An Update on Southern California Airspace Modernization

November 10, 2016 Chart Publication Date
Santa Barbara Municipal Airport, Bob Hope Airport, Palm Springs International Airport, Ontario International Airport and Van Nuys Airport

October 17, 2016
We Must Modernize
SoCal Metroplex Study Area

- **Scope:** Six major airports and 15 satellite airports:
  - Bob Hope Airport (BUR)
  - Los Angeles International Airport (LAX)
  - Long Beach Airport (LGB)
  - Ontario International Airport (ONT)
  - San Diego International Airport (SAN)
  - John Wayne-Orange County Airport (SNA)
- **Other airports include but not limited to:**
  - McClellan-Palomar Airport (CRQ)
  - Palm Springs International Airport (PSP)
  - Santa Monica Municipal Airport (SMO)
  - Van Nuys Airport (VNY)
SoCal Metroplex Overview

• Goals include improving flexibility and predictability of air traffic routes through increased use of performance based navigation (PBN)
• Improvements will be achieved by utilizing satellite technology and publishing and implementing advanced procedures
  o Area Navigation (RNAV)
  o Standard Terminal Arrivals (STARs)
  o Standard Instrument Departures (SIDs)
  o Required Navigation Performance (RNP) Approach procedures
  o Optimized Profile Descent (OPD)
SoCal Metroplex Terms

- Area Navigation (RNAV) - A method of navigation that mitigates the limitations of an aircraft navigating from one ground based navigational aid to a satellite system providing point to point operational capabilities.
- Standard Terminal Arrival Route (STAR) - A specific repeatable path with lateral and often vertical descent guidance for arrivals to an airport.
- Standard Instrument Departure (SID) - A specific repeatable path with lateral and often vertical climb guidance for departures from an airport.
- Required Navigation Performance (RNP Approach) - Approach providing a higher level of precision than an approach using ground based navigation.
- Optimized Profile Descent (OPD) - A procedure that keeps arrival aircraft at cruise altitude as long as possible before beginning a uninterrupted descent. Once begun, the procedure departs from the usual pattern of stair step descent all the way down to landing.
SoCal Metroplex Phases

• Study Team Phase (Completed December 2011)
  - Potential opportunities and operational issues were identified to determine if a benefit could be developed through the application of Performance Based Navigation (PBN) procedures and airspace changes
  - These designs were highly conceptual

• Design Team Phase (Completed March 2014)
  - This phase was used to refine the Study Team recommendations and conceptual designs into final, implementable PBN procedure and airspace designs

• Evaluation Phase (Completed August 2016)
  - The proposed procedures were evaluated to determine if they met operational, environmental and safety requirements

• Implementation Phase (Began August 31, 2016)
  - After issuance of a FONSI/ROD, activities in this phase are to complete and execute the implementation of the procedures developed during the previous phase(s)
DESIGN PRINCIPLES
Departure and Landing Direction
Runway Use

- Wind direction and velocity are key factors used to determine departure and landing direction
- Wind speed below five knots is negligible
- Runways are typically identified by their runway magnetic direction
  - Example: The west flow runway at San Diego International Airport (SAN) is 275 degrees magnetic
    - The last digit is dropped and it becomes SAN Runway 27
- The rationale for a headwind is more wind flowing over the wings provides more lift at a lower ground speed
  - A tailwind makes an aircraft faster across the ground requiring more runway length
- Southern California airports typical experience westerly winds which favors west operations
An Optimized Profile Descent 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-off descents in most conditions.

In the existing environment, Air Traffic Control will issue descent clearances to mitigate an aircraft departing protected airspace causing level-offs and manipulation of power settings resulting in inefficient descents.

Transition to approach procedure at 6,000 Feet.
Current arrival procedures utilize ground based navigation and radar vectors

- High workload for air traffic controllers and flight crew
- Inconsistent flight paths create wide dispersion for arriving traffic
- Inconsistent vertical profiles
  - Altitudes assigned by air traffic control
  - Arrival procedure not connected to approach
RNAV RNP Example

- RNAV STAR connects an arrival route to an RNAV RNP approach procedure
- STAR/Approach connectivity provides repeatable and predictable flight paths
  - Simplifies operations for flight crews and ATC
  - Allows use of flight-deck automation
  - Stabilized and efficient approach operations
An RNAV/PBN Standard Instrument Departure prescribes speed and altitude restrictions at waypoints 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 or separate from other traffic:
- Results in inefficient level offs
- Coordination between air traffic controllers
Summary of 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
NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)
SoCal Environmental Assessment (EA)

- The Environmental process began with Study Team participation in November of 2011
- Draft EA released June 10, 2015
  - Public comment period was open for 120 days
- Finding of No Significant Impact/Record of Decision (FONSI/ROD) signed August 31, 2016
- Final EA is available on the SoCal Metroplex website
FONSI/ROD enables the agency to move forward with replacing dozens of existing conventional air traffic control procedures with new satellite-based procedures.

