ✓ Eliminating the fragmented approach to European ATM
  - ✓ Syncronising all stakeholders and federating resources

SESAR Programme timing



ENAV commitment

- ENAV would like to share its experiences with the partners in this region in terms of air traffic management and air traffic methodology and with regard to the latest innovations that are being implemented in Europe.

Performance

附件二

- Performance is a Brief case to study.
- Aviation need culture
- Global aviation has been learned → many improvement procedure.
- The major element is TCAS.
- Just Culture Hold : The ATC and Flight Crew were acting Commensuretly with their experience and training
- Just culture: prevent accident, must be independent from criminal responsibility issues
- Human errors is a factor can cause un safety or incident so we must learn from event.
- B&47 followes ATC instruction. Standar practice is to follow the TCAS regulation Air to ATC instruction.

Questions :

1. How to reduce the incident of air traffic?
2. How is the judicial level of just culture?
3. Particular incident, can be caused by the controllers, if the controllers should be excused, How can decide the controllers are given excuse or not?
4. How to prevent and minimize human errors?

Answere :

1. Don't look to "why it can be happened", do the investigation, clarification, watch out, and improve the safety system,
2. It's a big society problem to overcome. So, we should recognize the case,then do the investigation.
3. This case is small element of a very complex event, but if it is happened, first we should investigate the incident.
4. It's a big challenge for us, we must continue just culture, inform just culture to the society, and all the system should be with regulators (just culture concept).

26th IFATCA Asia/Pacific Regional Meeting
Bali, Indonesia

Performance –

What Does It Mean To You ?

Presented by John Wagstaff
IFATCA Asia Pacific Representative

26th IFATCA Asia/Pacific Regional Meeting

Oxford English Dictionary

Performance

- *To act in a play or production.*
- *The execution of a duty.*
- *An assessment of a task.*
- *The capabilities of a machine.*

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ICAO

ICAO is changing its whole philosophy – from an organisation that set the 'rules' to an industry partner that identifies the objectives and sets the desired or required results

ICAO Doc 9883
Manual on Global Performance of the Air Navigation System

'ATM is performance orientated'

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Skybrary

Performance

658 entries on 'performance' topics,

including:

- *ATC performance*
- *Human performance*
- *Safety performance*
- *Performance framework*
- *Aircraft performance*
- *Performance based navigation*

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ATC Performance

- *What metric ?*
- *What comparison ?*
- *What ATC service ?*

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Airport Movements

European Airport (1 runway)	**895** flights busiest day August 2008
European Airport (2 Runways)	**1,352** flights busiest day July 2008
American Airport (5 Runways)	**2,749** flights busiest day Jan 2008
Asian Airport (2 Runways)	**971** flights busiest day April 2008

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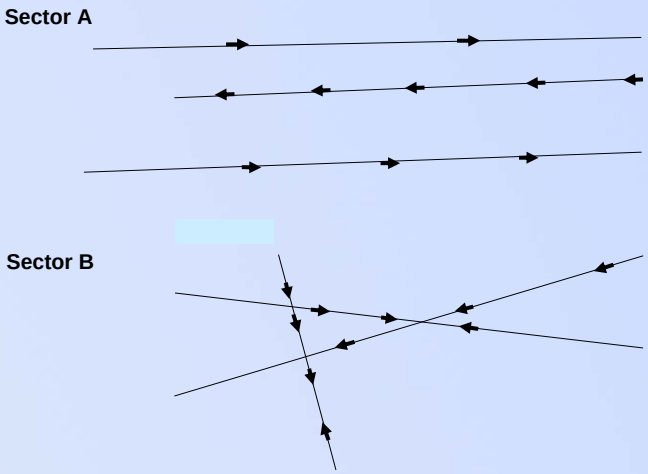
Traffic Density



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Workload

European airspace	100% radar coverage
North American airspace	100% radar coverage
Asian airspace	40% radar coverage
African airspace	10% radar coverage

A radar controller can handle more traffic, but a procedural controller will have a greater workload handling fewer aircraft.

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Human Performance

- *What metric ?*
- *Workload*
- *Skills*
- *Threat and Error Management /*
  Normal Operations Safety Survey

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Workload

EUROCONTROL

Workload is the demand placed on an operator's mental resources for perception, decision making and action.

The ratio of resources required by a task to the amount of resources available.

ICAO Doc 9426

Air Traffic Services Planning Manual

The average workload at CAPACITY must be less than 80% and workloads of 90% must not be exceeded more than 2.5% of the time.

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EUROCONTROL

A task can produce different workloads for the same operator at different times depending on their state when the task is to be performed.

The same task can produce different workloads for different operators at the same time depending on their respective abilities and states.

