

Metroplex

An Update on Southern California Airspace Modernization
November 10, 2016 Chart Publication Date
Long Beach Daugherty



FAA

| **NextGEN**

We Must Modernize



NEXT GEN Components: RNAV/RNP

Moving to Performance-Based Navigation

Conventional Routes

Today's airways connect ground-based navigation aids



Limited Design Flexibility

RNAV

Area Navigation (RNAV) routes follow defined "waypoints"



Increased Airspace Efficiency

RNP

Required Navigation Performance (RNP) routes within specified "containment area"



Optimize Use of Airspace

Source: Federal Aviation Administration



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SoCal Metroplex Phases

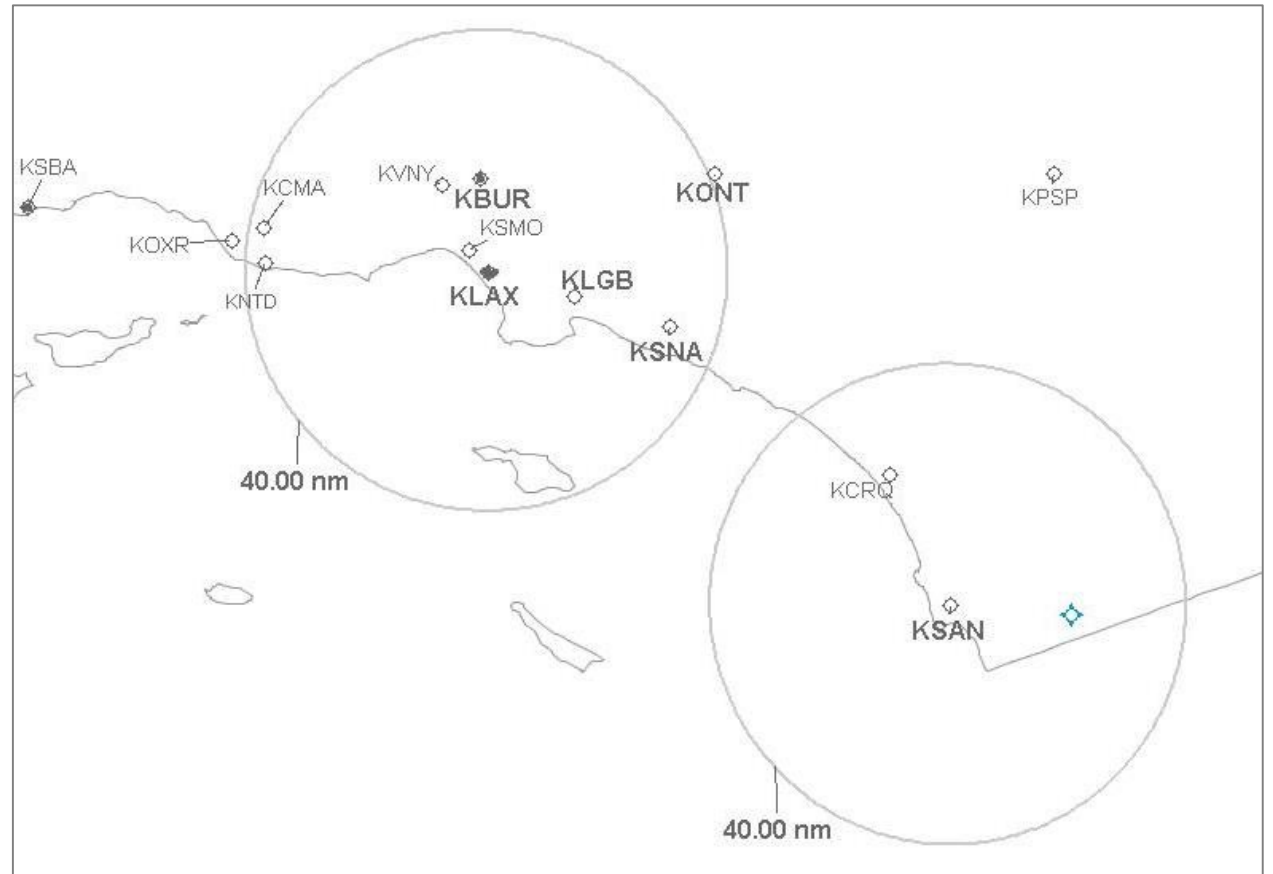
- Study Team Phase (Completed December 2011)
 - Potential opportunities and operational issues were identified to determine if a benefit could be developed through the application of Performance Based Navigation (PBN) procedures and airspace changes
 - These designs were highly conceptual
- Design Team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

SoCal Metroplex Benefits

- Increased use of performance based navigation (PBN)
- Reduced ATC task complexity
- Reduced communications (flight deck and controller)
- Reduced pilot workload
- Repeatable, predictable flight paths
- Accurate fuel planning
- Laterally or vertically segregated flows

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 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

