出國報告(出國類別：其他)

「出席國際航空無線電協會(RTCA)2010 年年會」出國報告

服務機關：交通部民用航空局
姓名職稱：金炳宏 技正
派赴國家：美國華盛頓
出國期間：99/04/03～99/04/10
報告日期：99/07/05

出國報告審核表

出國報告名稱：「出席國際航空無線電協會(RTCA)2010 年年會」出國報告		
出國人姓名 （2 人以上，以 1 人為代表）	職稱	服務單位
金炳宏	技正	交通部民用航空局
出國類別	☐考察 ☐進修 ☐研究 ☐實習 ■其他 國際航空無線電協會年會 （例如國際會議、國際比賽、業務接洽等）	
出國期間：99 年 4 月 3 日至 99 年 4 月 10 日		報告繳交日期：99 年 7 月 5 日

計畫主辦機關審核意見

■1. 依限繳交出國報告

■2. 格式完整（本文必須具備「目的」、「過程」、「心得及建議事項」）

■3. 無抄襲相關出國報告

■4. 內容充實完備

☐5. 建議具參考價值

■6. 送本機關參考或研辦

☐7. 送上級機關參考

☐8. 退回補正，原因：☐不符原核定出國計畫 ☐以外文撰寫或僅以所蒐集外文資料為內容 ☐內容空洞簡略或未涵蓋規定要項 ☐抄襲相關出國報告之全部或部分內容 ☐電子檔案未依格式辦理 ☐未於資訊網登錄提要資料及傳送出國報告電子檔

■9. 本報告除上傳至出國報告資訊網外，將採行之公開發表：

☐辦理本機關出國報告座談會（說明會），與同仁進行知識分享。

☐於本機關業務會報提出報告

■其他 存本局圖書室乙份供同仁參閱

☐10. 其他處理意見及方式：

審核人	一級單位主管	機關首長或其授權人員
	航管組組長 李建國	副局長林信得(一)

說明：

一、各機關可依需要自行增列審核項目內容，出國報告審核完畢本表請自行保存。

二、審核作業應儘速完成，以不影響出國人員上傳出國報告至「政府出版資料回應網公務出國報告專區」為原則。

列印

提 要 表

系統識別號：	C09901024
計畫名稱：	出席國際航空無線電協會〈RTCA〉2010年年會
報告名稱：	「出席國際航空無線電協會〈RTCA〉2010年年會」出國報告
計畫主辦機關：	交通部民用航空局
出國人員：	姓名 | 服務機關 | 服務單位 | 職稱 | 官職等 | E-MAIL 信箱 金炳宏 交通部民用航空局 航管組 技正 薦任(派) 聯絡人jonathan@mail.caa.gov.tw
前往地區：	美國
參訪機關：	國際航空無線電協會(RTCA)2010年年會
出國類別：	其他
出國期間：	民國99年04月03日 至 民國99年04月10日
報告日期：	民國99年07月05日
關鍵詞：	國際航空無線電協會，Radio Technical Commission for Aeronautics，RTCA，美國聯邦航空署，FAA，NextGen，Next Generation Air Transportation System，次世代飛航運輸系統
報告書頁數：	78頁
報告內容摘要：	2010年RTCA年會假華盛頓特區之Grand Hyatt飯店舉行，本年度的會議主題為Bringing NextGen into Focus，著眼於美國聯邦航空署之NextGen(Next Generation Air Transportation System，次世代飛航運輸系統，簡稱NextGen)建置規畫書(NextGen Implementation Plan, NGIP)相關討論，會中除邀請美國聯邦航空署相關主管與會研商外，另邀請歐盟飛航管理組織(EuroCONTROL)就歐盟地區「單一歐洲天空飛航管理研究計畫(Single European Sky ATM Research, SESAR)」進行經驗分享及討論美、歐雙方的異同之處。
電子全文檔：	C09901024_01.pdf
出國報告審核表：	C09901024_B.pdf
限閱與否：	否
專責人員姓名：	陳碧雲
專責人員電話：	02-23496197

列印

目　　錄

壹、目的

一、RTCA 簡介

國際航空無線電協會(Radio Technical Commission for Aeronautics, RTCA)是位於美國華盛頓特區的一個非營利的民間組織，其成員目前係由來自於美國及世界各地的政府組織、工商業團體及學術團體所組成，大約計有來自 400 個不同團體的會員。RTCA 會員代表航空業界的各個面向，包含政府組織、航空公司、空域使用者及航空站協會、勞工聯盟、飛航服務及設備製造商。其中較有名氣的美國當地會員如：美國聯邦航空署(FAA)、航空公司飛行員協會、波音公司、國防部(DoD)等。

另外 RTCA 係以提供全球服務為其宗旨，故全體會員中有大約 150 個非美國籍之國際協會、政府組織、商業團體等國際會員，如：澳洲飛航服務公司(ASA)、紐西蘭飛航服務公司(ANZ)、空中巴士公司、中國航空無線電電子研究所(CARERI)、馬來西亞民航局、英國民航局等。我國係於 1977 年以「中華民國民航局」之名稱加入 RTCA 為該國際協會組織會員之一。

RTCA 成立於 1935 年由美國航空商業局(Bureau of Air Commerce)副局長 Rex Martin 倡導成立，其目的係使航空無線電助導航裝備標準化，以因應航空界快速成長之需求，多年來其所建議制定之航電標準已成為行業中之領導角色。

RTCA 的功能類似於聯邦諮詢委員會，對於通信、導航、監視及飛航管理(CNS/ATM)，基於會員共識基礎提出建議，其建議經常被美國聯邦航空署作為政策、計畫及管理決定的基礎，亦被私人企業作為未來公司發展、投資及其他商業決策的基礎。

該組織常配合美國聯邦航空署之要求，建立航空業界共識之標準，並為推行各項理念或執行專案工作設有不同類型之專案小組(Task Forces, TF)或委員會。

專案小組例如：全球導航衛星系統(GNSS)轉移及建置策略小組、數位通訊轉移小組、自由飛行建置及驗證小組、NextGen 小組等。

委員會如：

- 飛航管理諮詢委員會(Air Traffic Management Advisory Committee, ATMAC)：本委員會的目的是提供聯邦航空署，以委員會成員共識為基礎的建議，以提高美國航空運輸系統之安全性、容量及效率。

- 計畫管理委員會(Program Management Committee, PMC)：對各會員經常性的要求進行專題討論，審查特別委員會所完成的報告並發表成為正式文件。

- 特別委員會(Special Committees, SC)：是針對特殊議題並由會員自願參加所組

成，特別委員會會議是公開發佈，開放給所有對該議題有興趣的任何會員，會議期間出席會員就選定的議題進行研討，並基於成員共識提出建議，這些建議被送到RTCA 計畫管理委員會討論,該委員會一方面審核特別委員會的報告，另方面指導額外的工作，經審核通過的建議會發表並成為可實行方案提供會員及公眾使用。

二、會議目的

2010 年 RTCA 年會假華盛頓特區之 Grand Hyatt 飯店舉行，本年度的會議主題為 Bringing NextGen into Focus，著眼於美國聯邦航空署之 NextGen(Next Generation Air Transportation System，次世代飛航運輸系統，簡稱 NextGen)建置規畫書(NextGen Implementation Plan, NGIP)相關討論，會中除邀請美國聯邦航空署相關主管與會研商外，另邀請歐盟飛航管理組織(EuroCONTROL)就歐盟地區「單一歐洲天空飛航管理研究計畫(Single European Sky ATM Research, SESAR)」進行經驗分享及討論美、歐雙方的異同之處。

本局指派飛航管制組技正金炳宏出席，希望藉由實際參與會議之經驗了解美國目前 NextGen 計畫推行進度及未來發展方向。

貳、會議過程

一、 參加人員

金炳宏　　民用航空局飛航管制組技正

二、 行程紀要

99 年 4 月 3 日～4 日	於桃園國際機場搭乘長榮航空 BR032 班機至美國紐約紐華克國際機場
98 年 4 月 5 日	由紐約搭火車前往華盛頓
98 年 4 月 6 日～7 日	參加會議(美國華盛頓)
98 年 4 月 8 日	由華盛頓搭火車前往紐約
98 年 4 月 9 日～10 日	於美國紐約紐華克國際機場搭乘長榮航空 BR031 班機返國

三、 會議議程及議題

- Session 1: FAA Response to NextGen Task Force Recommendations; Overview of the 2010 NextGen Implementation Plan

在 2009 年 9 月，RTCA 的 NextGen 專案小組(Task Forces 5, TF5)，向美國聯邦航空署(FAA)提交 RTCA 對於 NextGen 建置規劃之建議。聯邦航空署對 RTCA 建議之回應，已列示於 2010 NextGen 建置計畫(NGIP)內，本段座談係對 2010 NGIP 進行概括式的研討。

- Session 2: NextGen Implementation Activities

為實現 NextGen 之效益，需要及時且協調一致的按計畫執行。本段座談突顯出數項 NextGen

關鍵作業的最新進展。

- Session 3: NGIP and TF5…How is the Collaboration Going?

RTCA 飛航管理諮詢委員會(Air Traffic Management Advisory Committee, ATMAC)之 NextGen 建置工作小組(Implementation Working Group)的成員，提出他們對於 FFA 基於 TF5 建議調整的 NGIP 評估。本段座談討論已發現的差距及可能的解決辦法，並試圖決定建置 NextGen 各事項的優先順序。

- Session 4: Making it Real: Challenges to Implementing NextGen at a Metroplex

在複雜的大都會區域內，要如何實現 TF5 專案小組的建議？本段座談首先展示一模範 NextGen 系統之作業潛力，然後與各主要利益相關者(美國聯邦航空署和航空業界)討論挑戰及緩解潛在風險之策略，以確保成功實施。

- Session 5: Building the SESAR Business Case – Development, Implementation and Deployment

本段座談邀請歐盟組織就其「歐盟單一飛航管理研究案(Single European Sky ATM Research, SESAR)」提出整合、透明和可重複利用的商業案例。由航空業界以及國際標準化的角度來看，前述商業案例是否於未來將可更適切地反映全球一致作業能力？

- Session 6: Looking Forward – Future

Trends in the NextGen Business Case

本段座談係由投資者(美國聯邦航空署和航空業界)的角度，於 NextGen 的商業案例中，討論 NextGen 的關鍵能力，並充分考慮數據驅動的決策，環境問題，以及由投資 NextGen 中所取得之區域經濟利益。

- Session 7: Policy and Political Implications of NextGen Implementation

本段座談討論範圍廣泛的議題，包括：經濟預測和航空業界需求、聯邦航空署重新授權和 NextGen、NextGen 的資金和獎勵、航空安全、無縫執行—安全和環境。

參、心得與建議

2009 年 1 月中，美國聯邦航空署(FAA)致函國際航空無線電協會(RTCA)，就 2009 年至 2018 年 NextGen 轉移過程之作業進展規劃乙節，要求成立一專案小組，以取得航空業界全面之共識與建議。此即為 NextGen Mid-Term Implementation Task Force(亦稱 Task Force 5，TF5)之由來，該專案小組隨即於同年 9 月提交建議報告，並於報告中表示：本報告非關新科技之研發演進建議，而在於依序逐步提升美國國家空域系統(NAS，National Airspace System)之運作效率，進而使 NextGen 得以順利轉換完成。

該報告同時並明確建議「何事(what)」、「何者(who)」、「何地(where)」以及「何時(When)」，可對於 NextGen 之轉移作業產生最大效益。綜觀 RTCA 專案小組的建議可概分為：

1. 數據通訊(Data Comm)、
2. 整合式飛航管理(Integrated ATM)、
3. 機場場面(Surface)、
4. 跑道運作(Runway Access)、
5. 都會區空域(Metroplex)、
6. 巡航(Cruise)、
7. 國家空域系統運作(NAS Access)以及
8. 其他(Overarching)等八大項目。

美國聯邦航空署於本(2010)年 1 月，回應認同 RTCA 專案小組的建議，並隨後於 3 月發表修正後之 NextGen 建置計畫(NextGen Implementation Plan, NGIP)，明確列示各項子計畫之建置時程規劃及相關細節。

至於 RTCA NextGen Mid-Term Implementation 專案小組的各大項建議內容，以及 FAA 的相關回應簡摘如下：

- 數據通訊(Data Comm)及整合式飛航管理(Integrated ATM)：由於這兩大項互有相關聯之處故一併說明。RTCA 建議離場許可、航路更改及日常航管通訊使用數據通訊，並開放沿岸機場之 Tailored Arrivals，亦建議提供整合式飛航管理服務(含協同決策、流量管理、飛航管制等)。其中有關數據通訊及 Tailored Arrivals，FAA 將加速原規劃之執行進度以符合業界企望，目前規畫將於 2016 年提前完成數據通訊鏈路之建置及應用，以及於 2011 年開放沿岸機場之 Tailored Arrivals，此外有關整合式飛航管理服務乙節，FAA 亦規劃於 2012 年初步完成基於協同決策(CDM)概念之 ATM 服務。
- 機場場面(Surface)：RTCA 建議應建置更有效率之機場場面運作環境。FAA 將提供機場場面運作中心內有關航機於機場場面運作之資訊，予航空公司、地勤業者等，以使場面作業資訊透明化、公開化，以提升協同決策下機場場面之運作效率。並逐年於各主要機場建置 ASDE-X 系統，以及相關資訊分配系統，以輔助航機運作資訊之取得及公布。
- 跑道運作(Runway Access)：RTCA 建議提升交會(交叉)跑道或交會(交叉)航路運作之容量及流量，並建議逐步實踐相鄰跑道平行作業程序(Closely Spaced Parallel Operations, CSPO)。有關提升交會(交叉)航路(跑道)乙節，FAA 將研擬於「交會跑道輔助顯示器(Converging Runway Display

Aid, CRDA)」附加相對位置指示(Relative Position Indicator, RPI)功能之實際效益，以協助提升管制人員處理航機匯流點之效率。另外，FAA 亦於 2010 年起，開放部分相鄰跑道間距未達 2500 呎機場之 Staggered 進場，同時持續探討如何擴展替代型精確跑道監視器(Precision Runway Monitor- Alternative, PRM-A)之使用範疇，以維持平行進場航機之安全並提升效率。

- 都會區空域(Metroplex)：地理位置相近之都會型機場，因為相關因素限制，致使都會空域之使用效率低落。RTCA 建議推廣性能導航程序(Performance-Based Procedures)之使用並研討航機隔離作業準則，以提高都會區空域流量並收節能減碳及減少噪音之效。FAA 將對數個主要都會區之空域進行研究，以決定適當之航機隔離準則，並引入小於 1.0 之 RNP 程序，減少空域複雜度，提高該等空域流量。
- 巡航(Cruise)：為了提高整體空域運用效率及彈性，RTCA 建議設立高高度 RNAV(Q)航路，並強化限航空域(Special Activity Airspace, SAA)即時資訊之分享。FAA 將於本年度邀集相關單位、組織，研討 RNAV Q 航路(18000 呎含以上)及 T 航路(18000 呎至 1200 呎間)，規劃設置事宜。
- 國家空域系統運作(NAS Access)：為維持全天候作業能力，RTCA 建議對不具精確進場能力之機場規劃 LPV 進場程序，並對無雷達涵蓋之空域提供近似雷達(radar like)