Therefore workload is an individual experience and workload measurement methods must take into account human viability.

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Skills

Tower

Approach

Area

Procedural

Radar (Surveillance)

Instructor

Supervisor

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Threat and Error Management

Threat and Error Management is an overall safety concept about aviation operations and human performance to improve the margins of safety in aviation operations through the practical integration of Human Factors knowledge.

It was developed from the original Crew Resources Management (CRM) concept for flight crew.

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Threat and Error Management in aviation has been developed into Normal Operations Safety Studies (NOSS) for ATC.

ICAO Doc 9910 Manual on Normal Operations Safety Studies
*NOSS consists of a series of observations of ATC operations over a period of time, and the subsequent analysis of the data. The results are an overview of the most pertinent threats, errors, and undesired states that air traffic controllers must manage on a **daily basis**.*

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NOSS is conducted by a controller observing the actions of other controllers whilst they are working. Unlike an exam or check there is no 'pass' or 'fail', instead a record of actions and a note of any non-standard event or error is made.

The findings are then analysed by specialised human factors and safety experts.

Their report details problems and issues that are safety relevant, but does not offer solutions.

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Money

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Every two years CANSO produces the ATCO Remuneration Report giving data, analysis and conclusions. The report for 2008/09 has just been published and compares the gross pay, net pay, composition of pay and working conditions (including working hours and leave allowances) with an average wage for a sample of locations to give a 'relative wealth' factor.

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IFATCA Technical and Professional Manual

WC 1.8 Performance Indicators

Performance indicators as published and used by Air Navigation Service Providers must not be linked in any way to the pay and/or working conditions of individual Air Traffic Control Officers

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Safety Performance

- *Safety Performance Indicators*
- *Safety Performance Targets*
- *Safety Management System*

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Safety Performance Indicators

100%	Absolute Safety
99.9%	Accidents do happen
?	Risk – Acceptable Level of Safety

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Safety Performance

Target Level of Safety

A numerical expressions used to define levels of safety.

The ICAO Asia Pacific Office has established a Target Level of Safety for RVSM airspace of 5 x 10^{-9} fatal accidents per flight hour.

This figure allows for a Technical Risk of 2.5 x 10^{-9} and an Operational Risk of 2.5 x 10^{-9}.

99.999999995%

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Safety Management System (SMS)

ICAO Doc 9859 - Safety Management Manual

An organised approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures.

The objective of a Safety Management System is to provide a structured management approach to control safety risks in operations.

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Safety Management System

ICAO Doc 4444 PANS – ATM

The appropriate ATS authority shall implement safety management systems for the air traffic services under its jurisdiction

A Safety Management System is a tool for the management of safety by an organisation and cannot operate in isolation – there must also be an effective State Safety Programme in place. This requires the highest levels of management to be involved in establishing a structured safety plan.

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Performance Framework

ICAO has adopted a Performance Based Approach to planning and has identified a number of Key Performance Areas as the basis for the Global Air Navigation Plan and Global ATM Operational Concept.

This will require the regions to develop a Performance Framework with regional performance objectives with measurable outcomes and metrics.

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ASP Regional Performance-based Objectives include:

- *Airspace monitoring to achieve Target Level of Safety*
- *Opitmise En-route and Terminal airspace route structure*
- *Implementation of ADS-B*
- *Implementation of PBN-based procedures*
- *Enhance safety and efficiency of aerodrome operations*

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To assess the level of performance in implementing the objectives, a number of metrics were adopted:

- *Achieving the Target Level of Safety for RVSM operations*
- *Provision of instrument approach procedures with vertical guidance*
- *Implementation of PBN en-route and terminal procedures in accordance with Regional PBN Plan*
- *Average delay for departures at major international airports during the busiest hour*

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Aircraft Performance

9 February 1969

2 March 1969

International Federation of Air Traffic Controllers' Associations

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Aircraft Performance

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Aircraft Performance

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Operating costs

Environmental costs

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Performance Based Navigation

Traditionally the means of indicating navigation capability was to mandate the carriage of certain equipment, e.g. ILS, VOR/DME.

With the implementation of FANS this method limited the optimum utilisation of new navigation systems and procedures, e.g. RNP and RNAV.

In April 2007 ICAO issued guidance material on Performance Based Navigation to harmonise RNP and RNAV procedures worldwide.