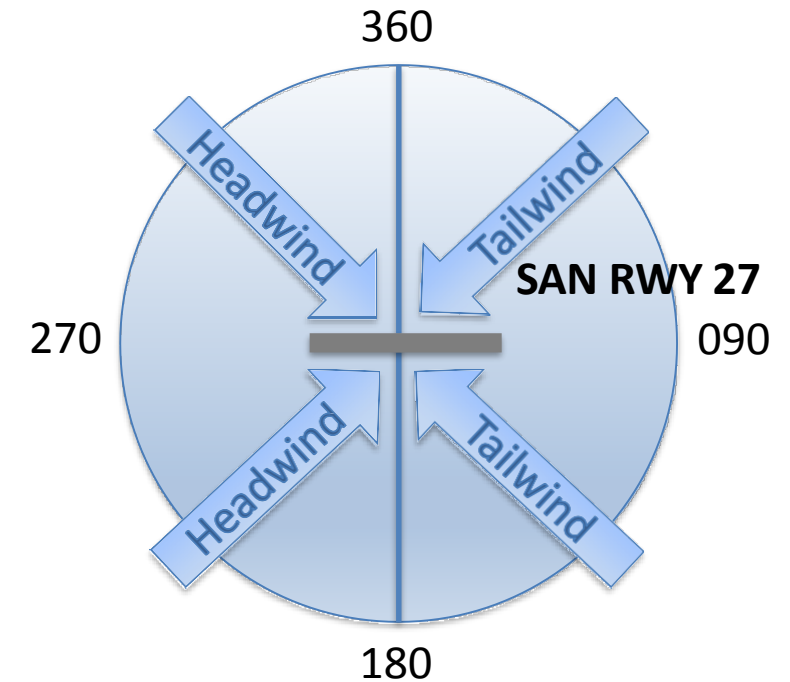


DESIGN PRINCIPLES

Departure and Landing Direction

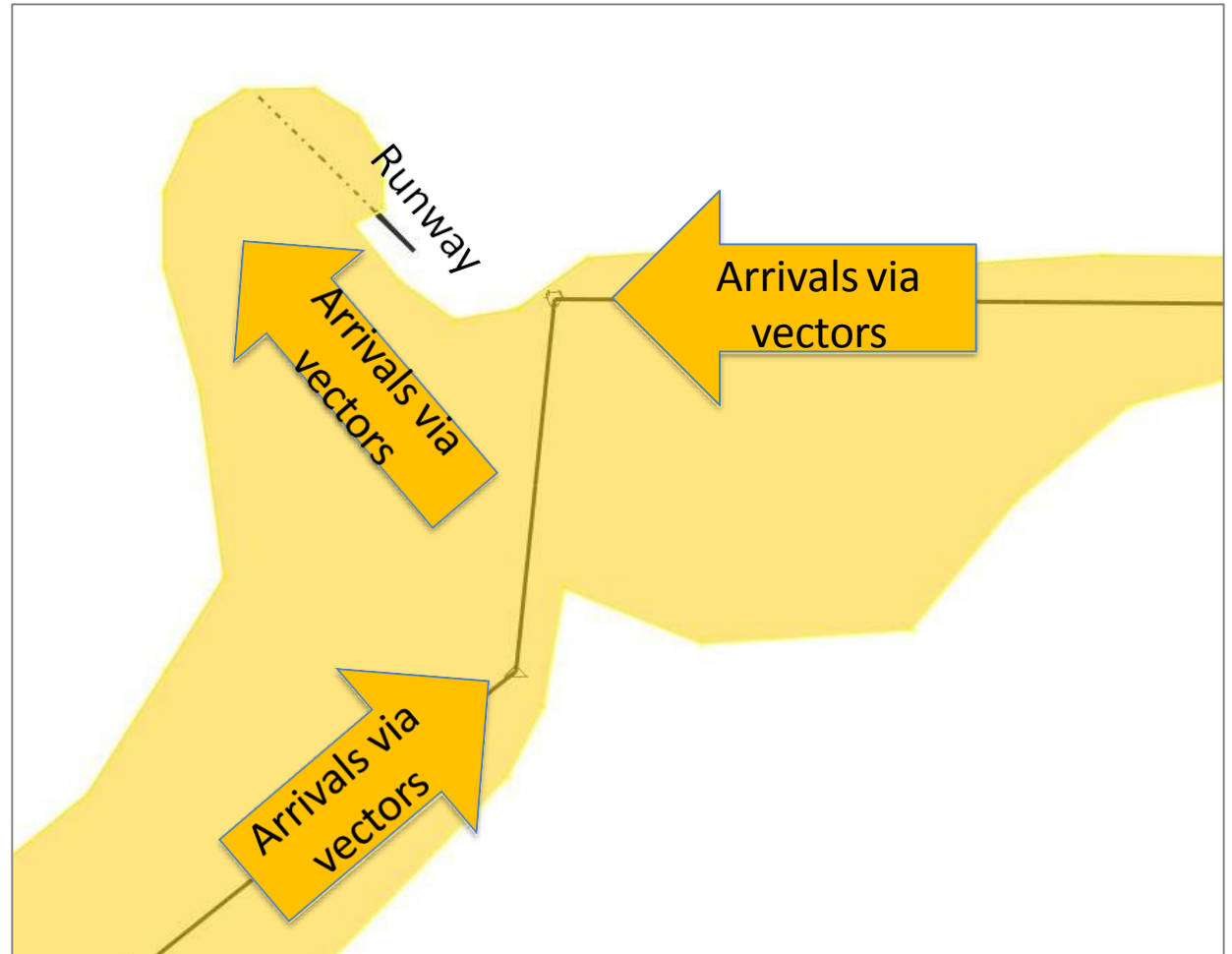
Runway Use

- 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



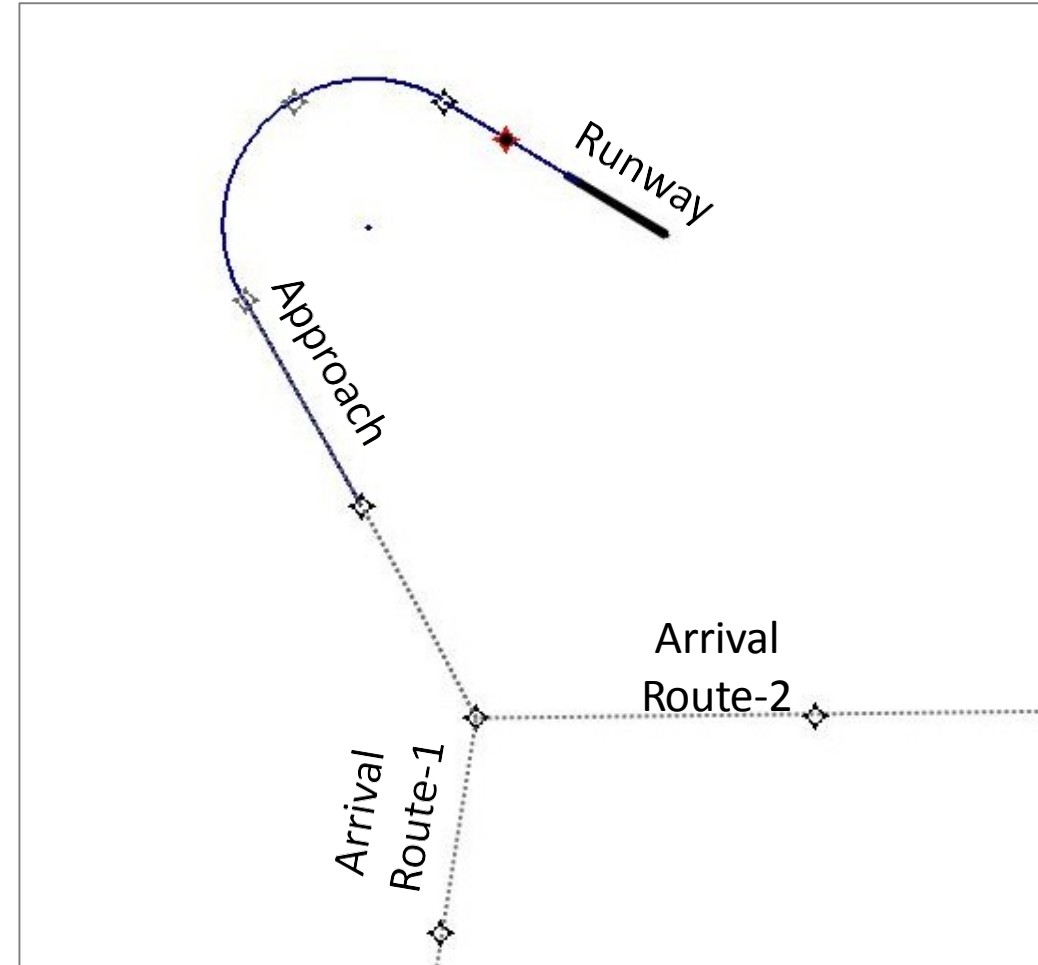
Vectoring Example

- 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

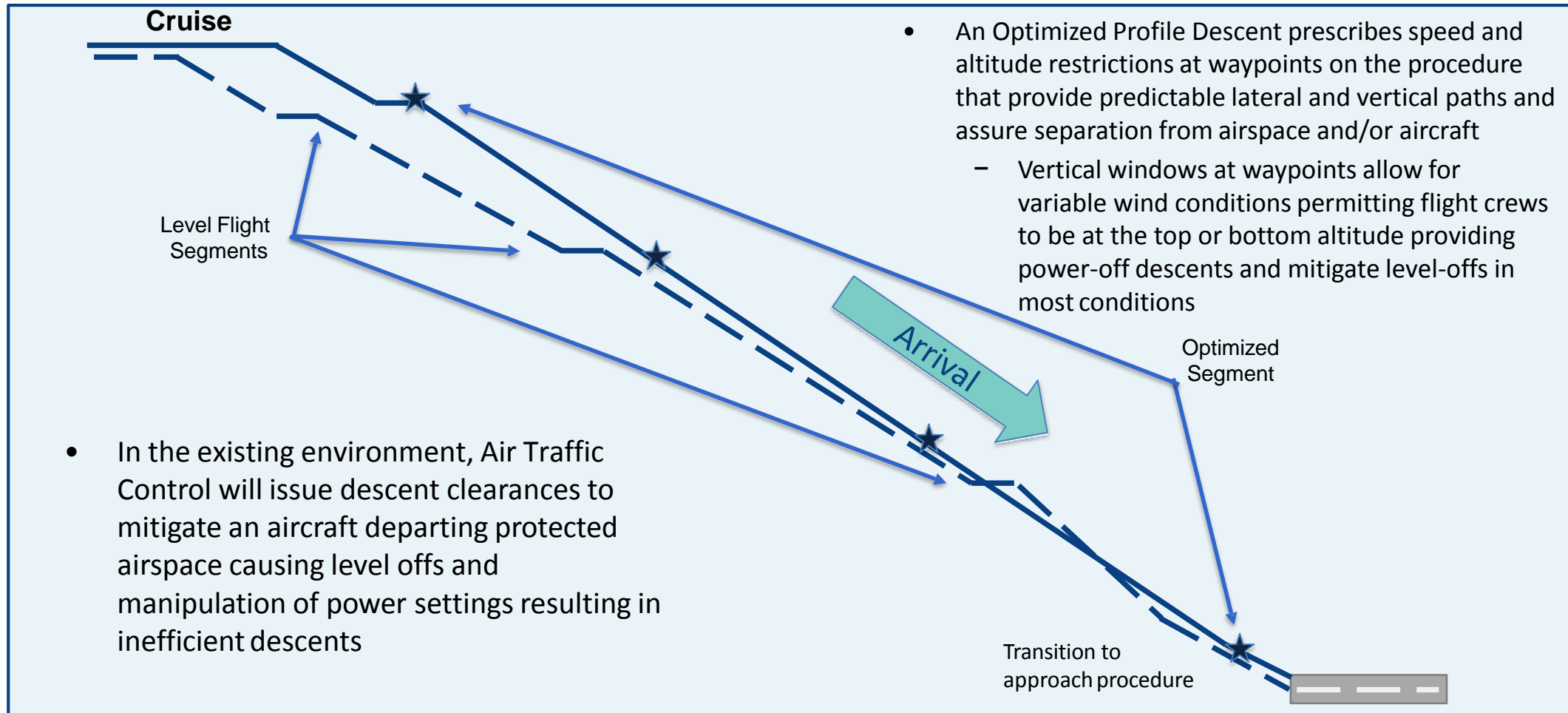


