Minutes of the Air Traffic Procedures Advisory Committee (ATPAC) Meeting #151
July 28-30, 2015

NASA Ames Research Center
Bldg N262, Room 100, Moffett Field, CA

1 Opening of the Meeting

1.1 The 151st Meeting of the Air Traffic Procedures Advisory Committee (ATPAC) was called to order by Chair Lynette Jamison on Tuesday, July 28, 2015 at 1:00 p.m. The meeting was hosted by the National Aeronautics and Space Administration (NASA) Aviation Safety Reporting System (ASRS) Office, and held at the NASA Ames Research Center, Building N262, Room 100, Moffett Field, CA.

1.2 Representatives from the Federal Aviation Administration (FAA), NASA ASRS, US Department of Defense (DOD), Airline Dispatchers Federation (ADF), National Business Aviation Association (NBAA), Air Line Pilots Association (ALPA), Allied Pilots Association (APA), Southwest Airlines Pilots' Association (SWAPA), National Air Traffic Control Association (NATCA), United Airlines, and the public attended as follows:

Heather Hemdal, Executive Director	Leslie McCormick, CSSI/AJV-8
Lynette Jamison, Chair	Michael McGinnis, APA
Jack Allen, FAA/AJV-8	Bruce McGray, FAA/AFS-410
James Arrighi, FAA/AJI-15	Glenn Morse, United Airlines
John Blair, FAA/AFS-410	Gary Norek, FAA/AJV-11
Patrick Boyle, ADF	Darrell Pennington, ALPA
John Collins, General Aviation Pilot	Brad Sims, SWAPA
Linda Connell, NASA ASRS	Frederick Soechting, US Air Force
Kari Gonter, NASA ASRS	David Swanson, FAA/AJV-82
Robert Lamond, NBAA	Sydney Tutein, US Army
Andy Marosvari, NATCA	Jeffrey Woods, NATCA

1.3 The meeting was informed that Larry Cole had moved to a new position within the DOD, and Frederick Soechting would represent DOD at future ATPAC meetings; and that Brad Sims had replaced Alan Roy as the representative for SWAPA.

1.4 Heather Hemdal presented the Executive Director's Report, providing the following information:

a. Status of Areas of Concern (AOC):
- Number of open AOCs: 3
- Deferred AOCs from Previous Meetings to Meeting #151 – 3
  - 145-2 - IFR Services in Class G Airspace
  - 148-01- ADS-B NOTAMS and Problem reporting
  - 148-02 - Clearances below published altitudes on procedures and airways
- New AOCs accepted at Meeting #150: None
- Closed AOCs from Meeting #150: None

b. Topics for discussion from Meeting #151:
- Solar Farm Reflection – Linda Connell, NASA ASRS
- Procedural Changes Resulting from ATO Safety Top 5 – Dave Swanson, AJV-83
- Status of Runway Approach Hold Sign Test – Dave Swanson, AJV-83

- Update from 7110.65 Rewrite Team – Jack Allen, AJV-8
- Status Update on World Aeronautical Charts – Guy Copeland, AJV-321

c. Briefings on new topics:
   - Changes to FAA Order 8400.9A, *National Safety and Operational Criteria for Runway Selection Plans and Noise Abatement Runway Use Programs* – John Blair, AFS-400

d. FAA Update: Randy Park was officially named as Deputy Chief Operating Officer for the FAA Air Traffic Organization (ATO). Steve McMahon will replace retiring Stephen Lloyd as the ATO Director for Safety. Joseph Teixeira, Vice President, Safety & Technical Training, will retire. Regarding the fiscal year (FY) 2016 FAA budget, there has been no allocation, and it is possible that the FAA will operate under a continuing resolution for FY 2016. There is talk about a bill being presented to Congress on privatization of the ATO.

1.5 Lynette Jamison presented the Chair's Report, providing administrative information to meeting participants. In addition, she informed the meeting that Mark Cato, representative from ALPA, had been diagnosed with Stage 4 lung cancer, and was undergoing treatment. Mark asked that the Chair pass his appreciation to all ATPAC members for their past working relationships. A card was circulated for participants to sign, which will be sent to Mark following the meeting.

1.6 The following agenda was presented to the meeting:

a. Call to Order/Roll Call
b. Recognition of Attendees
c. Executive Director's Report
d. Chair's Report
e. Review of Changes to the Guidelines
f. Corrections to ATPAC #150 Minutes
g. Review of Agenda Items and Call for New Agenda Items
h. Review of Deferred Safety Items/Call for Safety Items
i. Introduction of New AOCs or Miscellaneous Items
j. Status Updates to Existing AOCs
k. Briefings
l. Recurring Agenda Items
m. Discussion on New Agenda Items
n. Location and Dates for Future Meetings
o. Adjourn

1.7 Corrections to ATPAC #149 Minutes: The meeting had no changes to the ATPAC #150 Minutes, and the minutes were approved as written.

1.8 Review of Agenda Items and Call for New Agenda Items. No new agenda items were proposed.

2 Review of Deferred Safety Items/Call for Safety Items

Solar Power Tower Glare

2.1 James Adams, Environmental Planner for the California Energy Commission, participated in the meeting as a subject matter expert (SME) during the discussion on solar power tower glare. As a follow

up to previous discussions on solar glare, Linda Connell presented an update on visual glare reports related to solar plant reflection received through the NASA ASRS. A total of 11 reports had been received through July 15, 2015, which was an increase of two since the last meeting. A copy of the presentation is available at **Attachment A**.

2.2 Details on the Ivanpah Solar Electric Generating System were presented, along with information on an Ocular Hazard Analysis conducted by Sandia National Laboratories. Summarizing the glare monitoring, the presentation noted the following:

a. Heliostats in standby mode can cause glare to aerial observers (pilots)
b. Glare from heliostats can cause after-image at far distances (up to six miles)
c. Glare was visible from multiple heliostats in standby mode
d. The glare from the illuminated receiver was small in comparison to the standby heliostats
e. Drive-by surveys at three different times of the day did not reveal any ocular hazards
f. All data from receiver glare showed a low potential for after-image

2.3 A Letter to Airman was published in April 2014 urging pilots to report glare events using the ASRS program, however, additional information to prove the severity and frequency of the problem is needed. The California Energy Commission stated that input from pilot and air traffic controllers would be valuable to them, including information such as where glare is seen, and how often it occurs. Reporting can be done through existing programs, including ASRS, Aviation Safety Action Programs (ASAPs), and the Air Traffic Safety Action Program (ATSAP).

2.4 The meeting discussed what action could be taken by the ATPAC in regards to this problem. It was noted that this was a hazard to navigable airspace, but there is no FAA solution. The FAA has looked at the airspace in the vicinity of Ivanpah, but due to traffic congestion in the area, no airspace changes were feasible. It was agreed that there are no FAA air traffic procedures that can be changed to mitigate this problem.

3 Introduction of New AOCs or Miscellaneous Items

3.1 No new AOCs were submitted to the meeting.

3.2 The NASA ASRS office identified three issues that would be submitted as AOCs to the next meeting. Those were:

a. Naming of fixes and areas on Standard Terminal Arrival Routes (STARs);
b. FAA Job Order (JO) 7110.65, paragraph 2-1-16, Surface Areas; and
c. Phraseology for cancellation of takeoff clearance.

3.3 Regarding the phraseology for cancellation of takeoff clearance, ATPAC #150 had noted that *AOC 141-2, Subject: Cancellation of Takeoff Clearance "Phraseology" … JO7110.65 para 3-9-10,* had been opened. A summary of the subsequent meeting reports on this AOC during was presented, concluding with the closure of AOC 141-2 by ATPAC #143, when the action was passed to the Human Factors office. No report on the study conducted by Human Factors had been received, and Gary Norek agreed to follow up. Linda Connell will provide further data to the next meeting.

4 Status Updates to Existing AOCs

AOC 145-2 Instrument Flight Rules (IFR) Services in Class G Airspace

4.1 The Document Change Proposal (DCP) for the FAA Pilot/Controller Glossary with a new definition for Class G Airspace was awaiting signature by the AJV-8 Director following the meeting. The new wording will read:

> *CLASS G AIRSPACE – Uncontrolled airspace or Class G airspace is the portion of the airspace that has not been designated as Class A, B, C, D, or E. It is therefore designated uncontrolled airspace. Class G airspace extends from the surface to the base of the overlying controlled airspace. IFR flight into Class G airspace is permitted upon pilot request, however ATC has no responsibility for the separation of IFR traffic in Class G airspace. Safety alerts must be provided. Traffic advisories are provided, workload permitting.*

4.2 The AOC will be administratively closed once it is signed.

AOC 148-01 – Automatic Dependent Surveillance – Broadcast (ADS-B) Notices to Airmen (NOTAMS) and Problem Reporting

4.3 A DCP for the Aeronautical Information Manual (AIM), paragraphs 4-5-7, 4-5-8, 4-5-9 and 4-5-10 regarding ADS-B malfunction reports (NOTAMS) was in final coordination with comments due back July 28, 2015. The AOC will be administratively closed once it is signed.

AOC 148-02- Clearances below published altitudes on procedures and airways

4.4 DCPs to revise FAA JO 7110.65, paragraph 4-8-1, and the AIM, paragraph 5-4-7, were reviewed by the meeting. These DCPs were awaiting signature by the AJV-8 Director following the meeting. The DCP for the 7110.65 was signed, and a copy is provided at **Attachment B**. The changes will be effective on December 10, 2015.

4.5 The DCP to revise the AIM is in final coordination. The AOC will be administratively closed once it is signed.

5 Briefings

Procedural Changes Resulting from the FAA Air Traffic Organization (ATO) Safety Top 5

5.1 David Swanson briefed the meeting on the status of the FY 2015 Top 5 Corrective Action Plan. (See **Attachment C**) The goal was to meet 80% of the activities, and that goal was met with 21 of the 26 activities completed.

5.2 The following activities were still underway:

a. Inadequate Vectors: Activity 4: Appropriate changes to FAAO 7210.3 (Accomplishment of DCP development, associated SRMD, 45 day comment period, comment adjudication, and notice publication).

b. Misapplied Visual Separation (tower visual and pilot-to-pilot):
   - Activity 5: Complete initial coordination and initiate final coordination with DCP

stakeholders (provide complete package for final signatures to Directors with accompanying SRM documentation and recommendations for training requirements) for the DCP to Order JO 7210.3 defining which air traffic operations require the use of a memory aid.

- Activity 6: Update ATC Info Hub with the defined essential elements that must be met in memory aid development.

c. Surface Memory Aids: Activity 2: Complete initial coordination and initiate final coordination with DCP stakeholders (provide complete package for final signatures to Directors with accompanying SRM documentation and recommendations for training requirements) for the DCP to JO 7110.65 improving the clarity of visual separation procedures.

d. Weather Dissemination: Activity 4: Complete initial coordination and initiate final coordination with DCP stakeholders (provide complete package for final signatures to Directors with accompanying SRM documentation and recommendations for training requirements) for the DCP outlining the weather dissemination process for the Terminal environment.

Status of Runway Approach Hold Sign Test

5.3 David Swanson provided an update on the status of the Runway Approach Hold Sign Test. The data collection period ended at Chicago O'Hare (ORD), Cleveland Hopkins (CLE), and Nashville (BNA) in early July. The data was being evaluated and a report will be written for Airports Division to make a determination as to the validity of the test signs. A decision should be made by end of FY 2015 as to the future of this signage.

Update from FAA 7110.65 Rewrite Team

5.4 Jack Allen presented an update on the FAA ATC Handbook Revision Project. (See **Attachment D)** The following issues were being addressed under the project, as identified by the National Air Traffic Controllers Association (NATCA), Industry and FAA Management (Note: Items annotated with an asterisk were carried over from FY 2014). Status reported during the meeting is annotated next to each item. Regarding the 11 items still in progress, four are expected to be completed, but may not meet the September 30 deadline.

a. NATCA
   - En Route Passing and Diverging - Safety risk assessment had been completed and supporting documentation was being finalized.
   - Application Expanding the Definition of RADAR* - The change was in final coordination for incorporation into applicable orders. It was noted that the term RADAR would be generic to mean air traffic service (ATS) surveillance. In response to a question as to whether this would apply to an approach procedure where RADAR is required, it was clarified that these procedures would still require actual RADAR, not another means of surveillance. If the RADAR is not in operation, operators would not be able to use the approach procedure. FAA did not have approval to use ADS-B as the primary source of surveillance.
   - Pilot/Controller Glossary Class G Airspace* - The change was in final coordination for inclusion into FAAO JO 7110.65 (see paragraph 4.1 above).

- Transitional Separation - The change was in final coordination for inclusion into FAAO JO 7110.65**.** The meeting was also informed that "Transitional Separation" had been changed to "Transitional Procedures".
- Tower Applied and Pilot Applied Visual Separation - Safety risk assessment had been completed and supporting documentation was being finalized. A question was raised as to whether there would be a corresponding change to the AIM for pilots. Jack Allen agreed to look into this.

b. Industry
- Descend Via Phraseology – A Safety Risk Management Panel was scheduled for the week of August 3, 2015.
- Area Navigation (RNAV)/Required Navigation Performance (RNP) for Adjacent Airports* - The meeting was advised that this item was not accepted as a change to the FAAO JO 7110.65 and situations would be handled on a case-by-case basis. COMPLETED.
- Utilizing RNAV/RNP in lieu of Vectoring for Visual Approach – A safety risk assessment had been completed and supporting documentation was being finalized
- Performance-based Navigation (PBN) Capabilities Displayed to Controllers* - The meeting was advised that this was not a procedural issue, and had been forwarded to Air Traffic Requirements for consideration. If automation changes are agreed, this could be re-opened to determine if procedural changes are needed. COMPLETED.
- Shortcutting RNAV Aircraft - The change was in final coordination for inclusion into FAAO JO 7110.65.

c. FAA Management
- Triple Independent Approaches – No High Update RADAR - The change was in final coordination for inclusion into FAAO JO 7110.65.
- Reduction of Diagonal Separation for Parallel Dependent Approaches* - The change was in final coordination for inclusion into FAAO JO 7110.65.
- Treat Go-around and Missed Approach Operation as a Normal Departure – COMPLETED.
- Integrate ADS-B Procedural Guidance - The change was in final coordination for inclusion into applicable orders.
- Reorganize Approach Clearance Differentiations Paragraph - The change was in final coordination for inclusion into FAAO JO 7110.65.

5.5 New items have been solicited for FY 2016.

Status Update on World Aeronautical Charts (WAC)

5.6 Guy Copeland, AJV-321 provided the following update:

The FAA has released its Policy for Discontinuance of World Aeronautical Chart Series. This was published in the Federal Register on June 23, 2015. When this was first publicized at ATPAC 148, in May 2014 we relied upon chart sales data through 2013. An examination of the 2014 sales numbers further reinforces the sales decline trend for the World Aeronautical Charts (WACs). Year over year they are down 10% from 2013 to 2014. The continued precipitous falloff in sales has passed a tipping point that triggered the straight policy decision and release of the Notice. See the Federal Register Notice, Policy for Discontinuation of World Aeronautical Charts, June 23, 2015; and, see chart Alerts/Notices, EVCG 2015-02 Charting Notice; and, the

Dates of Latest Edition (DOLE) dated June 25, 2015 or thereafter.

5.7 The meeting discussed this update. John Collins commented that the Federal Register Notice didn't allow for comments, but rather announced the FAA decision to discontinue the WAC following the last printing date in FY2015. The Chairman provided the meeting with the name of the point of contact for questions or comments, which is Eric Freed, Aeronautical Information Services, Enroute and Visual Charting Group, Manager, Air Traffic Organization, AJV-5200, Federal Aviation Administration, 1305 East-West HWY, Silver Spring, MD 20910; telephone (301) 427-5080, email eric.freed@faa.gov.

5.8 ATPAC members were advised that this issue was being tracked by the Aeronautical Charting Forum, and that further updates would be made available by that group.

Changes to FAAO 8400.9A, National Safety and Operational Criteria for Runway Selection Plans and Noise Abatement Runway Use Programs

5.9 John Blair provided a presentation (see **Attachment E**) on the revision to FAAO 8400.9A. The purpose of this order is to identify operational parameters for the safe arrival and departure of aircraft at airports.

5.10 Runway selection guidance provided in FAA Orders 7210.3 *Facility Operations and Administration* and 7110.65 *Air Traffic Control*, is based on wind, operational advantage and pilot request. In addition to runway use, this revised Order will provide the process for determining the maximum crosswind and tailwind components for each runway at an airport. The derived values will provide the maximum wind component (direction and speed) by which the airport must be reconfigured, or use of a particular runway discontinued. Wind criteria for runway selection are addressed in Section 10 of this order.

5.11 This revision also includes information on industry participation in the newly created Runway Selection Safety Team (RSST) at all towered, Part 139 airports. Stakeholders were encouraged to be aware of the coming changes, how the changes will affect them, and why their participation is important.