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Asia Pacific Region PBN Plan

	2008 → 2012		2013 → 2016	
Type of Airspace	**Preferred Nav. Spec**	**Acceptable Nav. Spec**	**Preferred Nav. Spec**	**Acceptable Nav. Spec**
Oceanic	**RNP 4**	**RNAV 10**	**RNP 2** **RNP 4**	**RNAV 10**
Remote Continental	**RNP 4**	**RNAV 10**	**RNP 2**	**RNAV 2** **RNP 4**
En-route Continental	**RNAV 2** **RNAV 5**	**RNAV 2** **RNAV 5**	**RNAV 1** **RNP 1**	**RNAV 2** **RNAV 5**
TMA Arrival	**RNAV 1**		**RNAV 1** **RNP 1**	
TMA Dep	**RNAV 1**		**RNAV 1** **RNP 1**	
Approach	**RNP APCH**		**RNP APCH** **APV, GNSS**	

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2009 Industry Declaration in Support of Performance Based Navigation

Commitment from the following stakeholders :

ICAO	**IBAC**
IFATCA	**IBACC**
IFALPA	**ACI**
IATA	**FHA**
CANSO	**FSF**

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Oxford English Dictionary

Performance

To act in a play or production.

The execution of a duty.

An assessment of a task.

The capabilities of a machine.

26th IFATCA Asia/Pacific Regional Meeting

IFATCA Professional Manual

- *Global metrics for the performance of the Air Traffic Management System be developed through ICAO processes as soon as possible.*
- *Controller expertise must be used in the establishment and settings of metrics that measure the performance of the Air Traffic Management System*
- *Controller expertise must be used in establishing and reviewing models used for determining performance of the Air Traffic Management System to ensure that the models accurately reflect how the ATM system functions.*

26th IFATCA Asia/Pacific Regional Meeting

IFATCA Professional Manual

- *Controller expertise must be used in the interpretation of data used to assess the performance of the Air Traffic Management System to ensure that data is not misleading because it is incomplete or incorrectly applied.*
- *The measurement of performance of the Air Traffic Management System shall reflect the impact of any external-to-ATM constraints, including external environmental constraints.*
- *IFATCA urges MAs to be involved in the creation of and application of an ATM Performance Measurement System.*

26th IFATCA Asia/Pacific Regional Meeting

Oxford English Dictionary

Performance

- ***To act in a play or production.***
- *The execution of a duty.*
- *An assessment of a task.*
- *The capabilities of a machine.*

26th IFATCA Asia/Pacific Regional Meeting

These are very good actors and every year they perform a really slick performance . . . .

International Federation of Air Traffic Controllers' Associations

ATC Performance

附件三

The definition of “Performance” from the oxford English dictionary are :

-To act in a play,

- The execution of a duty,

- Tthe capabilities of a mechine.

ICAO changing its whole philosophy from an oragnisation that set the rule to an industry partner that identifies the objectives and sets the desired of required results.

The Performance oriented is ATM. ATM can affect in our future.The ATM including :

- ATC performance
- Human performance
- Safety performance
- Aircraft performance
- Perform based navigation

Metrics ATC

The Metric of ATC can be used to find the right or the wrong, good or bad one. These metrics are airport movement, how many delays of flight are occurred in airport, traffic density, and workload. It’s Very difficult to determine the metric of ATC performance.

In human Performance, the metrics are Workload (Eurocontrol, Air traffic Services Planning Manual), skill, treat and error management.

Threat and Error Management

Threat and error management is the overall safety concept about aviations operations and human performance to improve the margin of safety in aviation operations through the practical integration of human factors knowledge. The concept was developed from original crew resources management for flight crew. Threat and error management has been developed into Normal Operation Safety Studies (NOSS) to ATC. . It consists of a series of observations of ATC operations over a period of time and subsequent analysis of data.

Money

Money (Salary) is the indication how your profesion are respected and which society you come from. Money is not included in metric of ATC but very important in human performance.

Performance Indicators → must not be linked in any way to the pay and/or working conditions (salary)

Safety performance:

Indicators→ Acceptable level of safety

Targets→ target levels of safety: minimize the traffic accidents. Target level of safety : 99.999999995%

Management system→ objective: to provide a structured management approach to control safety risks in operations.

Performance framework: requires the region to develop a performance framework with regional performance objectives measureable outcomes and metrics.

Some metrics adopted to asses the level of performance in implementing the objectives:

-achieving the target level safety

-provision of instrument

-implementation of PBN en-route and terminal procedures

-average delay for departures at major int airport during the busiest hours

Aircraft performance: how far an airplane can fly

Operating costs→ efficiency

Environmental costs → efficiency

Performance based navigation: traditionally the means of indicating the navigation capability was to mandate the carriage of certain equipment.