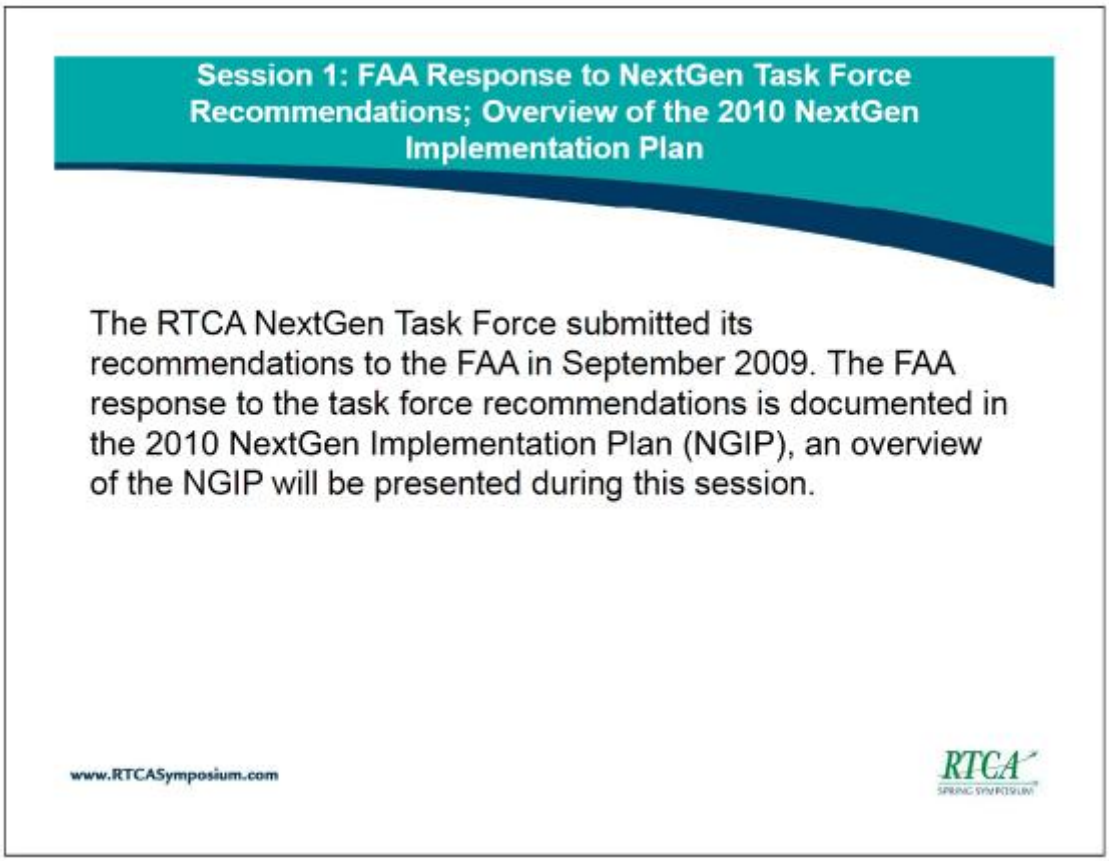
之飛航服務。FAA 目前已於全美各地的 1000 個機場，規劃設置了將近 2000 個 LPV 進場程序，FAA 將持續於未來 5 年內，以每年不少於 300 個 LPV 進場程序之速度規劃，並持續廣播式自動回報監視(ADS-B)地面站之設置。

- 其他(Overarching)：本項目 RTCA 建議 FAA 鼓勵提升機載設備普及率、作業許可及認證之效率化、3 浬及 5 浬隔離標準、無人飛機(UAV)之控管及 GPS 等全球衛星導航系統(GNSS)構建之完整性等。

綜上，由 RTCA 的建議與 FAA 的回應中可以發現，美國 NextGen 計畫絕非僅有飛航管理設備的更新及現代化而已，其主要目的係為提升國家整體空域(NAS)之運作效率，且 NextGen 所需之各項基礎科技(如：全球衛星導航系統、數據通訊、ADS-B 等)應用目前均趨於成熟，新科技相關之作業應用準則(如：WASS/LASS、PBN、RNAV、LPV 程序等)亦逐步由相關國際組織(如：FAA、ICAO 等)律定並推廣執行中。簡言之，NextGen 已經轉變為 NowGen 了。

身處如此急遽變化之環境，且為了達成飛航服務之全球協調(Global Harmonization)一致，我方應主動配合並追蹤國際民航組織(ICAO)之最新規劃進展，協調建構全球無縫隙之飛航服務。

肆、附錄


Session 1: FAA Response to NextGen Task Force Recommendations; Overview of the 2010 NextGen Implementation Plan
The RTCA NextGen Task Force submitted its recommendations to the FAA in September 2009. The FAA response to the task force recommendations is documented in the 2010 NextGen Implementation Plan (NGIP), an overview of the NGIP will be presented during this session.
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RTCA


Session 1: FAA Response to NextGen Task Force Recommendations; Overview of the 2010 NextGen Implementation Plan
9:15 a.m. – 10:45 a.m.
Moderator: Victoria Cox, Senior Vice President, NextGen and Operations Planning Services, Air Traffic Organization, FAA
Panel Members: Dr. Michael C. Romanowski, Director, NextGen Integration and Implementation, FAA
Kip Spurio, System Engineering Manager and Chief System Engineer, ATO Terminal Services, FAA
Leo Eldredge, Manager of the Global Navigation Satellite System Group, ATO Technical Operations, FAA
Gisele M. Mohler, Manager of Airspace and Performance Based Navigation Integration, ATO System Operations, FAA
Rowena Mendez-Ruano, NextGen Engineering Manager, ATO En Route Program Operations, FAA
Leo Eldredge, Manager of the Global Navigation Satellite System Group, ATO Technical Operations, FAA
Stephen Ryan, Senior System Engineer, ATO Terminal Services, FAA
Questions? Send an e-mail to Questions@RTCASymposium.com
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RTCA

NGIWG-Stated Gaps – Forwarded to FAA for Consideration:

Gaps between TF5 Recommendations and FAA Jan 31 Response – 1 of 2

- ***Surface Gap***: FAA establish Single Point Surface Lead as soon as possible
- ***Surface Gap:*** FAA adopt the identified geographic locations and participants
- ***Surface Gap:*** FAA accelerate time lines for critical activities
- ***Runway Gap:*** (Existing): FAA adopt dates and locations included in TF recommendations
- ***Runway*** **Gap** (Existing): FAA address facility-specific implementation issues
- ***Runway Gap:*** (Developing): FAA collaborate with NGIWG/ATMAC on models, simulations, and technical analyses
- ***Runway Gap***: (Developing): FAA develop more complete action plans
- ***Metroplex Gap***: New York metroplex strategy continue to be a high priority for FAA
- ***Metroplex Gap***: FAA start with an immediate consensus prioritization of necessary metroplex areas
- ***Metroplex Gap***: FAA should focus on optimized profile descents and climbs in the near-term
- ***Cruise Gap***: FAA include TMA training in CY2010 in lieu of CY2012
- ***Cruise Gap***: FAA pursue integration of TMA in other TFM tools in CY2011, in lieu of CY2013

RTCA

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NGIWG-Stated Gaps – Forwarded to FAA for Consideration:

Gaps between TF5 Recommendations and FAA Jan 31 Response 2 of 2

- ***Cruise Gap***: FAA identify Required Time of Arrival (RTA) activities for CY2010/11
- ***Cruise Gap***: RNAV-Based system should implement structure only where needed
- ***Access to NAS Gap***: FAA pursue the action plans in the TF5 response for ADS-B coverage in low altitude non-radar airspace and for LPV approach implementation at the rate of 300 per year
- ***Crosscutting (Data Comm) Gap***: FAA clarify ability for operators to use *current* ATN avionics for en route services
- ***Crosscutting (Data Comm) Gap***: Additional collaboration needed to understand and mitigate constraints on implementation
- ***Crosscutting (Integrated ATM) Gap***: FAA continue focus on defining framework for data sharing and integration, ensuring clarity of roles/responsibilities, and addressing integrated ATM.
- ***Overarching (Streamlining) Gap***: Continue FAA industry collaboration in execution of this initiative
- ***Overarching (Equipage) Gap***: FAA continue to collaborate with industry and establish operational incentives and financial incentives

RTCA

Federal Aviation Administration 5

New FAA Review Shows Few Gaps Exist

- ***Runway Gap***: (Developing): FAA develop more complete action plans
  - **[FAA interpretation - (time, location) of Relative Position Indicator (RPI)]**
- ***Crosscutting (Data Comm) Gap***: FAA clarify ability for operators to use *current* ATN avionics for en route services
- ***Crosscutting (Data Comm) Gap***: Additional collaboration needed to understand and mitigate constraints on implementation

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SURFACE

Kip Spurio
FAA Terminal Services
Manager, System Engineering

TF5 Recommendation

Surface Situational Awareness, Phase 1

Capture surface activity in the movement and non-movement areas

Participants: *COA, DAL, UAL, FDX, UPS, USA*
Locations: *OEP 35 and nearby satellite airports*
When: *2010-2014*

FAA's Action Plan:

- 2010-2011: Evaluate the benefit of FAA-funded infrastructure to provide surface surveillance coverage in non-movement areas, taking into consideration any radio spectrum capacity constraints
- 2010-2011: Develop data rights and data release policies in support of data sharing goals
- 2010-2013: Execute the current ASDE-X, ASDE-3/Airport Movement Area Safety System/ Multilateration implementation programs at 34 of the OEP 35 airports, and at six additional non-OEP airports
- 2010-2013: Install data distribution units at ASDE-X and ASDE-3/Multilateration locations and provide initial data dissemination capability
- 2011+: Develop and implement the longer-term data dissemination capability needed to provide a more reliable and robust data infrastructure

TF5 Recommendation

TFM Common Operational Picture

Define system requirements

Surface Connectivity

Define interoperability standards

Participants: *COA, DAL, UAL, FDX, UPS, USA*
Locations: *ATL, CLT, DEN, DTW, EWR, IAD, IAH, JFK, LAX, MEM, MSP, ORD, PHL, SDF, SFO*
When: *2010-2014*

FAA's Action Plan:

- 2010: Work with the SCT to define and gain consensus on a work plan to develop information exchange requirements
- 2011-2012: Conclude and execute information exchange requirements work plan
- 2012-2014: Work with the SCT and the Tower Flight Data Manager (TFDM) development team to define interoperability standards for surface operational data exchange
- 2013-2015: Conduct interoperability testing between the FAA and flight operations centers
- 2014-2016: Execute field implementation of surface operational data sharing

TF5 Recommendation

Surface Situational Awareness, Phase 2

Implement integrated airport movement management decision tools

Participants: *COA, DAL, UAL, FDX, UPS, USA*
Locations: *ATL, CLT, DEN, DTW, EWR, IAD, IAH, JFK, LAX, MEM, MSP, ORD, PHL, SDF, SFO*
When: *2014-2018*

FAA's Action Plan:

- 2010-2014: Leverage existing research and development activities and development plans to field integrated airport surface standards, processes and decision support tools by 2018

NGIWG Identified Gap

FAA establish a single point surface lead as soon as possible.

FAA Response

- Surface management spans several ATO service units
- Currently addressing coordination and policy issues internally
- Should the surface lead be a POC to simplify stakeholder access, or have responsibility, authority and accountability for improving surface operations?
- We remain committed to establishing a single point surface lead in 2010

NGIWG Identified Gap

FAA adopt the identified geographic location and participants.

FAA Response

- Recommendation 40
  - The FAA is still evaluating implementation at satellite airports and coverage of non-movement areas
- Recommendations 43, 38 and 41:
  - Once implemented, will be available NAS-wide
  - Once a positive business case exists, the program can proceed at justified locations, giving priority to Task Force recommended locations

NGIWG Identified Gap

FAA accelerate the time lines for critical activities.

FAA Response

- Data release policy, 2010 vs. 2010-11. The policy update is underway. Given complexity of issues, 2011 is a reasonable completion date
- Install DDUs in 2010-2012 vs. 2010-2013. In many cases DDUs will be deployed with ADS-B infrastructure. 2013 remains best estimate for completion
- Information exchange requirements, 2011 vs. 2011-2012. We have reconsidered the workload and schedule and we believe we can complete this work in 2011
- Interoperability testing, begin in 2011 vs. 2013. Dependent on TFMS schedule; 2013 remains best estimate

RUNWAY ACCESS

Leo Eldredge
FAA Technical Operations Services Manager, GNSS Group

TF5 Recommendation

Increase capacity and throughput for converging and intersecting runway operations

Runway Access 9

Participants: *Alaska Airlines, American Airlines, Continental Airlines, Delta Air Lines, FedEx, NetJets, NBAA, Southwest Airlines, United Airlines, UPS, US Airways*

Locations: *DEN, EWR, FLL, JFK, LAS, MEM, MIA, SDF*

When: *2010*

FAA's Action Plan:

- 2010: Analyze operations at BOS, BWI and JFK to determine potential CRDA operational benefit
- 2010: Demonstrate RPI at a minimum of two terminal sites (PHX, SJT) to support future NextGen capabilities
- 2011: Leverage data collected from demonstration activities to develop an Relative Position Indicator (RPI) requirements document to enable field implementation in 2012

NGIWG Identified Gap

FAA address the following Task Force 5 recommended locations: FLL, MIA, SDF, LAS, DEN, MEM.

Runway Access 9

FAA Response

The FAA has implemented CRDA at EWR

- 2010: Implement arrival distance window at BOS, DTW
- 2011: Implement arrival distance window at PHL

Drivers

- Implementation of RPI will be justified based on validated business case
- RPI is a safety critical system and requires safety assessment and safety critical software

TF5 Recommendation

Implement Closely Spaced Parallel Operations (CSPO) in a phased manner: Increase use of staggered approaches

Participants: *Alaska Airlines, American Airlines, Continental Airlines, Delta Air Lines, FedEx, NetJets, NBAA, Southwest Airlines, United Airlines, UPS, US Airways*

Locations: *ANC, ATL, BNA, DFW, DTW, IAH, LAS, LAX, MCO, MDW, MEM, MIA, PHX, PIT, SAT, SDF, SEA, SFO; EWR (already under development)*

When: *January 2012*

FAA's Action Plan:

- 2010: Approve additional dependent, staggered approaches (7110.308) for additional runway ends at airports already using the procedure, as well as at other qualifying airports:
  - EWR4/22
  - MEM
  - SEA34C/34R
  - IAD and DEN are under review

NGIWG Identified Gap

FAA address the following Task Force 5 recommended locations: ANC, ATL, BNA, DFW, DTW, LAS, LAX, MCO, MDW, MIA, PHX, PIT, SAT, SDF, SFO.

FAA Response

- The FAA will enable use of satellite navigation procedures RNP, LPV, and GLS for dependent and staggered approaches approved under FAA Order 7110.308 when FAA Order 7110.65 is updated
- 2011-2015: Continue assessment and implementation for remaining qualifying airports

Driver

- Additional airports will be assessed for future implementation based on established benefits

TF5 Recommendation

Implement Closely Spaced Parallel Operations (CSPO) in a phased manner: Revise the blunder assumptions

Participants: *Alaska Airlines, American Airlines, Continental Airlines, Delta Air Lines, FedEx, NetJets, NBAA, Southwest Airlines, United Airlines, UPS, US Airways*

Locations: *CMH, DAL, FLL, IND, JFK, MEM, MSP, PDX, PHX, RDU, SLC (All other airports currently or in the future having parallel runways with centerlines spaced less than 4300' but greater than 2500')*

When: *Decision by 2011, implement by 2012*

FAA Response

- 2010: Continue blunder testing for CSPO
- 2011: Complete analyses to re-evaluate the blunder model for CSPO and determine the operational impact in support of decreased minimums

NGIWG Identified Gap

FAA adopt the Task Force 5 recommended schedule.

FAA Response

- 2012: Begin implementation of changes across the NAS
- 2012: Implement an update to FAA Order 7110.65

Drivers

- We won't know if revised blunder assumption will support a change from 4,300' spacing until testing and analysis activities are complete
- Implementation of any change to existing spacing can not be processed until testing and analysis activities, including environmental reviews, are complete

TF5 Recommendation

Implement Closely Spaced Parallel Operations (CSPO) in a phased manner: Multilateration

Participants: *Continental Airlines and Delta Air Lines*

Locations: *Leverage Detroit operations involving use of Multilateration for closely-spaced parallel approaches. Other sites: CMH, DAL, FLL, IND, JFK, MEM, MSP, PDX, PHX, RDU, SLC (Parallel runways with centerlines spaced less than 4300' but greater than 2500'). SOIA for BOS, EWR, and other locations with runway separation less than 2500' (7110.308 airports/priority based on frequency of weather below VAPs and volume)*

When: *Decision by 2012, implement 3 sites by 2014*

FAA's Action Plan:

- 2010: Perform data collection to support a business decision on extended use of multilateration using PRM-A on a case-by-case basis
- 2011: Evaluate collected data in support of additional potential deployment

NGIWG Identified Gap

FAA address the following Task Force 5 recommended locations: CMH, DAL, FLL, IND, JFK, MEM, MSP, PDX, PHX, RDU, SLC, BOS, EWR.