Wake Turbulence Update

5.12 Jeffrey Tittsworth provided the following update prior to the meeting.

5.13 Wake Turbulence Mitigation for Arrivals Procedures (WTMA-P) analysis for Atlanta (ATL) was completed in June 2015. Discussions with ATL/Atlanta Terminal Radar Approach Control (TRACON) (A80) on potential implementation will be conducted later in CY2015. Discussions with Philadelphia (PHL) have resulted in a deferment of implementation until the new runway becomes operational.

5.14 WTRO is working with Detroit (DTW) on the development of a potential RNAV approach.

5.15 Implementation of Wake Re-categorization Project (RECAT) 1.5 implementations were completed was completed for Houston TRACON (I90) for George Bush Intercontinental (IAH) and Houston Hobby (HOU) Airports in December 2014, in Charlotte (CLT) and New York Newark (EWR), LaGuardia (LGA), John F. Kennedy International (JFK), Teterboro (TEB), White Plains (HPN) and Islip (ISP) Airports in March 2015, and in Chicago TRACON (C90) for ORD and Midway (MDW) Airports in June 2015. RECAT Phase 1.5 represents some additional separation reductions compared to Phase I. Previous RECAT Phase I sites Memphis (MEM), Louisville International (SDF), Cincinnati/Northern Kentucky International (CVG) and ATL Airports transitioned from Phase I to 1.5 in April 2015.

5.16 Implementation of RECAT Phase II at Northern California TRACON (NCT) for San Francisco (SFO), Oakland (OAK), and San Jose (SJC) is scheduled for September 2015. Denver (DEN) is scheduled for end of 2015 and Southern California TRACON (SCT) are scheduled for 1st quarter of calendar year (CY) 2016. RECAT Phase II represents additional separation reduction compared to Phase 1.5 and allows for local optimization of the RECAT categories based on fleet mix in order to maximize capacity gain.

5.17 Wake Turbulence Mitigation for Departures (WTMD) operational demonstrations at SFO/IAH and MEM were completed in early 2015 with a report published in May 2015. Operational benefit for SFO is sufficient to continue operations there. RECAT implementation at MEM provided 20+% arrival and departure capacity gain, competing for and overwhelming WTMD benefits. WTMD modifications for SFO, to enhance operational benefit there, are planned for implementation by the fall of 2015. An operational demonstration of Paired Departures is planned to begin at SFO and IAH in the summer of 2016. The Paired Departures solution represents an enhancement to the operational concept for WTMD and should provide a significant increase in opportunities for reduced separation on departure at both airports. If a one year operational demonstration for Paired Departures supports a decision for implementation at other airports, an acquisition decision will be sought. The operational demonstration of Paired Departures will use the same hardware as WTMD and some refined software and new procedures.

5.18 7110.308 is operational at SFO and NCT has been able to deliver a 40 aircraft per hour rate using the procedure. The instrument meteorological conditions (IMC) called rate for single runway operations at SFO are about 32 per hour. NCT is working on approval for a modified RNAV approach to SFO Runway 19R to support 7110.308 operations. Work continues to address the comments from the public outreach for Boston (BOS) Runway 4L RNAV approach that will support 7110.308 operations there. A date for Record of Decision and publication of the RNAV approach is not yet available. Analysis of potential 7110.308 operations at LAX is underway and coordination with LAX/SCT will occur this year when early RECAT implementation planning begins.

Time Based Flow Management (TBFM) Update

5.19 An update on TBFM was provided by Darnell Jones. (See **Attachment F**) The vision for TBFM is the expanded use of time-based metering to enable gate-to-gate improvements in both fuel and throughput efficiencies by applying spacing only where needed allowing for the routine use of Performance Based Operations (PBO) to capitalize on cockpit Flight Management System (FMS) capabilities adding more predictability to the ATC system. The goal is to achieve consistent and effective operational use of TBFM within the National Airspace System (NAS).

5.20 In order to accomplish this, automation was designed to manage the flow of aircraft as they approach and depart congested airspace and airports. Time Based Metering (TBM) more efficiently manages congested airspace versus Miles-in-Trail by smoothing out irregularities in traffic flows, eliminating the bunching of aircraft, and delivering a more efficient, consistent flow of traffic into the TRACON.

5.21 TBFM supports PBN by changing from strictly a demand/capacity tool to one that also supports routine use of PBN. It enables the smooth and orderly flow of aircraft to meet the tolerances of "optimized" procedures and capacity limitations of airspace, TRACONs, and runways, allowing controllers to efficiently achieve the spacing and flow rates. Present capabilities are a first step in introducing automation that assists controllers in producing a regulated flow.

5.22 A seven day formalized training class is now available for controllers at the FAA Mike Monroney

Aeronautical Center in Oklahoma City. This is the first formal training, and the feedback has been good.

Human Factors – Ongoing Work

5.23 Bruce McGray presented information (see **Attachment G**) on the FAA Flight Standards efforts to integrate human factors into the Enhanced Flight Vision System (EFVS), Low Visibility Operations (LVO) and Surface Movement Guidance and Control Systems (SMGCS) activities. The goal of these programs is to incorporate EFVS and emerging NextGen technologies into the LVO/SMGCS environment, and safely achieve zero/zero visibility gate to gate operations.

5.24 Tests done by NASA Langley and the Volpe Center have established that pilots can safely taxi with a 300 ft runway visual range (RVR) without losing situational awareness. The FAA Technical Center Human Factors and Engineering Office, ANG-C1, ensured a credible test plan. A potential FAA Prototype LVO/SMGCS Taxi Chart Book has also been developed.

6 Discussion on New Agenda Items

6.1 A question was raised by the US Air Force representative on the FAA use of Mode 5, which is an advanced version of Mode S. There have been discussions about US Air Force tactical missions operating on Mode 5 only, which will mean that they would not be in the FAA system. None of the ATPAC participants were familiar with Mode 5. This information will be taken back to the US Air Force for further consideration.

6.2 A concern was raised by the representative from APA that, during their operations at Dallas-Ft Worth (DFW) Airport, pilots are expecting an RNAV departure and are issued a conventional departure clearance without prior notice. When the pilot is prepared for an RNAV departure, it is difficult for him to then fly the conventional procedures. This was discussed with air traffic staff at DFW staff a few years ago, but is still occurring. It was also noted at the meeting that general aviation pilots are experiencing the same situations. NASA has received ASRS and ATSAP reports on this. It was suggested that the data be collected and an AOC be submitted in writing at the next meeting.

7 Location and Dates for Future Meetings

7.1 It was tentatively agreed that the **ATPAC #152** meeting would be held at CGH Technologies in Washington DC on Tuesday afternoon and all day Wednesday, October 20-21, 2015. Confirmation and additional information will be sent out as soon as it is available.

7.2 The **ATPAC #153** meeting will tentatively be held in late February 2016 at CGH Technologies.

8 Other business

8.1 NASA Ames provided tours of the NASA Future Flight Central (FFC) tower simulator facility and the NASA Aircraft Operations Lab (AOL) to those interested following the meeting.

9 Adjournment

9.1 There being no further business, the meeting was adjourned on Wednesday, July 29 at 3:00pm.

Attachment A

Visual Glare Reports Related to Solar Plant Array Reflection

(Update from ATPAC 150 February 2015)

ATPAC 151, NASA Ames Research Center

July 28 – 30, 2015

Linda Connell
NASA ASRS Program Director
NASA Ames Research Center

AVIATION SAFETY REPORTING SYSTEM

Pilot Reports: Visual Glare from Solar Plant Array Reflection

Solar Array Inflight Visibility Glare
ASRS Reporting

- **First report received at ASRS in August 2013**
- **Total of 11 reports have been received through July 15, 2015**

Characteristics of Reported Information

- **Pilots Flying Various Aircraft**
  Commercial, Corporate, and General Aviation
- **Range of Altitudes Experienced Visual Glare**
  Surface to 38,000 ft
- **Distance Circle from Solar Array Plant**
  Approximately 20 nautical miles (distance of one event from the Solar Array was undetermined)


Mooney 20J
10,000 MSL Cruise
Approaching WHIGG
Intersection on V-21
Mooney 20J
8,600 MSL Climbing
near BOACH
Intersection – 11 NM
from the plant
Sail Plane
0 AGL – 12,000 MSL
Pilot all around plant
B737
FL180 LAS SHEAD 8
RNAV Departure -
MINEY intersection
through 20nm East of
SHEAD
Beech 1900
10,000 MSL CRESO3
LAS Arrival
Small Aircraft
12,000 MSL Cruise
Vectored off of V-538
Direct to HEC VOR
Light Transport
13,000 MSL LAS
KEPEC3 Arrival Over
CLARR Intersection
Small Transport
6,000 – 12,000 MSL
BVU Departure -
J60/V12 southwest of
NATEE Intersection
Cessna
9,500 MSL Cruise
B737
38,000 MSL
(Undetermined Location)
B737
14,000 MSL LAS
Departure, BOACH
Intersection
This graphic is for illustrative purposes only and ... to be used for any other purpose.
Aviation Safety Reporting
NASA


Mooney 20J
10,000 MSL Cruise
Approaching WHIGG
Intersection on V-21
Mooney 20J
8,600 MSL Climbing
near BOACH
Intersection – 11 NM
from the plant
Sail Plane
0 AGL – 12,000 MSL
Pilot all around plant
B737
FL180 LAS SHEAD 8
RNAV Departure -
MINEY intersection
through 20nm East of
SHEAD
Beech 1900
10,000 MSL CRESO3
LAS Arrival
Small Aircraft
12,000 MSL Cruise
Vectored off of V-538
Direct to HEC VOR
Light Transport
13,000 MSL LAS
KEPEC3 Arrival Over
CLARR Intersection
Small Transport
6,000 – 12,000 MSL
BVU Departure -
J60/V12 southwest of
NATEE Intersection
Cessna
9,500 MSL Cruise
B737
38,000 MSL
(Undetermined Location)
B737
14,000 MSL LAS
Departure, BOACH
Intersection
This graphic is for illustrative purposes only and not to be used for any other purpose.
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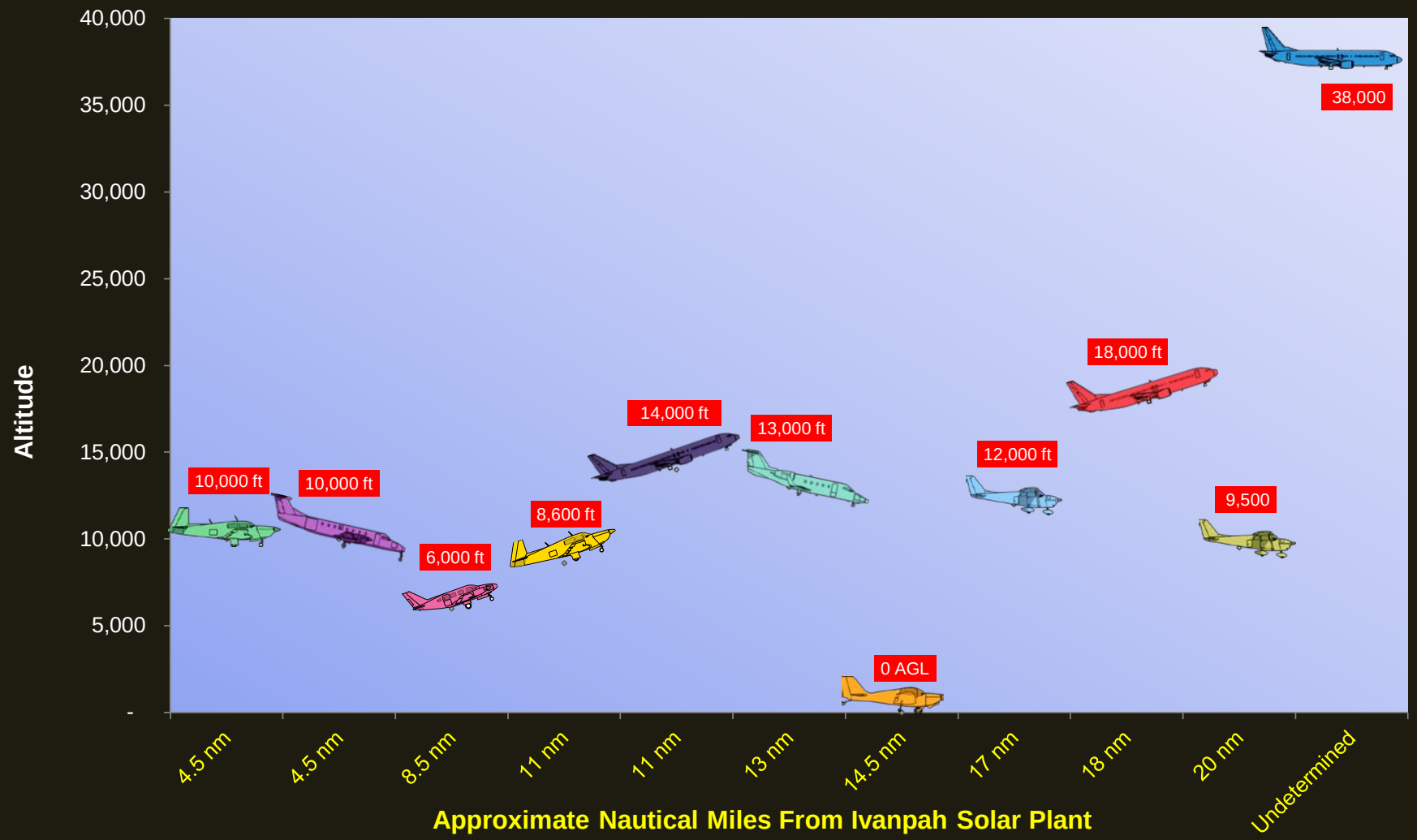
Reported Altitudes and Nautical Miles from Solar Plant



This graphic is for illustrative purposes only and not to be used for any other purpose.

Aviation Safety Reporting

Aerial Glare

Sandia National Laboratories

April 24, 2014
9:15 – 10:30 AM PDT

Ivanpah Solar Electric Generating System

Sandia National Laboratories

- Three power tower units (377 MW (net) / 392 MW (gross)
  - Unit 1: 126 MW
  - Unit 2: 133 MW
  - Unit 3: 133 MW
  - Each tower 140 m (459 ft) tall
- 173,500 heliostats
  - 2 mirrors/heliostat: 15.2 m^2
- Direct steam receiver (22 m tall x 17 m wide + ~16 m of white shielding)
- Dry-cooling
- 14.2 km^2 (3500 acres) on public desert land in southern California
- Owners: NRG Energy, Google, and Brightsource Energy

Heliostats Reflective Panels

Narrative Excerpts

- ACN 1266580 – May 2015
  - *"We were on the SID at [dawn]. With the sun coming up, we were temporarily blinded by the bright glare from three man-made objects southwest of our departure airport. …the reflection off of them was extremely bright to [the extent] that when I looked away I was seeing spots for several minutes."*
- ACN 1238677 – February 2015
  - *"Blinding reflection from solar facility. It is so bright, it is uncomfortable to look in that direction, even with sunglasses. This means scanning for traffic from that direction isn't done."*
- ACN 1205014 – September 2014
  - *"The light generated from the station was blinding to both pilot and crew. The bright light was almost blinding from a distance of 20 plus miles."*

Narrative Excerpts

- ACN 1194004 – August 2014
  - *"Blinding reflection from solar facility. It is so bright, it is uncomfortable to look in that direction, even with sunglasses. This means scanning for traffic from that direction isn't done."*
- ACN 1194022 – July 2014
  - *"The Ivanpah Solar Power Plant glare caused cockpit illumination. The glare makes scanning for traffic impossible over approximately 40 degrees of the horizon which is directly ahead of the aircraft, approaching WHIGG Intersection, on V21."*
- ACN 1184458 – June 2014
  - *The intensity of the glare from the towers appears to be fairly constant once line-of-sight is obtained whereas the glare from the mirror fields varies depending on altitude, the aircraft's direction relative to the power plant, and sun angle."*