Questions : -

Answered : -

附件四

GOING FORWARD

WITH PERFORMANCE BASED NAVIGATION (PBN)

- PBN : global set of area navigation standar. It's based on performance requirements for aircraft navigating on departure, arrival, approach, en-route.
- PBN → RNAV and RNP
- RNAV does not include requirement for on-board performance monitoring and alerting.
- RNP includes requirement for on-board performance monitoring and alerting.
- Commitment from Stekeholders :
  - ✓ To support the timetable
  - ✓ To collectively work to facilitate the implementation of PBN
  - ✓ To assist state, region and other stakeholders
- The environmental Impact of RNAV SIDS :
  - ✓ Significant reduction in aircraft track dispersion, noise level caused by reduced ground track and by allowing aircraft to wxpedite climbs.
- RNP has saved flight dispersion to the next closest airport
- One of the most dangerous airports in the world is Tegucigalpa
- Continuos Descent Operations : less fuel, noise, gas emissions, saves environment
- But, it needs many times requires extra spacing on sequencing and to reduce capacity at airport
- CDO is not yet an ICAO procedure
- IATA Fully support PBN and CDO and recommend it by procedure design strongly.

Questions : -

Answere : -

Introduction to Performance (2009-2023)

附件五

Presented by: DR. Raymond Tse

The controllers need to understand about performance, especially ATM performance.
Basic understanding of ATM performance is likely to be part of controller training in the future. This mean there will be a need for controller experts in performance to help in a correct understanding and application of performance to ATM.
ATM performance:

- Affect the way the controllers do their job
- Influence the assessment of the controllers's work
- Determine what ATM changes are made
- Communicate to non-controller decision-maker, such as lawyers and accountants, and it'll be necessary to explain to them in terms they understand
- Even safety is one aspect of performance

Performance: particular way of managing something or someone.
Performance requires some way to measure some aspect of the system → selecting appropriate measurements is a difficult task.
The simples definition of managing any system or part of a system using performance is that decisions are made using numbers. The number represents the measurement of some aspect of the system.

Performance is like fire, it can be wisely used, it can be used with little value or harm, or it can badly applied.
Skills of using the performance wisely:

- Selecting the right metric or measure. The example is measuring sector workload by the number of aircraft per unit of time, but this is not a good metric
- Mathematical constructs used to represent a system. Models can be simple or very complex → used by the ICAO Separation and Airspace Safety Panel to determine collision risk when developing new separation standards. The purpose of modeling is to

input certain values and determine an output (a metric) that'll aid decision making. Unfortunately, most models have assumptions built into them.

- Use of multiple metrics, because using a single metric to view a system can often be misleading, meaning that measuring only one gives a false view of the whole system.

Metrics can be seductive in some people and appear to be accurate, impartial, and reliable → performance-driven, because they want the number to drive behavior.
Others take more cautious approach to metrics, recognizing them as a valuable tool but realizing that they are a guide → performance based (not driven)
ICAO Global ATM Operational Concept → use performance-orientated ATM system

Speed Limit → decided by law, interpretation is not permitted, exceeding the limits has consequences.
There are defined separations minima and that infringing those has significant consequences → there are now recording devices that generate reports when separation standards are infringed → attempts to improve one metric can have consequences on other metrics.

Definiton

The definition would only be something like "an ATM system that's performance-based" because "performance-based" is a descriptor or qualifier of something else.
Despite many attempts at defining it, it can still be perceived in different ways → there are many "shades" and "styles" of performance-based ATM.

Scope

Performance based can apply to many activities, not just ATM, and can be applied in many ways.
ATM system can be any ATM system, even an old one or a basic one → performance based is not just "advanced" systems.

Principles

- **Metrics**

  Performance is based around measurement → objective (not subjective) → fact (not opinion) → metrics will represent the performance
- **Functions**

  A companion concept is the concept of functionality rather than specifics → functionality requirement (not equipment required)
- **Systems**

  ATM cannot be simply considered as independent functions, as one function affect other functions. It is actually a built up systems, so it is a system of systems. All inclusive ATM system does not exist in isolation but is itself part of a larger system, so ATM must comply with external legislation)

Application Areas

- **Input (requirement)**

  In order to design a system, it is necessary to know how well each component performs → this could be called an input to performance management of ATM.
- **Output (delivered)**

  In order to know how well a system is functioning → measure the performance delivered → performance outcome/ output → often used to see if change is needed or if a previous change was successful
- **Incentives**

  To use metrics to provide incentives (rewards) for desired behavior and disincentives for unwanted behavior

Performance Requirements

- **Previously**

  ATM systems were designed on the basis of carry this type of equipment (or specific equipment)

- **Now and Future**

Changing to the functional approach to performance requirements. Performance measures → not dependent on a particular type of equipment but rather the functional performance of that equipment

"Capability Levels"→ way of expressing system within system.

The overall ATM system can be broken down into separate individuals functions → rarely applied in isolation, and so a set of functions can be grouped together to form a 'system within system'.