FAA Response

Drivers

- Data collected from the demonstration system at Detroit required to establish a business case integration and implementation in the NAS
- Once a positive business case exists, the program can proceed at justified locations

TF5 Recommendation

Implement Closely Spaced Parallel Operations (CSPO) in a phased manner: SATNAV or ILS

Participants: *Alaska Airlines, American Airlines, Continental Airlines, Delta Air Lines, FedEx, NetJets, NBAA, Southwest Airlines, United Airlines, UPS, US Airways*

Locations: *All sites currently conducting simultaneous independent and dependent approaches*

When: *June 2010*

FAA's Action Plan:

- 2010: Conduct simulations and safety analysis of using any combination of ILS, RNAV, RNP, LPV and GLS during simultaneous and/or dependent approaches to closely spaced parallel runways
- 2011: Update FAA Order 7110.65 to approve any combination of RNAV (with vertical navigation)/RNP/LPV/GLS/ILS for simultaneous independent and dependent approaches to closely spaced parallel runways

NGIWG Identified Gap

FAA adopt the Task Force 5 recommended schedule.

FAA Response

- 2011: Update FAA Order 7110.65 to include RNP, LPV and GLS equivalent to ILS for widely-spaced and closely spaced parallel operations
- 2012: Begin implementation and training of FAA Order 7110.65 update

Drivers

- The FAA must follow the Safety Risk Management process to ensure no unacceptable degradation of safety is created before the document change to FAA Order 7110.65 can be completed
- If sufficient data is not available to support the safety case, additional simulations will be required to collect sufficient data

METROPLEX

Gisele Mohler
FAA System Operations Services
Integration Manager, Airspace and AIM

TF5 Recommendation

Optimize and increase the use of RNAV operations, institute tiger teams that focus on quality at each location

Metroplex 32a, 29

Participants: *AOPA, Alaska Airlines, American Airlines, Continental Airlines, Delta Air Lines, DoD, FedEx, NBAA, NetJets, Southwest Airlines, United Airlines, and US Airways*

Locations: *NAS-wide, with an emphasis on metroplex sites with the greatest need*

When: *Starting immediately*

FAA's Action Plan:

- 2010: Create initial set of stakeholder tiger teams to address PBN procedure optimization at locations prioritized by need, cost benefit, budget and other considerations
- 2010: Assemble expert procedure design teams to facilitate the long-term development, integration and optimization of PBN procedures
- 2010: Continue to review existing work plans and make adjustments as appropriate to ensure the development of high-value procedures
- 2011: Create implementation teams that execute the results of the initial set of tiger teams
- 2011: Leverage expert design team structure to complete development on remaining scheduled legacy procedures
- 2012+: Leverage expert design team structure in moving toward implementation of integrated airspace procedures

TF5 Recommendation

Integrate Procedure Design to Deconflict Airports, Implement RNP with RF Capability, and Expand Use of Terminal Separation Rules

Participants: *AOPA, Alaska Airlines, American Airlines, Continental Airlines, Delta Air Lines, the DoD, FedEx, NBAA, NetJets, Southwest Airlines, United Airlines, and US Airways*

Locations: *Metroplexes include Atlanta, Chicago, Dallas, Denver, Florida, Houston, New York, Northern California, Ohio Valley, Seattle, Southern California, Southern Nevada, and Washington, D.C.*

When: *2010 – 2015*

FAA's Action Plan:

- *See Next Slide*

TF5 Recommendation *(cont'd)*

FAA's Action Plan:

- 2010-2012: Complete airspace redesign projects in New York, Chicago, Houston and Southern Nevada. These projects include the broad use of RNAV, the deconfliction of airports and the realignment of airspace to optimize flight and flows.
- 2010-2012: Initiate integrated airspace and procedure projects at key sites. Candidate sites include all metro areas cited in the recommendation. The concurrent development and implementation of RNAV Standard Instrument Departures (SIDs) and Standard Terminal Arrival Routes (STARs) will ensure an integrated approach to procedural optimization. Decouple operations between primary and secondary/satellite airports located in complex terminal airspace. Advanced features, such as RNP radius-to-fix, may be required (initially with RNP 1).
- 2013-2015: Complete integrated airspace and procedure projects at key sites. Begin next increment of integrated airspace and procedure projects. Expand the use of three-mile separation and controller techniques as appropriate.
- 2013-2015: Complete studies and further refine expanded use of reduced separation rules, surveillance data fusion and automation convergence in support of future NextGen applications.

NGIWG Identified Gap

New York metroplex strategy continues to be a high priority for the FAA.

FAA Response

- New York continues to be a top focus for the FAA and is funded as a high priority
- There are completed and ongoing efforts in the New York metroplex, including:
  - airspace enhancements
  - RNAV SIDs and STARs procedures
  - airfield improvements
  - increased enhanced low visibility operations
  - demonstration projects
- We are providing operational improvements to metroplex areas across the NAS (including NY)

NGIWG Identified Gap

FAA start with an immediate consensus prioritization at necessary metroplex areas.

FAA Response

- The FAA has developed a construct for the Tiger Teams efforts at metroplexes that responds to the RTCA TF5 recommendations for optimizing airspace and RNAV/RNP:
  - Part I: Study Teams to assess and survey current activities and explore potential improvements at metroplexes
  - Part II: Results from Part I assessments will be prioritized and become target activities for Design and Implementation Teams
- Metroplex prioritization will be conducted at the 23 sites recommended by TF5, including the 7 FAA Flight Plan Metro Areas, using criteria
  - quantitative: delays, # of operation, site readiness, potential OPD benefits
  - qualitative: political, potential combined metroplex benefits, ongoing existing efforts/commitments
  - previous environmental decisions, as well as not interfering with ongoing environmental reviews
- 2010: Begin with Study Teams at initial set of sites
- 2011: Move to Design and Implementation Teams and begin Study Teams at next set of sites

NGIWG Identified Gap

FAA should focus on optimized profile descents and climbs in the near-term.

FAA Response

- The FAA is developing performance-based navigation (PBN) routes and procedures and putting in place a strategic approach to NAS-wide development of PBN. Some examples include:
  - Development in progress for 8 new Q-routes in FY11/12
  - OPD development projects in progress at Charleston, Atlanta, Phoenix, Chicago and other locations.
- There are ongoing and planned efforts to look at:
  - safety and efficiency gains through lateral guidance
  - the use of 3NM separation in more airspace
  - preliminary operational safety assessment and development of functional automation requirements
  - expanded use of reduced separation rules, surveillance data fusion and automation convergence
  - expanded departure routes and faster climbs

CRUISE

Rowena Mendez-Ruano
FAA En Route Services
Manager, En Route NextGen Engineering

TF5 Recommendation

Expand Use of Time-Based Metering (TBM)

Cruise 24

Participants: *Continental Airlines, Delta Air Lines, FedEx, Southwest Airlines, and US Airways*

Locations: *All locations for which Traffic Management Advisor (TMA) is currently deployed but not in full use*

When: *2010 - 2015*

FAA's Action Plan:

- 2010: Conduct cost-benefit analysis of implementing additional Adjacent Center Metering (ACM) capabilities, which extends TBM beyond the boundaries of a single en route center
- 2010-2015: Pending positive results, expand ACM to:
  - LAX — ACM from ZAB and ZLA
  - SFO — ACM from ZSE, ZOA, ZLA and ZLC
  - SAN — ACM from ZLA and ZOA
  - ATL — ACM from ZDC and ZHU
  - IAD — ACM from ZNY
- 2012: Complete an improved training program for FAA traffic management coordinators at sites where TMA is deployed, with the goal of increasing the consistent use of TBM
- 2012-2015: Dependent on first quarter calendar year 2010 final investment decision on TBFM and a positive cost/benefit analysis, deploy TMA to additional OEP airports: TPA, CLE, DCA, BWI, SAN
- 2013: Dependent on first quarter calendar year 2010 Final Investment Decision on TBFM, make a final investment decision on the integration of TMA data with the traffic flow management systems

NGIWG Identified Gap

FAA include TMA training in CY2010, not CY2012.

Cruise 24

FAA Response

- The FAA is committed to expanding the use of Time Based Metering and is working to develop the procedures necessary to implement a hands-on TMA training program that will elevate the process to an "art form"
- The FAA believes that the CY2012 timeframe for deployment is reasonable

Drivers

- Training will reflect the procedures that are currently in the Document Change Proposal (DCP) process
- Safety Risk Management Panel Review is needed for two safety issues identified
- Coordination with centers on availability to schedule and conduct training may impact the timeframe

The FAA agrees to provide updates on TBFM through the S2K meeting forum

NGIWG Identified Gap

FAA pursue integration of TMA in other TFM tools in CY2011, not CY2013.

Cruise 24

FAA Response

- A Final Investment Decision for Time Based Flow Management (TBFM) initiatives to support the response will be made early in CY2010
- The FAA believes the CY2013 timeframe for deployment is reasonable

Drivers

- The FAA will need to establish a policy on sharing TMA data, as well as design, develop and integrate the tools
- The integration of TMA data is dependent on the Traffic Flow Management System (TFMS) schedule

TF5 Recommendation

Utilize Required Time of Arrival (RTA) Procedures to Leverage Collaborative Arrival Planning (CAP)

Cruise 25

Participants: ***American Airlines, Continental Airlines, Delta Air Lines, FedEx, NetJets, United Airlines, and US Airways***

Locations: ***All en route centers***

When: ***2010-2015***

FAA's Action Plan:

- 2010: Analyze and review CAP performance at Memphis and Atlanta centers
- 2010: Develop data rights and sharing policies for CAP
- 2010: Work with industry to develop RTA/CAP performance metrics
- 2010: Deliver RTA Safety Management System (SMS) analysis
- 2011: Conduct RTA proof-of-concept demonstration
- 2011-2014: Leverage demonstration results to conduct engineering and analysis necessary to support the development of initial RTA capability
- 2015-2018: Implement limited RTA capability (dependent on the establishment of a positive business case, approved SMS analysis, automation system enhancements and aircraft equipage)

NGIWG Identified Gap

FAA identify Required Time of Arrival (RTA) activities for CY2010/11.
The CY2011 proof of concept did not detail TF recommended sites.

Cruise 25

FAA Response

- The FAA concurs with the recommendation to advance the use of RTAs to improve flight efficiency and will further define the process for site selection
- Based on the policy and the analysis of the current sites with CAP, FAA will work with users to expand CAP to additional locations as applicable
- 2010: Deliver program plan to industry stakeholders for comment and work to develop plans for flight trials and explore sites for executing flight trials associated with RTA metering and tactical flow concepts. The RTA industry collaboration will occur via Program Office Technical Interchange Meetings (TIMs), the Integrated Airport Initiative (i.e., Embry-Riddle OTA), Airline Memorandums of Agreement (MOA), and other technical engineering contract mechanisms

Drivers

- The FAA will need to establish local airline and air traffic partnership agreements to further vet RTA concepts via data collection and flight trials activities
- Coordination with Centers on availability to schedule and conduct trials, as well as programmatic dependencies may affect the timeframe

TF5 Recommendation

Develop Area Navigation Based En Route System

Cruise 30

Participants: ***AOPA, American Airlines, Continental Airlines, Delta Air Lines, NBAA, United Airlines, US Airways (for T-routes and lowering of NRS waypoint grid)***

Locations: ***NAS-wide***

When: ***2012-2013***

FAA's Action Plan:

- 2010: In collaboration with stakeholders, deliver a nationwide strategy for the implementation of RNAV Q (18,000 feet and above) and T (below 18,000 feet down to 1,200 feet) routes
- 2011: In collaboration with stakeholders, determine the usefulness of the NRS to the GA community, and/or determine an alternative for low-altitude users

NGIWG Identified Gap

RNAV-based system should implement structure only where structure is needed.

Cruise 30

FAA Response

- The FAA agrees with the need to develop a performance-based en-route route structure only where needed

Drivers

- For publication of T routes, environmental impact assessments
- For publication of all new routes, federal rulemaking activities take 2 years

TF5 Recommendation

Special Activity Airspace Real-Time Status and Scheduling

Cruise 35

Participants: *NBAA members, Delta Air Lines, United Airlines, and AOPA members are interested in serving as lead operators to develop and implement a capability.*

Locations: *All en route centers, with priorities listed*

When: *2011 - 2013*

FAA's Action Plan:

- *See Next Slide*

TF5 Recommendation *(cont.)*

Special Activity Airspace Real-Time Status and Scheduling

FAA's Action Plan:

- 2010-2014: Conduct business case assessments for implementation at RTCA recommended priority sites (Minneapolis, Denver, Albuquerque, Los Angeles, Seattle, Salt Lake City) for implementation in coordination with the DoD and industry stakeholders
- 2010-2014: Conduct the following activities under the AIM modernization program:
  - 2010: In collaboration with the SAA community, develop a concept of operations to integrate diverse SAA functions
  - 2011: In collaboration with the SAA community, conduct an initial benefits analysis and review policy, and develop metrics and requirements
  - 2010-2014: Develop common digital information exchange services for coordinating and disseminating SAA usage and activation data for planning and tactical use
    - 2010: Enable SWIM exchange of SAA data
    - 2010-2011: Conduct demonstrations of SWIM exchange of SAA data to external users: Volk CRTC, Luke AFB, Jefferson Range, Eastern Air Defense Sector
    - Other sites under consideration for demonstration activity: Holloman AFB, Cannon Range, White Sands Missile Range
    - 2013-2014: Make integrated SAA data available to NAS systems such as ERAM and traffic flow management
  - 2011-2014: Implement a measurement system validating real time use of SAA data
  - 2014: Integrate SAA status information into air traffic decision support tools to enable strategic and tactical airspace management

NAS ACCESS

Leo Eldredge
FAA Technical Operations Services Manager, GNSS Group

TF5 Recommendation

Implement LPV Approaches to Airports Without Precision Approach Capabilities

Participants: *AOPA (piston GA), NBAA (jet GA), NetJets*
Locations: *NAS-wide*
When: *2010 - 2016*

FAA's Action Plan:

- 2010-2015: Maintain a goal of at least 300 new LPV approaches per year, placing highest priority on the value of new procedures
- 2010: Work with the aviation community to prioritize the schedule of runway ends slated to receive LPV procedures

NGIWG Identified Gap

FAA pursue the action plans in the Task Force 5 response for LPV approach implementation at the rate of 300 per year.

FAA Response

- 2010-2012: Complete a study to reevaluate the airport infrastructure requirements for LPV approaches with minimums down to 200 feet
- 2010-2016: Start delivering localizer precision (LP) approaches to runways that do not qualify for LPVs due to obstacles. LP procedures will provide the lowest possible minimums for runways that cannot support LPV approaches

Driver

- LPV procedures require airport obstacle surveys which take approximately 1-2 years to complete

TF5 Recommendation

Low-Altitude Non-Radar Access

Participants: *AOPA, NBAA, NetJets*

Locations: *Airports and low-altitude en route and terminal airspace where radar service is not currently available, Metroplex areas/satellite airports are an area of concentration (i.e. within 35-40 miles of IAD/DCA/BWI or JFK/EWR/LGA, etc.) and beyond those areas, we need to work with the FAA to define areas where safety and efficiency could be enhanced by the expansion of low-altitude radar-like surveillance. (Possibly a working group or the tiger team to focus on additional locations would be an option)*

When: *2010 (to leverage existing infrastructure); 2012 (begin deployment of additional ADS-B infrastructure*

FAA's Action Plan:

- 2010-2013: Continue to deploy ADS-B ground infrastructure
- 2010+: Explore state and local cost-sharing partnerships which could expand surveillance services (e.g., Colorado WAM initiative) into low-altitude, non- radar airspace
- 2011+: Pursue ADS-B program expansion to provide surveillance services in non-radar airspace

NGIWG Identified Gap

FAA pursue the action plans in the Task Force 5 response for ADS-B coverage in low altitude non-radar airspace.