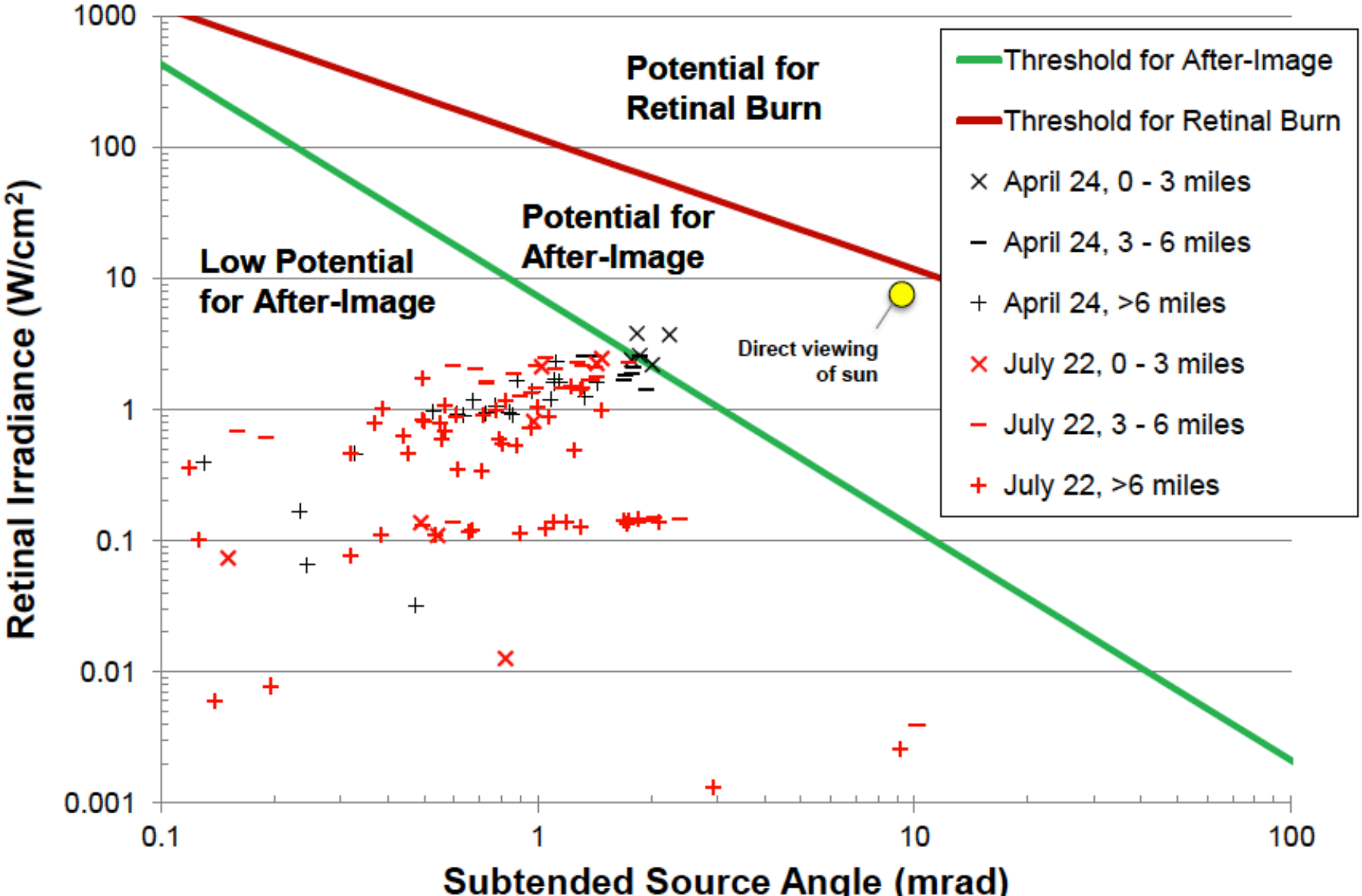
Narrative Excerpts

- ACN 1184374 – June 2014
  - *"…approximately 20 miles east of SHEAD. The glare was significantly stronger than from the other two stations and appeared to be due to poor aiming of the mirrors. …it would have been very difficult for us to fly southbound and pick out traffic from below and/or have to stare into that light."*
- ACN 1182901 – June 2014
  - *"Light reflected from the mirrors and the central towers is blinding…. Additionally, the bright light creates "sun spots" in the pilot's vision. I fly this route several times a week and have experienced these hazards every time the sun is visible."*
- ACN 1177345 – May 2014
  - *I experienced temporary blindness, visual discomfort and distraction. I was unable to scan at all for about 5 minutes…"*

Narrative Excerpts

- ACN 1156120 – March 2014
  - *"…we were temporary blinded by bright lights (reflections) from the ground. These reflections, coming from the new solar power station were so bright that any attempt to look outside the plane was met with pain and temporary blindness even when looking back inside"*
- ACN 1109473 – August 2013
  - *…At its brightest neither the pilot nor co-pilot could look in that direction due to the intense brightness. From the pilot's seat of my aircraft the brightness was like looking into the sun and it filled about 1/3 of the co-pilots front windshield. In my opinion the reflection from these mirrors was a hazard to flight because for a brief time I could not scan the sky in that direction to look for other aircraft.."*

Ocular Hazard Analysis



Summary of Glare Monitoring

Sandia National Laboratories

- Aerial Monitoring
  - Heliostats in standby mode can cause glare to aerial observers (pilots)
  - Glare from heliostats can cause after-image at far distances (up to 6 miles in our helicopter surveys)
  - Glare was visible from multiple heliostats in standby mode
  - The glare from the illuminated receiver was small compared to the glare from the standby heliostats
- Ground Monitoring
  - Drive-by surveys at three different times of the day did not reveal any ocular hazards
  - All data from receiver glare showed a low potential for after-image

Ryan Goerl, NRG

Points of Contact

- **FAA ZLA-530, Los Angeles ARTC Center**
  MacLean, Rex (Rex.MacLean@faa.gov)
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- **California Energy Commission (CEC)**
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- **Sandia National Lab**
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DOCUMENT CHANGE PROPOSAL/BRIEFING SHEET
FINAL DISPOSITION

ORDER/PUBLICATION: 7110.65W
CHANGE: Basic
EFFECTIVE DATE: December 10, 2015 **TRACKING #126DCP**

CONTROL LEAD/ROUTING: David Swanson AJV-83 (202) 267-0816
SPECIALIST/ROUTING: Gary Christiansen AJV-83 (202) 267-0131

1. PARAGRAPH NUMBER AND TITLE:

4–8-1. APPROACH CLEARANCE

2. BACKGROUND: Confusion exists concerning the issuance of approach clearances in accordance with FAAO JO 7110.65, Paragraph 4-8-1, Approach Clearance. The FAAO JO 7110.65 Revision Steering Committee convened in August 2014 and was asked to review and modify this paragraph in a manner that would eliminate this confusion as one of the Top 15 document change proposal taskings for FY2015.

Separately, a question was raised by the Air Traffic Procedures Advisory Committee (ATPAC) about whether controllers are authorized to assign altitudes below altitudes published on approach charts. This change clarifies that they are, provided there is an MVA or MIA that allows it, and the aircraft is assigned an altitude to maintain until reaching a point that it is vertically established on the approach.

3. EXPLANATION OF CHANGE: This change reorganizes and provides clarity to FAAO JO 7110.65, Paragraph 4-8-1, Approach Clearance. This is accomplished in two important ways: by aligning commonalities, as well as delineating important differences pertaining to the issuance of approach clearances in reference to Performance Based Navigation (e.g., RNAV, RNP, etc.), and conventional (e.g., ILS/VOR/NDB, etc.) approaches. Additionally, 4-8-1 b2 was changed to clarify the use of MVA/MIA in lieu of published altitudes on instrument flight procedures.

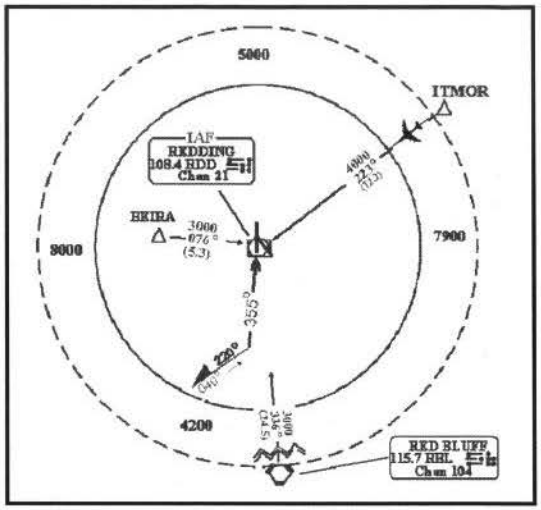
4. CHANGE:

OLD	**NEW**
4-8-1. APPROACH CLEARANCE	4-8-1. APPROACH CLEARANCE
Title thru a.5. Phraseology	No change
EXAMPLE– *"Cleared Approach."*	***EXAMPLE-*** No change
"Cleared V–O–R Approach."	Delete
"Cleared V–O–R Runway Three-Six Approach."	Delete
Add	***"Cleared (V-O-R/I-L-S/Localizer) Approach."***
"Cleared L–D–A Approach."	Delete
"Cleared L–D–A Runway Three-Six Approach."	No change
"Cleared I–L–S Approach."	Delete
"Cleared Localizer Approach."	Delete
"Cleared Localizer Back Course Runway One-Three Approach."	No change

"Cleared RNAV Z Runway Two-Two Approach."	Delete
"Cleared GPS Runway Two Approach."	Delete
Add	***"Cleared (GPS/RNAV Z) Runway Two-Two Approach."***
"Cleared BRANCH ONE Arrival and RNAV Runway One-Three Approach."	Delete
Add	***"Cleared BRANCH ONE Arrival and (ILS/RNAV) Runway One-Three Approach."***
"Cleared I–L–S Runway Three-Six Approach, glideslope unusable."	No change
"Cleared S–D–F Approach."	No change
"Cleared G–L–S Approach."	No change
Note 1 thru Note 2	No change
3. In some cases, the name of the approach, as published, is used to identify the approach, even though a component of the approach aid, other than the localizer on an ILS is inoperative. Where more than one procedure to the same runway is published on a single chart, each must adhere to all final approach guidance contained on that chart, even though each procedure will be treated as a separate entity when authorized by ATC. The use of alphabetical identifiers in the approach name with a letter from the end of the alphabet; for example, X, Y, Z, such as "HI TACAN Z Rwy 6L or HI TACAN Y Rwy 6L," or "RNAV (GPS) Z Rwy 04 or RNAV (GPS) Y Rwy 04," denotes multiple straight-in approaches to the same runway that use the same approach aid. Alphabetical suffixes with a letter from the beginning of the alphabet; for example, A, B, C, denote a procedure that does not meet the criteria for straight-in landing minimums authorization.	*3. In some cases, the name of the approach, as published, is used to identify the approach, even though a component of the approach aid, other than the localizer on an ILS is inoperative.*
Add	***4. Where more than one procedure to the same runway is published on a single chart, each must adhere to all final approach guidance contained on that chart, even though each procedure will be treated as a separate entity when authorized by ATC***
Add	***5. The use of alphabetical identifiers in the approach name with a letter from the end of the alphabet; for example, X, Y, Z, such as "HI TACAN Z Rwy 6L or RNAV(GPS) Y Rwy 04", denotes multiple straight-in approaches to the same runway that use the same approach aid.***

Add	***6. Alphabetical suffixes with a letter from the beginning of the alphabet; for example, A, B, C, denote a procedure that does not meet the criteria for straight-in landing minimums authorization.***
Note 4.	Renumber to **Note 7.**
5. An aircraft which has been cleared to a holding fix and prior to reaching that fix is issued a clearance for an approach, but not issued a revised routing; that is, "proceed direct to...." may be expected to proceed via the last assigned route, a feeder route (if one is published on the approach chart), and then to commence the approach as published. If, by following the route of flight to the holding fix, the aircraft would overfly an IAF or the fix associated\ with the beginning of a feeder route to be used, the aircraft is expected to commence the approach using the published feeder route to the IAF or from the IAF as appropriate; that is, the aircraft would not be expected to overfly and return to the IAF or feeder route.	***8. An aircraft which has been cleared to a holding fix and prior to reaching that fix is issued a clearance for an approach, but not issued a revised routing; that is, "proceed direct to...." may be expected to proceed via the last assigned route, a feeder route (if one is published on the approach chart), and then to commence the approach as published. If, by following the route of flight to the holding fix, the aircraft would overfly an IAF or the fix associated with the beginning of a feeder route to be used, the aircraft is expected to commence the approach using the published feeder route to the IAF or from the IAF as appropriate; that is, the aircraft would not be expected to overfly and return to the IAF or feeder route.***
Note 6.	Renumber to **Note 9.**
Reference	No Change
b. For aircraft operating on unpublished routes, issue the approach clearance only after the aircraft is: (See FIG 4-8-1)	b. For aircraft operating on unpublished routes, issue the approach clearance only after the aircraft is:
FIG 4-8-1 Approach Clearance Example	Delete
Figure 4-8-1	Delete
1. Established on a segment of a published route or instrument approach procedure, or	1. Established on a segment of a published route or instrument approach procedure, or **(See FIG 4-8-1)**
EXAMPLE- *Aircraft 1: The aircraft is established on a segment of a published route at 5,000 feet. "Cleared V-O-R Runway Three Four Approach."*	EXAMPLE- *The aircraft is established on a segment of a published route at 5,000 feet. "Cleared V-O-R Runway Three Four Approach."*
Add	**FIG 4-8-1** **Approach Clearance Example**

Add



2. Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure.

EXAMPLE-

Aircraft 2: The aircraft is inbound to the VOR on an unpublished direct route at 7,000 feet. The minimum IFR altitude for IFR operations (14 CFR Section 91.177) along this flight path to the VOR is 5,000 feet. "Cross the Redding V-O-R at or above five thousand, cleared V-O-R Runway Three Four Approach."

Add

2. Assigned an altitude to maintain until the aircraft is established on a segment of a published route or instrument approach procedure. **(See FIG 4-8-2)**

EXAMPLE-

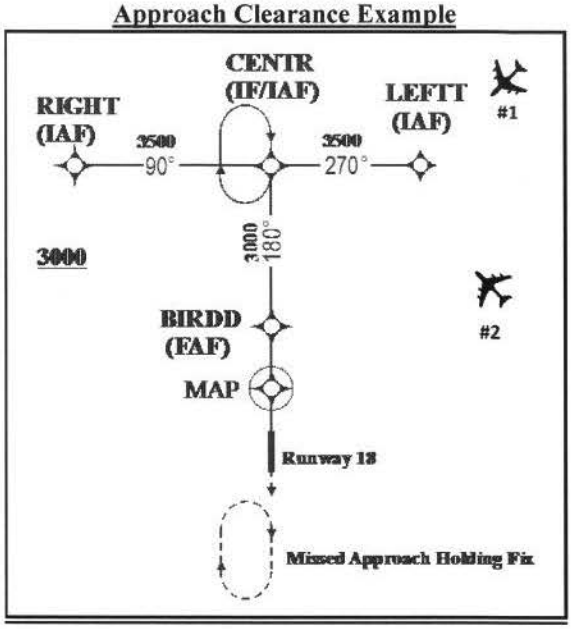
Aircraft 1 is cleared direct LEFTT. The MVA in the area is 3,000 feet, and the aircraft is at 4,000 feet. "Cross LEFTT at or above three thousand five hundred, cleared RNAV Runway One Eight Approach."

The MVA in the area is 3,000 feet and Aircraft 2 is at 3,000 feet. "Cleared direct LEFTT direct CENTR, maintain three thousand until CENTR, cleared straight-in RNAV Runway One Eight Approach."

Add

Add

FIG 4-8-2
Approach Clearance Example



Note 1 thru Note 2

No Change

Add

3. An aircraft is not established on an approach until at or above an altitude published on that segment of the approach.

Add

REFERENCE
FAAO 8260.3 United States Standard for Terminal Instrument Procedures (TERPS), Para 10-2

c.

No Change

d.

Renumber to h.

FIG 4-8-2

Renumber to **FIG 4-8-4**

Add

d. Intercept angles greater than 90 degrees may be used when a procedure turn, a hold-in-lieu of procedure turn pattern, or arrival holding is depicted and the pilot will execute the procedure.

e. For both RNAV and conventional approaches, intercept angles greater than 90 degrees may be used when a procedure turn, a hold-in-lieu of procedure turn pattern, or arrival holding is depicted and the pilot will execute the procedure. If a procedure turn, hold-in-lieu of procedure turn, or arrival holding pattern is depicted and the angle of intercept is 90 degrees or less, the aircraft must be instructed to

e. If a procedure turn, hold-in-lieu of procedure turn, or arrival holding pattern is depicted and the angle of intercept is 90 degrees or less, the aircraft must be instructed to conduct a straight-in approach if ATC does not want the pilot to execute a procedure turn or hold-in-lieu of procedure turn. (See FIG 4-8-3)

conduct a straight-in approach if ATC does not want the pilot to execute a procedure turn or hold-in-lieu of procedure turn. (See FIG 4-8-3)

Phraseology thru FIG 4-8-3	No Change
Example	No Change
f.	Renumber to i.
g. thru h.	Renumber to f. thru g.
Add	RNAV APPLICATION
i. thru l.	Renumber to j. thru m.
FIG 4-8-4 thru FIG 4-8-5	Renumber to **FIG 4-8-5** thru **FIG 4-8-6**

No further changes to paragraph.

