Optimization of Airspace and Procedures in the Metroplex

SoCal Metroplex Project Overview Brief

To: Los Angeles World Airport
By: Rob Henry, Manager SoCal Metroplex
Jose Gonzalez, SoCal Metroplex
Date: May 27, 2015
Agenda

- SoCal Metroplex Project Background
- Scope of Work
- Environmental Assessment
- Benefits
- Challenges
- Implementation
Thursday, August 12, 2013
11,404 tracks

Blue – Jets
Yellow – Turboprops
Red – all others
Metroplex and NextGen

- The purpose of the project is to improve airspace efficiency and reduce complexity
- RTCA’s Task Force 5 recommendations for NextGen implementation included:
  - Focus on major metropolitan areas
  - Optimize flight paths and climb/descent profiles
  - Institute collaborative teams to broadly proliferate existing PBN experience and expertise
  - Promote RNAV “everywhere” and RNP (Required Navigational Performance) “where beneficial”
  - Integrate airspace and procedure design
  - Decouple operations arriving and departing adjacent airports
  - Use 3 NM and terminal separation rules wherever possible
Southern California Metroplex Scope

- **Scope of work**
  - Metroplex is an optimized approach to integrated airspace and procedures projects
    - Proposed solutions center on PBN procedures and airspace redesign
  - Airspace and procedures solutions are limited to those that can be achieved without producing significant noise increases
    - Noise impacts assessed and reported in an Environmental Assessment (EA)
    - Draft EA will include a noise analysis and track/altitude information
    - Years modeled: 2015 and 2020 forecast conditions
    - Preliminary analysis shows no significant noise increases in the 65 DNL
Design

- The SoCal Design Team worked in cooperation with Industry
- Procedure design was focused on establishing Optimized Profile Descents (OPD) where feasible
  - Terrain and closely spaced airports contributed to design challenges
  - Where OPDs were not feasible the Design Team developed solutions with Industry to improve procedures over current conditions
  - RNP approaches attached to the end of a STAR were also developed with Industry partners
SoCal Metroplex Airports

- The Southern California Metroplex consists of airspace delegated to the SCT and ZLA
- Interactive operations at eight SCT airports were examined closely
  - Los Angeles International Airport (LAX)
  - San Diego International Airport (SAN)
  - Bob Hope Airport (BUR)
  - Ontario International Airport (ONT)
  - John Wayne Airport – Orange County (SNA)
  - Long Beach/Daugherty Field (LGB)
  - Santa Monica Municipal Airport (SMO)
  - Van Nuys Airport (VNY)
SoCal Metroplex Delegated Airspace
SoCal Metroplex Area of Interest

This figure shows the six primary airports including BUR, LAX, LGB, ONT, SAN and SNA along with CRQ, PSP, SMO and VNY.
SoCal Metroplex Environmental Process

1. OAPM Study Team Completes Recommendations
3. Circulate Draft EA for Public Review (30 Days)
4. Circulate Final EA (Summer 2015)
5. Issue Notice of Intent to Prepare Draft EA (Jan 2014)
6. Agency Briefing Meetings (Fall 2014)
7. Conduct Public Workshops (Summer 2015)
8. FONSI (Proposed November 2015)
9. Notional Designs Completed by D&I Team (June 2014)
10. Complete Draft EA (Spring 2015)
11. Review Comments and Prepare Responses (Summer 2015)
12. Implement Metroplex Procedures (Proposed March 2016)
Purpose & Need of Metroplex EA

• Main Purpose of Metroplex
  • To enhance efficiency in the SoCal Metroplex
    • Reduce Complexity
    • Provide Predictability
    • Provide Flexibility
EA Draft Study Area

- SBA
- BUR/VNY
- LAX
- ONT
- SNA
- PSP
- SAN

Pacific Ocean
# Public Workshops

<table>
<thead>
<tr>
<th>Date</th>
<th>Workshop 1</th>
<th>Workshop 2</th>
<th>Workshop 3</th>
<th>Workshop 4</th>
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<tr>
<td>15-Jun-15</td>
<td>Public Workshop SNA</td>
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## Summary of Potential Benefits

### Qualitative Benefits
- Reduced ATC task complexity
- Reduced communications (flight deck and controller)
  - Reduced phraseology
  - Reduced frequency congestion
- Reduced pilot workload
- Repeatable, predictable flight paths
- Accurate fuel planning
- Laterally or vertically segregated flows where practical