FAA is working to phase in use of the procedures, starting in November 2016 and continuing through April 2017.

The agency will conduct additional informational briefings to inform the public of the project at each phase.
SoCal Environmental Information

- When the Southern California Metroplex procedures are implemented, some people might see aircraft where they did not previously fly. This is because some air route changes will occur, and because satellite-based procedures create more concentrated flight paths than conventional procedures.
- Some people will experience noise decreases or increases and some will experience no changes at all.
- Some flight track dispersion will continue to occur after the new procedures are implemented because the Metroplex project includes a number of existing procedures.
- Also, air traffic controllers will need to occasionally vector aircraft for safety or efficiency reasons or to reroute them around weather systems.
SoCal Metroplex Noise Maps

- The following noise maps are created to enhance the understanding of all potential noise changes in the study area.
- Please note that many of these changes occur at noise levels at or below the noise level experienced in everyday living situations in the area.
- Noise maps represent noise changes of DNL\(^*\) \(\pm 1\) dB.
  - For many people, this small change is difficult to distinguish.
- FAA did not use these maps for decision purposes.
- Noise maps are provided for disclosure purposes only.

\(^*\)The Day Night Level (DNL) metric is a value representing the aircraft sound level over a 24-hour period and includes all of the sound energy generated within that period. The DNL metric includes a 10-decibel (dB) weighting for noise events occurring between 10:00 P.M. and 7:00 A.M. (nighttime).
Increase/Decrease in DNL At or Above DNL 45 dBA

Notes: Grid points depict noise analysis results for U.S. Census block population centroids and the 0.5 nautical mile grid as discussed in Section 5.1.2 of the EA for the SoCal Metroplex Project. Grid points representing Section 4(f) resources and National Register listed historic resources are not depicted. Noise analysis results for grid points representing Section 4(f) resources and National Register listed historic resources are available in Appendix B to the SoCal Metroplex Noise Technical Report released on September 2, 2016. All noise analysis results released on September 2, 2016 are available in Google Earth format available for download at http://www.metroplexenvironmental.com. Based on requirements depicted in FAA Order 1050.1E, "Environmental Impacts Policies and Procedures", the noise impact analysis evaluates significant and reportable changes in DNL at levels equal to or higher than DNL 45 dB. Noise analysis results for the SoCal Metroplex Project EA indicate that the Proposed Action, when compared to the No Action Alternative, would not result in any significant impacts (i.e., a day-night average sound level [DNL] 1.5 dB increase in areas exposed to DNL 65 dB or higher) or reportable noise increases (i.e., DNL increases of 3 dB or more in areas exposed to aircraft noise between DNL 60 dB and 65 dB or DNL increases of 5 dB or greater in areas exposed to aircraft noise between DNL 45 dB and 60 dB).
Increase/Decrease in DNL Below DNL 45 dBA

FAA did not use these maps for decision purposes. Noise maps are provided for disclosure purposes only.

Notes: Grid points depict noise analysis results for U.S. Census block population centroids and the 0.5 nautical mile grid as discussed in Section 3.1.2 of the EA for the SoCal Metropole Project. Grid points representing Section 4(f) resources and National Register listed historic resources are not depicted. Noise analysis results for grid points representing Section 4(f) resources and National Register listed historic resources are available in Appendix B to the SoCal Metropole noise technical report released on September 2, 2016. All noise analysis results released on September 2, 2016 are available in Google Earth format available for download at http://www.metroplexenvironmental.com.

