LAX Arrivals near La Habra Heights

Presented to: LAX/Community Noise Roundtable
By: WSC Operations Support Group
Date: January 11, 2012
Arrival Altitude Comparison

- One day (January 14) from 2005 and 2011
- Average altitude in 2005 was 7400 ft. MSL
- Average altitude in 2011 was 6600 ft. MSL
- Arrivals originating from nearby airports such as ONT and PSP are not included due to level flight over La Habra Heights
- Altitudes recorded may vary as much as 200 ft. from actual aircraft altitude (FAA Order JO 7110.65, 5-2-17)
Arrival Altitude Comparison
Arrivals from nearby airports (ONT, PSP) not included

- 1/14/2005
- 1/14/2011

Number of Aircraft

Altitude Range

<6000
6000-7000
7000-8000
>8000
Altitude Comparison Analysis

• Flight altitude gradient for east arrivals is lower in 2011 compared with 2005
• In 2005, the minimum crossing altitude on arrival procedures was lowered from 8000 to 7000 at FUEL as arrivals were consistently too high when acquiring the glide slope (SAFETY ISSUE)
• There has been NO CHANGE to the glide slope angle of 3°
Altitude Comparison Conclusions

• Fleet mix in 2011 has a higher percentage of quieter aircraft vs. 2005
• More aircraft today are equipped and capable of automated power off descents
27th International Congress of the Aeronautical Sciences (2010)

• The following slides contain excerpts from the report ‘Environmental Benefits of New Continuous Descent Operations at Los Angeles International Airport’ by Sandy Liu, Walter White, Richard Nehl, and John-Paul Clarke
Continuous Descent Arrival (CDA)

• The first publicly-charted CDA in the US was implemented at LAX on Dec. 20, 2007 called the LAX RIIVR RNAV STAR (Standard Terminal Arrival Route)

• A CDA provides an advantage over conventional arrival profiles by reducing ground noise along the flight path, saving flight time and, more importantly, fuel
CDA (Continued)

- Environmental benefits were computed by the FAA’s Aviation Environmental Design Tool (AEDT)
- This CDA implementation has been estimated to save an average 25 gallons of jet fuel per flight, or annually saves approximately 2 million gallons of jet fuel, which is equivalent to mitigation of 41 million pounds of Carbon Dioxide (CO₂)
NOISE-REDUCING APPROACH

Aircraft making a long, steady approach create less noise when close to the ground.

Area in which the aircraft adjusts its flight path for the final approach
Conventional approach
Proposed noise-reducing approach
Area in which the aircraft on conventional approach adjusts its flight path

Fig. 1. Conventional Approach versus the Continuous Descent Approach (CDA)
LAX 2010 Noise Footprint

• Baseline traffic using a week in January, April, July and October
• Four weeks of data is approx. 37,000 tracks analyzed
• Range rings are based on center of airport so La Habra lies at approx. 21 NM range ring
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<tr>
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LAX 2010
CATEX

• CATEX (December 2007) was a modification to existing RIIVR TWO STAR, not original RIIVR ONE
• Removed runway transitions and published each transition on its associated approach
• No ground track change
• Modification had no impact to National Parks or local scenic resources
• CATEX for establishing RIIVR ONE STAR – attempting to locate
2008 Updates

• The following slides are from an operational analysis by The MITRE Corporation and are included to show the evolution to the current procedures

• Changes implemented on Sept 25, 2008 were made at distances greater than 45 NM from the runway to optimize descent profiles and improve fuel burn and emissions when transitioning from the enroute phase of flight
LAX Pre-Implementation Procedure

RIIVR ONE Arrival

These become four separate approaches

NOTE: DME or RADAR required.

NOTE: Expect runway assignment on initial contact with Southern California TRACON. In the event of lost communications prior to runway assignment, proceed via RWY 25L.

RIIVR ONE ARRIVAL

RIEVIR (RIIVR) 07/28

SS-537 (FAA)

Pre-/Post- changes circled in red

SW-3, 08 MAY 2008 to 05 JUN 2008
LAX Post-Implementation Procedure
RIIVR TWO Arrival

NOTE: DME or RADAR required.
NOTE: Expect runway assignment on initial contact
with Southern California TRACON. In the event of
lost communications prior to runway assignment,
proceed via ILS RWY 25L.

NOTE: Chart not to scale.

HECTOR TRANSITION (HEC, RIIVR2): From over HEC VORTAC via
HEC R-203 and PDZ R-046 to RUSTT, then via LAX R-068 to RIIVR.

PEACH SPRINGS TRANSITION (PGS, RIIVR2): From over PGS
VORTAC via PGS R-229 and PDZ R-046 to RUSTT, then via
LAX R-068 to RIIVR.

LOST COMMUNICATION: In the event of lost communications
prior to runway assignment proceed via ILS Rw 25L.
LAX Pre-Implementation Procedure

North SEAVU ONE Arrival

NOTE: DME and RADAR required.

NOTE: Aircraft to proceed via RWY 25L unless otherwise instructed by ATC.

(Continued on following page)

TWENTYNINE PALMS TRANSITION (TNP.SEAVU1): From over TNP VORTAC via TNP R-245 and PDZ R-069 to CATAW, then via POM R 098 to DIXXN. Thence....