5. **INDEX CHANGES:**
6. **REFERENCE CHANGES:**
7. **GRAPHICS:**
8. **GENOT/NOTICE:**
9. **SAFETY RISK MANAGEMENT:** (Check appropriate box).
   - ☐ **SRMD**. Proposed change meets full SMS requirements for safety risk assessment.
   - ☒ **SRMDM**. Proposed change does not introduce new safety risks into the NAS.
10. **ICAO DIFFERENCES: YES** ☐ **NO** ☒

Mary J. Hemdal FOR HEATHER HEMDAL

Heather Hemdal
Director, Air Traffic Procedures

Date: 7-28-15

ICAO DIFFERENCES IDENTIFICATION FORM

AJV-8 SME: Gary Christiansen **DATE:** July 22, 2015 **ATO DCP #:** 94-

ICAO DIFFERENCE SARP/PANS

SPECIFIC US REGULATION AND REFERENCE	PANS ATM, ANNEX PROVISION	DESCRIPTION OF DIFFERENCE	REMARKS

DIFFERENCE CATEGORY: N/A

DETERMINATION OF DIFFERENCE: YES ☐ **NO** ☒

VALIDATOR NAME: David Young

VALIDATOR PHONE: (202) 267-1119

Attachment C

Federal Aviation Administration

Air Traffic Organization
FY15 Top 5 Status

TOP 5

FY15 TOP 5 High-Level Status

FY2015 TOP 5 Program Status	
Goal	**Progress**
Complete 80% of the CAP (21 of 26 CAP activities)	**80%** completion (21 of 26 activities completed)
Goal Met	

FY15 TOP 5 High-Level Status

1. WEATHER DISSEMINATION
Need to solicit and disseminate significant Pilot Weather Report information and/or to issue pertinent weather information.

2. SURFACE MEMORY AIDS
Use of effective Surface Memory Aids.

3. MISAPPLIED VISUAL SEPARATION
(tower visual and pilot-to-pilot)
Proper utilization of visual separation.

4. INADEQUATE VECTORS
Use of adequate vectors to maintain separation associated with Opposite Direction Operations.*

5. MISJUDGMENT
Use of proper judgment of aircraft rate of climb, descent or closure associated with Opposite Direction Operations.*

- **Safety Performance Targets**
  - Developed a preliminary list of safety performance targets with MITRE for FY15 Top 5 measurement
  - Implementing data collection mechanisms for specific monitoring
- **Lessons Learned**
  - Conducted a lessons learned session for FY15 CAP development and are working towards improvement for the development of FY16 Top 5 through:
    - Timeliness (earlier review with Stakeholder Management)
    - Additional data/factors (e.g., system states) to help rank existing hazards and support a preliminary risk assessment of the identified hazard

FY15 TOP 5 High-Level Status

Inadequate Vectors Associated with ODO	Misjudgment Associated with ODO	Surface Memory Aids
Activity 1. Publish ATO-SG-14-09 addressing development of local ODO procedures to comply with FAA Order JO 7210.3, paragraph 2-1-30.	**Activity 1.** Publish ATO-SG-14-09 addressing development of local ODO procedures to comply with FAA Order JO 7210.3, paragraph 2-1-30.	**Activity 1.** Review and quantify results of the 2013 "Memory Aids in Air Traffic Control" survey, review CAT A/B RIs from the past two years, and package information for work group use.
Activity 2. Deliver weekly Q&As via webinar responding to facility inquiries regarding requirements in ATO-SG-14-09.	**Activity 2.** Deliver weekly Q&As via webinar responding to facility inquiries regarding requirements in ATO-SG-14-09.	**Activity 2.** Based upon the results of the 2013 "Memory Aids in Air Traffic Control" survey (comparing survey results to MOR, OSA, SSR, and RAE data): a. Define which air traffic operations require memory aids. Draft a DCP to FAA Order JO 7210.3 with AJV-8 to establish these requirements and initiate coordination. b. Define the essential elements that must be met in memory aid development.
Activity 3. All facilities (per ATO-SG-14-09) to develop local ODO procedures, to include adequate vectors as applicable, which will be reviewed and approved by the OSGs and tracked within CEDAR (CAR/CAP Tracker); complete local training/briefings.	**Activity 3.** All facilities (per ATO-SG-14-09) to develop local ODO procedures, to include adequate vectors as applicable, which will be reviewed and approved by the OSGs and tracked within CEDAR (CAR/CAP Tracker); complete local training/briefings.	**Activity 3.** Add memory aid radio button to CEDAR.
Activity 4. Appropriate changes to FAAO 7210.3 (Accomplishment of DCP development, associated SRMD, 45 day comment period, comment adjudication, and notice publication).	**Activity 4.** Appropriate changes to FAAO 7210.3 (Accomplishment of DCP development, associated SRMD, 45 day comment period, comment adjudication, and notice publication).	**Activity 4.** Provide the human factors material on memory and the use of memory aids to AJI-2 for the scheduled Recurrent Training offering.
Activity 5. Initiate follow-up QC monitoring activities.	**Activity 5.** Initiate follow-up QC monitoring activities.	**Activity 5.** Complete initial coordination and initiate final coordination with DCP stakeholders (provide complete package for final signatures to Directors with accompanying SRM documentation and recommendations for training requirements) for the DCP to Order JO 7210.3 defining which air traffic operations require the use of a memory aid. **Activity 6.** Update ATC Info Hub with the defined essential elements that must be met in memory aid development.

FY15 TOP 5 High-Level Status

Misapplied Visual Separation	Weather Dissemination (A)	Weather Dissemination (B)
Activity 1. Draft DCP for FAA Order JO 7110.65, paragraph 7-2-1, to improve logical flow and structure to increase clarity of the application of visual separation procedures (including phraseology examples), in turn improving controller understanding. Send to AJV-8 for initial coordination. **Activity 2.** Complete initial coordination and initiate final coordination with DCP stakeholders (provide complete package for final signatures to Directors with accompanying SRM documentation and recommendations for training requirements) for the DCP to JO 7110.65 improving the clarity of visual separation procedures.	**Activity 1.** Evaluate the current Terminal weather dissemination process to determine the feasibility of implementing a process similar to that of the weather coordinator responsibilities within the En Route environment outlined in paragraph 17-26-4 of FAA Order JO 7210.3. **Activity 2.** Determine existing PIREP dissemination gaps with the current systems and provide the information in a memo to AJV-72 and AJV-73 for review and possible implementation into the E-IDS concept of operations. **Activity 3.** Deliver final recommendations on the feasibility of implementing a weather coordinator role in the Terminal environment to be included in a DCP to FAA Order JO 7210.3 or FAA Order JO 7110.65. **Activity 4.** Complete initial coordination and initiate final coordination with DCP stakeholders (provide complete package for final signatures to Directors with accompanying SRM documentation and recommendations for training requirements) for the DCP outlining the weather dissemination process for the Terminal environment.	**Activity 5.** Evaluate the use of the term "pertinent" with regard to ATC issuance of weather (FAA Order JO 7110.65, paragraph 2 6 4; FAA Order JO 7210.3) **Activity 6.** Deliver final recommendations for clarifying the term "pertinent" with regard ATC issuance of weather. **Activity 7.** Deploy ECP-01 WARP (software delivery), which will be limited to Houston and Seattle. **Activity 8.** If it is determined that a DCP is required, complete initial draft and coordination, then initiate final coordination with DCP stakeholders (provide complete package for final signatures to Directors with accompanying SRM documentation and recommendations for training requirements).

Update to ATPAC

FAA Air Traffic Safety

ALIGNING 7110.65 WITH NEXTGEN AND PBN

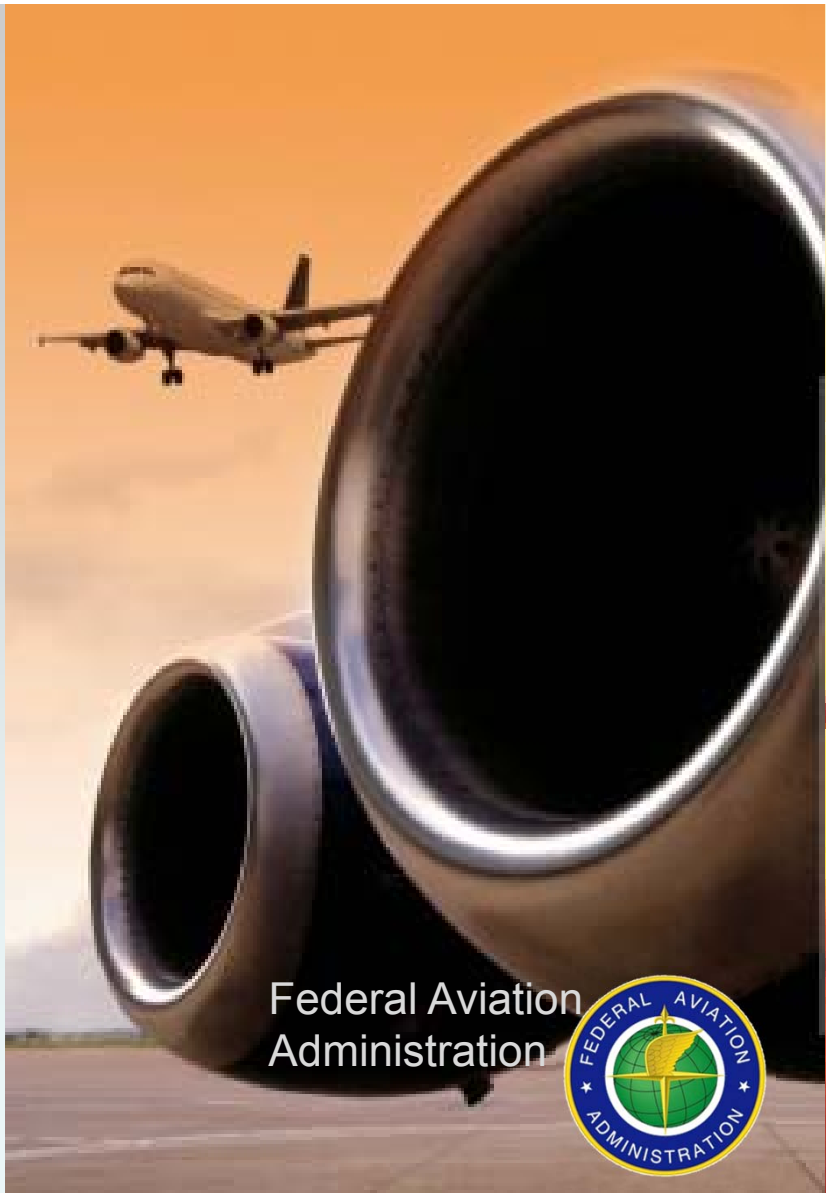
ATC Handbook Revision Project

Presented by:

Jack Allen ♦ Senior Technical Advisor, Mission Support, AJV-8

July 2015

FOR OFFICIAL USE ONLY



The ATC Handbook ♦ Top 15 ♦ FY15

NATCA	INDUSTRY	MANAGEMENT
En Route Passing and Diverging Application	Descend Via Phraseology	Triple Independent Approaches – No High Update RADAR
Expanding the Definition of RADAR	RNAV/RNP for Adjacent Airports	Reduction of Diagonal Separation for Parallel Dependent Approaches
Pilot / Controller Glossary Class G Airspace	Utilizing RNAV/RNP in lieu of Vectoring for Visual Approach	Treat Go-around and Missed Approach Operations as a Normal Departure:
Transitional Separation	PBN Capabilities Displayed to Controllers	Integrate ADS – B Procedural Guidance
Tower Applied and Pilot Applied Visual Separation	Shortcutting RNAV Aircraft	Reorganize Approach Clearance Differentiations, Paragraph

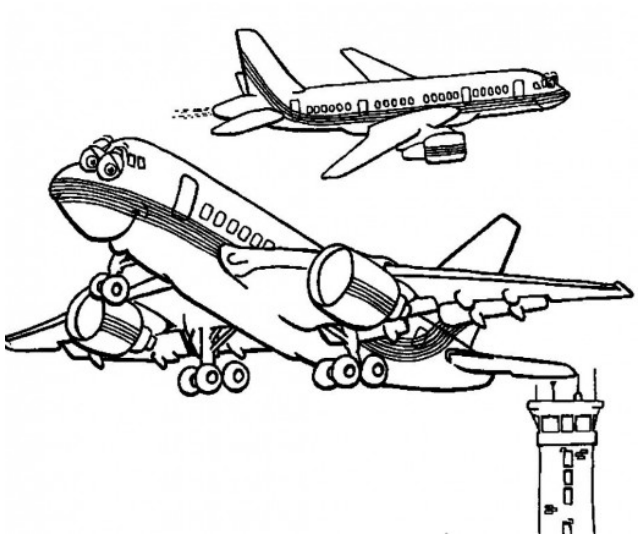
TOP 5 ITEM

RED: CARRY OVER FROM FY14

ATC Handbook Top 15 - NATCA

En Route Passing and Diverging Application

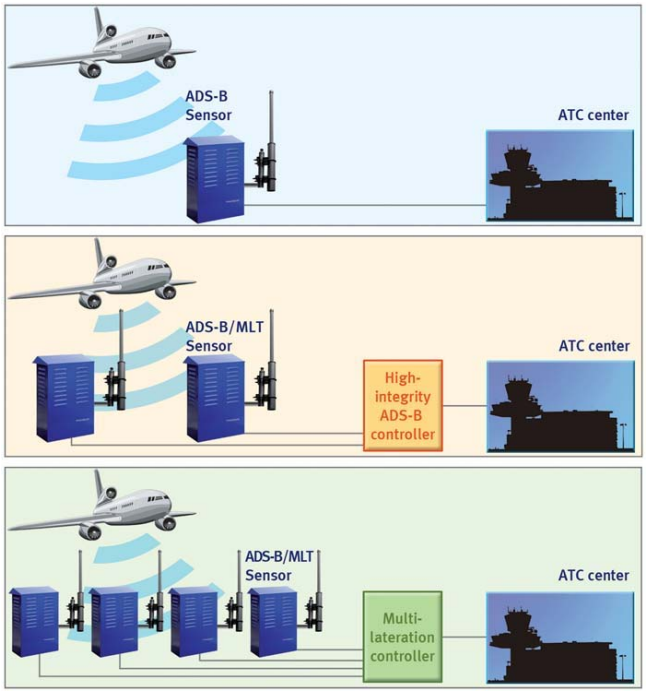
- Expanding to En Route Environment
- 45 degrees
- Update – Safety risk assessment has been completed and supporting documentation is being finalized



ATC Handbook Top 15 - NATCA

Definition of RADAR

- For ATC purposes only
- No phraseology change
- Update – The change is in final coordination for incorporation into applicable orders

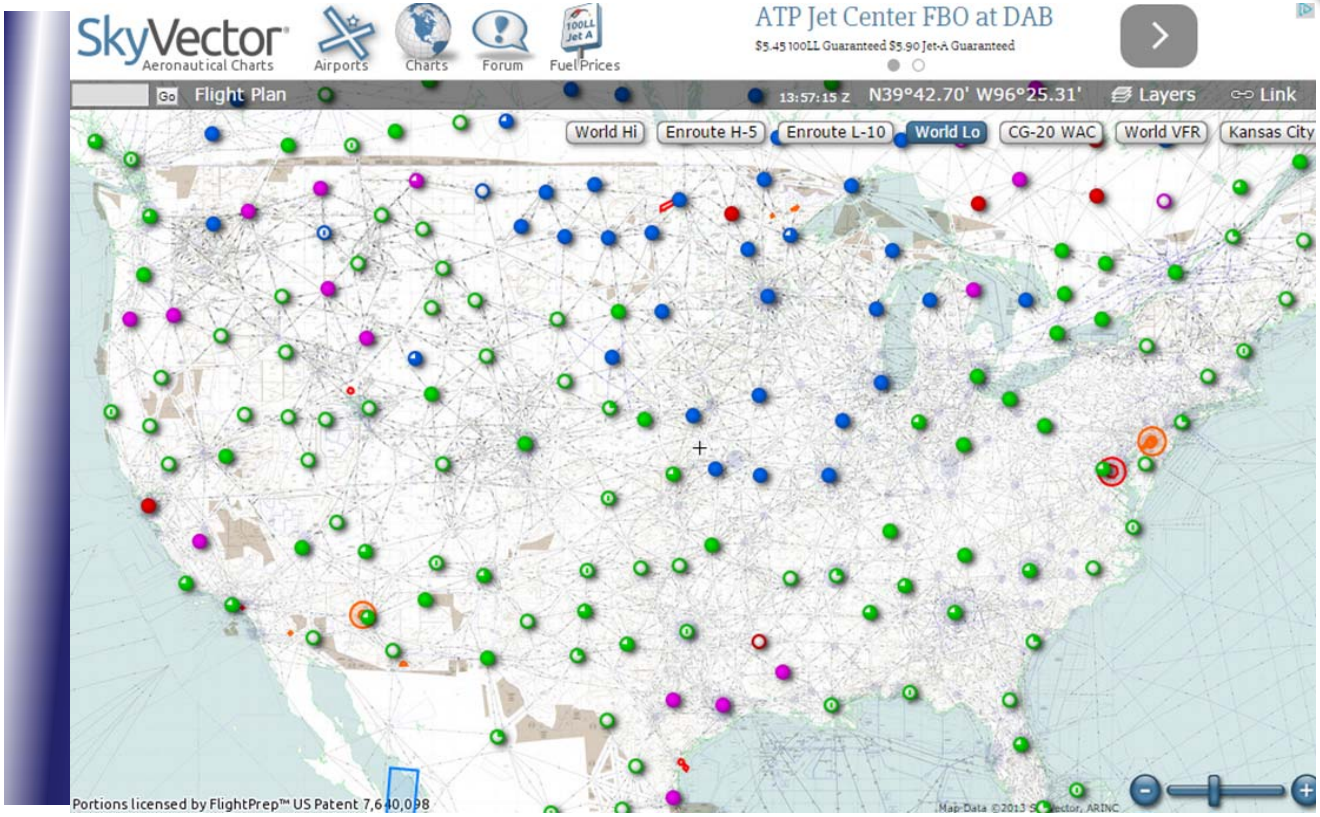


ATC Handbook Top 15 - NATCA

Pilot/Controller Glossary – Class G Airspace

- Current
  - CLASS G AIRSPACE – That airspace not designated as Class A, B, C, D or E
- New
  - CLASS G AIRSPACE – Uncontrolled airspace or Class G airspace is the portion of the airspace that has not been designated as Class A, B, C, D, or E. It is therefore designated uncontrolled airspace. Class G airspace extends from the surface to the base of the overlying controlled airspace. IFR flight into Class G airspace is permitted upon pilot request, however ATC has no responsibility for the separation of IFR traffic in Class G airspace. Safety alerts must be provided. Traffic advisories are provided, workload permitting.
- Update – The Change is in final coordination for inclusion into FAAO JO 7110.65