Performance Based Navigation (PBN)

PBN is about certification of a particular level of navigation performance in order that the ATM system can be designed around that performance.

Interesting issue → navigation specifications are being developed depending on whether there is self-contained monitoring or not, however the observed performance (from radar) seems to be very accurate for modern airline aircraft performance in all environments → interesting to see if radar data supports the multiple navigation specifications being developed for PBN.

PBN is an example of the definitions of a performance requirement (input) based on functionality not specific equipment.

Performance Change

Performance based approach:

- Measure the current state of the system
- Make a change, which are expected to make an improvement
- Measure to see if the change was beneficial and did what was expected

The process is repeated over and over again → continuous improvement

ICAO Manual (PBA)

Based on:

- Strong focus on desired/required results
- Informed decision making
- Reliance on facts and data for decision making

ICAO Performance Management

- Define/review scope, context, and general ambitions/expectation
- Identify opportunities, Issues and set objectives
- Quantify objectives
- Select solution to exploit opportunities and resolve issues
- Impelement solutions
- Assess achievement of objectives

Performance Incentives

It is potentially apply to anyone in ATM → not reasonable to use this for operational positions

The Future

The future is already here and change has already started

ICAO has already moved towards Performance based ATM. Its plaing and implementation is based on performance plans

Much in ATM used to be done using "professional judgement" → now many decisions are being based on analysis of ATM performance → individual and collective performance will be analysed.

It was remarkable the way that data from radar, geographical data, aircraft data, etc had been integrated into one analysis.

More real time awareness of traffic levels, controller workload, etc → In future there may be separations standards that can only be used a certain number of times.

ICAO Manual on Global Performance of the Air Navigation System

It is used when considering any changes to the ATM system.

Role → foundation document addressing the basic performance management terminology and techniques that are the "common denominator" between all performance planning/management applications.

Context → the best results are expected to be achieved if all ATM community members cooperate in a performance based manner. For this reason, ICAO supports and encourages the global adoption of performance management techniques.

Audience → wide audience ranging from ICAO panel, PIRGs and state aviation regulators to operators and service providers. The aim: address all levels of personnel in these organizations from senior management to front-line workers.

Principles → Strong focus on desired/required results, informed decision making, and reliance on facts and data for decision making.

Advantages → result oriented; policy making become much more transparent; gives more freedom and flexibility in selecting suitable solutions; exclusive bottom-up approaches are easier to avoid; use quantitative and qualitative methods; helps the decision makers to set the right priorities; organizations will be more successful in reaching goals; worth the investment (cost saving/ cost avoidance).

General Performance Management Process

1. **Scope**
    - Define scope

      Important to avoid misunderstanding. It can also defines the limits of responsibility and accountability
    - Define context

      Includes clarifying what the strategic fit is within a larger performance management activities, with whom there is a need to coordinate and collaborate, and what the external drivers and constraints are for the scope
    - Identify ambitions and expectations

Develop a strategic view on the results that are expected.

Expectation → external perspective

Ambition → internal initiative

2. **Set Objectives**

To develop a more detailed understanding of the performance behavior of the system and to decide which specific performance aspects are essential for meeting the general expectations.

- Develop a list of present and future opportunities and issues by using SWOT analysis
- Focus efforts by defining and prioritizing performance objectives → necessary to translate general expectation into specific performance objectives → deciding on improvement actions. It is a 2 stage process: a) in each Key Performance Area, identify a number of more specific area; and b) within focus areas, define one or more performance objectives.

3. **Quantify Objects**

- Define how progress in achieving performance objectives will be measured
- Define the desired speed of progress in term of baseline and target performance

4. **Select Solutions**

To exploit opportunities and resolve issues.

Purpose → to apply the principle of "informed decision making, driven by the desired/required results

- Select the decisive factors to reach the target performance
- Identify solutions to exploit opportunities and mitigate effects of the selected drivers and blocking factors
- Select a sufficient set of solutions → part of the process where decisions are made on which solution to implement

5. **Implement Solutions**

   This step is the execution phase of the performance management process → where the changes and improvements which were decided during the previous step are worked out into detailed plans, actually implemented, and start delivering benefits.

6. **Assess Achievement**

   Purpose → to continuously keep track of performance, and monitor whether performance gaps are being closed as planned and expected.

   Output → an updated list of the performance gaps and their causes.

After all of the six steps, the process is then repeated. The periodicity of the process greatly depends on where in the Air Navigation System and lifecycle it is applied. Depending on the nature of the project/activity, it could be:

- Ensuring performance of concepts and systems
- Applications of regulatory method to organization, people, and systems
- Annual performance review
- Proactive, collaborative performance planning

Question:

1. We know that every county has different air traffics, and the ATC performance is based on individuals. The question is, why use flight simulator as one of the means of performance indicators?
2. Can we implement the system in Asia? How to prepare the implementation?