RNAV RNP Example

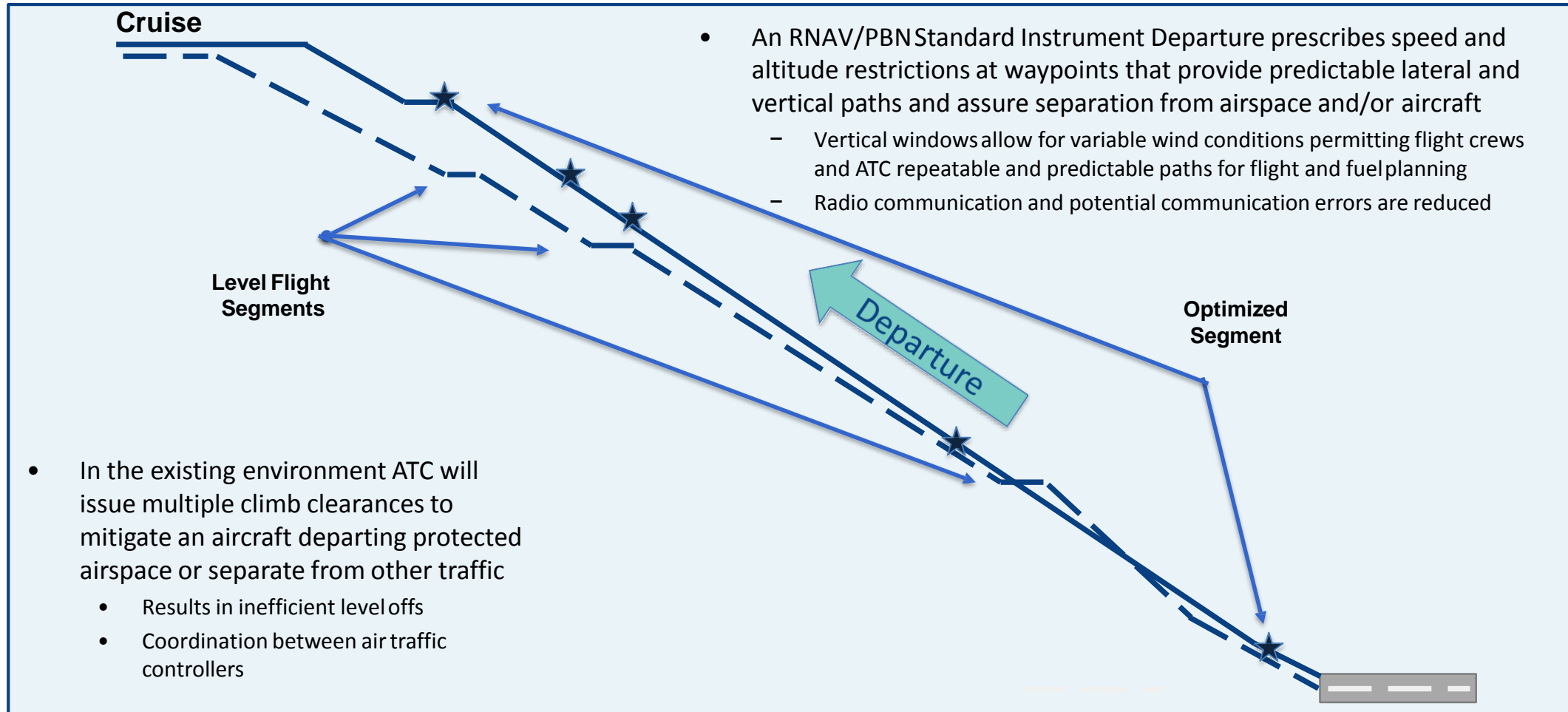
- RNAV STAR connects an arrival route to an RNAV RNP approach procedure
- STAR/Approach connectivity provides repeatable and predictable flight paths
 - Simplifies operations for flight crews and ATC
 - Allows use of flight-deck automation
 - Stabilized and efficient approach operations