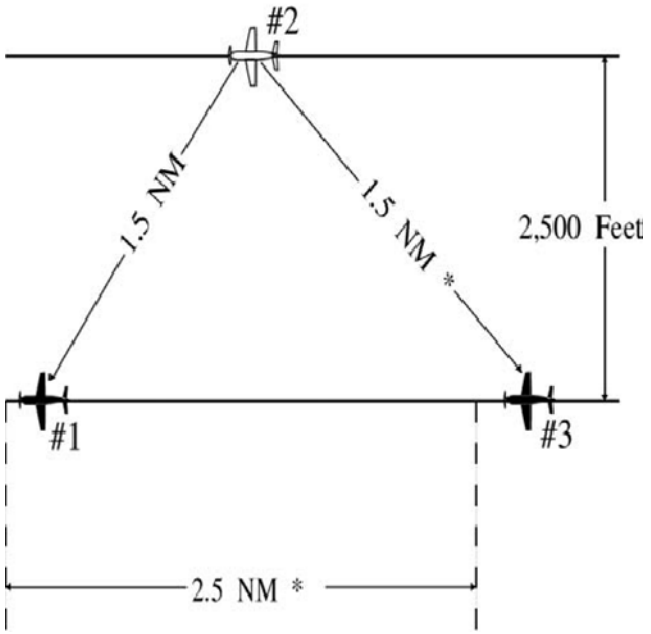
ATC Handbook Top 15 - NATCA



ATC Handbook Top 15 - NATCA

Transitional Procedures

- Internal to ATC
- Transparent to the user
- Update – The change is in final coordination for inclusion into FAAO JO 7110.65



ATC Handbook Top 15 - NATCA

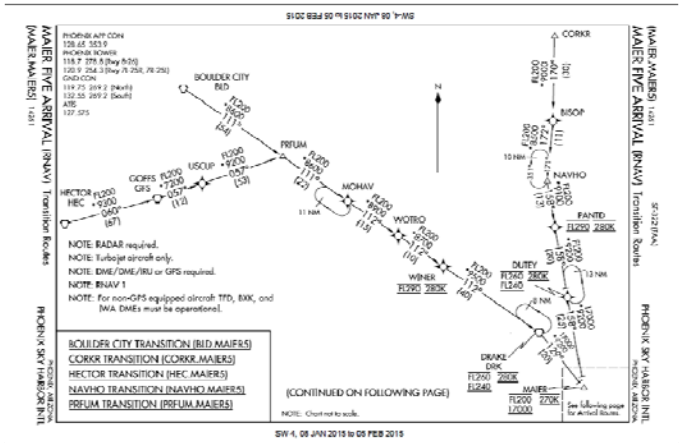
Tower Applied & Pilot Applied Visual Separation

- **TOP 5 ITEM**
- Transparent to user
- NO change to pilot applied visual separation
- Clarification for ATC
- Update – Safety risk assessment has been completed and supporting documentation is being finalized
-

ATC Handbook Top 15 - Industry

Descend Via Phraseology

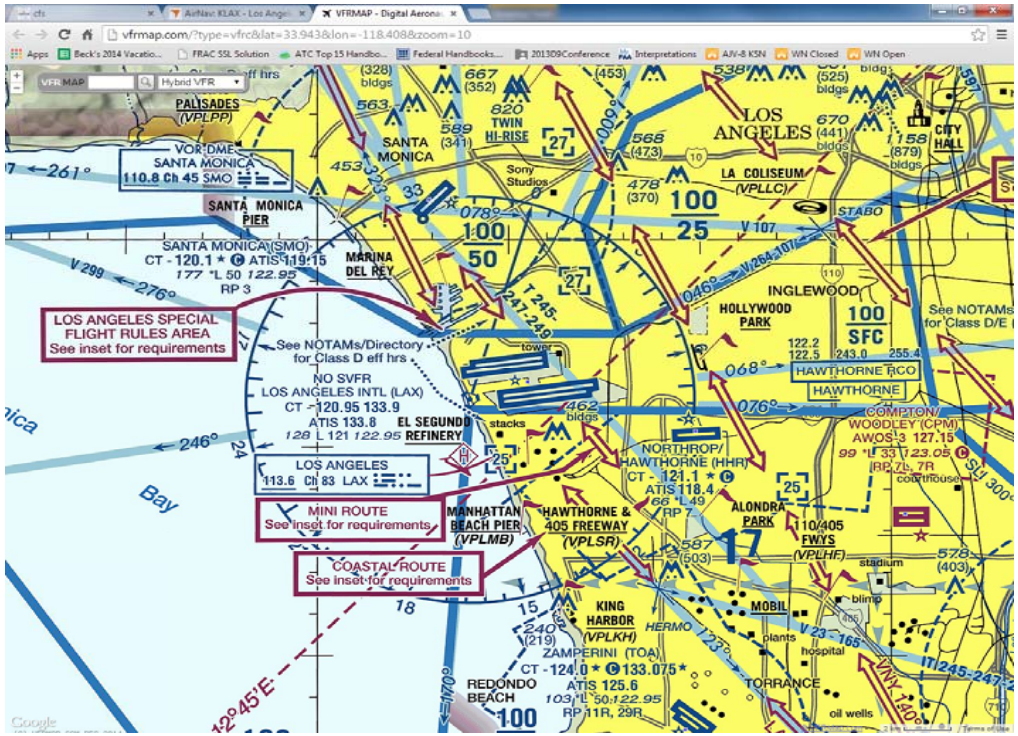
- Researching ARTCCs issuing runway transition assignment with a descend via clearance
- Update – Safety risk management panel is scheduled for the week of August 3



ATC Handbook Top 15 - Industry

RNAV/RNP for Adjacent Airports

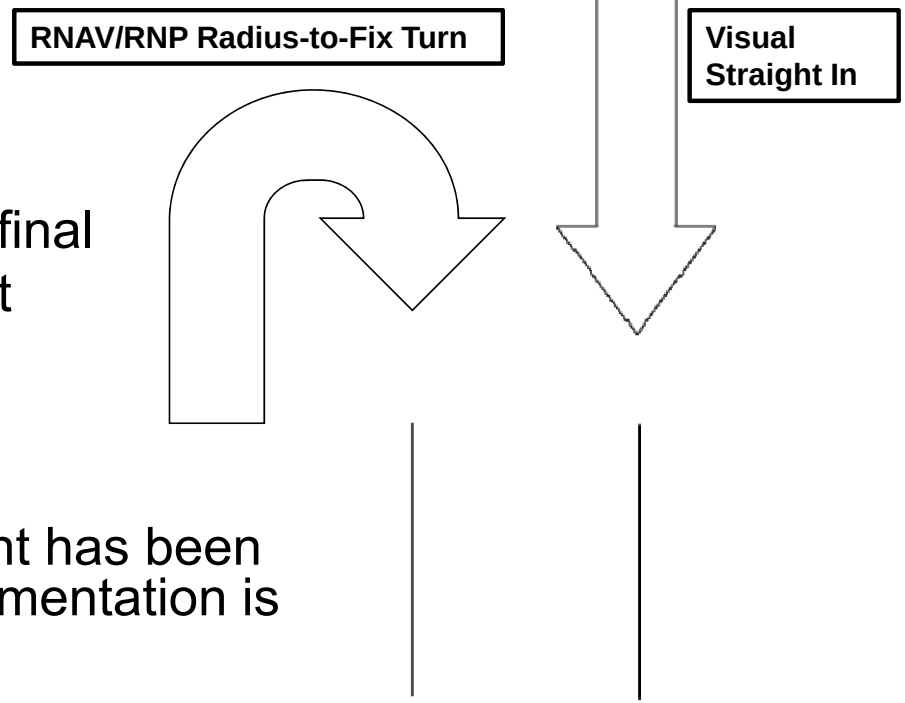
- Procedurally separate aircraft operating into airports within close proximity
- Update – Completed



ATC Handbook Top 15 - Industry

Utilizing RNAV/RNP in lieu of Vectoring for Visual Approach

- 30 degree intercept rule
- Radius-to-Fix & RNAV paths to final meet the 30 degree requirement
- Transparent to User
- Update – Safety risk assessment has been completed and supporting documentation is being finalized



ATC Handbook Top 15 - Industry

PBN Capabilities Displayed to Controllers

- Provide equipment capabilities to controllers
- Reduce frequency congestion
- Update – Completed

ATC Handbook Top 15 - Industry

Shortcutting RNAV Aircraft

Current language in 7110.65, 5-6-1a:

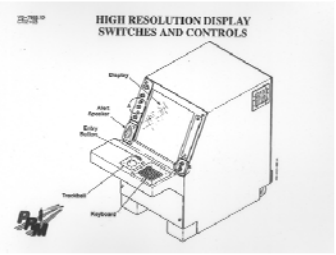
"In controlled airspace for separation, safety, noise abatement, operational advantage, confidence maneuver, or when a pilot requests. ~~Allow aircraft operating on RNAV route to remain on their own navigation to the extent possible~~"

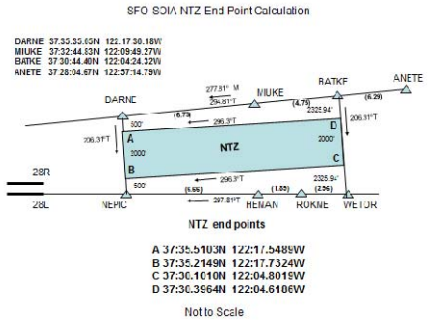
- Update – The change is in final coordination for inclusion into FAAO JO 7110.65

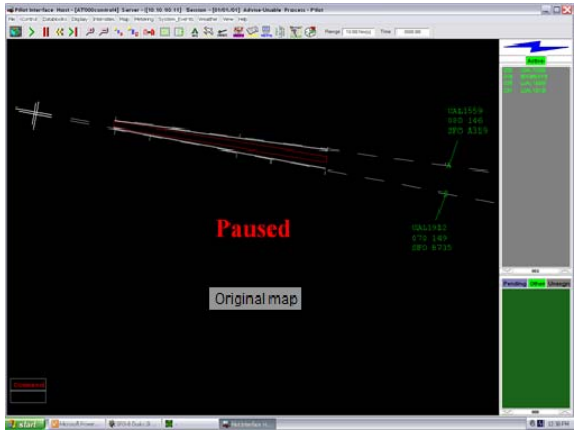
ATC Handbook Top 15 - Management

Triple Independent Approaches – No High Update RADAR

- Eliminates the need for high update RADAR
- Update – The change is in final coordination for inclusion into FAAO JO 7110.65



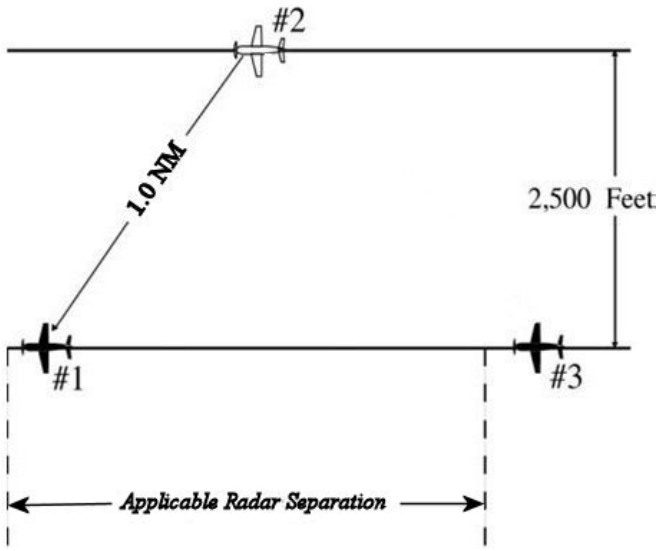




ATC Handbook Top 15 - Management

Reduction of Diagonal Separation for Parallel Dependent Approaches

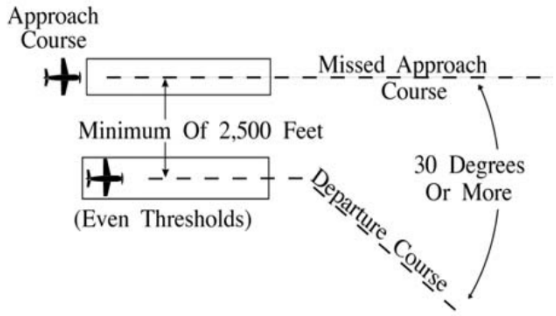
- Reduces diagonal separation for simultaneous dependent approaches from 1.5 to 1.0 NM
- Update – The change is in final coordination for inclusion into FAAO JO 7110.65

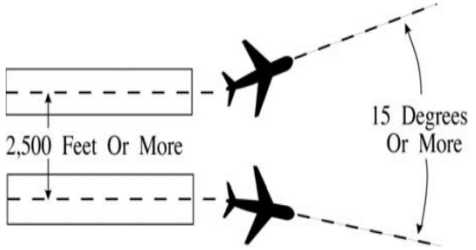


ATC Handbook Top 15 - Management

Treat Go-around and Missed Approach Operations as a Normal Departure

- Requesting a study for 15 degrees instead of 30 degrees
- Update - Completed

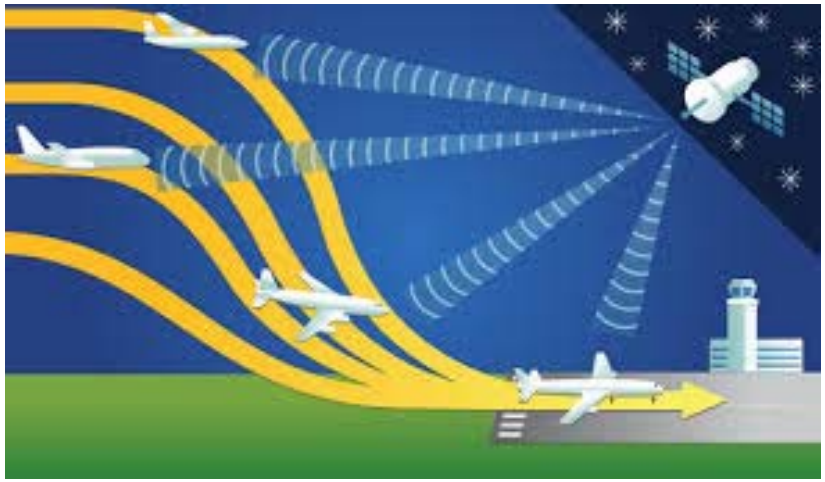




ATC Handbook Top 15 - Management

Integrate ADS-B Procedural Guidance

- Within the 7110.65 change RADAR system to ATC Surveillance Source = covers future systems
- Update – The change is in final coordination for inclusion into applicable orders



ATC Handbook Top 15 - Management

Reorganize Approach Clearance Differentiations

- Transparent to the users
- Clarifying for ATC
- Update – The change is in final coordination for inclusion into FAAO JO 7110.65

Opening America's skies . . .

Thank you

Attachment E

Federal Aviation Administration

FAA Order 8400.9

National Safety and Operational Criteria for Runway Selection Plans and Noise Abatement Runway Use Programs.

Presented to: AWOs

By: John Blair AFS-410

Date: May 5, 2015

History

- **Order 8400.9 originally issued in 1981**
  - No updates since
- **Established Formal/Informal plans for noise abatement**
- **No published wind limits in ATO, therefore the order became the default for use as a selection limit for locations that were utilizing “Operationally Advantageous”**
- **Joint effort between AFS-410 and ATO evolved into Runway Use *and* Runway Selection Plans**

Purpose of Order 8400.9

The purpose of this order is to provide a process for **towered (Part 139) airports** to identify operational parameters for the safe arrival and departure of aircraft at airports. Airports with formal or informal noise abatement programs are required to have a Runway Selection Plan as part of their Noise Abatement Runway Use Program. The Runway Use Plan defines noise-preferred runways and includes wind/weather/environmental limitations for operating in the preferred configuration.