### Quantitative Benefits

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<tr>
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<th>Low</th>
<th>High</th>
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<tbody>
<tr>
<td>Estimated Annual Fuel Savings: SIIDs and STARs (Dollars)</td>
<td>$9.94M</td>
<td>$22.68M</td>
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<tr>
<td>Estimated Annual Fuel Savings: SIIDs and STARs (Gallons)</td>
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<td>Estimated Annual Carbon Savings: SIIDs and STARs (Metric Tons)</td>
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<td>77K</td>
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<td>Estimated Annual ADOC Savings: LAX Dual Independent Finals</td>
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<td>Estimated Annual Fuel Savings: SMO / LAX Interactions</td>
<td>$200K</td>
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<tr>
<td>Estimated Annual Savings: TOTAL</td>
<td>$14.13M</td>
<td>$26.93M</td>
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Optimized Profile Descent Example

(Arrival)

- An OPD prescribes speed and altitude restrictions at waypoints on the procedure that provide predictable lateral and vertical paths and assure separation from airspace and/or aircraft
  - Vertical windows at waypoints allow for variable wind conditions permitting flight crews to be at the top or bottom altitude providing power-off descents and mitigate level-offs in most conditions

- In the existing environment ATC will issue descent clearances to mitigate an aircraft departing protected airspace causing level offs and manipulation of power settings resulting in inefficient descents
Optimized Climb Profile Example
(Departure)

• An RNAV/PBN SID prescribes speed and altitude restrictions at waypoints on the procedure that provide predictable lateral and vertical paths and assure separation from airspace and/or aircraft
  - Vertical windows allow for variable wind conditions permitting flight crews and ATC repeatable and predictable paths for flight and fuel planning
  - Radio communication and potential communication errors are reduced

• In the existing environment ATC will issue multiple climb clearances to mitigate an aircraft departing protected airspace causing level offs and manipulation of power settings resulting in inefficient departure/climb profiles
SoCal Metroplex
Proposed Procedures

<table>
<thead>
<tr>
<th>RNAV STARs</th>
<th>RNAV SIDs</th>
<th>Conventional STARs</th>
<th>Conventional SIDs</th>
<th>RNAV/RNP Approaches</th>
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<td>37</td>
<td>50</td>
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**LAX Specific**

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<th>RNAV STARs</th>
<th>RNAV SIDs</th>
<th>Conventional STARs</th>
<th>Conventional SIDs</th>
<th>RNAV/RNP Approaches</th>
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Note: 38 existing approach procedures will require amendment
Challenges
(1 of 2)

- LAX runway projects as of 04/28/2015
  - Runway 06L/24R unavailable from 06/29/2015 through 10/15/2015
  - Runway 24L approach threshold relocation 11/15/2015 through 05/15/2016
  - Runway 6R approach threshold displaced 05/15/2016 through 09/30/2016
  - Runway 25R approach threshold relocation 10/01/2016 through 01/15/2017
  - Runway 07L/25R closed 01/16/2016 through 05/30/2017
  - Runway 07R/25L resurfacing
    - TBD (forecast closure 01/01/2018 through 05/31/2018)
  - Flight Checks dependent on runway projects
Challenges
(2 of 2)

• LAX MagVar
• SoCal MagVar
• SCT STARS Transition
• International Coordination
  • Mazatlán ACC and Tijuana Approach Control
• Achievement of OPD Benefits
• Department of Defense Airspace Expansions
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<th>Activity</th>
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<td>Design Phase Start</td>
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# Proposed Implementation

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<th>SoCal Due Date</th>
<th>WSA FPT Due Date</th>
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<td>Group 1A</td>
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<td>5/17/2015</td>
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SoCal Metroplex SIDs and STARs
Points of Contact

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QUESTIONS?
Acronym Definitions

• ATC: Air Traffic Control
• EA: Environmental Assessment
• NextGen: Next Generation Air Transportation System
• OAPM: Optimization of Airspace and Procedures in the Metroplex
• OPD: Optimized profile descent
• PBN: Performance based navigation
• RTCA: Radio Technical Commission for Aeronautics
• RNAV: Area Navigation
• RNP: Required Navigation Performance
• SCT: Southern California Terminal Radar Approach Control
• SID: Standard Instrument Departure
• SoCal: Southern California
• STAR: Standard Terminal Arrival Route
• ZLA: Los Angeles Air Traffic Control Center