FAA Response

- The FAA will propose a list of candidate locations, including those not previously considered, that meet the criteria for possible expansion of services and work collaboratively with industry to prioritize these locations
- The FAA expects to sign a Memorandum of Understanding with the National Association of State Aviation Officials (NASAO) for a NextGen initiative that will explore state and local cost-sharing partnerships for expansion of surveillance services into low-altitude, non-radar airspace

CROSS-CUTTING

Integrated ATM Data Comm

Stephen Ryan
FAA Terminal Services
Systems Engineer

TF5 Recommendation

Integrated Air Traffic Management Integrated System-wide Approach (CDM/TFM/ATC)

Participants: *CDM participants, ADF, FAA*

Locations: *NAS-wide*

When: *2011*

FAA's Action Plan:

- 2010-2011: Continue the analysis necessary to develop the requirements needed to implement proven decision support tools and data sharing capabilities
- 2011: In collaboration with aviation stakeholders, deliver a mid-term traffic flow management capabilities roadmap that outlines improvements that can be accomplished in the 2014-2018 timeframe
- 2012: Upgrade the existing TFMS to include an initial electronic negotiation capability for more efficient flight planning

NGIWG Identified Gap

FAA continue to focus on defining a framework for data sharing and integration, clarifying roles and responsibilities among multiple organizations (FAA, operators, other government agencies) and addressing integrated ATM beyond traditional TFM/CDM capabilities.

FAA Response

- The FAA will have a data sharing policy by 2010

TF5 Recommendation

Improved C-ATM automation to negotiate user-preferred routes and alternative trajectories

Cross-Cutting
7b, 8, 46

Participants: *CDM participants, ADF, FAA*

Locations: *NAS-wide*

When: *2013 - 2015*

FAA's Action Plan:

- 2011-2016: Deploy the ability for traffic managers to electronically transmit reroutes from the traffic flow management automation to en route automation for delivery to the pilot and dispatcher:
- 2011: Predeparture reroutes (Tower)
- 2014: Airborne reroutes (En Route)
- 2016: More complex RNAV clearances, dependent on Data Comm
- 2011: Institute TBFM, a series of enhancements to the TMA decision support tool (dependent on first quarter calendar year 2010 TBFM final investment decision)
- 2012: Upgrade the existing TFMS to include an initial electronic negotiation capability for more efficient flight planning

TF5 Recommendation

Digital ATC-Aircraft Communications for Revised Departure Clearances, Reroutes, and Routine Communications

Cross-Cutting
16, 17, 39, 44, 42

Participants: ***American Airlines, Continental Airlines, Delta Airlines, Southwest Airlines, and United Airlines***

Locations: ***NAS-wide incremental implementation***

When: ***Data Comm Tower: 2012, En Route: 2014.***
Tailored Arrivals: continuing as appropriate

Data Comm Segment 1

FAA's Action Plan:

- 2011: Deliver a final investment decision on Data Comm Segment 1
- 2014: Enable revised departure clearance capability in the tower environment via VDL-2 for aircraft equipped with FANS 1/A+
- 2016: Enable revised departure clearance capability via VDL-2 for aircraft equipped with ATN
- 2016: Provide airborne reroutes for traffic flow management (TFM) in the en route environment for Data Comm equipped aircraft (FANS 1/A+ or ATN) via VDL-2

FAA Response to RTCA Task Force Recommendations
April 6, 2010
Federal Aviation Administration
53

NGIWG Identified Gap

FAA revise departure clearances on the ground by 2012.

Cross-Cutting
16, 17, 39, 44, 42

Data Comm Segment 1

FAA Response

- The FAA projects the availability of this capability in 2014
- Revised departure clearance deployment expedited from original schedule

Drivers

- Investment Decision: FY11
- Upgrades to TDLS
- ERAM Modifications (M&C function)
- Rollout

FAA Response to RTCA Task Force Recommendations
April 6, 2010
Federal Aviation Administration
54

NGIWG Identified Gap

FAA Provide en route reroutes via Data Comm in 2014.

Cross-Cutting
16, 17, 39, 44, 42

Data Comm Segment 1

FAA Response

- The FAA projects the availability of this capability in 2016

Driver

- Required ERAM enhancements not in place until 2016

NGIWG Identified Gap

FAA Provide more information regarding the utility of current ATN (Baseline 1/Link2000+) avionics for en route services.

Cross-Cutting
16, 17, 39, 44, 42

Data Comm Segment 1

FAA Response

- ATN Baseline 1/Link2000+ not compatible with full scope of planned Data Comm capabilities
- En route services to be provided via SC-214 compliant ATN avionics
  - Expected aircraft equipage availability: 2014

NGIWG Identified Gap

Operator confidence in realizing benefits is at risk with FAA-proposed dates; timely benefits delivery needed to maintain business case.

Cross-Cutting
16, 17, 39, 44, 42

Data Comm Segment 1

FAA Response

- Data Comm program commissioned ad hoc committee through the Airlines Electronic Engineering Committee (AEEC) Data Link Users Forum (DLUF)
  - Address technical and integration issues for initial services
  - Discuss programmatic and technical risk mitigation strategies
- Data Comm program initiated outreach efforts:
  - One-on-one meetings with interested Data Comm stakeholders, including RTCA recommended airlines: American, Continental, Delta/Northwest, FedEx and United
  - Invitation extended to any interested airline
  - Focus on the FAA's understanding of benefits/timelines/business case

TF5 Recommendation

Digital ATC-Aircraft Communications for Revised Departure Clearances, Reroutes, and Routine Communications:

Cross-Cutting
16, 17, 39, 44, 42

Tailored Arrivals

FAA's Action Plan:

- 2011: Transition Tailored Arrivals from a demonstration project to full operational use (Miami, San Francisco, Los Angeles)
- 2011: Identify potential required changes to automation platforms necessary to support operational implementation of use of Oceanic Tailored Arrivals
- 2011-2014: Collaborate with industry to identify additional coastal airports where there is a positive business case for the implementation of Tailored Arrivals. Due to the dependence of Tailored Arrivals on FANS equipment, these procedures are currently limited to use at airports that support transoceanic traffic

Session 3: NGIP and TF5…How is the Collaboration Going?

Members of the RTCA ATMAC NextGen Implementation Workgroup will present their assessment of the NGIP alignment with the TF recommendations. The panel will then discuss perceived gaps, possibilities for resolving issues; opportunities for acceleration and ideas for determining priorities for implementation.

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Session 3: NGIP and TF5…How is the Collaboration Going?

2 p.m. – 3:30 p.m.

Moderator: **Capt. Steve Dickson**, *Senior VP, Flight Operations*, Delta Air Lines

Panel Members: **Lorne Cass,** *Director, ATM & Industry Affairs*, Delta Air Lines

Robert G. Lamond Jr., *Director, Air Traffic Services & Infrastructure*, National Business Aviation Association

Dave Nakamura, *Chief Engineer, BCA Aviation Infrastructure*, The Boeing Company

Craig Spence, *VP Operations & Internal Affairs*, Aircraft Owners and Pilots Association

Capt. Brian Townsend, *Flight Technical Operations*, US Airways

Steve Vail, *Sr. Advisor Air Traffic Operations*, FedE

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Post Task Force Collaboration

- **Phase 1: Clarification and Disposition of Recommendations**
  - FAA-Industry Collaborative Planning
  - Updated NextGen Implementation Plan
  - *Responsibility—Authority—Accountability*
- **Phase 2: Implementation and Execution**
  - Joint Government/Industry Implementation Mechanism
- **Phase 3: Performance Tracking**
  - Enhance the Collection, Dissemination, and Analysis of System Performance
  - Utilize the ATMAC to Track Progress on Implementation

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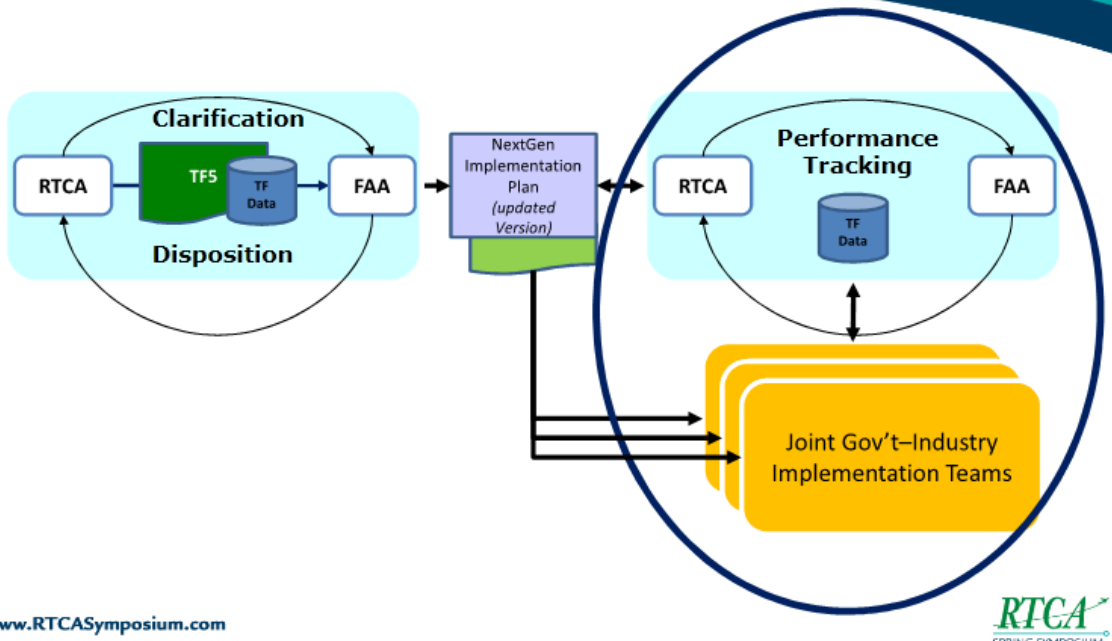
Post Task Force Collaboration



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Activities Since Task Force Report Submitted in Sept 2009

October 29	ATMAC Established NextGen Implementation Work Group in Response to Request by FAA
Dec. – Jan	NGIWG Subgroups Coordinate With FAA Leads on FAA Response to RTCA Task Force Recommendations
January 31	FAA Response to Task Force Recommendations Published
February	NGIWG Review of FAA Response
March 3	ATMAC Meeting: Considered FAA Response and NGIWG Review of FAA Response (See Next Chart)
March 8	NextGen Implementation Plan (2010 Edition) Published
April 6	RTCA Spring Symposium

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ATMAC Actions Related to FAA Response and NGIWG Report

- Recognized that Gaps Exist Between the TF 5 Recommendations and the FAA January 31 Response
- Recommended that the FAA Work to Address the Gaps When Developing the NextGen Implementation Plan (NGIP) and Related Implementation Planning Documents
- Extended the NGIWG Charter until the September 2010 ATMAC meeting and Agreed to Assess Need for Extension at that Meeting

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RTCA SPRING SYMPOSIUM

Making it Real: Challenges to Implementing NextGen at a Metroplex

Lillian Ryals

RTCA Spring Symposium
6 April 2010

CAASD MITRE

Metroplex Problems

- Complexity associated with diverse operations and mixed equipage
- Reduced-visibility conditions and severe weather that limits flexibility and throughput
- Adjacent airports in close proximity that share the same airspace
- Imbalance of traffic flows across ingress and egress points
- Environmental constraints and noise abatement procedures

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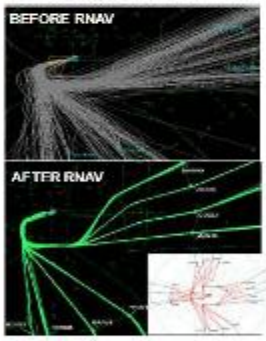
"Making it Real"

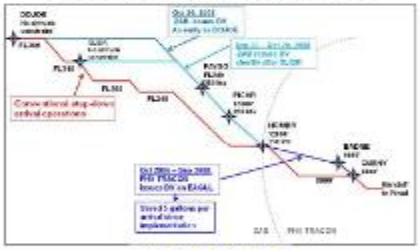
MITRE CAASD

Leverage RNAV/RNP



ATL SIDs/STARs

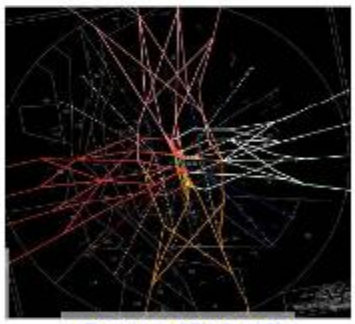
Optimized arrival profiles



PHX OPDs

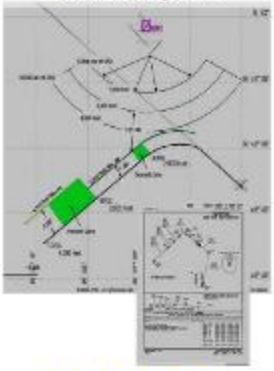
Efficient use of airspace supported by appropriate tools

Integrated airspace & procedures, efficient access to en route



Denver Kick-off

Decoupling geographically close airports

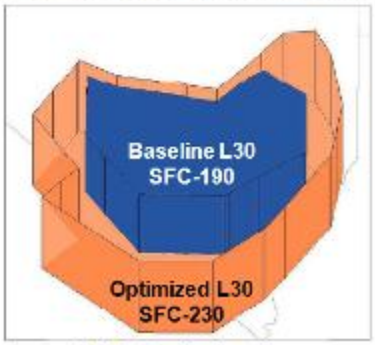


MDW RNP AR

Expedited departures

NY: Westgate Departures

Most efficient separation rules

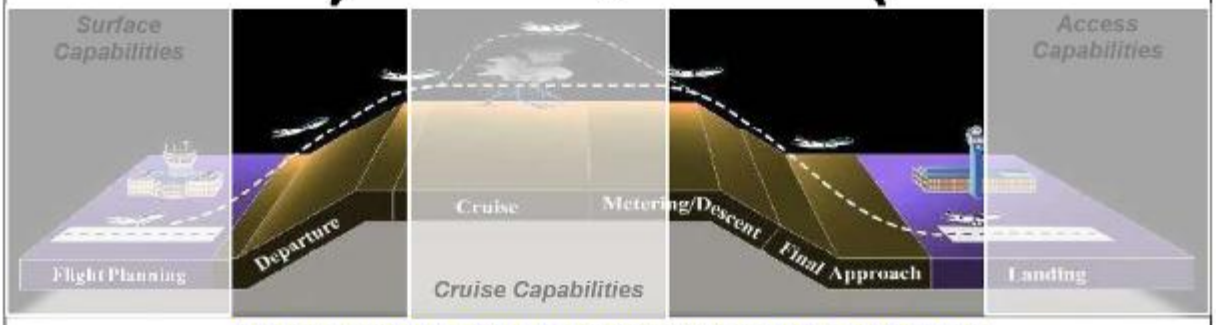


LAS Optimization

MITRE CAASD

Desired Metroplex Capabilities

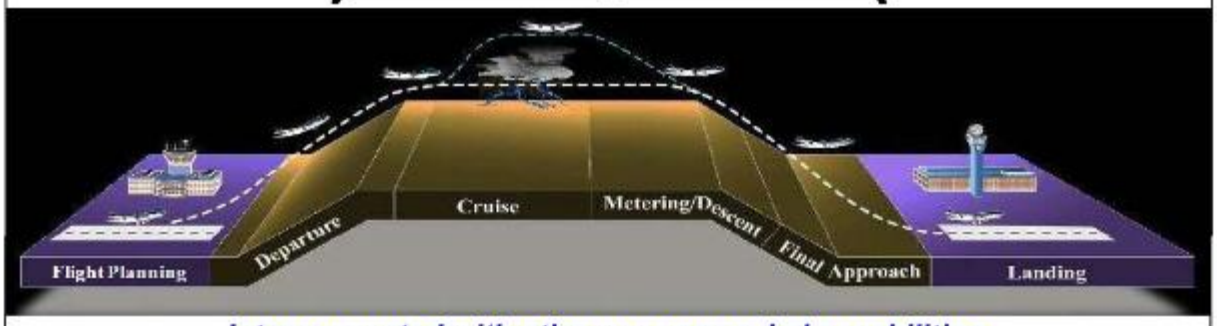
- Leverage RNAV/RNP
- Expedited departures
- Optimized arrival profiles
- Integrated airspace & procedures with efficient access to en route
- Most efficient separation rules
- All supported by enhanced tools



Interconnected with other recommended capabilities

Desired Metroplex Capabilities

- Leverage RNAV/RNP
- Expedited departures
- Optimized arrival profiles
- Integrated airspace & procedures with efficient access to en route
- Most efficient separation rules
- All supported by enhanced tools



Interconnected with other recommended capabilities

Surface Operations
- ✓ Situation Awareness
- ✓ Data Exchange
- ✓ Common Operational Picture

Cross Cutting
- ✓ Data Communications
- ✓ Integrated ATM

Cruise Operations
- ✓ Special Activity Airspace
- ✓ Time-based Metering
- ✓ RNAV-based Route System

Airport and Airspace Access
- ✓ Low Altitude Non-Radar
- ✓ LPV Approaches

Runway Access
- ✓ Converging and Intersecting Runways
- ✓ Parallel Runways

Panel Discussion

- **What are the challenges and potential risk mitigation strategies to ensure successful implementation?**

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Building the SESAR Business Case – Development, Implementation and Deployment

This session will present an integrated, transparent and re-usable modeling for business cases. When considered from a stakeholder point of view and in the context of international standardization, should the business case of the future better reflect the global interoperability perspective?