Optimized Profile Descent Example (Arrival)



Optimized Climb Profile Example (Departure)





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

SoCal Decision Document

- 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

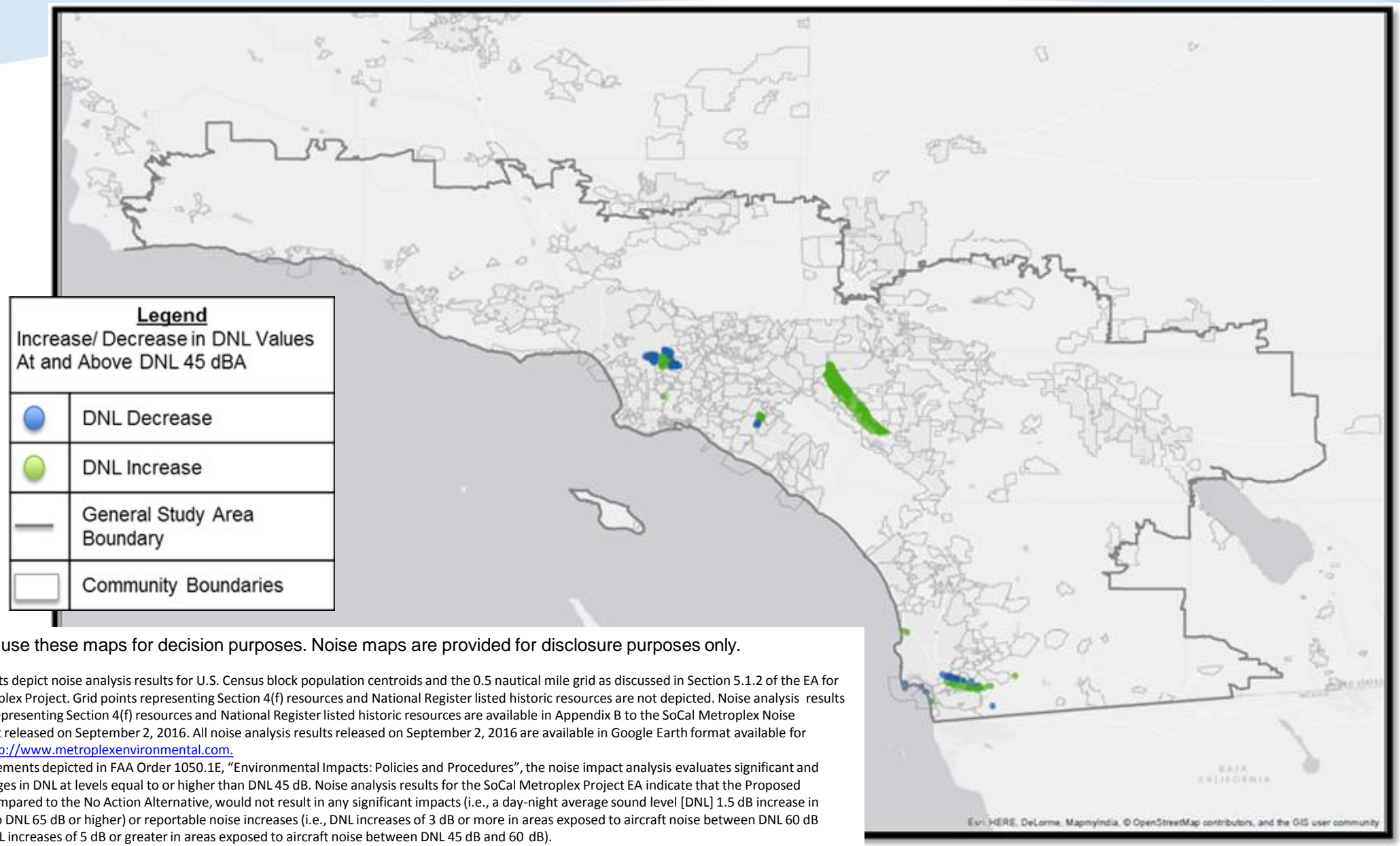
- When the Southern California Metroplex procedures are implemented, some people might see aircraft where they did not previously fly. This is because some air route changes will occur, and because satellite-based procedures create more concentrated flight paths than conventional procedures
- Some people 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

