RNAV RNP Procedures for Ontario, California

E Operations Workshop
Kevin Elmer
The Boeing Company
December 6, 2007
Outline

- FAA’s Plan and Schedule
- Design Criteria
- Operators involvement UPS, Alaska, Southwest
- Boeing’s Participation
  - Recommend design options to AVN based on Operator’s and TRACON feedback
- Desired Outcome for ONT RNAV RNP Approach procedures
  - Reduce Track Distance and Flight Time
  - Accommodate Continuous Descent for Fuel Savings, as well as Noise and Emissions Reduction
  - Usable for all equipped aircraft and SAAAR qualified operator’s
    - Pass Environmental Impact Assessment Criteria
FAA’s Roadmap for Performance-Based Navigation (Near Term)

The aviation community is using FAA’s Roadmap for Performance-Based Navigation to leverage advances in flight deck navigation capability to meet the demands of future air travel. As a collaborative (government/industry) effort, the Roadmap focuses on accelerating two key elements of PBN at U.S. airports – RNAV and RNP.

Near Term (2006-2010)

- RNAV SIDs/STARs at OEP airports
- RNP-1 SIDs/STARs where beneficial
- Automation requirements for merging RNAV arrivals
- Concepts for RNAV and RNP with 3D, constant descent arrivals (CDA), and time of arrival control
AVN Production Schedule

Instrument Flight Procedures (IFP) Production Plan

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<th>State</th>
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<th>City</th>
<th>Description</th>
<th>Scheduled Pub Date</th>
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<td>Under Development</td>
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* Next to Status Identifies an IFP Contingent upon Survey
F Next to Status Identifies a Delay Due to Funding
W Next to Status Identifies a Delay Due to WAAS outage

Comments or Suggestions
Production Integration Branch
Danny E Hamilton, Manager

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Existing STAR (SETER)

**SETER TWO ARRIVAL**

**SETER TWO ARRIVAL**

**NOTE:** Chart not to scale.

**JULIAN TRANSITION (JLI_SETER2):** From over JLI VORTAC via JLI R-315 to SETER INT. Thence:
- **PALM SPRINGS TRANSITION (PSP_SETER2):** From over PSP VORTAC via PSP R-260 and PDZ R-078 to SETER INT. Thence:
  - **LANDING ONTARIO INTL:**
    - Rwy 26L/R: From over SETER INT via SB NDB 292° bearing to SB NDB. Expect ILS approach.
    - Rwy 8L/R: From over SETER INT via PDZ R-078 to PDZ VORTAC. Expect vectors to final approach course.
- **ALL OTHER AIRPORTS:**
  - From over SETER INT via PDZ R-078 to PDZ VORTAC. Expect vectors to final approach course.

**SETER INT**:

**VERTICAL NAVIGATION PLANNING INFORMATION**
Expect clearance to cross at 14,000.

**SETER**:

**VERTICAL NAVIGATION PLANNING INFORMATION**
Expect clearance to cross at 12,000.

**OCEANSIDE**

**VERTICAL NAVIGATION PLANNING INFORMATION**
Expect clearance to cross at or below FL240.
Initial Recommendation (Smiths PDT Tool)
EHF.ZARTI.VPLSB.COVIN.NAROD

? Terrain & Flyability issues (85.9 NM from ZARTI)
Initial Recommendation (Smiths PDT Tool)

Still Terrain & Flyability issues - (28.6 NM from MAJEK)
Prototype RNAV RNP Procedures based on TF Legs / Criteria
Prototype RNAV RNP Procedures, cont.

based on TF Legs / Criteria
Feedback on Prototype with TF Legs
RNAV (RNP) Z RWY 26R/L

1. Routing. The primary interest in replacing the current ZIGGY FOUR Arrival is to reduce the groundtrack from feeder fixes to the runways.

UPS flies a lot of arrivals from the Northwest--PMD - MAJEK - HESPE - HITOP - NITIY - ZIGGY - PETIS. It looks like your RNAV (RNP) Z RWY 26R/L Approaches both approximate the ZIGGY FOUR waypoints from PMD to PETIS. There is virtually no reduction in the groundtrack distance from the ZIGGY arrival--so there is very little benefit in using this approach over the current arrival/ILS approach.

2. Altitudes. Another desired feature of the new arrival is the desire to fly a Continuous Descent Arrival (CDA) while on the published arrival--traffic permitting. A 10,700 ft restriction at OSOYI is alright, given the extended groundtrack on the approach, but a restriction of 8,900 ft at KOMTE is actually higher than the present 8,000 ft restriction at HITOP, KOMTE's counterpart on the ZIGGY. Our crews must use speed brakes for every arrival over HITOP today and many times they must lower the airplane's landing gear as well in order to intercept the glideslope at PETIS. Being 900 feet higher on the arrival at this crucial point will not make this a useful approach.