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COMMUNITY ENGAGEMENT
SoCal Community Engagement

- Early Notification of EA – January 21, 2014
- FAA conducted 11 public workshops: June 16 through July 1, 2015
  - Santa Ana, Santa Monica, Los Angeles, San Diego, Palm Springs, Torrance, Long Beach, Ontario, Ventura, Santa Barbara, and Burbank
- FAA extended public comment period for total of 120 days (October 8, 2015)
- Approximately 4,000 individual substantive comments received
  - Approximately 2,700 unique comment/form letters received
  - Approximately 380 comments received after public comment closed
  - Approximately 570 comments were received from three online community groups
- Responses to comments are included in the environmental assessment
Community Engagement

• Based on community comments the FAA reviewed all procedures
• Analysis consisted of reviewing the following:
  • Safety
    • Will the change have an adverse impact on safe operations?
    • Team considered Aviation Safety Information Analysis and Sharing data with potential relevance to airspace, procedures and enhancement of safety:
      • Traffic Collision Avoidance System hotspots
      • Terrain Avoidance Warning System alerts
      • High energy descent/approach events
  • Efficiency
    • Will the change create substantial inefficiencies?
  • Complexity
    • Will the change increase workload beyond a reasonable level for controllers or flight crews?
NOVEMBER 10, 2016 PROCEDURE IMPLEMENTATION
Map of November 10, 2016 Procedures

Legend:
- Waypoints
- Standard Terminal Arrival Routes (STARs)
- Standard Instrument Departures (SIDs)
- Metroplex
- Required Navigation Performance (RNP) Approaches
- Local Study Area Boundary
- Community Boundaries
Procedures for November 10, 2016

<table>
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<tr>
<th>Group One Publication November 10, 2016</th>
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<tr>
<td>BUR/VNY WEESL One STAR (RNAV)</td>
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<td>BUR RNP Y RWY 8 (RNAV)</td>
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<tr>
<td>BUR GPS Z RWY 8 (RNAV)</td>
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<td>BUR ILS Z or LOC Z RWY 8 (Conventional)</td>
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<tr>
<td>BUR ILS Y or LOC Y RWY 8 (Conventional)</td>
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<th>Future Chart Dates</th>
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<tr>
<td>JANUARY 5, 2017</td>
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<td>MARCH 2, 2017</td>
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<td>APRIL 27, 2017</td>
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*NA until April 27, 2017*
There is no existing published arrival procedure for SBA.

This STAR will reduce complexity and verbiage between Air Traffic Control and flight crews providing a repeatable and predictable path for SBA arrivals.

The STAR was not designed with an Optimized Profile Descent, but contains altitude restrictions to de-conflict SBA arrivals from San Diego International Airport departures and Los Angeles International Airport arrivals.

The design will reduce complexity between SBA arrivals and John Wayne-Orange County Airport, Long Beach Airport (Daugherty Field) and McClellan-Palomar Airport (Carlsbad) arrivals.

The design does not conflict with existing noise procedures.
SBA GAUCH and MISHN RNAV SIDs

Santa Barbara Municipal (SBA)
SID (Departure)
Publication:
GAUCH, MISHN Nov 10, 2016

- Current departure procedures are dependent on ground based navigation and radar vectors
- The GAUCH and MISHN SIDs are designed as RNAV-off-the-ground procedures
- The MISHN SID provides de-conflcition from the newly designed SBA PITBL STAR
- Concurrence of the designs was achieved with the airport operator, pilot groups and ATC
- The design does not conflict with existing noise procedures
BOB HOPE AIRPORT (BUR)
This STAR will reduce complexity and verbiage between Air Traffic Control and flight crews providing a repeatable and predictable path for BUR arrivals.

The WEESL STAR will de-conflict BUR arrivals from aircraft on the newly designed LAX WAYVE STAR and overflight traffic in the area.
• The RNAV RNP approach will reduce complexity and verbiage between Air Traffic Control and flight crews providing a repeatable and predictable path for BUR arrivals
• STAR transitions from the west and northwest join the approach
The RNAV GPS approach was modified to incorporate SoCal Metroplex waypoints to provide continuity.
BUR ILS Z or LOC Z RWY 8 (Conventional)
BUR ILS Y or LOC Y RWY 8 (Conventional)

Bob Hope Airport (BUR)
Instrument Approach
ILS (Z) or LOC Z RWY 08
ILS (Y) or LOC Y RWY 08
Publication:
RNAV (GPS) Z and Y RWY 08
Nov 10, 2016

- The RNAV GPS approaches were modified to incorporate SoCal Metroplex waypoints to provide continuity.
PALM SPRINGS INTERNATIONAL AIRPORT (PSP)
The development of the PSP RNAV RNP RWY 13R approach will provide a more repeatable and predictable path.