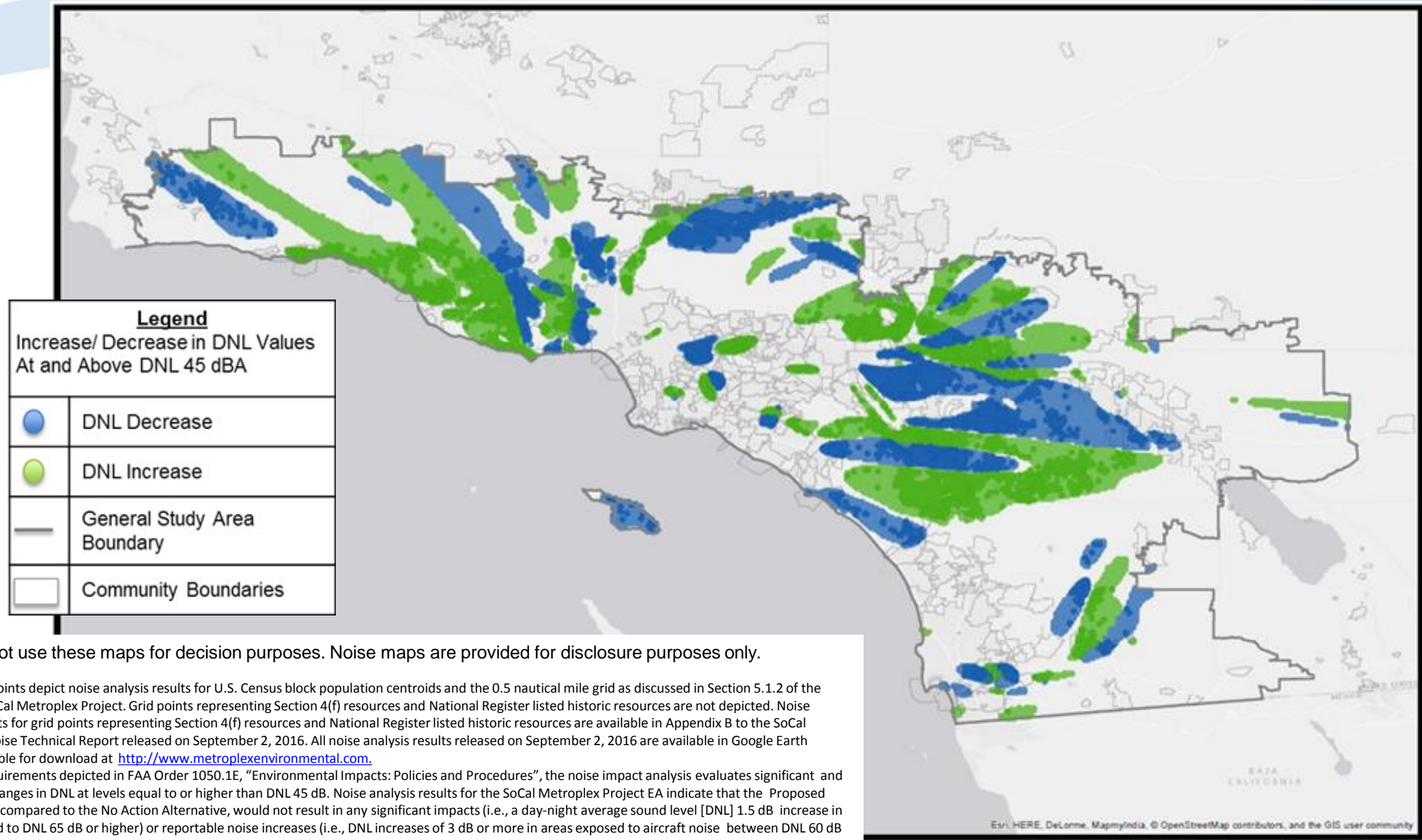
- The following noise maps are created to enhance the understanding of all potential noise changes in the study area
- Please note that many of these changes occur at noise levels at or below the noise level experienced in everyday living situations in the area
- Noise maps represent noise changes of DNL* +/-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

*Day-Night Average Sound Level (DNL) is the 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between midnight and 7 a.m., and between 10 p.m., and midnight, local time.

Increase/Decrease in DNL At or Above DNL 45 dBA



Increase/Decrease in DNL At or Below DNL 45 dBA





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?