Answer:

1. Although the air traffic of every country is different, the use of flight simulator still can improve the ATC performance. Because this tools can be used as a training means, meaning that it will improve the capability of individuals, and it will affect the ATC performance.

   The most important thing about the flight simulator is that the individuals can adapt with the simulator environment, which is nearly the same with the real environment. So, this method is acceptable as one of means of performance indicators.
2. We can implement the system applied in Europe to Asia. However, there must be an adaption of the system, because the situation in Europe is different with the situation in Asia.

   To prepare the implementation of this system, we must do the implementation step by step, according to the general performance management process:

   - **Scope** → Define scope; Define context; Identify ambitions and expectations
   - **Set Objectives**
   - **Quantify Objects** → Define how progress in achieving performance objectives will be measured; Define the desired speed of progress in term of baseline and target performance
   - **Select Solutions** →to exploit opportunities and resolve issues
   - **Implement Solutions** → the execution phase of the performance management process
   - **Assess Achievement**

   After all of the six steps, the process is then repeated.

ICAO Manual on Global Performance
of the Air Navigation System
(ICAO Doc 9883)

IFATCA Executive Board

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ICAO Manual on Global Performance of the Air Navigation System (ICAO Doc 9883)

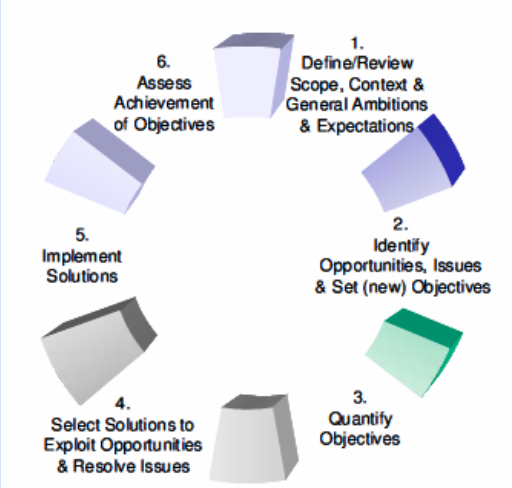

Figure 2 General Performance Management Process

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Role of Manual

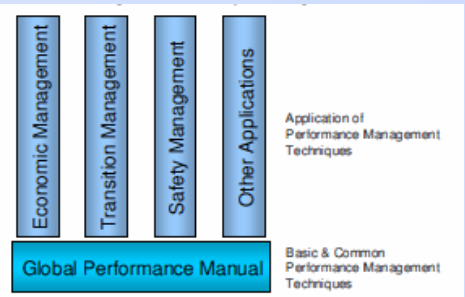

Figure 1 Role of the Global Performance Manual

Context

The best results are expected to be achieved if all ATM community members cooperate in a performance based manner.

For this reason, ICAO supports and encourages the global adoption of performance management techniques.

Audience

- This manual targets a wide audience ranging from ICAO Panels, PIRGs and State aviation regulators to operators and service providers.
- It also aims to address all levels of personnel in these organizations from senior management to front-line workers.
- This manual is aimed at those personnel who are responsible for designing, implementing and managing effective performance management activities.
- Users should find sufficient information herein for the justification, initiation and operation of a viable performance management process in their organisation.

ifatca International Federation of Air Traffic Controllers' Associations

Principles

- Strong focus on desired/required results
- Informed decision making, driven by the desired/required results
- Reliance on facts and data for decision making

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Advantages (1)

- It is result oriented, allows customer focus and promotes accountability;
- Policy making becomes much more transparent when the goals to be reached are publicly stated in terms of performance outcome rather than solutions;
- The shift from prescribing solutions to specifying desired/required performance also gives more freedom and flexibility in selecting suitable solutions.
- Exclusive bottom-up approaches ("technology driven approach" and "solutions searching for a problem to solve") are easier to avoid;

Advantages (2)

- Reliance on anecdotal evidence can be replaced by a more rigorous scientific approach employing quantitative and qualitative methods;
- The focus on desired/required results helps decision makers to set the right priorities, make the most appropriate trade-offs, choose the right solutions and perform optimum resource allocation;

1. Scope

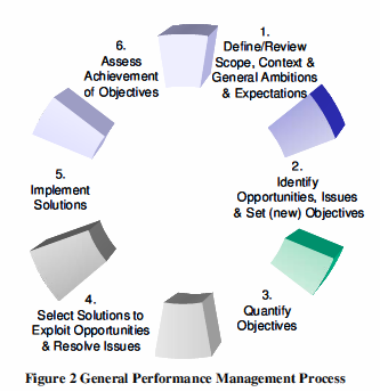

Figure 2 General Performance Management Process

- Step 1.1: Define Scope
- Step 1.2: Define Context
- Step 1.3: Identify Ambitions & Expectations

11 Expectations (KPAs)

- safety,
- security,
- environmental impact,
- cost effectiveness,
- capacity,
- flight efficiency,
- flexibility,
- predictability,
- access and equity,
- participation and collaboration,
- interoperability.