The PSP/ SIZLR RNAV STAR ties into the PSP RNP RWY 13R approach.

- The PSP SIZLR STAR also serves Jacqueline Cochran Regional Airport and Bermuda Dunes Airport.

Additional transitions will allow access to the approach from the east and southeast via radar vectors over TRM and SBONO as shown in the figure.
ONTARIO INTERNATIONAL AIRPORT (ONT)
The conventional STAR was modified to incorporate SoCal Metroplex waypoints to provide continuity.
VNY WEESL ONE RNAV STAR

Van Nuys Airport (VNY)
STAR (Arrival)
WEESL RNAV
Publication:
WEESL Nov 10, 2016

- This STAR will reduce complexity and verbiage between Air Traffic Control and flight crews providing a repeatable and predictable path for VNY arrivals
- The WEESL STAR will de-conflict VNY arrivals from aircraft on the newly designed LAX WAYVE STAR and overflight traffic in the area
Questions?

Online participants may experience periods of silence during Q/A
PROJECT INFORMATION
SoCal Metroplex Project Information

• This briefing is for informational purposes and does not reopen the SoCal Metroplex Environmental
• No changes have or will take effect before November 10, 2016
• Noise issues should be directed to the appropriate airport noise office
• Information about the SoCal Metroplex Project is available on the Metroplex site
• This presentation will be available on-line
• Education information will be available in coming weeks
Additional Public Information

• Before publishing the procedures, the agency will conduct additional public information meetings and webinars to further inform people about the changes
• The FAA will announce the upcoming public outreach to select officials, in press releases and on Facebook, Twitter, Instagram, the Metroplex website and possibly other platforms too
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<th>Meeting</th>
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<td>Community Pre-implementation (Webinar)</td>
<td>October 17, 2016, 6:00 PM (SBA, BUR, PSP, ONT and VNY)</td>
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<td>Community Pre-implementation (Webinar)</td>
<td>October 17, 2016, 8:00 PM (LGB, SNA, SLI, FUL and TOA)</td>
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<tr>
<td>Community Pre-implementation (Webinar)</td>
<td>October 20, 2016, 6:00 PM (LAX and SMO)</td>
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<td>Community Pre-implementation (Webinar)</td>
<td>October 20, 2016, 8:00 PM (SBA, BUR, PSP, ONT and VNY)</td>
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<td>Community Informational Briefing</td>
<td>October 25, 2016 D.W. Griffith Middle School (LAX and SMO)</td>
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<td>Community Informational Briefing</td>
<td>October 26, 2016 Palms Middle School (LAX and SMO)</td>
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<td>October 27, 2016 Liberty Station-Corky McMillin Event Center (SAN Area)</td>
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<tr>
<td>Community Informational Briefing</td>
<td>November 1, 2016 6:00 – 9:00 PM, La Presa Middle School, 1001 Leland Street, Spring Valley, CA 91977 (SAN Area)</td>
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<tr>
<td>Community Informational Briefing</td>
<td>November 2, 2016 6:00 – 9:00 PM, El Modena High School at 3920 E. Spring Street Orange, CA 92869 (LGB, SNA, SLI and TOA)</td>
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SOCAL METROPLEX WEBSITE INFORMATION
Website Links
(1 of 2)

SoCal Environmental Assessment Website
• http://www.metroplexenvironmental.com/socal_metroplex/socal_introduction.html

SoCal Metroplex Frequently Asked Questions
• http://www.metroplexenvironmental.com/socal_metroplex/socal_questions.html

SoCal Metroplex Documents (EA and Google Earth)
• http://metroplexenvironmental.com/socal_metroplex/socal_docs.html
Website Links (2 of 2)

Volume 1 (Responses to public comments)
• http://metroplexenvironmental.com/docs/socal_metroplex/final/SoCal_Metroplex_FEA_Appendix_F-Vol_I.pdf

Volume 2 (Responses to public comments)
• http://metroplexenvironmental.com/docs/socal_metroplex/final/SoCal_Metroplex_FEA_Appendix_F-Vol_II.pdf

Volume 3 (Responses to public comments)
• http://metroplexenvironmental.com/docs/socal_metroplex/final/SoCal_Metroplex_FEA_Appendix_F-Vol_III.pdf
Thank you!