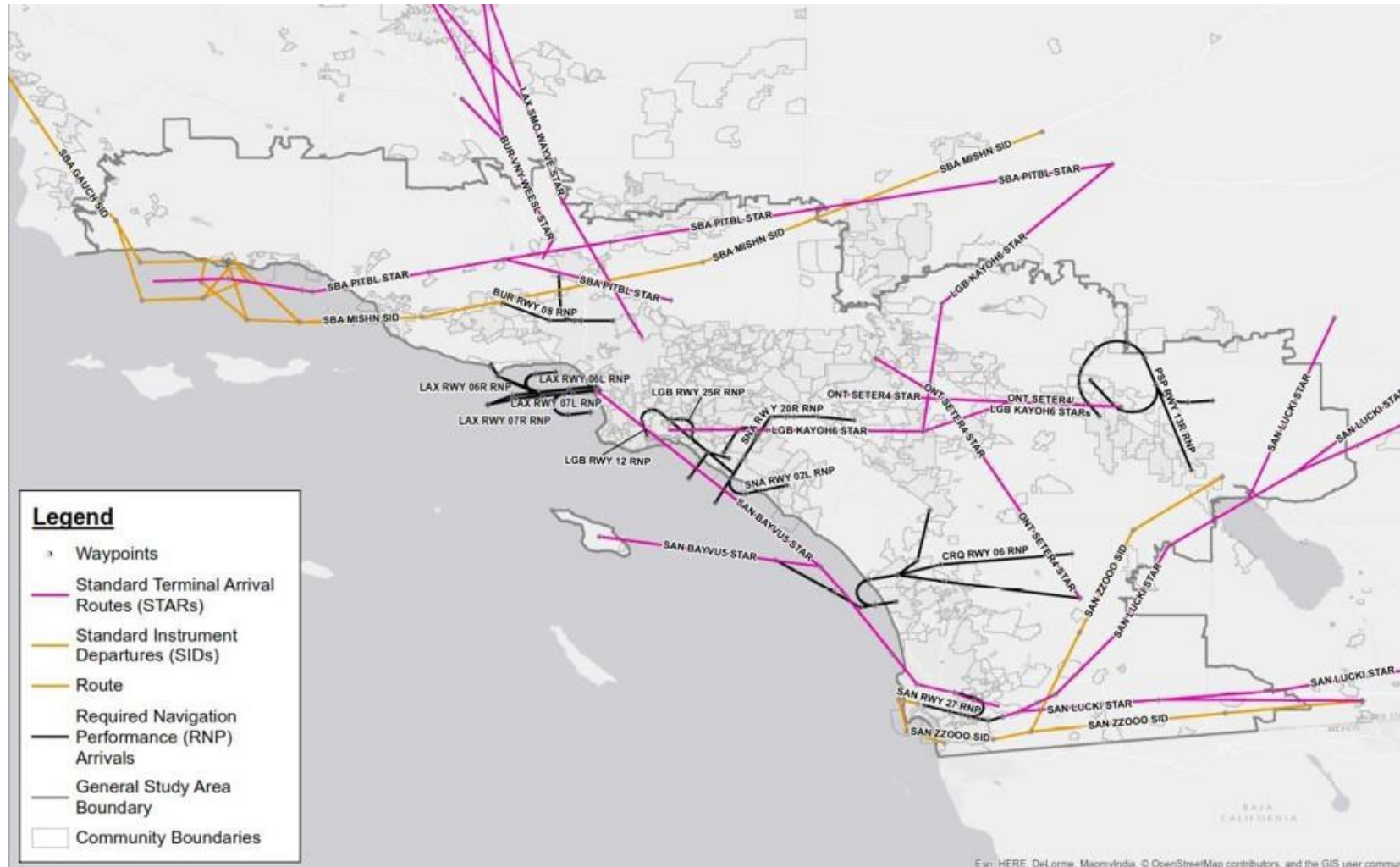
Community Engagement

Meeting	Date and Location
Community Pre-implementation (Webinar)	October 17, 2016, 6:00 PM (SBA, BUR, PSP, ONT and VNY)
Community Pre-implementation (Webinar)	October 17, 2016, 8:00 PM (SAN, CRQ, SDM and NZY)
Community Pre-implementation (Webinar)	October 18, 2016, 6:00 PM (LGB, SNA, SLI, FUL and TOA)
Community Pre-implementation (Webinar)	October 18, 2016, 8:00 PM (SAN, CRQ, SDM and NZY)
Community Pre-implementation (Webinar)	October 20, 2016, 6:00 PM (LAX and SMO)
Community Pre-implementation (Webinar)	October 20, 2016, 8:00 PM (SBA, BUR, PSP, ONT and VNY)
Community Informational Briefing	October 25, 2016 D.W. Griffith Middle School (LAX)
Community Informational Briefing	October 26, 2016 Palms Middle School (SMO/Culver City)
Community Informational Briefing	October 27, 2016 Liberty Station-Corky McMillin Event Center (SAN)
Community Informational Briefing	November 1, 2016 6:00 – 9:00 PM (La Presa Middle School, 1001 Leland Street, Spring Valley, CA 91977)
Community Informational Briefing	November 2, 2016 6:00 – 9:00 PM (El Modena High School at 3920 E. Spring Street Orange, CA 92869)



NOVEMBER 10, 2016 PROCEDURE IMPLEMENTATION

Map of November 10, 2016 Procedures



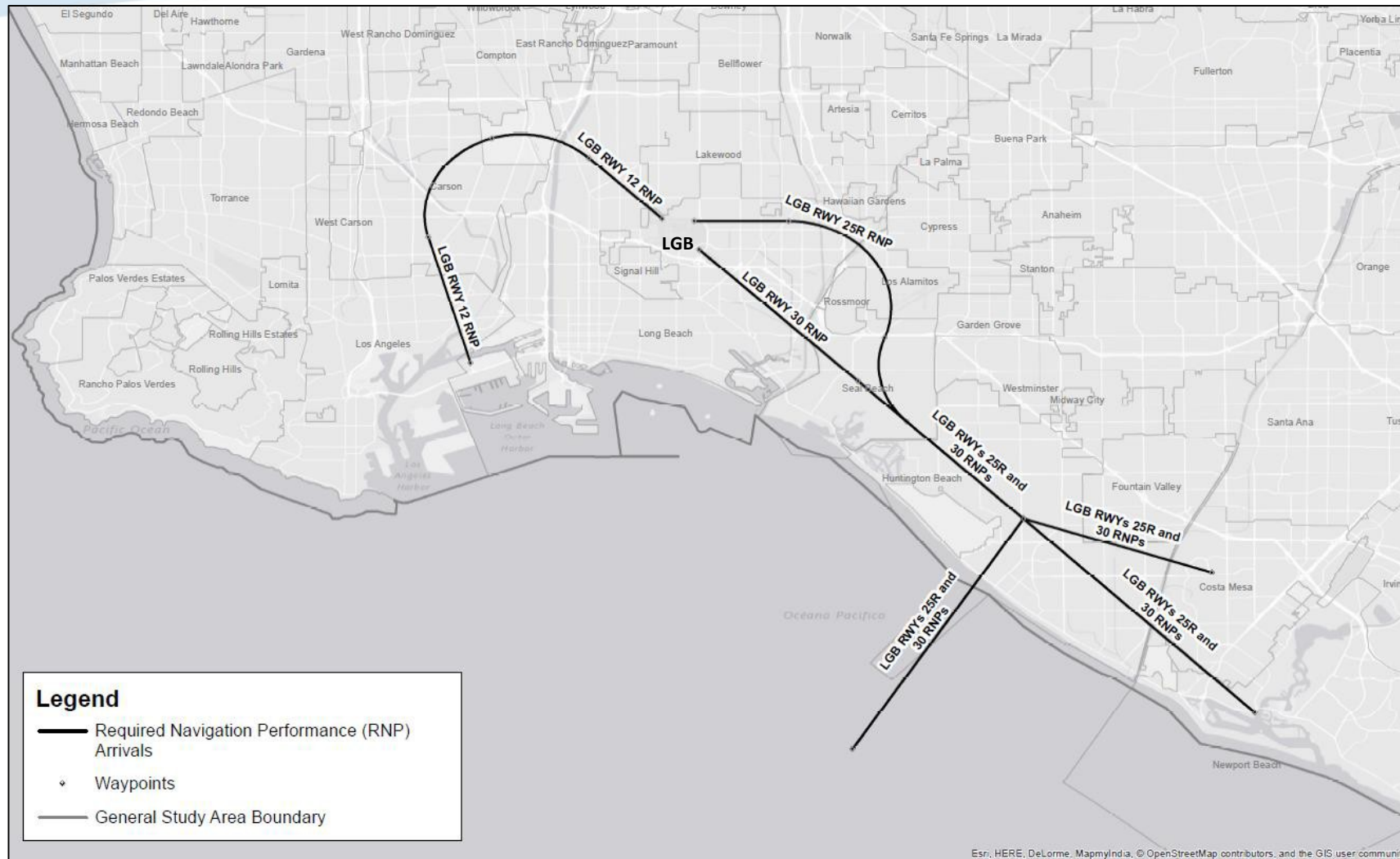
Procedures for November 10, 2016

Group One Publication November 10, 2016	
LGB RNAV RNP RWY 12	LGB, SNA, SLI, FUL and TOA KAYOH6 STAR (conventional amendment)
LGB RNAV RNP RWY 25R	SNA RNAV RNP Z RWY 20R
LGB RNAV RNP RWY 30	SNA RNAV RNP RWY 02L
LGB GPS RWY 30	
Future Chart Dates	
January 5, 2017	
March 2, 2017	
April 27, 2017	



LONG BEACH DAUGHERTY AIRPORT (LGB)

Map of November 10, 2016 LGB Procedures



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LGB RNAV RNP RWY 12



Long Beach Daugherty Airport (LGB)
Instrument Approach
RNAV (RNP) RWY 25R
Publication: Nov 10, 2016

- A Required Navigation Performance (RNP) approach provides a higher level of precision, providing a more repeatable and predictable path for LGB arrivals
- The BAUBB, PCIFC and DSNEE STARS are designed to join the RNP approach increasing efficiency
 - ✦ The LGB ROOBY STAR will require a radar vector to the approach
- The approach is assigned by ATC to properly equipped jet and high performance turboprop aircraft with qualified aircrews

LGB RNAV RNP RWY 25R



Long Beach Daugherty Airport (LGB)