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Bringing NextGen Into Focus

Building the SESAR Business Case –

Development, Implementation and Deployment

Patrick Ky,

Executive Director

SESAR Joint Undertaking

www.RTCASymposium.com

RTCA SPRING SYMPOSIUM

RTCA Symposium Washington DC, 07 April 2010

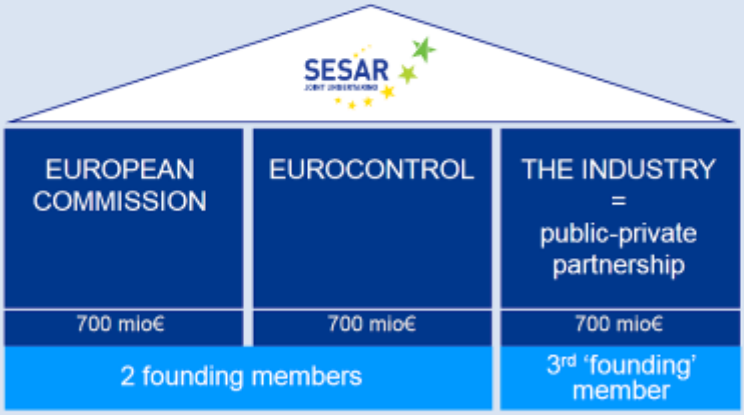
Patrick KY

SESAR JOINT UNDERTAKING

founding members

Page 1

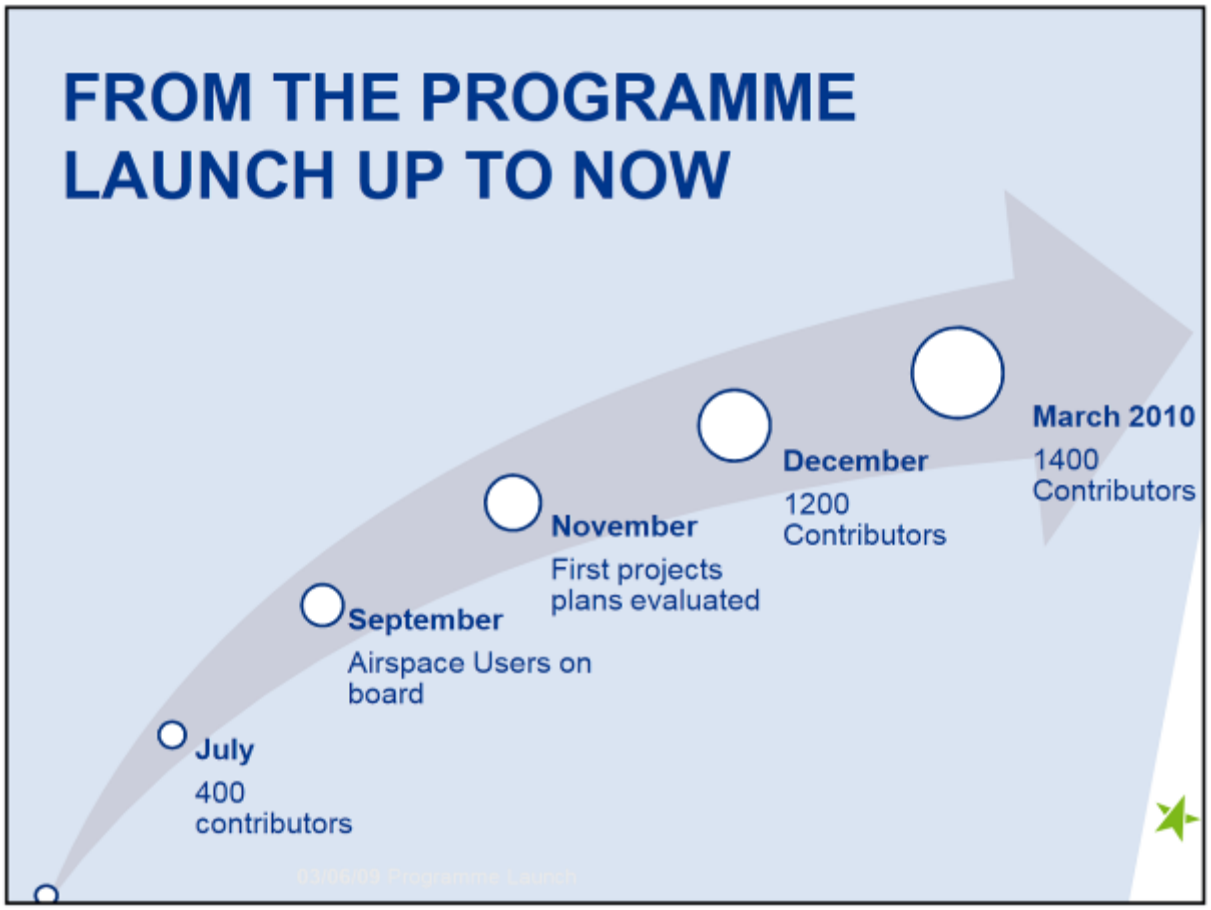
THE SESAR JOINT UNDERTAKING

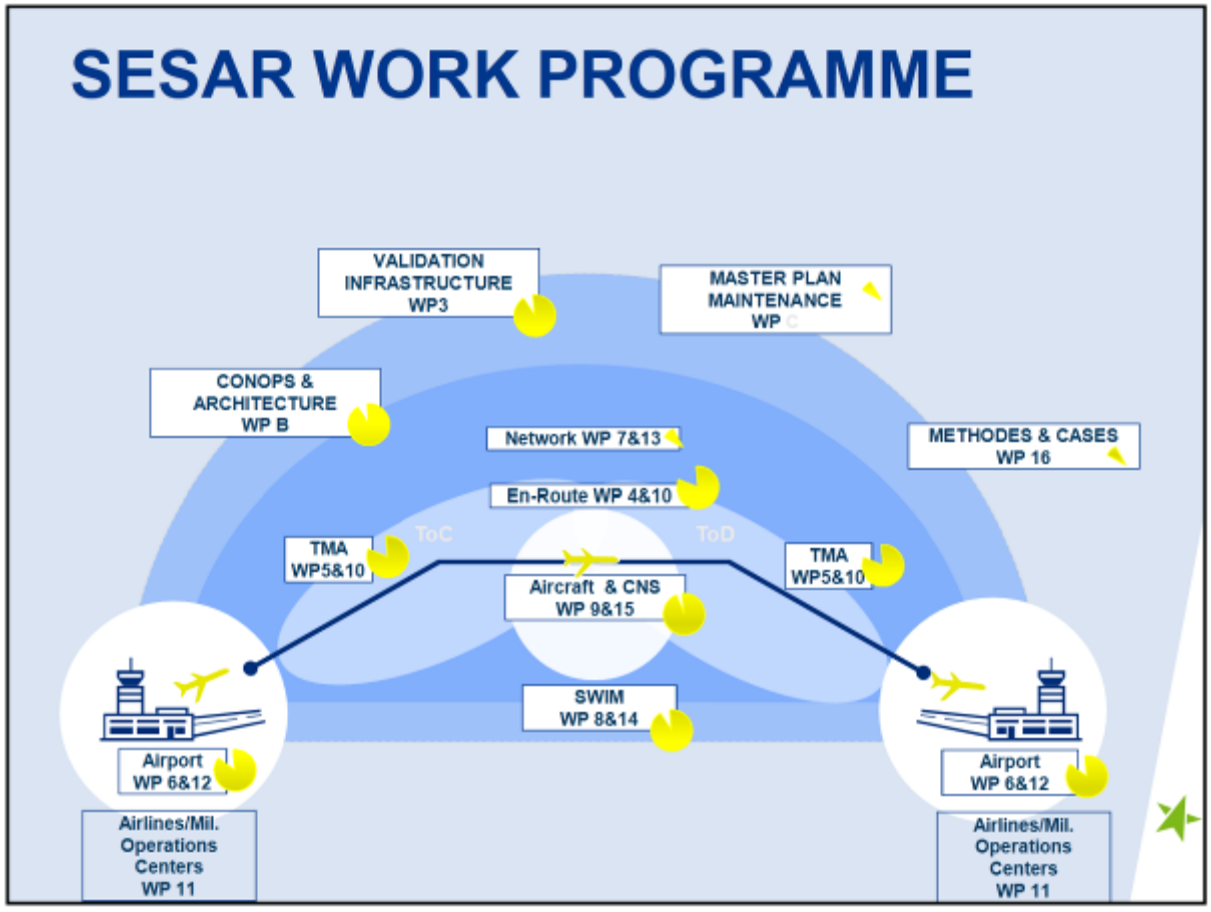


Created by the European Union Council Reg. N° 219/2007

Budget: € 2.1 billion (over 7 years)

Public-Private Partnership
- Innovation from private sector
- Public financial stability & enforcement power
- Manage wide range of actors


FROM THE PROGRAMME LAUNCH UP TO NOW
July
400 contributors
September
Airspace Users on board
November
First projects plans evaluated
December
1200 Contributors
March 2010
1400 Contributors
03/06/09 Programme Launch

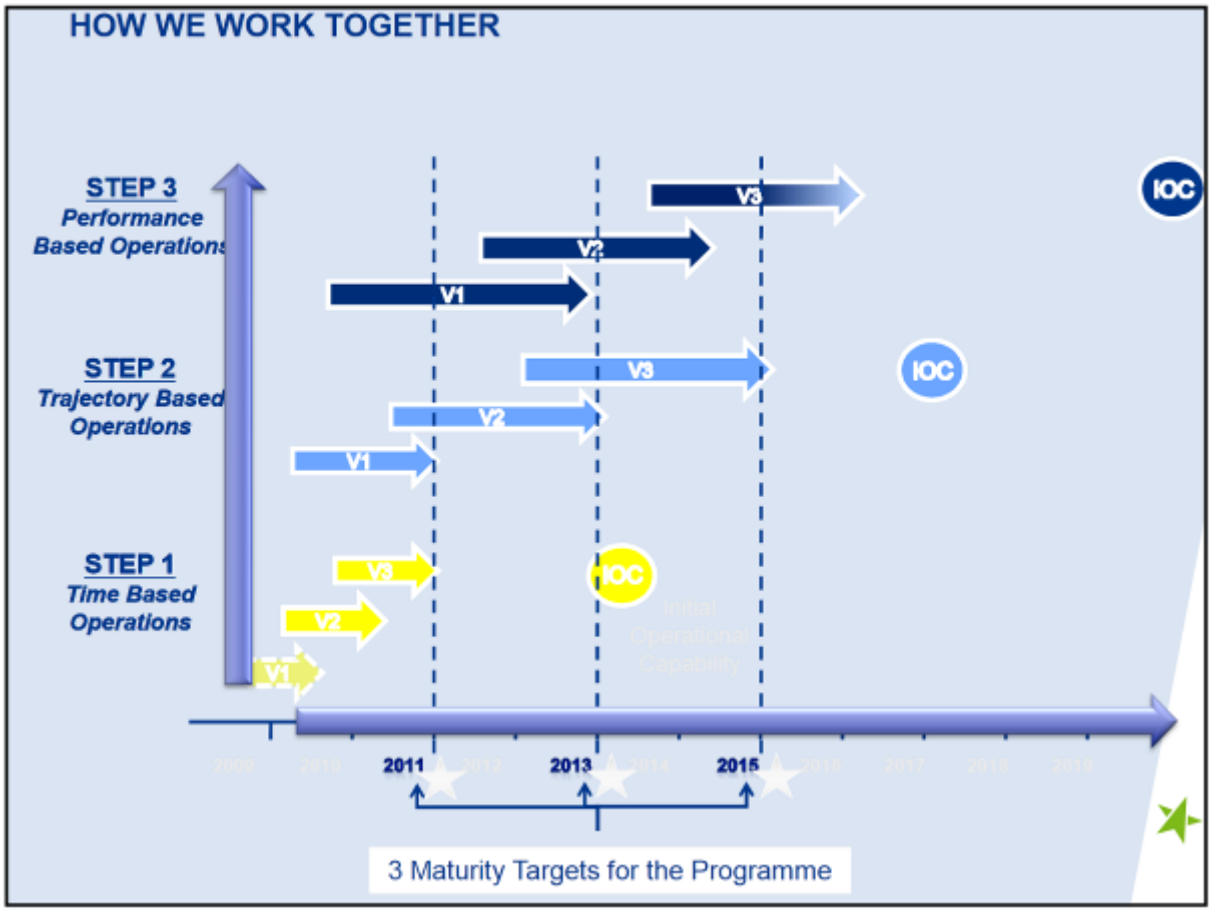

SESAR WORK PROGRAMME
VALIDATION INFRASTRUCTURE WP3
MASTER PLAN MAINTENANCE WP C
CONOPS & ARCHITECTURE WP B
Network WP 7&13
METHODES & CASES WP 16
En-Route WP 4&10
ToC
ToD
TMA WP5&10
TMA WP5&10
Aircraft & CNS WP 9&15
SWIM WP 8&14
Airport WP 6&12
Airport WP 6&12
Airlines/Mil. Operations Centers WP 11
Airlines/Mil. Operations Centers WP 11