2. Set Objectives

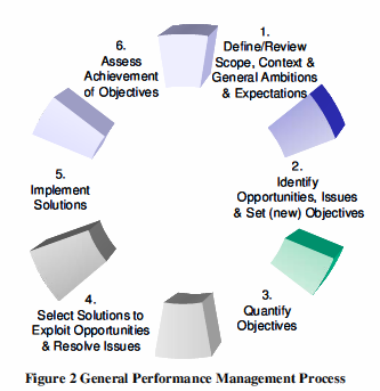

Figure 2 General Performance Management Process

- Step 2.1: Develop a List of Present and Future Opportunities and Issues (S.W.O.T.)
- Step 2.2: Focus Efforts by Defining and Prioritising Performance Objectives

Focus

Two stage process:

- In each Key Performance Area identify Focus Areas
- If each Focus Area define one or more performance objectives

3. Quantify Objectives (1)

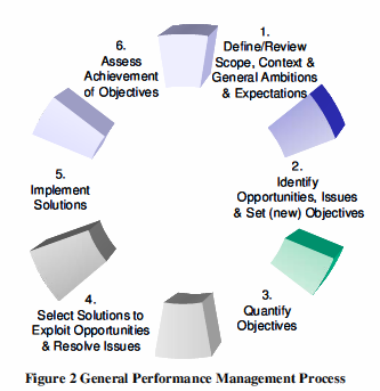

Figure 2 General Performance Management Process

- Step 3.1: Define how Progress in Achieving Performance Objectives will be measured
- Step 3.2: Define the Desired Speed of Progress in Terms of Baseline and Target Performance

Indicators - KPIs

- Can be directly measured or calculated
- Indicators support Objectives
- Must be supported by data
- Supporting metrics last longer
- Collect data at most detailed level affordable

3. Quantify Objectives (2)

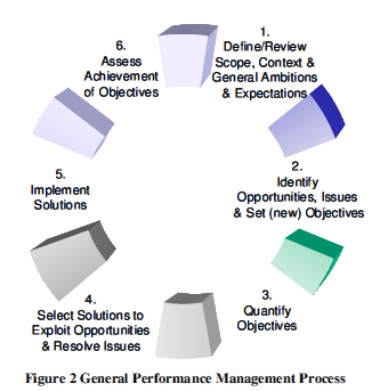

Figure 2 General Performance Management Process

- Step 3.1: Define how Progress in Achieving Performance Objectives will be measured
- Step 3.2: Define the Desired Speed of Progress in Terms of Baseline and Target Performance

Targets

- Can be for guidance or for enforcement
  - Strategic design target (transition)
  - Incentive
  - Requirement
  - Needed to enable other improvements
  - Safety requirement
  - Gain access to airspace or service
- Performance Gap = the difference between baseline and target.
- Should be time bound (realistic)

4. Select Solutions (1)

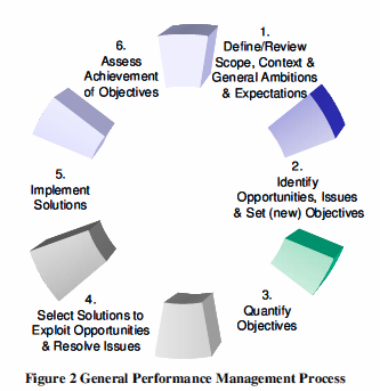

Figure 2 General Performance Management Process

- Step 4.1: Select the Decisive Factors
- Step 4.2: Identify Solutions
- Step 4.3: Select a Sufficient Set of Solutions

4.1 Gap Analysis

Identify what is the most significant change to make to achieve performance improvement

– Is it a blocking factor?

This process:

- Eliminates ineffective change
- Maximises effectiveness
- Traceability Chain / Performance Case
- Progress to Solutions

4.2 Identify Solutions

- List of options – “solution space”
- Solutions relate to issues.
- Developed from different complementary perspectives.