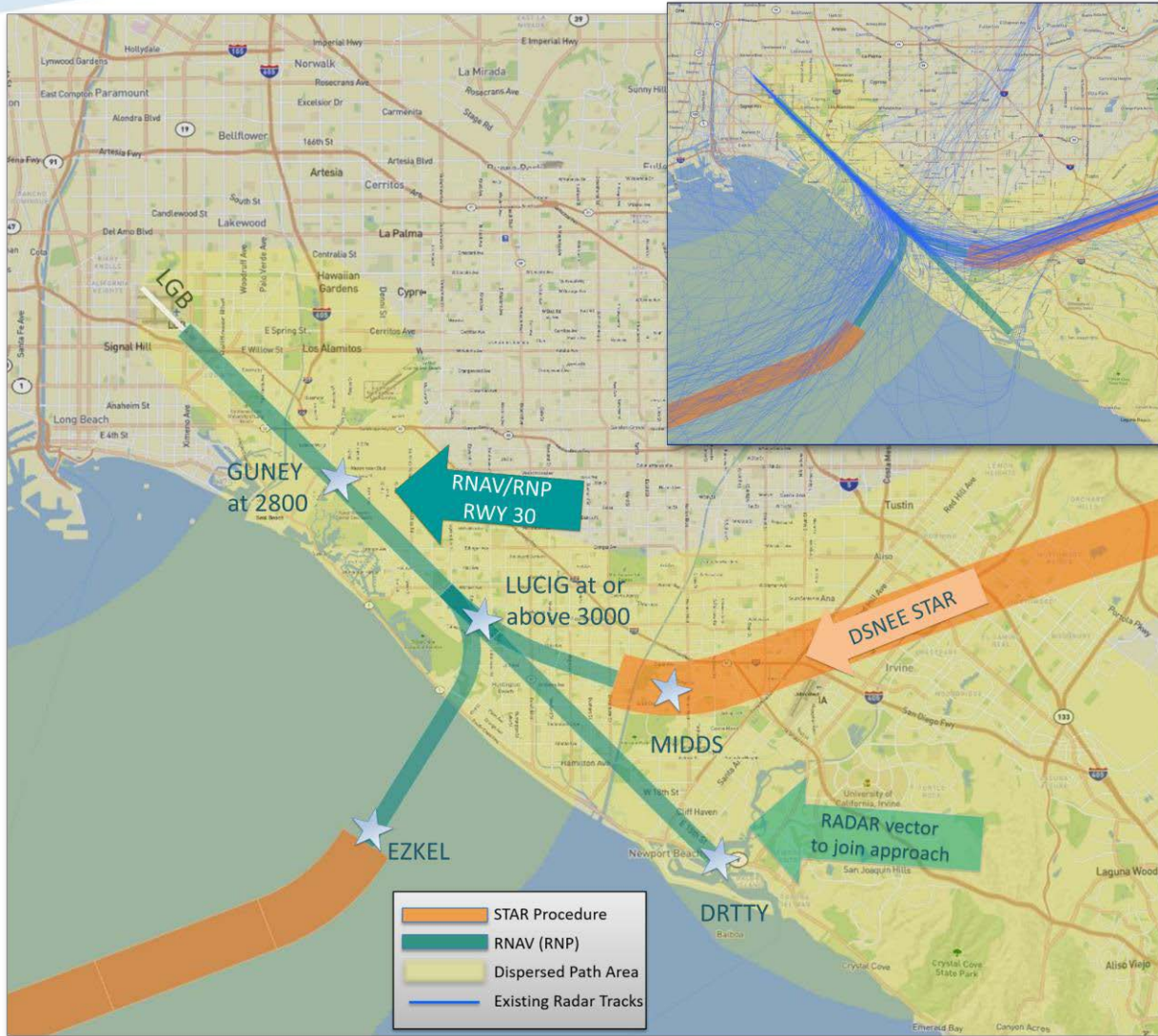
Instrument Approach

RNAV (RNP) RWY 25R

Publication: Nov 10, 2016

- A Required Navigation Performance (RNP) approach provides a higher level of precision, providing a more repeatable and predictable path for LGB arrivals
- The BAUBB, PCIFC and DSNEE STARS are designed to join the RNP approach increasing efficiency
 - The LGB ROOBY STAR will require a radar vector to the approach
- The approach is assigned by ATC to properly equipped jet and high performance turboprop aircraft with qualified aircrews
- Existing Radar Tracks are not provided due to limited use of RWY 25R