I don't understand the TCH of 60 feet. There doesn't appear to be any reason why the TCH cannot match that of the ILS approach--50 feet (the TCH for your RWY 8 approach is 45 ft). I would think that one goal of the approach design is to mimic the features found in an ILS approach.

It would be normal to use the Precision Approach Path Indicators (PAPIs) that are installed for each of the runways, instead of telling pilots not to use them on this approach (VGSI AND RNAV GLIDEPATH NOT COINCIDENT).

3. Airspeeds. The current airspeed restriction is 250 kts at MAJEK.
Your proposal has the speed restricted to 210 kts at OSOYI, MAJEK's counterpart--which is 41 track miles from the runways. Once again, the proposed RNP approaches have the disadvantage of taking more that one minute longer to fly than the current arrival/approach.

4. Missed Approach. The current missed approach procedure (MAP) is to climb straight ahead to 1,700 ft, then turn left direct to PDZ. Your approaches have two waypoints prior to PDZ, making the MAP more complicated than the current one. Your RNAV (RNP) Z RWY 8L has a single waypoint on the departure, then a turn direct to the PDZ VORTAC.
**Feedback on Prototype with TF Legs**  
**RNAV (RNP) Z RWY 8L**

**Overall, this approach looks fine.** I think that there should be a "T" after the 089.83 value between PECIN and APIPE on the plan view. Also, the RNP value in the same location should be RNP 0.50, not 0.05. On the missed approach, there should be a "T" after the 89.90 value.

**RECOMMENDATION**

Please take a look at what Boeing's Kevin Elmer has proposed for the approach from the PMD fix. RNP approaches have the benefit of using natural mountain passes that are too narrow to benefit conventional arrivals/approaches due to their TERPS criteria restrictions. Cajon Pass is one such spot and it is currently home to a major freeway, I-15 and numerous railroad tracks (important for environmental considerations). There is no reason that every instrument approach to runways 26R/L must go through a point located 12 NM to the east of the airport. **We don’t need to replicate what we currently have in place today.**

Try drawing a line from OSOYI to GORPE and then another line from KOMTE to CADIN. At the intersection of these lines, create a new waypoint. Traffic from PMD would go to OSOYI, then this new waypoint, then to CADIN. Traffic from APLES would go to KOMTE, then virtually straight ahead to the new waypoint, then CADIN. This routing would be more beneficial to all inbound traffic as it substantially reduces the track miles flown on the approaches from the north.
Recommendation for RF Leg Based Design

New waypoint location recommended by UPS

N34° 09.617 W117° 23.617
*LECHNE
RNAV (RNP) with TF Legs
RNAV (RNP) with TF Legs, Cont.
RNAV (RNP) with RF Legs
RNAV (RNP) with RF Legs, Cont.
The purpose of this document is to provide a discussion of the existing and future noise conditions related to the Pacific Gateway Cargo Center (PGCC) at Ontario International Airport (ONT).

Included in this discussion is a general discussion describing noise, including definitions of the noise metrics used, and the effects of noise on people.

This document also provides details of the inputs used and developed to produce current and future noise impacts at ONT.

This includes aircraft flight and ground operations, flight and taxi paths and profiles, roadway traffic, ground service equipment, stationary sources and construction equipment inputs.

As part of the noise analysis discussed in this document, noise impacts are provided as acres of land use and household and population counts.
## Number of Flights Included in Analysis

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<th>Proposed Action Alternative</th>
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URS, 2005.
2020 No Action Alternative
Noise Technical Report
Pacific Gateway Cargo Center
March 2006
New Facility to accommodate non-UPS Cargo Operations

Legend:
- Agricultural
- Airport
- Auxiliary Residential
- Commercial
- Community Facilities
- Industrial
- Open Space
- Multi-Family Residential
- Single Family Residential
- Mobile Home
- Transportation
- Utilities
- Vacant
- Undefined

Year 2020 Proposed Action Noise Contours
- CNEL 65
- CNEL 70
- CNEL 75

Source:
City of Ontario, CA. 2005
City of Fontana, CA. 2006
3M, Inc. 2005
landscape 2000
Land Corp. 2009

Figure 3.2
Summary

- Ongoing Collaborative Effort to Provide Guidance for RNAV RNP Design at ONT
  - Initial Recommendations tested in Simulator
- TF Legs Inadequate for Beneficial Design
- Agreement to on Procedure Development Objectives
- Design Work Rescheduled