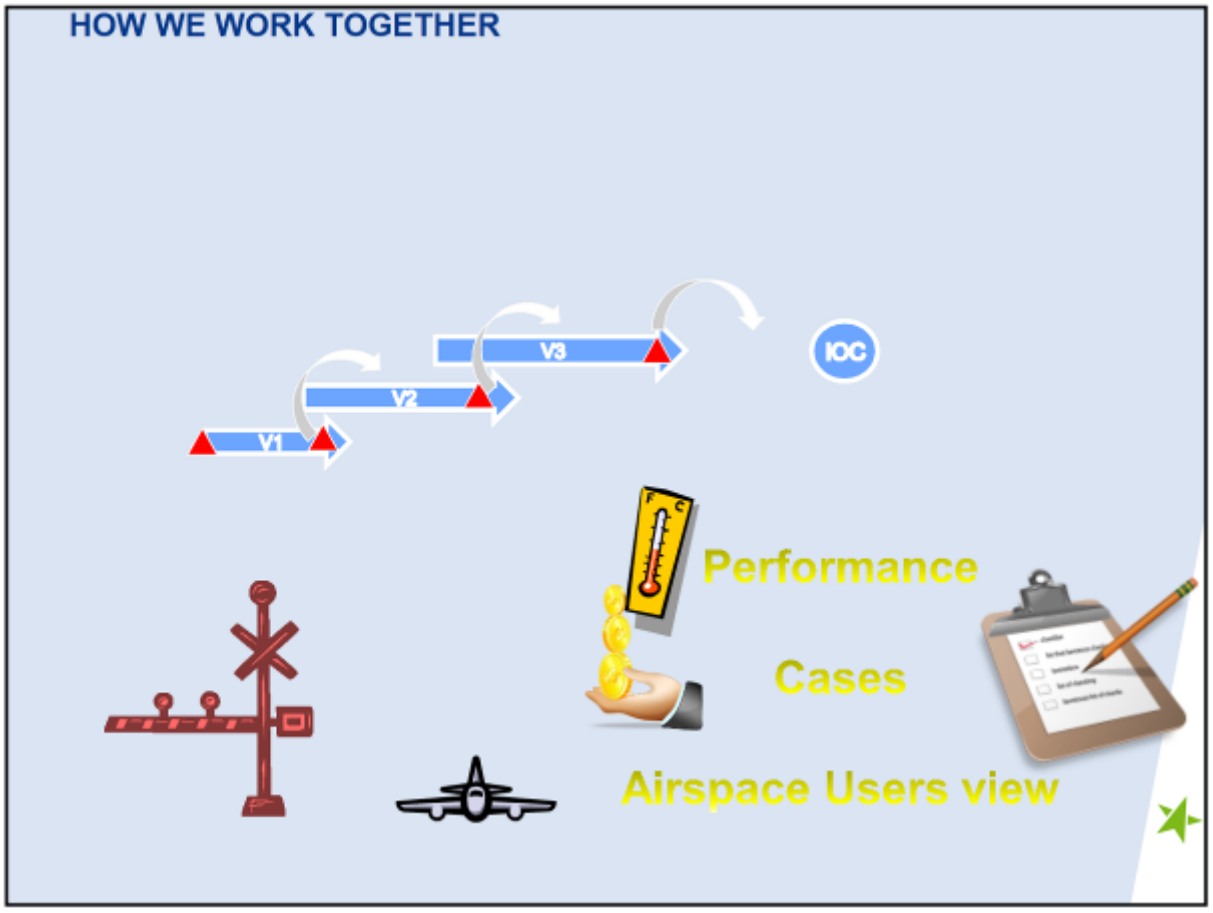
SESAR Public-Private Partnership

- 16 Members & about 70 companies on board

Key Figures

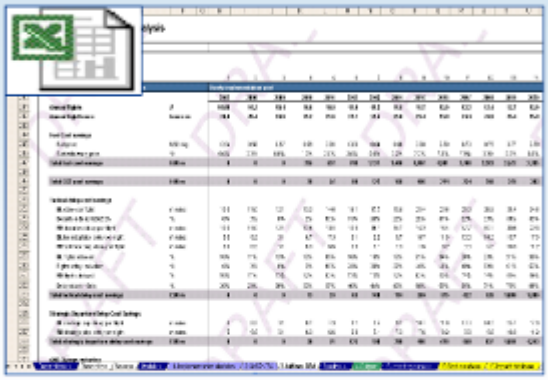
- More than 300 projects
- Average project:
  - *Duration 4 years*
  - *Budget 7M€*
  - *Dependencies with 5 other projects*
- Airspace Users directly involved in projects
  - *Air France & Régional, KLM, Iberia,*
  - *Lufthansa Group including SWISS and LCAG,*
  - *SAS Scandinavian Airlines, TAP Portugal, Novair,*
  - *EBAA including Netjets Europe and Dassault*
  - *IATA*
  - *IAOPA*
  - *Low Cost Carriers*
  - *No US carrier*


HOW WE WORK TOGETHER
STEP 3
Performance Based Operations
STEP 2
Trajectory Based Operations
STEP 1
Time Based Operations
V1
V2
V3
IOC
Initial Operational Capability
2011
2013
2015
3 Maturity Targets for the Programme


HOW WE WORK TOGETHER
V1
V2
V3
IOC
Performance
Cases
Airspace Users view

An integrated, transparent and re-usable model has been built, validated and documented

Excel-based CBA based



- Integrated, quantitative view on airlines and ANSPs granular at stakeholder and technology level
- Editable set of user parameters (e.g. fleet usage pattern)

Model documentation

- 55 page Powerpoint presentation
- Description of model and assumptions
- Detailed explanation of each Excel worksheet
- Detailed breakdown of each calculation

Page 11

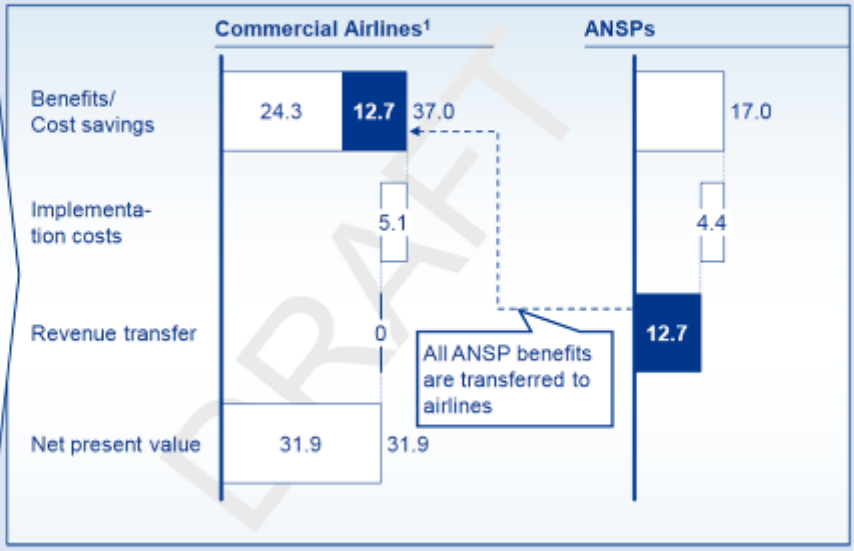
Overall results of the new integrated model

PRELIMINARY

EUR billions, present value (2008-2025)

Key assumptions

- Total NPV discounted at 8% real rate, zero terminal value
- No taxes considered
- Traffic growths between 2% and 5% annually
- 56% of the fleet retrofitted
- Benefits are computed as delta approach on full implementation of previous implementation package



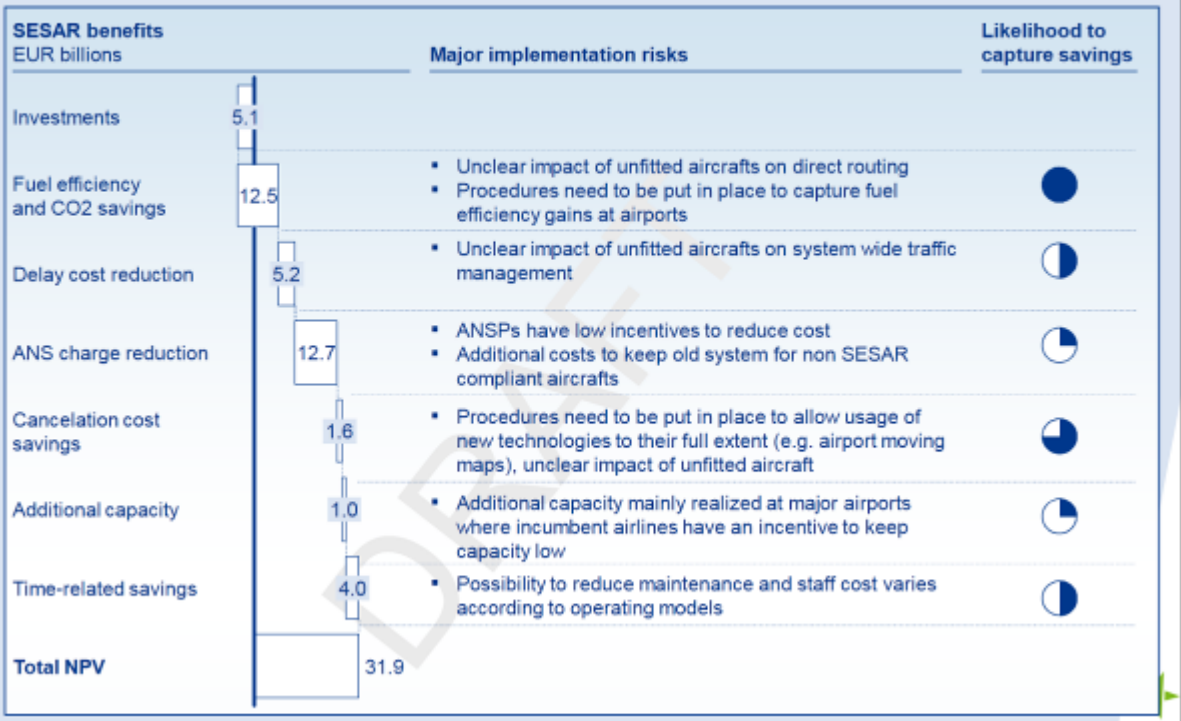
1 Excluding GBA

SOURCE: SESAR D4; EMOSIA Dec 07 for Airlines; ANSPs; Military; D4 Cost Effectiveness Team; ANSP Financial Cases, 16.11.2007

Page 12

Fuel efficiency, CO2 cost savings and delay reduction seem the most reliable sources of benefits

PRELIMINARY



SOURCE: Team analysis; EMOSIA airline CBA models for IP1, IP2a, IP2b Dec 07; Definition phase ANSP model (IFM-RE-1.xls)

Page 13

The benefits for airlines differ significantly, ranging from 5 to 10 years to breakeven

OUTSIDE-IN ESTIMATES

SESAR impact for different types of airlines

EUR millions	Typical Hub Carrier	Typical East European Carrier	Typical Regional Carrier	Typical Low Cost Carrier	Typical US Carrier [2]
Investments	-203	-35	-23	-92	-22
Fuel+CO2 s.	883	53	49	396	25
Delay cost s.	261	25	31	163	9
ANS charge s.	1,191	59	55	451	31
Time related s.[3]	353	20	19	234	10
Other	131	11	13	71	4
NPV	2,616	133	143	1,221	58
NPV per flight EUR thousands	5.2[1]	2.8	2.4	3.9	1.6
Breakeven Years	5	8	7	6	10
Breakeven Fuel only Years	8	13	12	9	14
Rationale	Long average flight duration resulting in high ANS charge and fuel savings	Fit of a large major airline fleet with low utilization resulting in late breakeven	Operations in regions with low ANS charges reducing the benefits	Low fitting costs for low fair airlines improving the business case	Benefiting at one airport per flight only

1 May be distorted due to large amount of long haul flight, all flights leaving Europe have been given a fix flight time in European airspace, to North and South America 100 min (Frankfurt-Dublin), Africa 160 min (Frankfurt-Morocco), Asia and Australia 152 min (Frankfurt-Istanbul)
2 Benefiting from 50% of delay cost s., 50% of cancelations and additional traffic, 84% of fuel gains, fitting a fleet of 28 aircrafts
3 Only low cost carriers realize time related savings on staff cost

SOURCE: Team analysis; OAG Aviation Solutions Schedules Database; EMOSIA airline CBA models for IP1, IP2a, IP2b Dec 07; Definition phase ANSP model (IFM-RE-1.xls)

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CONCLUSION

Any ATM modernisation programme must be justified by a business case:

- *For ANSPs: gains in efficiency, maintainability,…*
- *For Airlines: gains in efficiency, direct operating cost,*
- *For Air Forces: gains in efficiency, cost, access to capacity*

The global dimension is part of the business case

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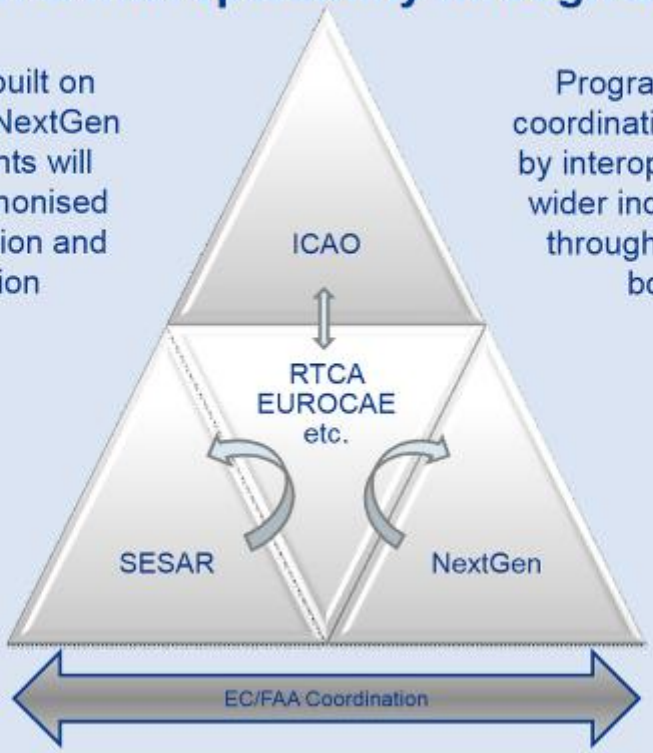
AIRLINES OPERATING BEYOND EUROPE
Cooperation & Interoperability through Standards

Standards built on SESAR and NextGen developments will support harmonised Implementation and Regulation



Programme level coordination enhanced by interoperability and wider industry buy-in through standards bodies.

Session 6: Looking Forward – Future Trends in the NextGen Business Case

This session will address the NextGen business case from the perspective of key investors in NextGen capabilities – the FAA and aircraft operators – with due consideration of data-driven decision making, environmental issues, and the regional economic benefits of NextGen investments.

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Session 6: Looking Forward – Future Trends in the NextGen Business Case

9 a.m. – 10:15 a.m.

Moderator: **Kirk Rummel**, *Managing Director of Finance-Operations*, Continental Airlines, Inc.

Panel Members: **Craig Spence**, *Vice President, Operations & Internal Affairs*, Aircraft Owners and Pilots Association

Fred Messina, *Executive Advisor*, Booz Allen Hamilton

Debby Kirkman, *Senior Principal Engineer*, The MITRE Corporation

Nancy LoBue, *Acting Assistant Administrator, Policy, Planning and Environment*, FAA

Kristen Burnham, *Director, Investment Planning and Analysis*, FAA

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Future Trends in the GA Business Case

Craig Spence

Aircraft Owners and Pilots Association

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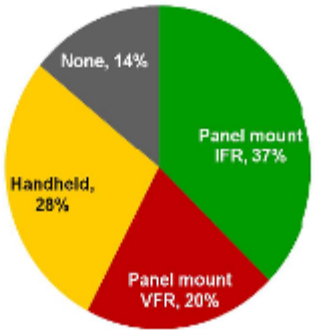
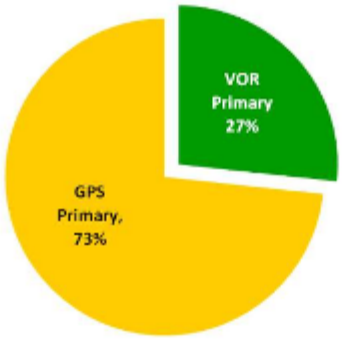
GPS Usage by GA Aircraft





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Remain Supportive and Optimistic

- AOPA has long been a proponent of a Satellite based navigation system
  - Since the early 90's
  - AOPA members adopted GPS because of a proven benefit
- When examining, look at our core member
  - 75% of 415,000 flew less than 125 hours last year
- Average Piston Fleet Age 2005
  - 36.5 Years
- Average Piston Fleet Age 2008
  - 42.25 Years

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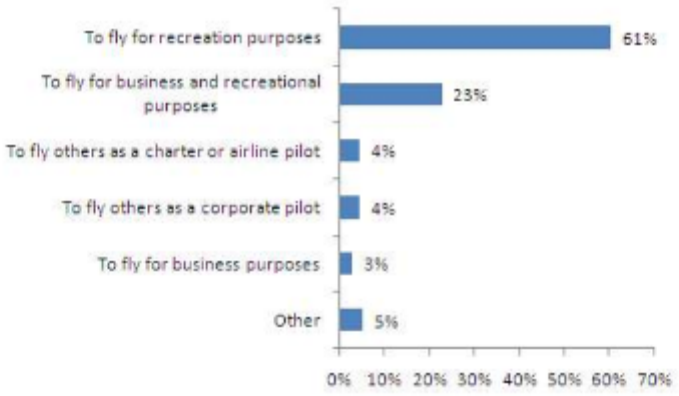
Why our Members Fly

- Business case for these individuals is much different than other facets of GA. 30/70 rule.