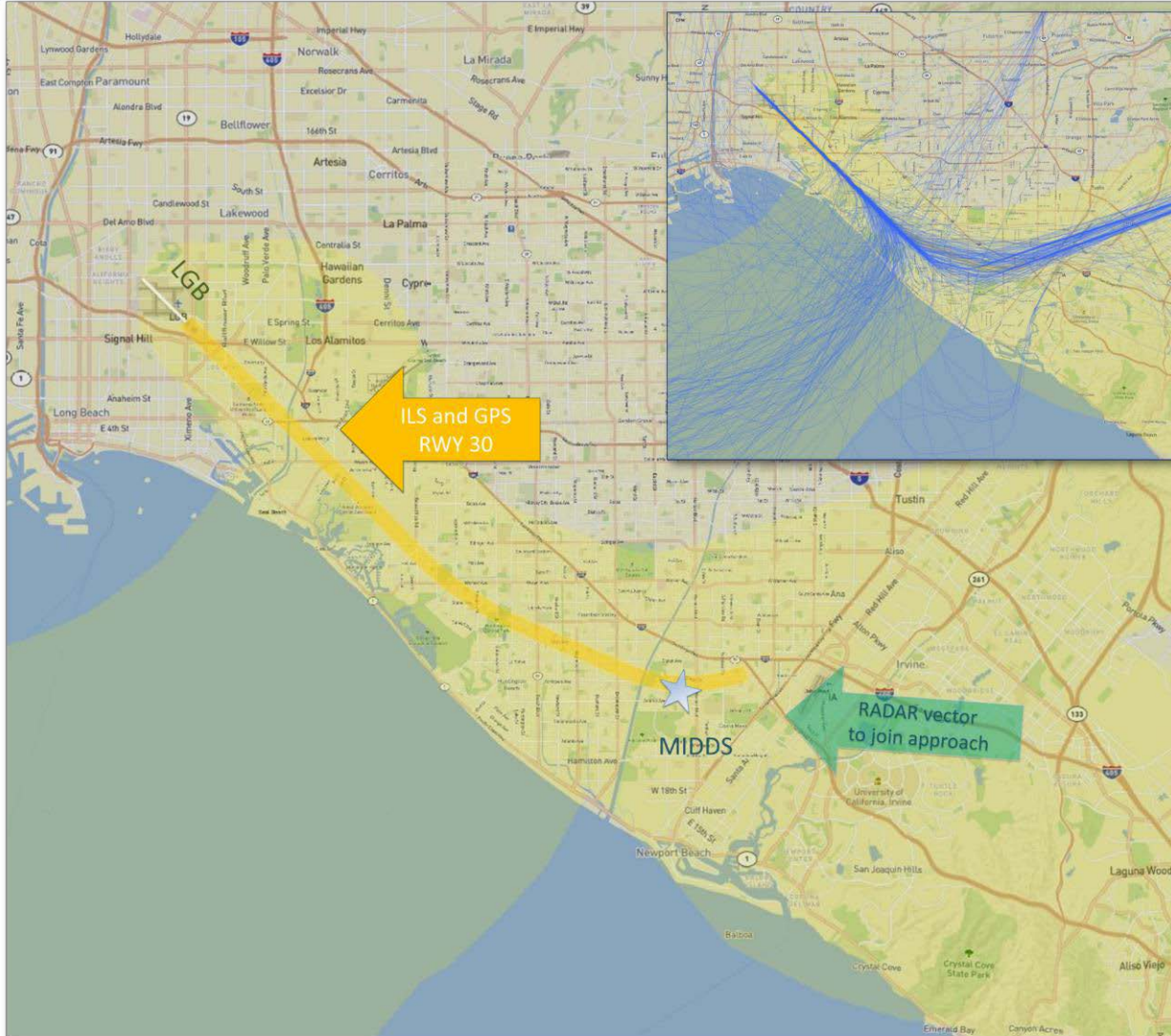
LGB RNAV RNP RWY 30



Long Beach Daugherty Airport (LGB)
Instrument Approach
RNAV (RNP) RWY 30
Publication: Nov 10, 2016

- A Required Navigation Performance (RNP) approach provides a higher level of precision, providing a more repeatable and predictable path for LGB arrivals
- The BAUBB, PCIFC and DSNEE STARs are designed to join the RNP approach increasing efficiency
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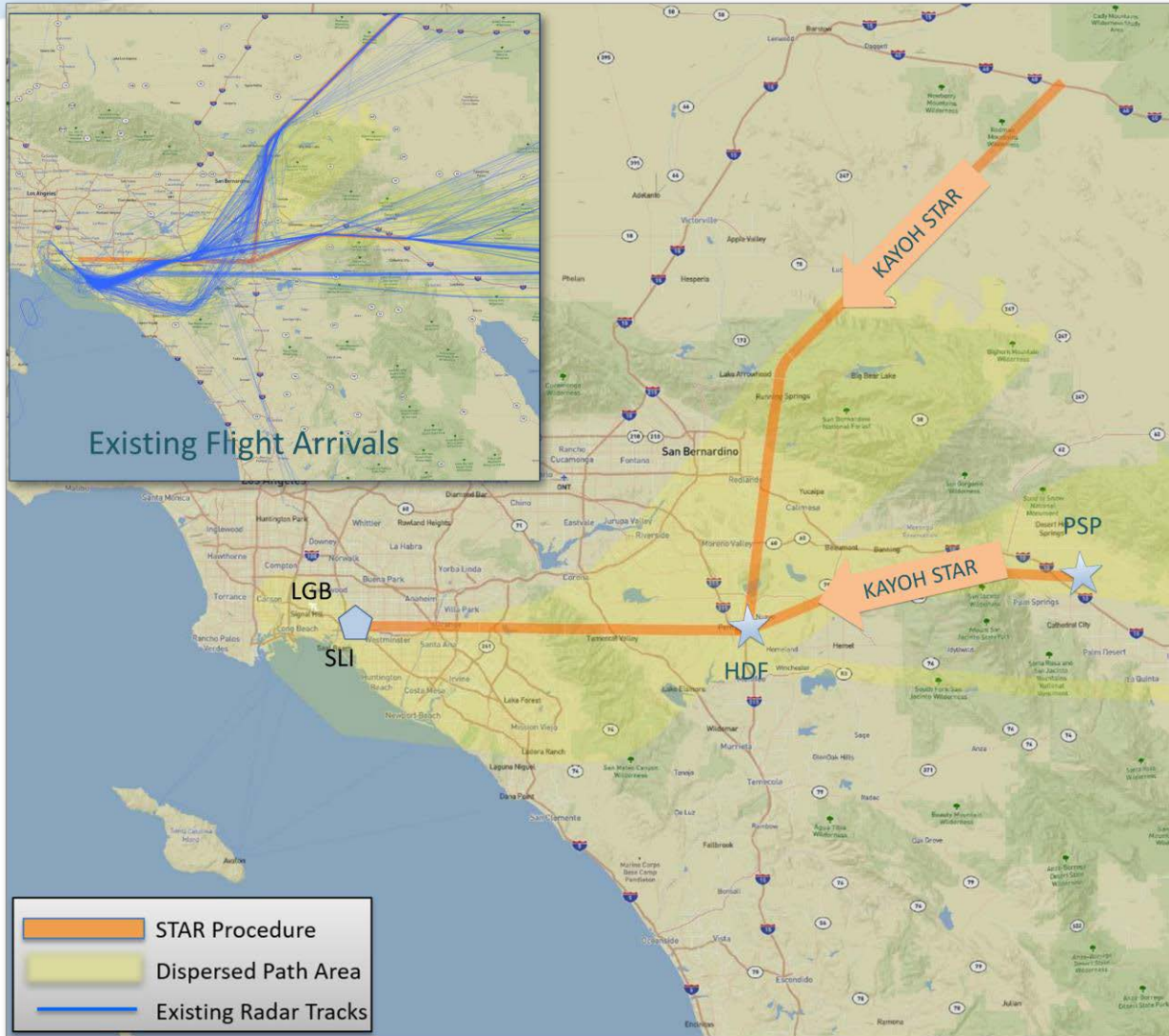
LGB ILS and GPS RWY 30



Long Beach Daugherty Airport (LGB)
Instrument Approach
GPS RWY 30
Publication: Nov 10, 2016

- These approaches were modified to incorporate Metroplex waypoints in order to provide continuity

LGB KAYOH 6 Conventional STAR Amendment



Long Beach Airport (LGB)
STAR (Arrival)
KAYOH 6
Publication:
KAYOH 6, November 10, 2016

- The KAYOH Conventional STAR terminates at SLI
- Arrivals on the KAYOH STAR are usually radar vectored prior to the end of the procedure to the runway in use
- This conventional STAR was modified to incorporate Metroplex waypoints in order to provide continuity



ENVIRONMENTAL AND PROJECT INFORMATION

Environmental and Project Information

- This briefing is for informational purposes and does not reopen the SoCal Metrolink 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 Metrolink Project is available on the Metrolink site
- Education information is also available

Additional Public Information

- Before publishing the procedures, the agency will conduct additional public information meetings and webinars to further inform people about the changes
 - Briefings in January/February for March/April Implementation
 - Public Meeting will be held in and around LGB in February
- 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



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)

Final Environmental Assessment Appendix F:

Volume 1 (Responses to public comments)

- http://metroplexenvironmental.com/docs/socal_metroplex/final/SoCal_Metroplex_FEA_Appendix_F-Vol_I.pdf.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