Runway Selection guidance provided in Federal Aviation Administration (FAA) Orders 7210.3 *Facility Operations and Administration* and 7110.65 *Air Traffic Control*, is based on wind, operational advantage and pilot request. In addition to runway use, **this Order will provide the process for determining the maximum crosswind and tailwind components for each runway at an airport**. The derived values will provide the maximum wind component (direction and speed) by which the **airport must be reconfigured**, or use of a particular runway discontinued. Wind criteria for runway selection are addressed in Section 10 of this order.

Revision Rational

- **Commercial Aviation Safety Team (CAST) Safety Enhancement (SE 219)**
- **NTSB Recommendation (A-10-109/AAR-10-04)**
- **Provide guidance at locations using Operationally Advantageous**
  - ATO received numerous ATSAP reports on pilot/controller runway selection issues leading to corrective action reports
    - Issues arose where operational capacity flow overrode most favorable wind
- **Waiver request (SFO)**

Revision Work Group

Flight Standards

Pilot Groups and Unions

Air Traffic Organization

NATCA

Airports

Runway Safety

- **Meeting since 2013 to address safety concerns and operational realities**
- **Group defined terms, responsibilities, safety criteria including wind limits**

Re – Write Elements

- **The revised order recognizes that each airport & runway is unique**
- **Re-write effort evolved into Runway Use and Runway Selection Plans**
- **Each airport has the responsibility for designing Use & Selection criteria unique to that airport within the criteria of the revised order**
- **The order references a newly created Runway Selection Safety Team (RSST), through the Service Center Manager, that is tasked with developing an airport plan**

Runway Selection Safety Team (RSST)

- **The RSST determines maximum wind components for the airport's runways**

- **Due to the importance of establishing unique airport wind limits, the team is comprised of representatives of the local user community (air carriers, general aviation, military, labor organizations, as appropriate), airport operator, the local Airway Facilities office, Flight Standards (The Regional NextGen Branch Manager will determine the Flight Standards representative), ATO Management and the National Air Traffic Controllers Association (NATCA) from both the Airport Traffic Control Tower and the Approach Control Facility.**

RSST Considerations

- **<u>Each airport's Runway Selection Safety Team (RSST) is tasked with considering a large variety of factors</u>**
- **Each airport may set it's own parameters, but must remain within the limits of the revised order**
- **Nothing is intended to infringe upon the responsibilities of the Pilot-in-Command.**
- **An RSST must be held within the first 12 months of publication of the new 8400.9**

RSST Considerations

- **Runway design**
- **Aircraft performance**
- **Approach guidance**
- **ATO**
- **Contaminated runway**

Industry/Operator Involvement

- **InFO 16xxx and the RSST**
  - What it is?
  - Does it apply to me?
  - Why should I care?
    - Safety – The big picture
  - Who should I send?
    - Current and experienced **Pilot** personnel
    - What information is the operator representative expected to have?
      - Aircraft limitations and an experienced perspective of real life line operations.

Questions?

Backup Slides

8400.9

b. The crosswind/tailwind limits in this document are maximum limits, and should not be used as a starting point in the RSST process. The maximum may not be appropriate for all runways or all aircraft. The limits derived by the RSST are maximum limits to aid ATC decision making in the selection of a runway and not to limit aircraft operations. The RSST must document justification for the limits established for its Runway Selection Plan. Each airport has its unique operational environment that must be taken into consideration as stated in Appendix A.

8400.9

b. Maximum crosswind component (including gust)

i. Dry Runway: 25 kts

ii. Wet Runway: 15 kts

iii. Contaminated Runway: 15 kts

b. Maximum tailwind component (including gust)

i. Dry Runway: 10 kts

ii. Wet Runway: 10 kts

iii. Contaminated Runway (< 8000 ft) < 3 kts (reported as calm)

iv. Contaminated Runway (≥ 8000 ft) 5 kts

Runway Use Vs. Selection

- **Use equals Noise. Selection is all other**
- **Selection complies with 7210.3 on most favorable wind**
- **Therefore:**
  - **The design criteria will reside in a revised Order 8400.9, and a revised 7210.3**

Air Traffic Procedures ATPAC TBFM Update

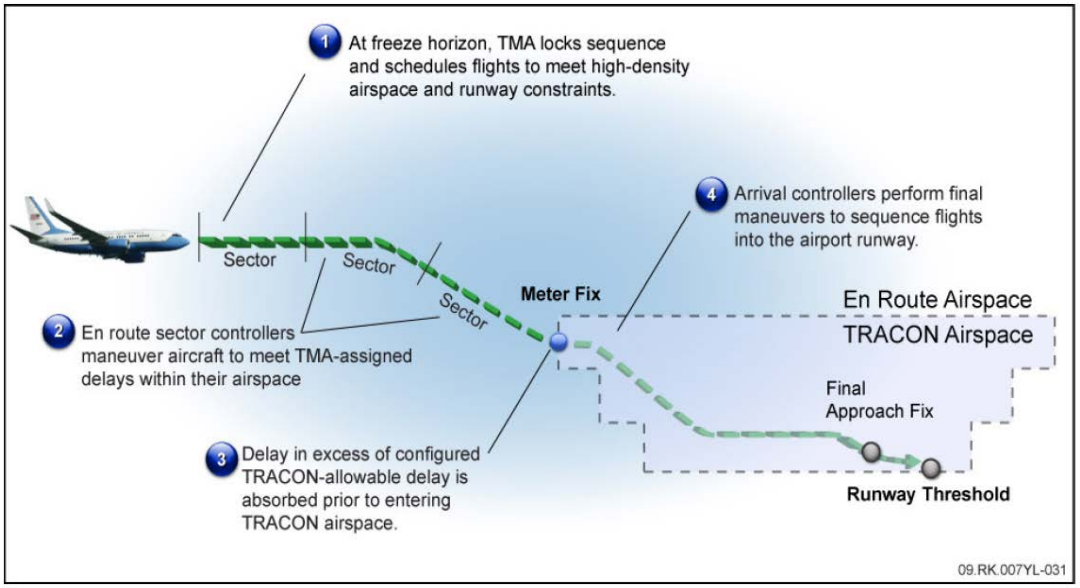
TBFM
Time Based Flow Management

Presented By: Air Traffic Procedures

Presented To: ATPAC

Time Based Flow Management (TBFM)

- ✓ Automation designed to manage the flow of aircraft as they approach and depart congested airspace and airports
- ✓ **Time Based Metering (TBM) more efficiently manages congested airspace versus Miles-in-Trail by:**
  - ✓ **Smoothing out irregularities in traffic flows**
  - ✓ **Eliminating the bunching of aircraft**
  - ✓ **Delivering a more efficient, consistent flow of traffic into the TRACON**

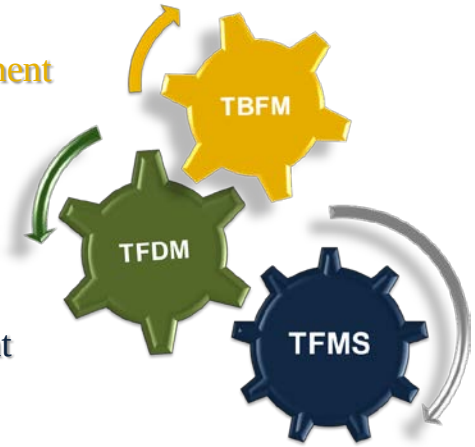


TBFM is part of a broad set of Traffic Management tools

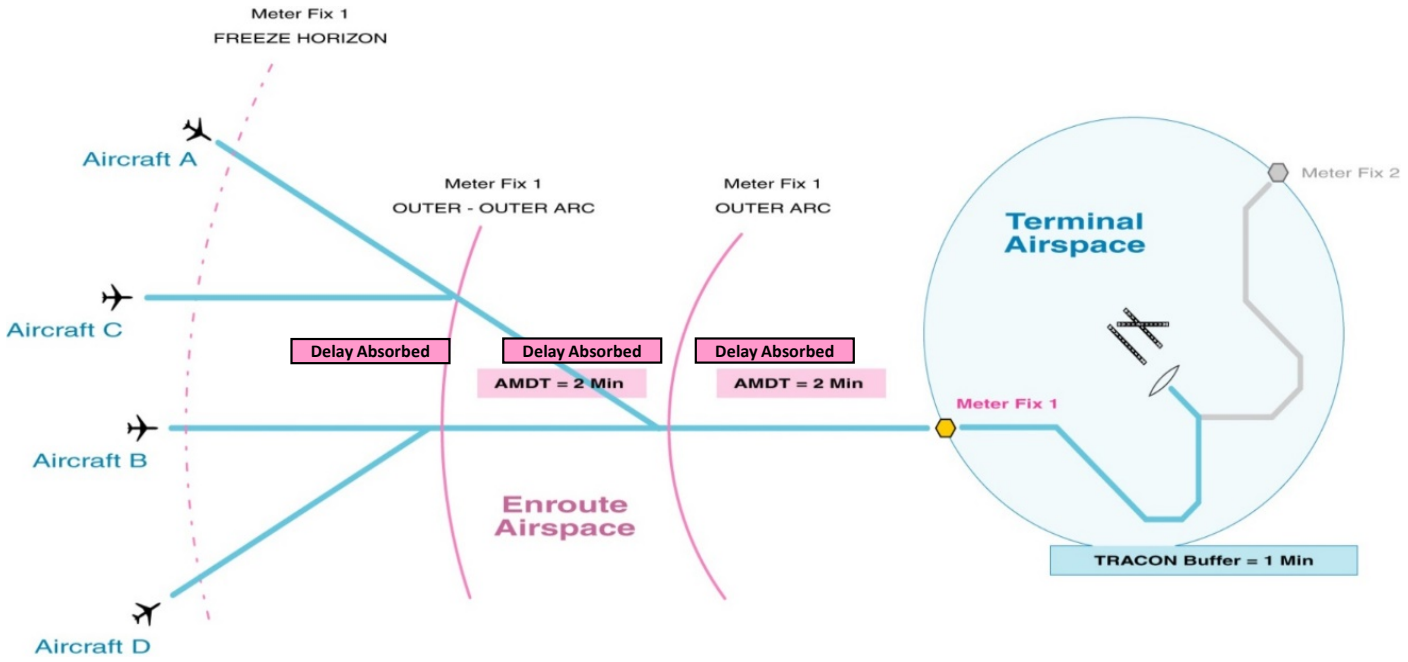
Time-Based Flow Management (TBFM)

Terminal Flight Data Management (TFDM)

Traffic Flow Management System (TFMS)



How Metering Works



Anticipate arrival delays and move delay outside TRACON boundary

- Predict arrival time at runway (ETA)
- Assign/schedule runway arrival time (STA)
- Schedule arrival time at meter fix and meter arcs
- Interarrival spacing based on desired separation rather than airport “capacity”

Key TBFM Inputs

Adaptation: Multi-facility considerations

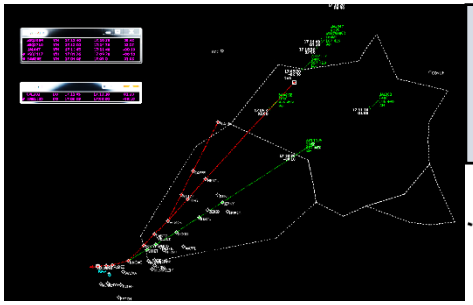
- ✓ Identify locations of meter fixes and meter arcs
- ✓ Define nominal routes in the TRACON
- ✓ Runway assignment decision tree
- ✓ Aircraft performance
- ✓ Frequently used airport configurations

- **Real-time ETA Calculation (every 6 seconds)**
  - Flight plan data
    - Filed route
    - Aircraft type
  - Radar track data
    - Current Position and speed
  - Wind speed and direction (RUC data)
    - Updated hourly (*improved wind processing expected in July)

TBFM Settings: Dynamic system management

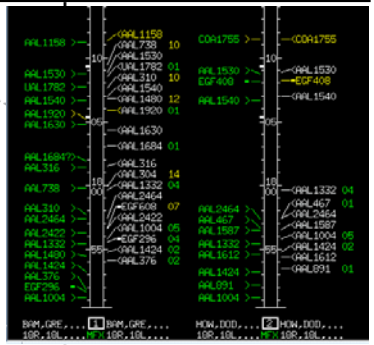
- ✓ Current airport configuration
- ✓ Desired separation at the runway
- ✓ Desired minimum separation at the meter fix
- ✓ Airspace maximum delay time (AMDT)
- ✓ TRACON Buffer (how much delay can be absorbed in TRACON)

Current TBFM Capabilities



Airborne Metering (Times on Glass): Provides aircraft specific delay times to provide smooth flow into a terminal.

Arrival Management: Graphical depiction of flows and timing into a terminal.



Departure

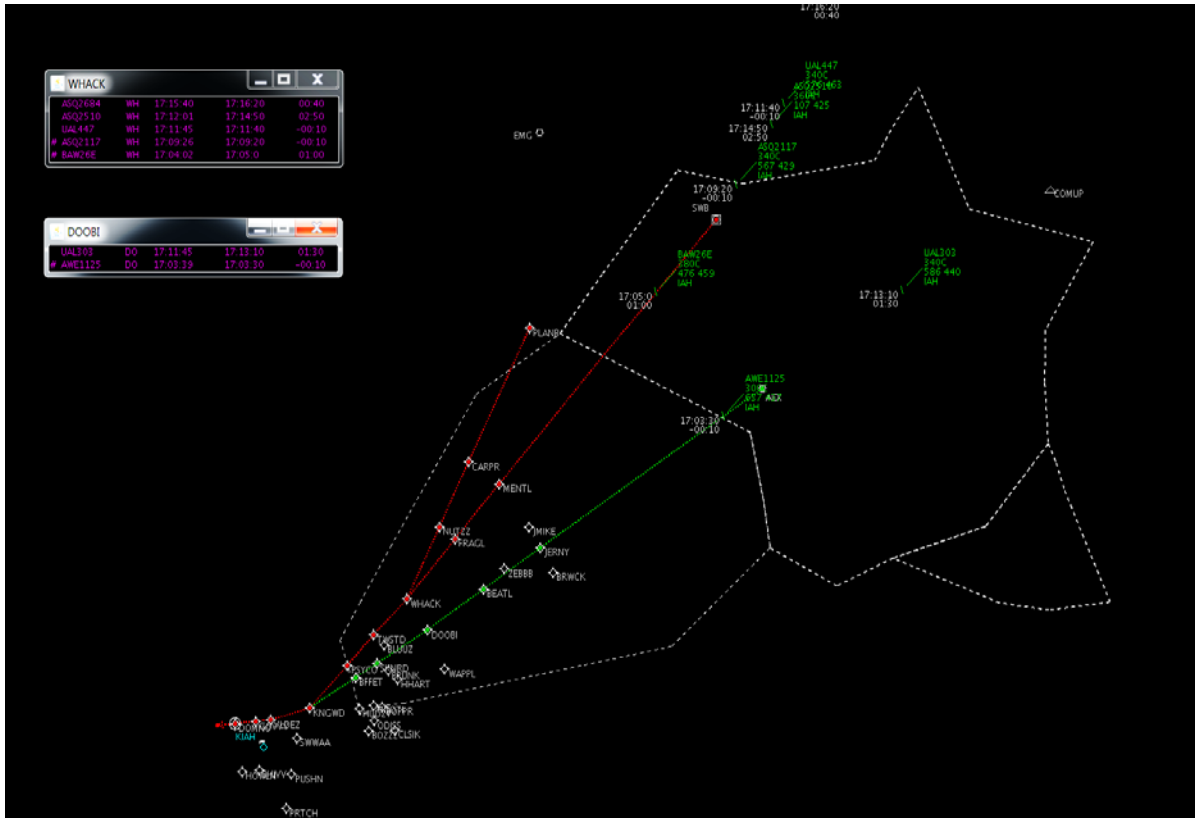
Departure Scheduling: Generates release times for aircraft to join the arrival stream to a terminal.

Arrival

En Route Departure Capability (EDC): Generates release times for aircraft to meet an overhead restriction

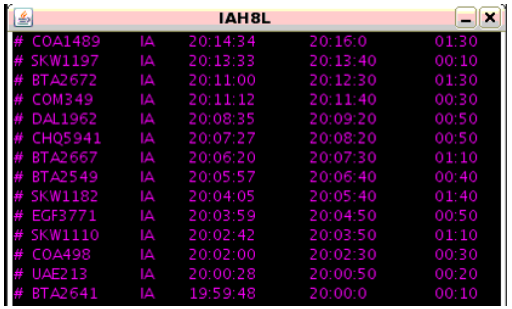
Rendering is notional – not drawn to scale.
Source: MITRE CAASD

What Do Controllers See?