4.3 Set of Solutions

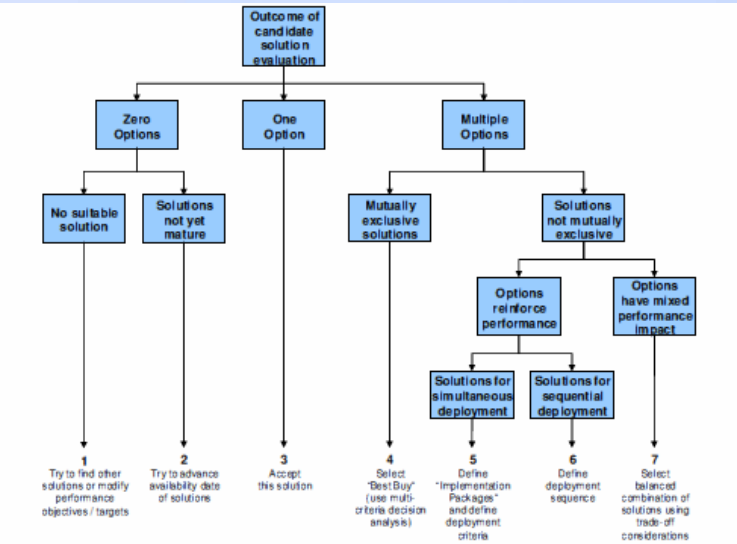

Figure 4 Selection of Solutions

5. Implement Solutions

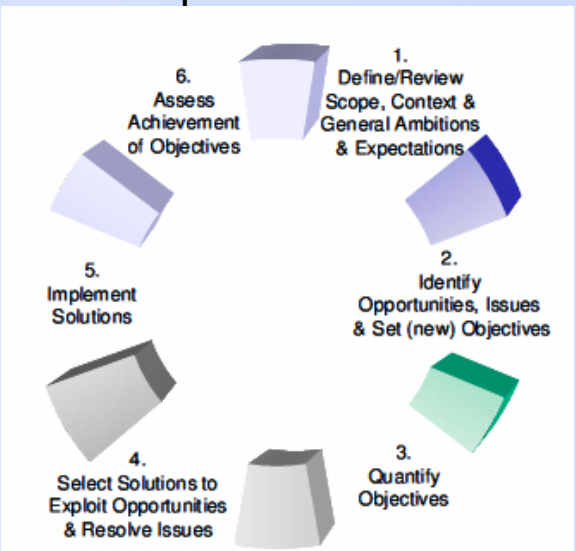

Figure 2 General Performance Management Process

6. Assess Achievement

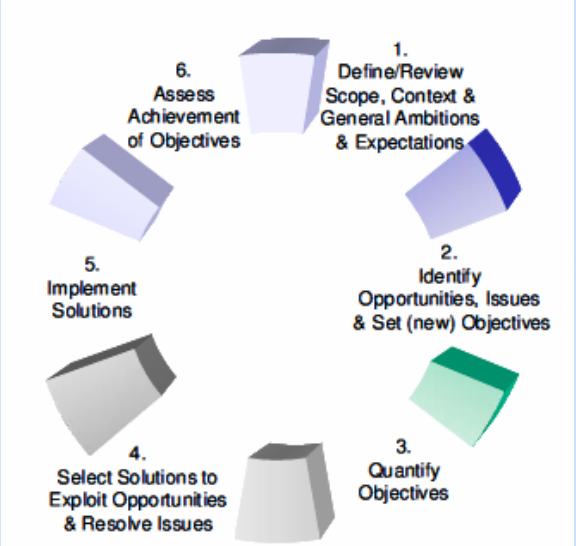

Figure 2 General Performance Management Process

Start Over

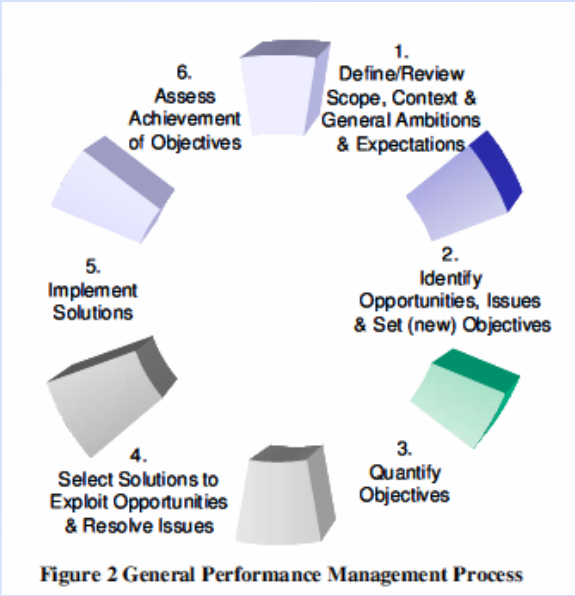

Figure 2 General Performance Management Process