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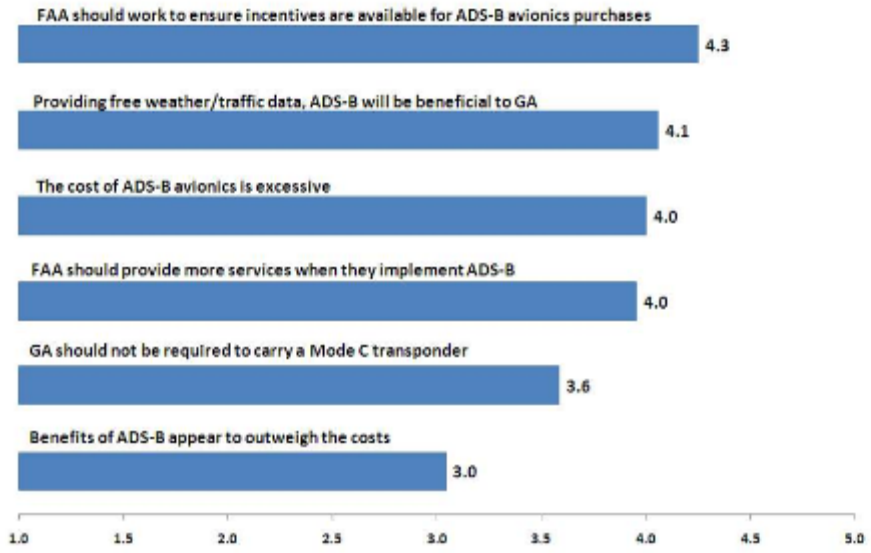
What our Members Think



Please indicate how strongly you agree or disagree with the following statements?
Strongly Agree (5) – Strongly Disagree (1)

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What Needs to be done to make it fly!

- Key Filter to Successful Implementation
  - Increased Safety
  - Operational Efficiency
  - Increased Access
- ADS-B out Should be able to justify benefits on its own
  - First test of NextGen Business Case
  - Low Cost Alternative will drive equipage
  - Don't make me pay for what I already have

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Building a Viable Business Case for Equipage Strategies

Fred Messina

Booz Allen Hamilton

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So Many Stakeholders…..So Many Business Cases

Investment Decisions Are Driven By Positive Business Cases

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A Key *NextGen* Decision: Equipage

- Many *concepts* are being considered to accelerate equipage, for example:
  - Operational incentives - "Best Equipped-Best Served" or "Better Capability-Better Service"
  - Financial incentives – "*NextGen* Equipage Bank"
  - Actual realization of true *NextGen* benefits hinges on the *development and implementation* of viable equipage strategies
  - Analytics provide the hard data needed to close respective stakeholder business cases, and *move from concepts to reality*

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Building the BE-BS Case

- Combining the outcomes of these analyses with costs allows true business case assessment

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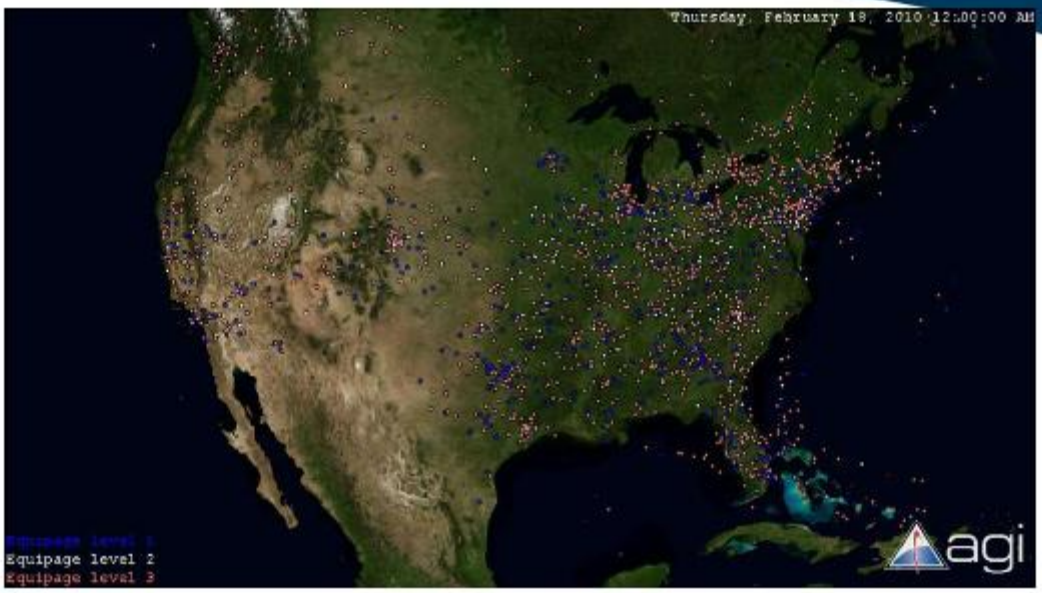
Geospatial: Visualizing and Assessing System Level Interactions



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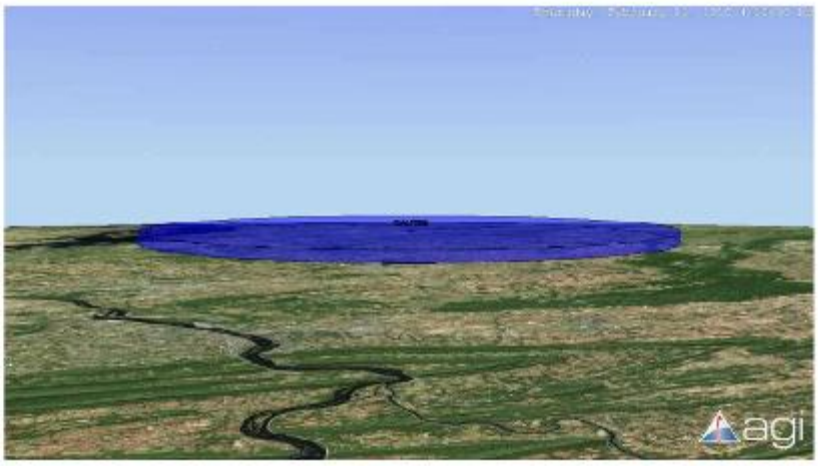
Geospatial Analysis: Model, Analyze, Iterate

Flight Specific Variables & Scenarios

- Sensor Accuracy
- Buffer zones
- Trajectories
- Event Times
- Total Flights
- Etc.



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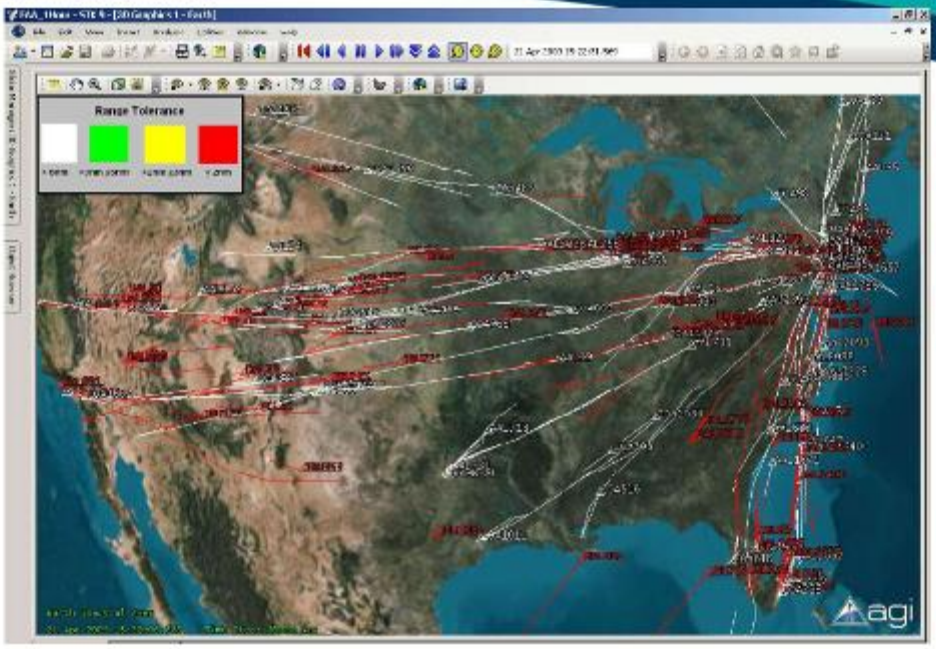
Exploring a What-if Scenario



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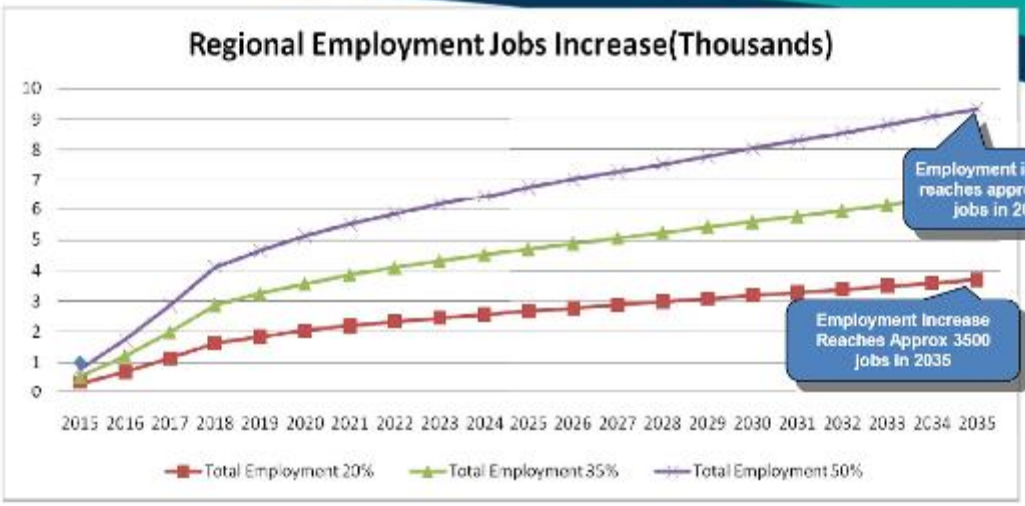
Decreased Delays Lead to Increased Consumer Spending Which Leads to Increased Regional Employment (New York Area)



- A 20% decrease in air carrier delay costs result in average of 2,500 new jobs 2015 - 2035
- A 35% decrease in air carrier delay costs result in average of 4,000 new jobs 2015 - 2035
- A 50% decrease in air carrier delay costs result in average of 6,000 new jobs 2015 - 2035

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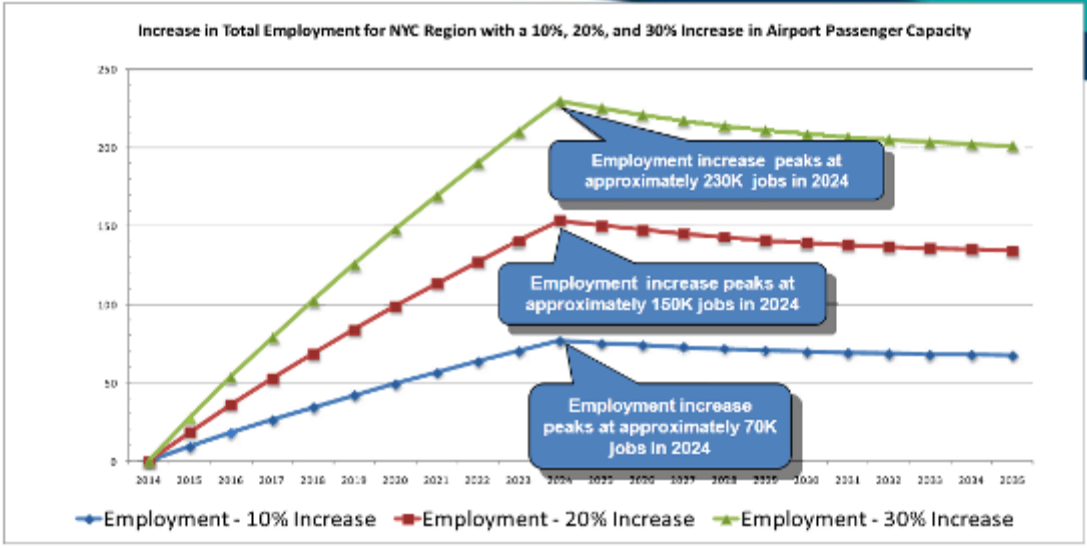
Economic Analysis: Increased Capacity Leads to Increased Consumer Spending & Employment Increases



- A 10% capacity increase yields an average annual increase of approx 50K jobs 2015-2035
- A 20% capacity increase yields an average annual increase of approx 100K jobs 2015-2035
- A 30% capacity increase yields an average annual increase of approx 170K jobs 2015-2035

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Summary

- Geospatial & Economic Analyses Are Essential For:
  - Developing Viable BE-BS implementation strategies
  - Completing individual stakeholder business cases
  - Building the National level business case

Thank You

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RTCA SPRING SYMPOSIUM

Building the NextGen Business Case

Deborah Kirkman
The MITRE Corporation
7 April 2010

MITRE

Building the NextGen Business Case: Essential Elements

Integration of all three views are needed to result in commitments to invest

MITRE

TF5: What Worked in Developing Consensus

- Compressed schedule kept people focused
- Leadership was committed to using and sharing data
- Used a balance of judgment and analysis
  - Stakeholder input on assessment metrics
  - Cross-validation of operational and financial measures
  - Transparency and visual interface to data

MITRE

The Dashboard

- Reflects the results of open capability assessment sessions
- Provides visual navigation through 15+ MB of data
- Allows reader to see substantiation at multiple levels

NextGen Dashboard - for Mid-Term Implementation (9/8/09)

For Legend See "Parameters" Sheet

Capability Name (click for Description)	Timeframe	Benefit	Readiness	Implementation Risk Resolution	Other Consideration Resolution	Assessment Confidence
02_2.5 Final Separation	2010	M^	L	M	H^	Medium
03_3.5 Spacing Buffers	2014	H	L^	H^	H^	Medium
04_Adjacent Airports	2010-2015	H	M^	H^	H?	Medium
05_ADS-B Performance Based Routes	2013	M	L^	L	M	Medium
06_Arrival Offsets	2015-2018	M?	H^	L?	L	Low
07a_CATM High Low Reroutes (phase1)	2009+	M?	H^	H?	H^	Low

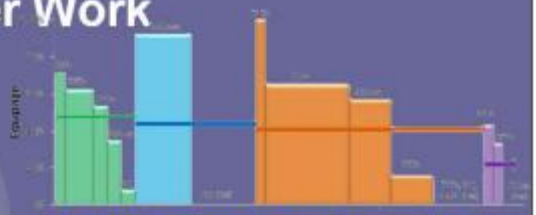
MITRE

Building the NextGen Business Case: MITRE's Broader Work

OPERATIONAL
"What is it?"

