

# PHX Arrivals – An Optimized Point of View

EWG Meeting

November 17, 2008

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US Airways

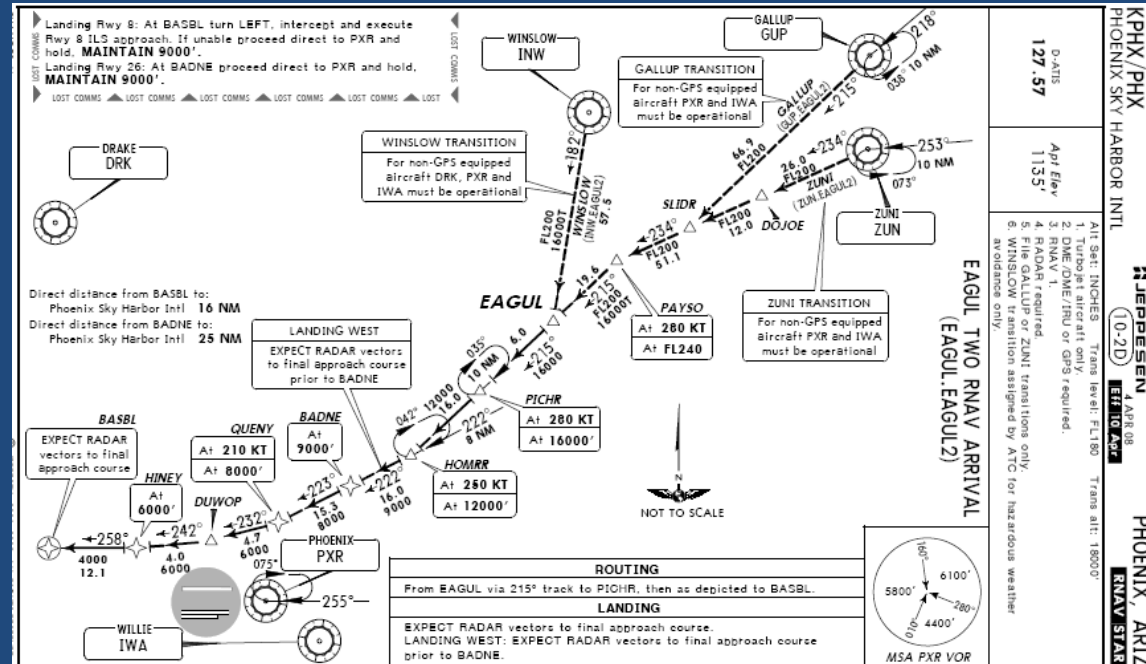


# Air Traffic and Customer Approach

- Willing to listen to customer needs and make necessary operational changes
- Created RNAV procedures that provide tangible benefits from initial design to implementation
- Worked within the existing airspace confines
- Continuing to find ways to build from the foundation for added value

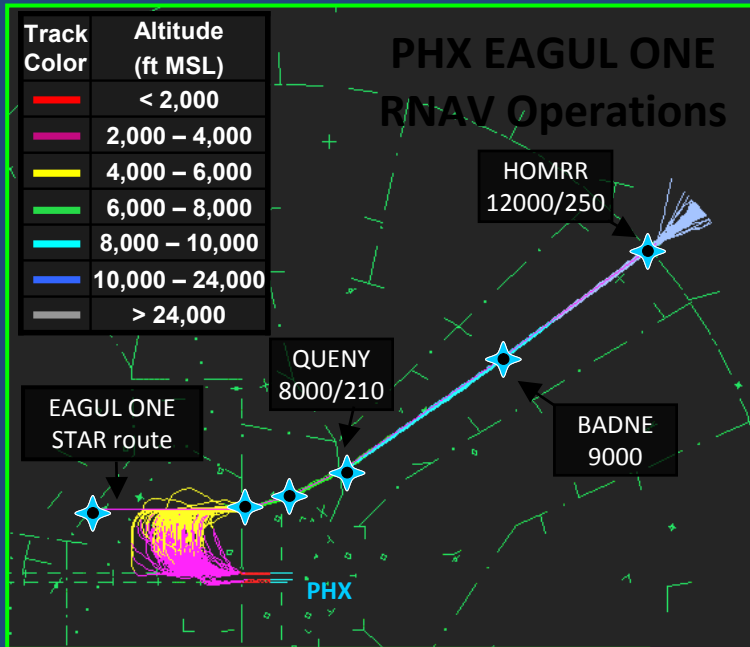
# PHX RNAV STARs

- STARs implemented in October 2006
- All with published altitudes and speeds in the en route portion
- Descend Via was a huge change for TRACON and En Route Controllers
- Operational challenges and philosophies restricted vertical profiles to the terminal environment

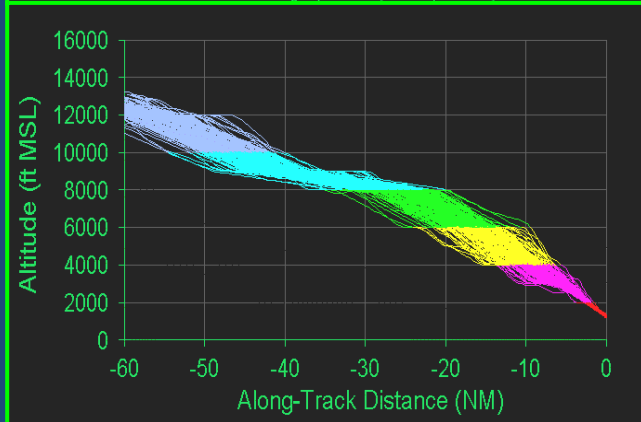


# PHX EAGUL RNAV STAR

## Terminal Area Benefits



- **PHX RNAV procedures with vertical guidance and descend via**
  - Reduce low-altitude level flight segments
  - Enable more time in reduced or idle-power descent
- **Fuel burn savings to operators**
  - Observed savings of 5 gallons per flight
  - Savings of up to 9 gallons per flight possible with full equipage and participation
- **Lower aircraft emissions**
  - Observed savings of 2500 Metrics tons of Carbon Dioxide (CO<sub>2</sub>) per year
  - Savings of up to 4500 metric tons per year possible