Data Block

Delay Countdown timer (DCT)

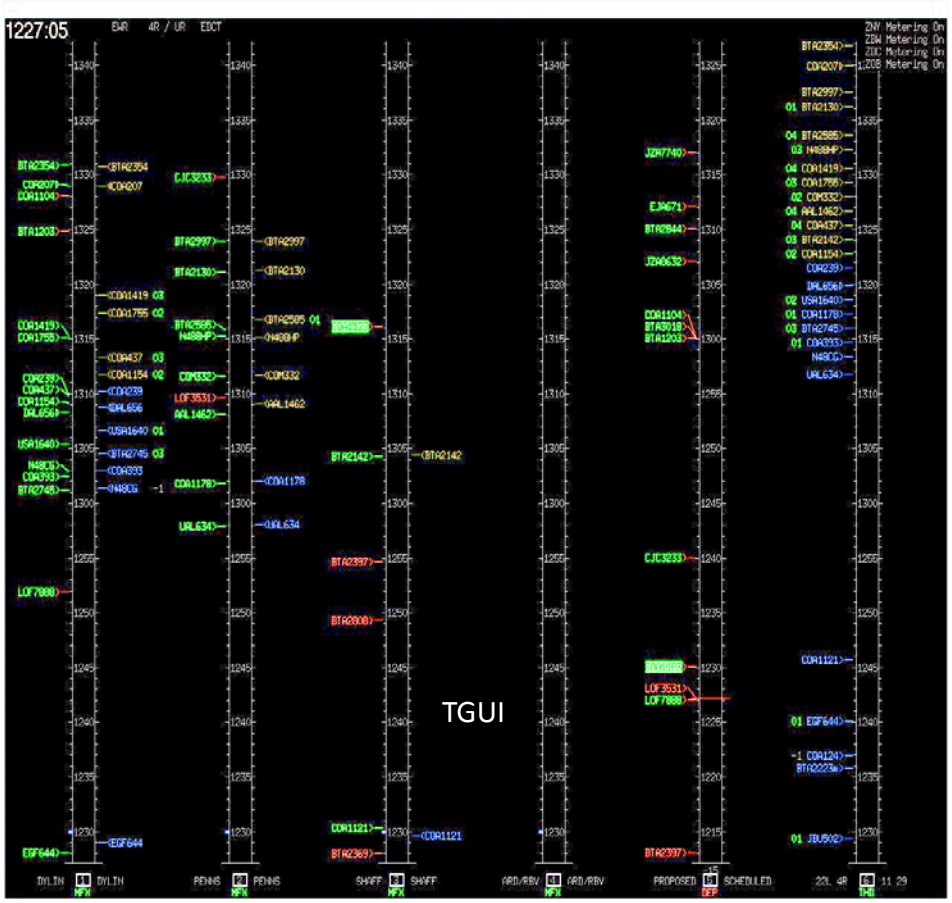


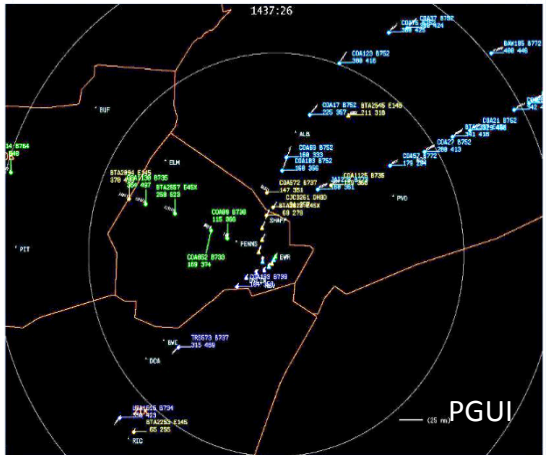
IAH8L

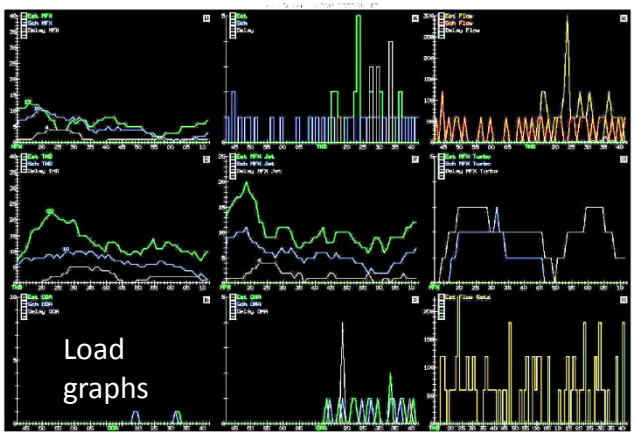
# COA1489	IA	20:14:34	20:16:0	01:30
# SKW1197	IA	20:13:33	20:13:40	00:10
# BTA2672	IA	20:11:00	20:12:30	01:30
# COM349	IA	20:11:12	20:11:40	00:30
# DAL1962	IA	20:08:35	20:09:20	00:50
# CHQ5941	IA	20:07:27	20:08:20	00:50
# BTA2667	IA	20:06:20	20:07:30	01:10
# BTA2549	IA	20:05:57	20:06:40	00:40
# SKW1182	IA	20:04:05	20:05:40	01:40
# EGF3771	IA	20:03:59	20:04:50	00:50
# SKW1110	IA	20:02:42	20:03:50	01:10
# COA498	IA	20:02:00	20:02:30	00:30
# UAE213	IA	20:00:28	20:00:50	00:20
# BTA2641	IA	19:59:48	20:00:0	00:10

Meter list

What Do Traffic Management Coordinators See?





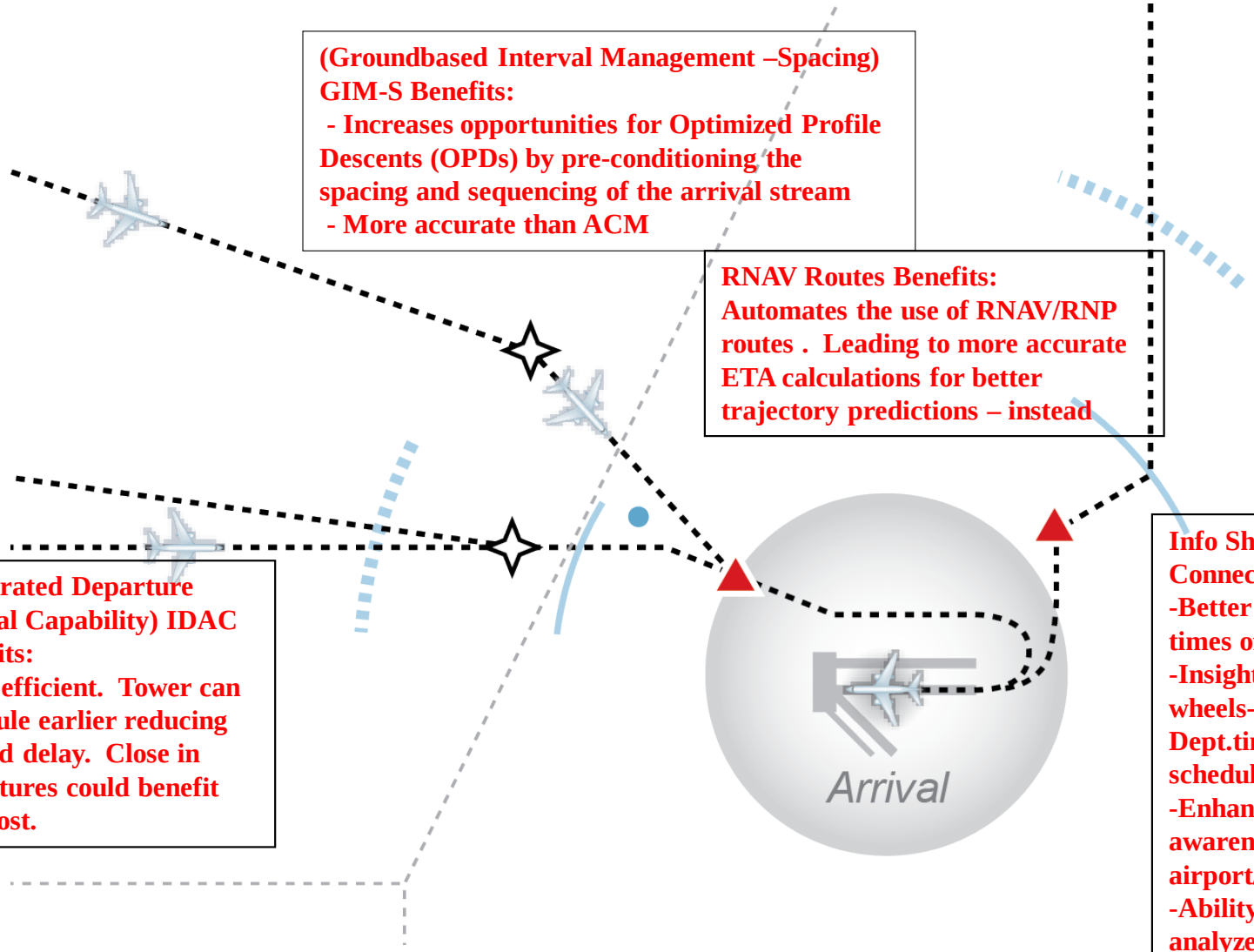


Advanced Capabilities in Progress (Near Future)

(Groundbased Interval Management –Spacing) GIM-S Benefits:
- Increases opportunities for Optimized Profile Descents (OPDs) by pre-conditioning the spacing and sequencing of the arrival stream
- More accurate than ACM

Metering Analysis and Information (MA&I): Provide facilities TBFM performance reports (4.4)

RNAV Routes Benefits:
Automates the use of RNAV/RNP routes . Leading to more accurate ETA calculations for better trajectory predictions – instead



(Integrated Departure Arrival Capability) IDAC Benefits:
More efficient. Tower can schedule earlier reducing ground delay. Close in departures could benefit the most.

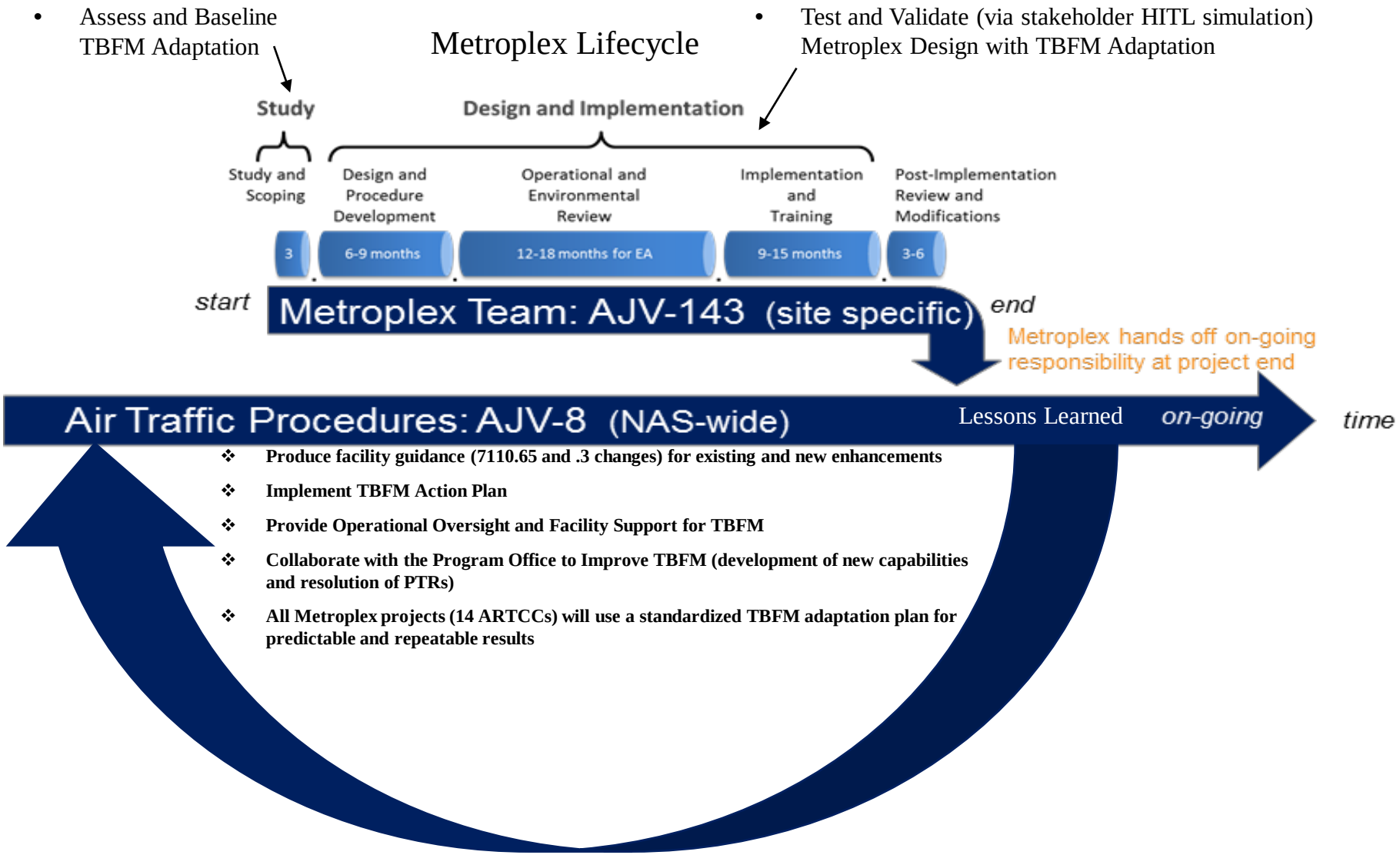
Info Share Benefits (SWIM Connectivity):
-Better predict arr/dept times of aircraft
-Insight into scheduled wheels-up times (sched. Dept.time) once a dept. is scheduled in TBFM
-Enhance situational awareness to improve airport/gate utilization
-Ability of consumer to analyze TBFM TMIs

TBFM Supports PBN

- TBFM changes from strictly a demand/capacity tool to one that also supports routine use of PBN
- TBFM enables the smooth and orderly flow of aircraft to meet the tolerances of "optimized" procedures and capacity limitations of airspace, TRACONs, runways allowing controllers to efficiently achieve the spacing and flow rates
- Present capabilities are a first step in introducing automation that assists controllers in producing a regulated flow
  - Departure Scheduling enables departing aircraft to seamlessly join an arrival flow
  - En Route departure capability times departing aircraft to join and meet an airborne restriction
  - Arrival time based metering provides controllers awareness of a Scheduled Time of Arrival to condition the flow while accounting for other flows to the runway

Relationship of Metroplex and TBFM Activities

- Assess and Baseline TBFM Adaptation
- Test and Validate (via stakeholder HITL simulation) Metroplex Design with TBFM Adaptation



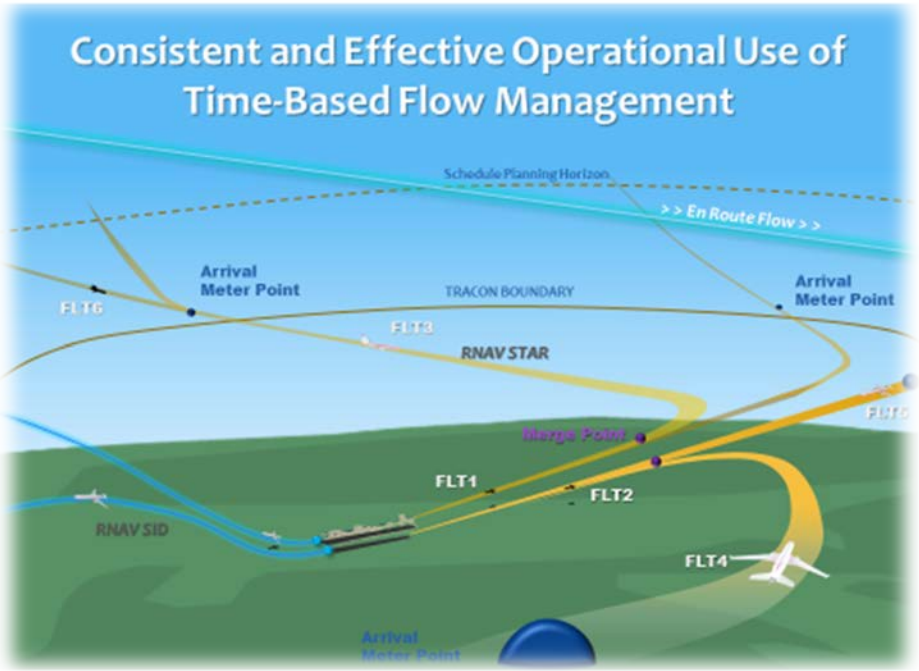
- **Produce facility guidance (7110.65 and .3 changes) for existing and new enhancements**
- **Implement TBFM Action Plan**
- **Provide Operational Oversight and Facility Support for TBFM**
- **Collaborate with the Program Office to Improve TBFM (development of new capabilities and resolution of PTRs)**
- **All Metroplex projects (14 ARTCCs) will use a standardized TBFM adaptation plan for predictable and repeatable results**

TBFM Action Plan Progress

Targeted TBFM Objectives	Progress
Vision	Completed Vision: ***The vision for TBFM is the expanded use of time-based metering to enable gate-to-gate improvements in both fuel and throughput efficiencies by applying spacing only where needed allowing for the routine use of Performance Based Operations (PBO) to capitalize on cockpit Flight Management System (FMS) capabilities adding more predictability to the ATC system.***
Unified Direction	Complete ❖ ATP Future Procedures Group single point of contact for TBFM.
Policies and Procedures	In Process ❖ **External comment period has ended, internal review in process** ❖ **Use policy:** **"When departure and or arrival flows are subject to TMI's, or when supporting PBN procedures, TBFM must be used to the maximum extent"**
Training	Controller/FLM-Completed TMC/STMC-Completed ❖ **(new data) En route controller completed eLMS course** ❖ **(new data) Terminal controllers completed eLMs course** ❖ **7 day TMC/STMC course completed target completion FY 2017**
Culture and Communication	In Progress ❖ **Articles published My FAA & FAA Focus, TBFM field/facility POC,s identified, and working with FAA Communications on consist TBFM messaging**
System Management	In Progress ❖ **PMO advanced TBFM training for FAST Team** ❖ **PR being reviewed daily**
Outcome Analysis	In Progress ❖ **Possible 3 Tier Metric System** ❖ **Dashboard concept explored** ❖ **Initial Customer forum conducted to vet possible metrics**

Questions

What we want to Achieve



NAS Vision for TBFM

The vision for TBFM is the expanded use of time-based metering to enable gate-to-gate improvements in both fuel and throughput efficiencies by applying spacing only where needed allowing for the routine use of Performance Based Operations (PBO) to capitalize on cockpit Flight Management System (FMS) capabilities adding more predictability to the ATC system.