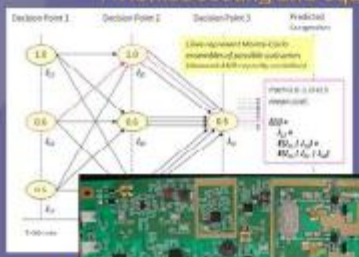
MITRE

Building the NextGen Business Case: MITRE's Broader Work



Avionics costing and equipage profiles

REALITY
"Why should I believe it?"

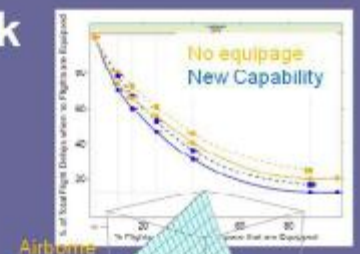


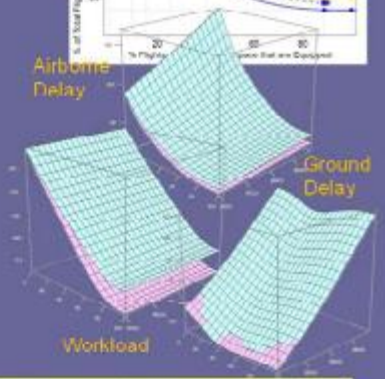
NAS Enterprise Architecture

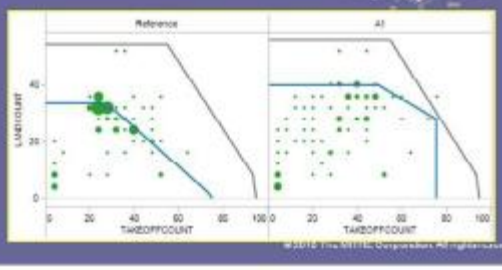
MITRE

Building the NextGen Business Case: MITRE's Broader Work

VALUE
"Why do I care?"







MITRE

The NextGen Business Case: Moving Towards Commitments

- Understand what aspects of a capability contribute to, or detract from a stakeholder's operation
- Provide a way for stakeholders to contribute sensitive information with assurance of data protection
- Lay out the implementation alternatives, pointing out constraints and potential mitigations
- Identify opportunities to provide early benefits for first adopters
- Look at all aspects of implementation – Technology, Procedures, and Policy

MITRE

The NextGen Business Case: Environment and Energy Issues

Federal Aviation Administration

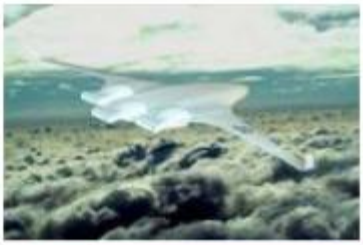
RTCA Symposium: Bringing NextGen into Focus

Nancy LoBue, Acting Assistant Administrator for Policy, Planning, and Environment

April 7, 2010

What is NextGen?

- The Next Generation Air Transportation System (NextGen) Plan aims to modernize the U.S. aviation system.
- It seeks to achieve the next level of safety, capacity, efficiency, and environment protection through a portfolio of technologies, capabilities, and policies.



- NextGen <u>is not</u> a single projects, or program plan, or even a new air traffic system implemented on a single date.

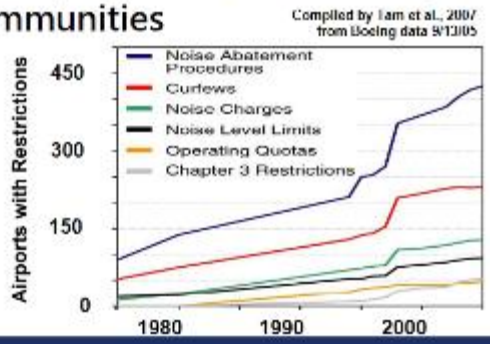
NextGen At A Glance

Federal Aviation Administration 29

Aircraft Noise Issues

Aircraft noise remains a primary concern for communities that hinders airport expansion.

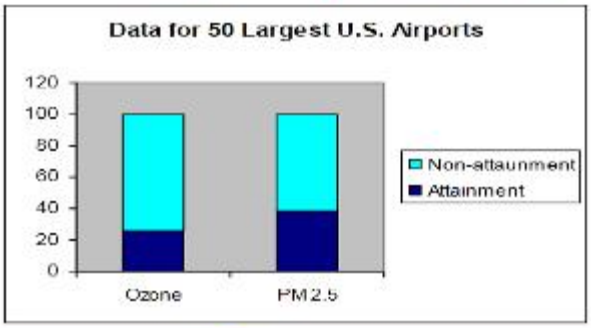
Effects of Noise:
- Annoyance
- Sleep disturbance
- Learning effects
- Quality of life for surrounding communities



Air Quality Issues

- Aviation emissions impact surface air quality.
- Most of the aircraft related health impacts are primarily due to particulate matter (PM).
- Air quality and health impacts from aviation emissions range from local to regional scales.

Air quality standards emphasize attention to aviation emissions, particularly when emissions from other sources are decreasing.



Aviation Climate Change Issues

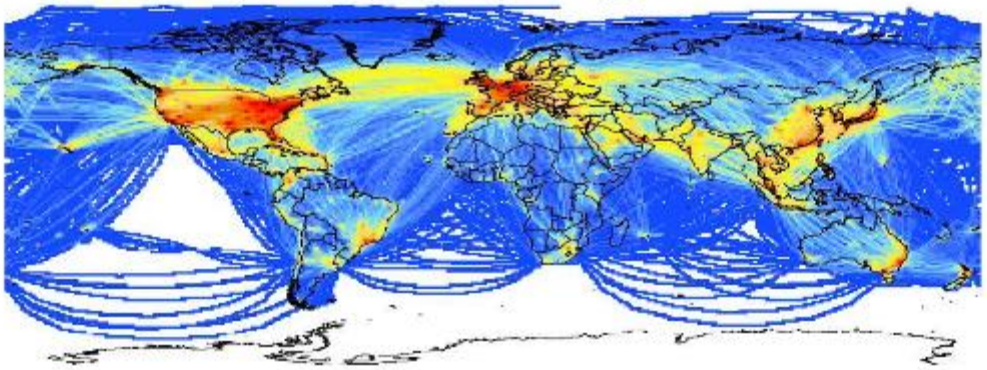


Figure from FAA System for Assessing Aviation's Global Emissions (SAGE)
http://www.faa.gov/about/office_org/headquarters_offices/aep/models/sage/

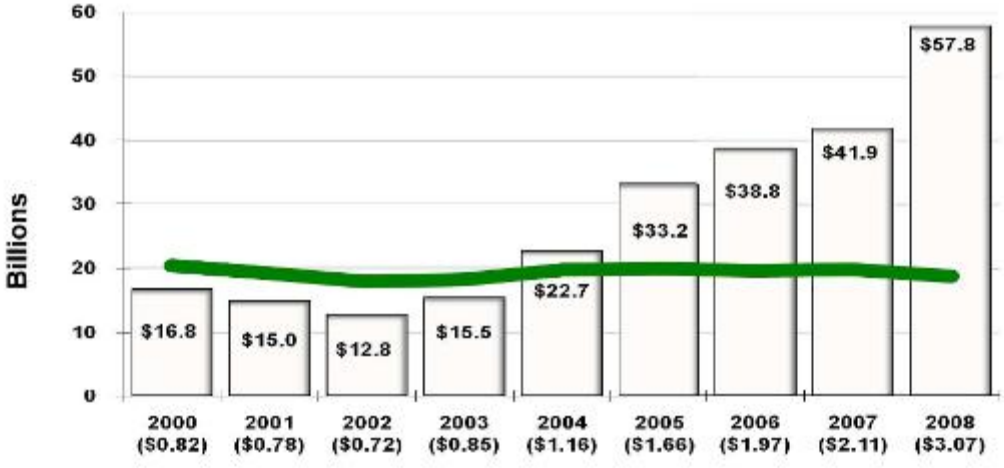
Aircraft emissions account for ~3-4% of total greenhouse gas emissions

Potential domestic legislation could constrain growth

International proposals to tax and/or constrain growth

Energy Issues

– The demand and cost of fuel continues to increase as the need for aviation grows



Note: Value in parentheses below year is average price paid per gallon excluding taxes, into-plane fees, pipeline tariffs and hedging costs
Sources: ATA, Energy Information Administration, Department of Transportation
Chart courtesy of John Heimlich, ATA

NextGen's Environmental Vision

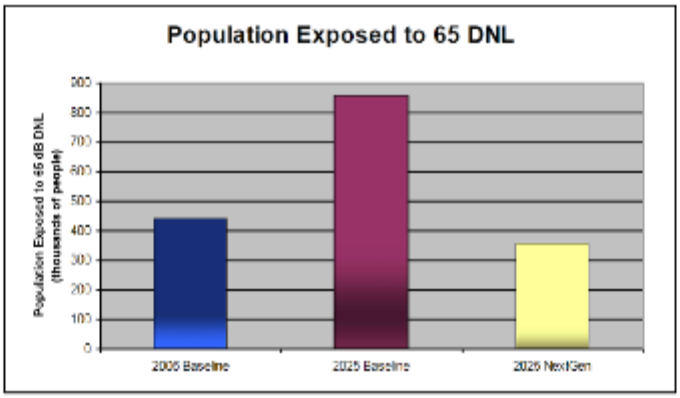
Provide environmental protection that allows sustained aviation growth

– Five Pillar Strategy for Addressing Environmental & Energy Issues

1. Better Science and Integrated Modeling
2. Accelerated Air Traffic Management Modernization
3. Foster New Aircraft and Engine Technology
4. Develop and Deploy Sustainable Alternative Fuels
5. New Policy, Standards and Market-based Measures

NextGen Benefits: Reduced Noise Exposure

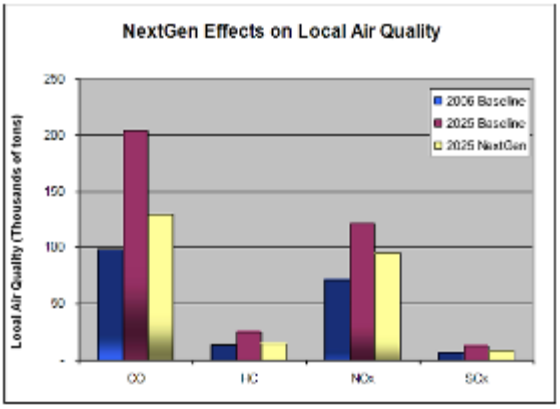
- **By 2025 NextGen reduces the number of people exposed to 65 dB DNL by 58% (and by 19% relative to population exposed in 2006)[1].**
- **The reduction in noise could reduce impacts on property values exposed to 55 dB DNL between $13-15 billion in 2025[2].**

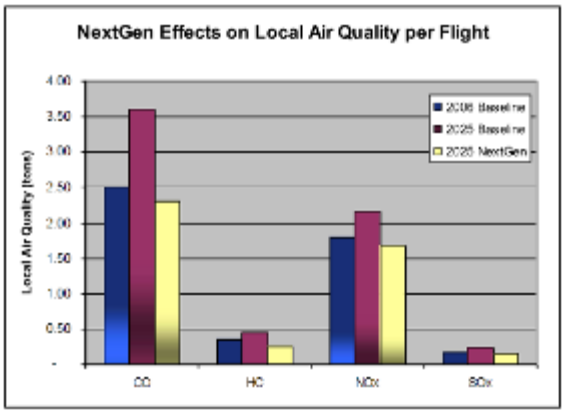


[1] Based on estimates comparing 2025 No Action vs. 2025 NextGen High Density analysis which included 70% of the commercial traffic at the CONUS OEP airports.
[2] APMT Analysis of SMAD HD Case, July 17, 2008.

NextGen Benefits: Reduced Air Quality Impacts

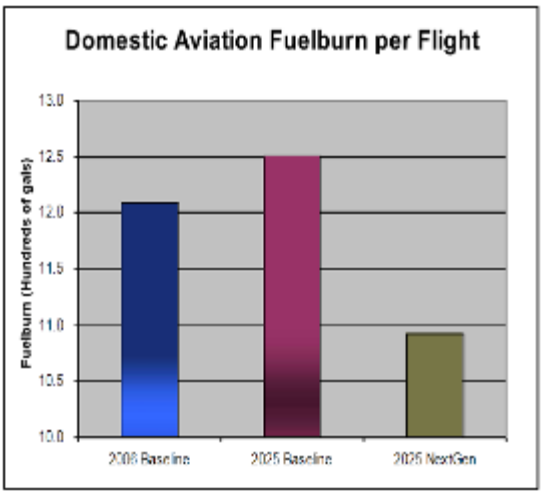
- In 2025 NextGen could reduce impacts on local air quality by 22% to 42% across the pollutants[1].
- By 2025 NextGen could reduce the costs associated with local air quality health risks by $1 to $3 billion[2].

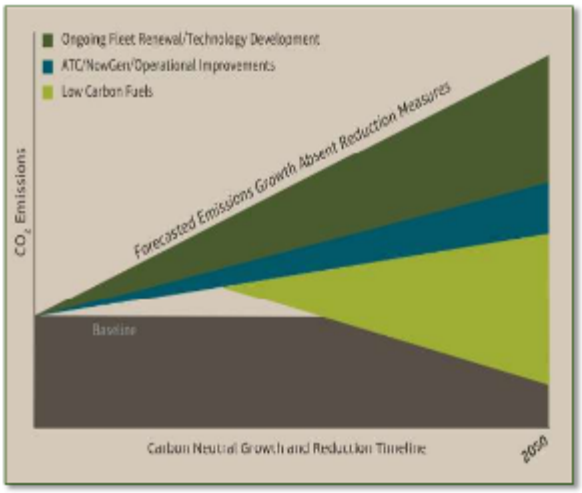




[1] Based on estimates comparing 2025 No Action vs. 2025 NextGen High Density analysis which included 70% of the commercial traffic.
[2] APMT Analysis of SMAD HD Case, July 17, 2008

NextGen Benefits: Reduce Aviation's Carbon Footprint





NextGen could reduce socioeconomic damages associated with climate changes by between $25 and $80 billion.[1]

1 APMT Analysis of SMAD HD Case, July 17, 2008.

Some Closing Observations

- Despite past progress, environmental constraints to aviation growth real.
- Environmental and energy issues gaining increased visibility along with willingness to regulate.
- NextGen will not achieve capacity or efficiency goals without addressing environmental issues.
- NextGen Business Case supports investment in air traffic modernization, aircraft and engine technology, and alternative fuels.
- Initial assessments indicate significant return on investment in energy-environmental endeavors in NextGen

Business Cases in a Transitional Environment

A Perspective

Presented to: RTCA Spring Symposium

By: Kristen Burnham, Director,
Investment Planning & Analysis,
FAA

Date: April 7, 2010

Federal Aviation Administration

Today—What's Different?

- Large-scale transitional environment
- Complex menu of interdependent options
- Importance of outside investors
- Solutions of varying maturity levels
- Need to maintain investment balance between legacy and NextGen
- Need to evolve that balance over time

ALL OF THESE AFFECT THE ROLE AND POTENTIAL OUTCOME OF FAA BUSINESS CASES

Yes or No—Not the Only Options (or, A Business Case Détente)

- **Business case should support a yes/no decision when:**
  - Capabilities are well understood and mature
  - Reasonable confidence in benefits, costs, and risk
- **Business case should support and inform PROGRESS when:**
  - Capabilities and requirements are immature
  - Interdependencies are soft
  - Benefits look promising
  - Recent examples

Going Forward—Business Case as Risk Management Tool

- **Expect yes/no decision when it's warranted**
  - Then use business case to establish management expectations
    - Meaningful metrics
    - Portfolio contributions
- **If not, use business case to drive progress**
  - Highlight risk areas and expect resolution
    - e.g., stakeholder commitment, soft cost estimates, operational uncertainties, appropriateness of sites
  - Create a productive tension between business, operational, and technology decisions

Relevance for FAA's NextGen Investment Decisions

- **Number and nature of decisions**
- **Need to drive progress, while allowing investors to gain confidence**
- **Achieving momentum and credibility over the long term**