JULIAN TRANSITION (JLL.SEAVU1): From over JLL VORTAC via JLL R-303 to SEAVU, then via POM R-098 to DIXXN. Thence....

South leg becomes OLDEE ONE

SW-3, 08 MAY 2008 to 05 JUN 2008
LAX Post-Implementation Procedure

SEAVU TWO Arrival

NOTE: Expect runway assignment on initial contact with Southern California TRACON. In the event of lost communications prior to runway assignment proceed via ILS Rwy 25L.

NOTE: DME or RADAR required.

TWENTYNINE PALMS TRANSITION (TNP.SEAVU2):
From over TNP VORTAC via TNP R-245 and PDZ R-069 to CATAW, then via POM R-098 to SEAVU.

LOST COMMUNICATION: In the event of lost communication prior to runway assignment proceed via ILS Rwy 25L.

SW-3, 30 JUL 2009 to 27 AUG 2009
Current Flight Procedures

- RIIVR TWO ARRIVAL
- SEAVU TWO ARRIVAL
- ILS or LOC RWY 25L
- ILS or LOC RWY 25R
- ILS or LOC RWY 24L
- ILS or LOC RWY 24R
RIIVR TWO ARRIVAL  LOS ANGELES INTL

NOTE: DME or RADAR required.
NOTE: Expect runway assignment on initial contact with Southern California TRACON. In the event of lost communications prior to runway assignment, proceed via ILS RWY 25L.

HECTOR TRANSITION (HEC.RIIVR2): From over HEC VORTAC via HEC R-203 and PDZ R-046 to RUSTT, then via LAX R-068 to RIIVR.

PEACH SPRINGS TRANSITION (PGS.RIIVR2): From over PGS VORTAC via PGS R-229 and PDZ R-046 to RUSTT, then via LAX R-068 to RIIVR.

LOST COMMUNICATION: In the event of lost communications prior to runway assignment proceed via ILS Rwy 25L.
SEAVU TWO ARRIVAL

NOTE: Expect runway assignment on initial contact with Southern California TRACON. In the event of lost communications prior to runway assignment proceed via ILS Rwy 25L.

NOTE: DME or RADAR required.

TWENTYNINE PALMS TRANSITION (TNP.SEAVU2): From over TNP VORTAC via TNP R-245 and PDZ R-069 to CATAW, then via POM R-098 to SEAVU.

LOST COMMUNICATION: In the event of lost communication prior to runway assignment proceed via ILS Rwy 25L.

NOTE: Chart not to scale.
ILS 24L/24R

LOS ANGELES INTL

DATE: January 11, 2012


Partner Airlines’ Opinion

• For LAX, the RIIVR and SEAVU STARS are a huge benefit for the residents of the LA Basin. These procedures are considered Optimized Profile Descents providing the customers of LAX with fuel savings while reducing the noise footprint for LAX arrivals.

• Below 17,000', both the RIIVR and SEAVU are an idle descent until approximately 4 miles from runway 25L and 24R. At 4 miles from these runways the pilots must configure the aircraft for landing. These procedures are used as an example throughout the U.S. on how to design and use arrivals into airports. If we can design and place into use procedures that allow the pilots to leave the throttles at idle, noise is significantly reduced. The RIIVR and SEAVU arrivals provide pilots with the necessary tools to reduce the noise for the residents of the LA basin.
Flight Profile Comparison 2005/2011

• Examples from 2005 and 2011:
  1. aircraft making a smooth continuous descent
  2. aircraft leveling at 5000’ for one or more miles and then continuing descent

• Side profile of flight tracks for both years

• Animation of each sample flight
  – Click in black area of slide to start animation
Flight Profile Comparison
1/13-14/2005 ~ B737 & GLF5

GLF5 continuous smooth descent

B737 levels at 5000’ MSL
B737 – “Dive & Drive” Descent
January 13, 2005 (Animation)
GLF5 – Continuous Descent
January 14, 2005  (Animation)
Flight Profile Comparison
January 14, 2011 ~ A346 & B738

B738 continuous smooth descent

A346 levels at 5000’ MSL
A346 – “Dive & Drive” Descent
January 14, 2011 (Animation)
B738 – Continuous Descent
January 14, 2011  (Animation)
Arrival flow from west

• Next slide depicts downwind arrival traffic inbound over Fillmore (FIM) and Ventura (VTU) VORTACs
• Downwind traffic is not on CDA’s
• Downwind traffic is turned to final approach course inside of La Habra
Conclusions

• Currently most LAX arrivals from the east are on a profile descent (SEAVU2 or RIIVR2 Arrival) that allows for a transition to RWY 24/25 ILS approaches

• Standard operating procedure for arrivals is to be cleared for ILS approach no later than 35 nautical miles (NM) out from runway
  – The aircraft then meet the “at or above” descent altitudes until capturing the glide slope

• La Habra Heights is approx. 20 NM from runway

• The glide slope is normally usable out to 10 NM from runway

• Different aircraft may have variable descent rates depending on pilot technique and the onboard navigation capabilities of each aircraft
Questions?