Attachment G

Human Factors: Ongoing work with AFS-410 Presented to ATPAC

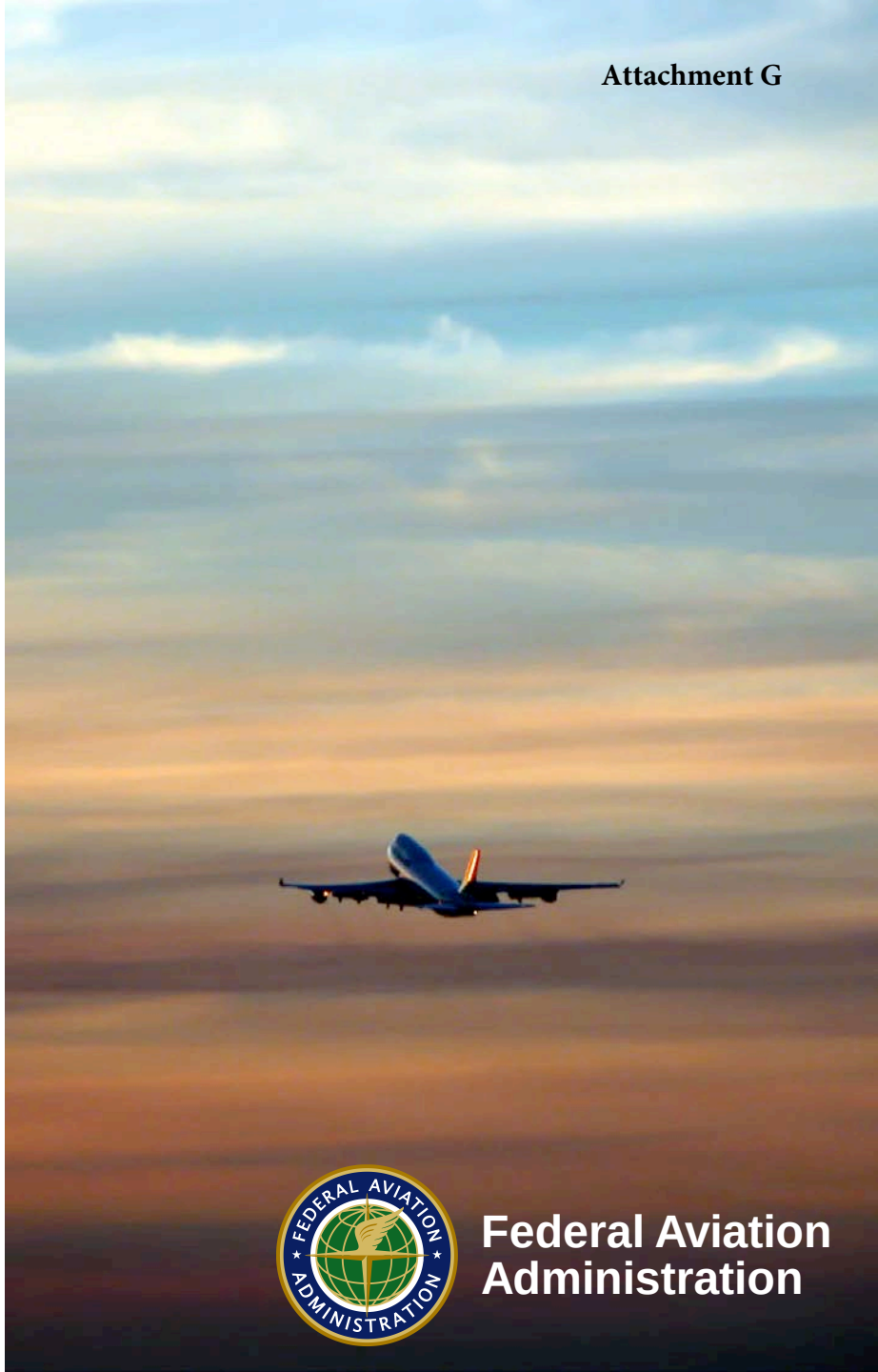
The road to Zero/Zero Gate to Gate

ATPAC

Presented to:

By: Bruce McGray, FAA AFS-410

Date: July 2015



Federal Aviation Administration

Our Background & Mission

- **FAA Aviation Flight Standards Division (AFS-400)**
  - Flight Operations Branch AFS-410

The Flight Operations Branch is the principal directing element of AFS-400 with respect to:

Direction, control, and execution of all flight operational aspects of instrument flight operations projects

And other flight operation applications resulting from the introduction of new technologies and concepts.

Incorporating EFVS and future technologies into the LVO/SMGCS environment

- **What is LVO/SMGCS?**
  - FAA Order 8000.94 Defines LVO/SMGCS as all ground operations at the airport at visibilities less than 1200ft RVR.
- **There are currently 2 levels of LVO/SMGCS**
  - Level 1: Below 1200ft-500ft RVR
  - Level 2: Below 500ft-300ft RVR
- **Today laying the foundation for Level 3 LVO/SMGCS- Less than 300ft RVR**

What is our Big Goal?

Incorporate EFVS and emerging NextGen technologies into the LVO/SMGCS environment, and safely achieve zero / zero visibility gate to gate operations

Breaking the 300ft RVR Barrier

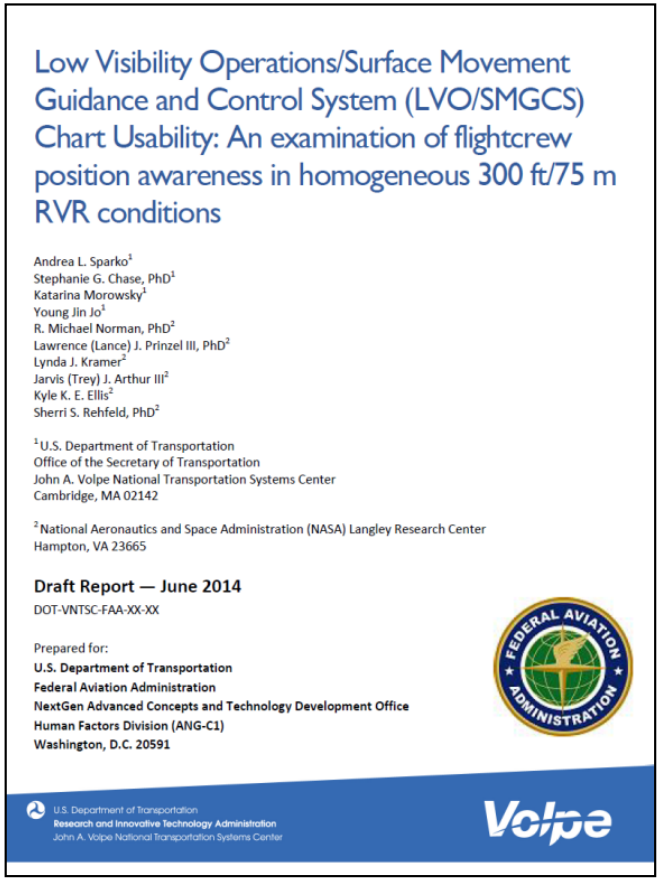
To successfully create Level 3 LVO/SMGCS and safely operate in extremely low visibility, we must build on previous research/operational work and learn from our lessons, exactly as the CAT III ILS POC was conducted.

Joint Efforts with ANG-C1 and Results

- NASA Langley/Volpe Taxi Study
- Boston OSA
- Volpe Charting Study
- Gate-to-Gate in Zero Vis POC Efforts
- 1984-1987 CAT III ILS Study

NASA Langley/Volpe Results

- **First** 300 ft RVR taxi evaluation in aviation history
- Also **first** time in aviation history that Level D simulator with accurate visuals used for LVO Taxi
  - High time CAT III qualified pilot captains and test pilots, Memphis ATC SME validated accuracy
  - Thorough beta test improved final trials



Low Visibility Operations/Surface Movement Guidance and Control System (LVO/SMGCS) Chart Usability: An examination of flightcrew position awareness in homogeneous 300 ft/75 m RVR conditions

Andrea L. Sparko[1]
Stephanie G. Chase, PhD[1]
Katarina Morowsky[1]
Young Jin Jo[1]
R. Michael Norman, PhD[2]
Lawrence (Lance) J. Prinzel III, PhD[2]
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Kyle K. E. Ellis[2]
Sherri S. Rehfeld, PhD[2]

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Draft Report — June 2014
DOT-VNTSC-FAA-XX-XX

Prepared for:
U.S. Department of Transportation
Federal Aviation Administration
NextGen Advanced Concepts and Technology Development Office
Human Factors Division (ANG-C1)
Washington, D.C. 20591

U.S. Department of Transportation
Research and Innovative Technology Administration
John A. Volpe National Transportation Systems Center

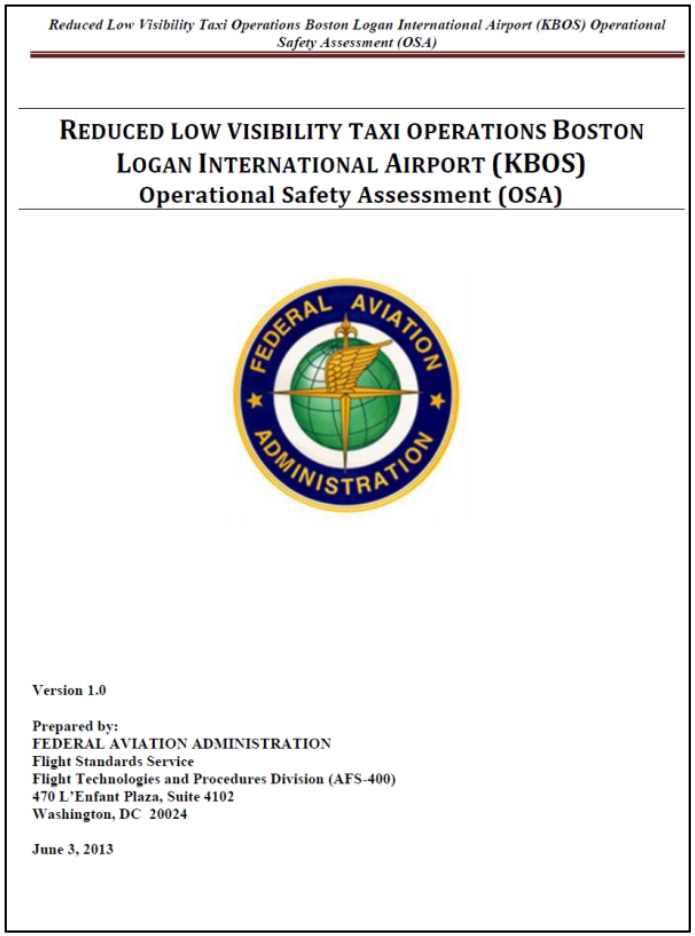
Volpe

More Results:

- Established that pilots can safely taxi in 300 ft RVR without losing situational awareness
- ANG-C1 ensured credible test plan
- Designed a potential FAA Prototype LVO/SMGCS Taxi Chart Book

Boston OSA- Full SMS Evaluation

- Validated- pilots can see and avoid at 500 ft RVR with proper mitigations
- Improved taxi access at airports by establishing that 500 ft visibility can be the new floor for Level 1 LVO/SMGCS
  - To date 13 airports now authorized operating at 500 ft RVR
- Established 10 KTS taxi speed in LVO via NASA-Langley simulator data
- Used ANG-C1 methodology in SMS evaluation



Reduced Low Visibility Taxi Operations Boston Logan International Airport (KBOS) Operational Safety Assessment (OSA)

REDUCED LOW VISIBILITY TAXI OPERATIONS BOSTON LOGAN INTERNATIONAL AIRPORT (KBOS)
Operational Safety Assessment (OSA)

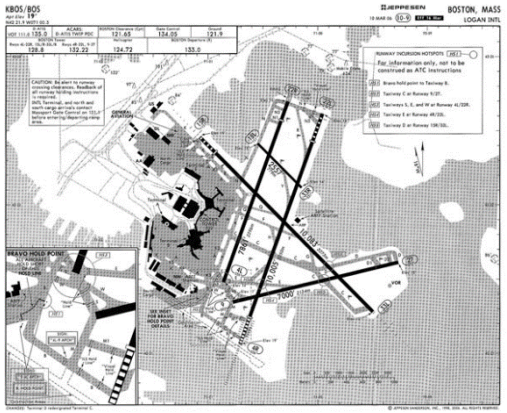
Version 1.0

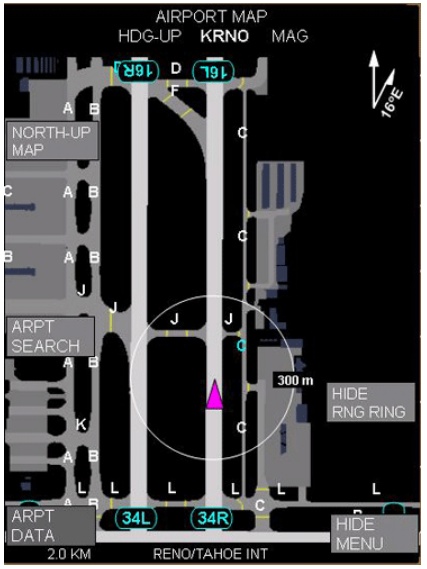
Prepared by:
FEDERAL AVIATION ADMINISTRATION
Flight Standards Service
Flight Technologies and Procedures Division (AFS-400)
470 L'Enfant Plaza, Suite 4102
Washington, DC 20024

June 3, 2013

Volpe Charting Study

- The analysis will drive ICAO white paper content to achieve more standardized international charting symbols
- Will contribute to more consistent LVO/SMGCS operations worldwide





Gate to Gate in Zero Visibility

- Introduced concept of Level 3 LVO/SMGCS (< 300 ft RVR) - Seattle Demonstration Project
- Propose ANG-C1 head development of data collection for this
- FedEx taxi test goal– to determine EFVS performance for reduced airport equipage requirements for LVO/SMGCS
  - ANG-C1 overseeing test criteria development
- Seattle interdependencies in place

Gate to Gate Issues- LVO Taxi Not Regulated

- Determine any addition safety/procedural mitigations for Air Traffic, airport operator, cockpit operations to protect aircraft movement at values less than 300 ft RVR using vision systems
- Validate vision system performance necessary to eventually support zero/zero gate to gate
- Satisfy FAA and industry participants of efficacy of this type operation

We Propose:

- Use the CAT III ILS study process steps as a historically proven methodology for operational approval of emerging technologies. Some of those steps:
  - Clearly stated primary and secondary goals
  - Thorough documentation of history and any contentious positions on possible outcomes
  - Properly qualified joint Industry/FAA subject matter experts on the team

We Propose:

- Other key process steps;
  - Organize process for validating or disproving the feasibility of zero/zero visibility gate to gate
  - All parties commit to support whatever outcome is reached
  - Data based decision making is key
  - Proper combination of testing and operational evaluations

LED Lighting Efforts

- Flight Ops field deployment problems and unique LED characteristics resulted in FAA/industry safety concerns
- Opinion- Human Factors implementation oversight is needed

How we are working together

A proven track record of working across the FAA and Industry with established Interdependencies to improve NAS performance

Working together to achieve results via key elements of critical thinking

Discussions and Questions?

Contact Info

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Figure 3: Cockpit Motion Facility with RFD Simulator I