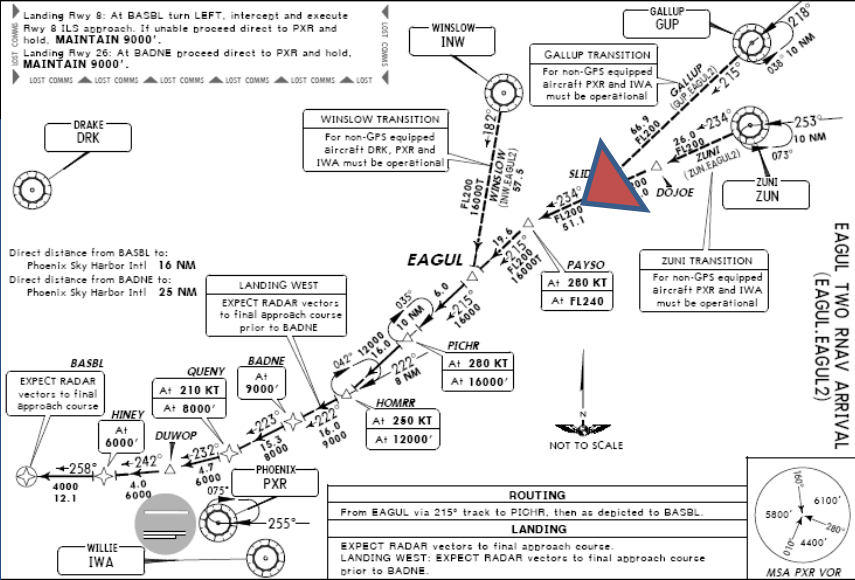
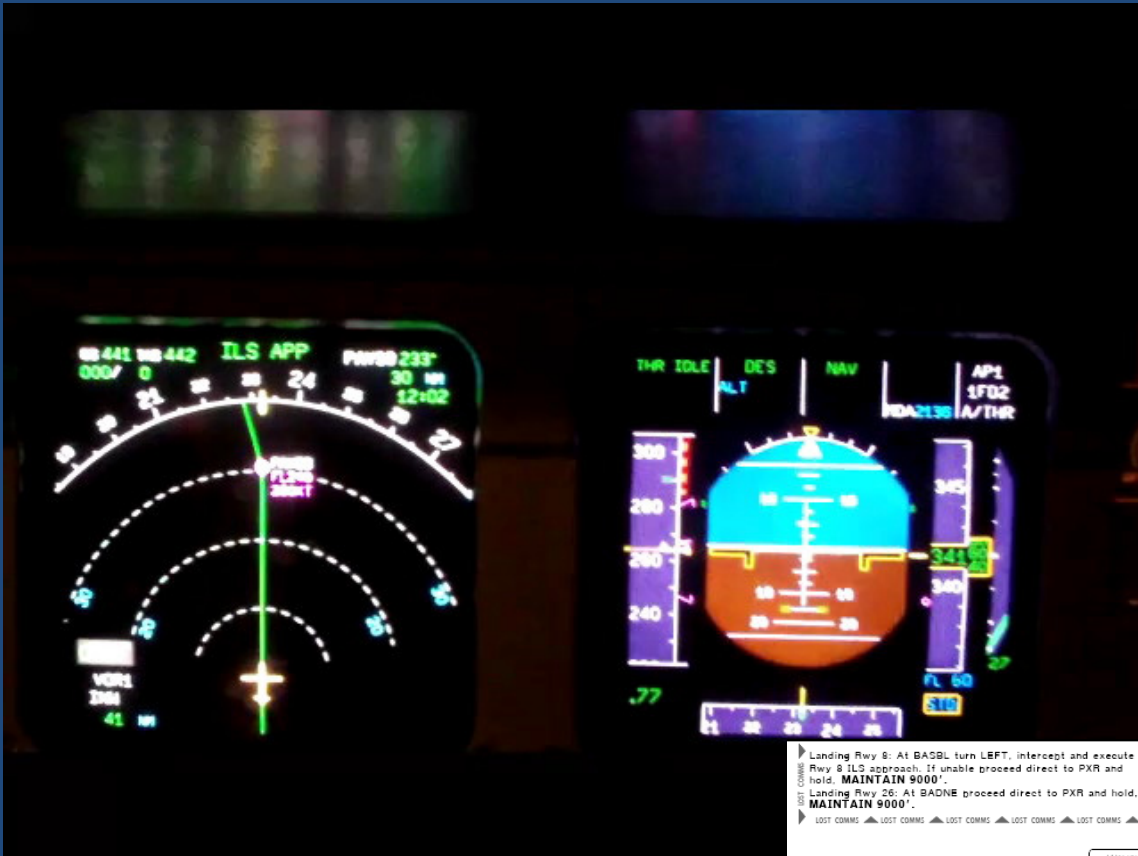


# Persistence Pays

- Historically high fuel prices have heightened the urgency of optimizing our airspace where possible
- ABQ ARTCC began initiative to bring DV clearances back
- Since September 22, 2008
  - DV issued to all participating aircraft
  - Clearance issued at FL360; soon to go higher

Soaring Like An EAGUL

Snapshots of Descending Via

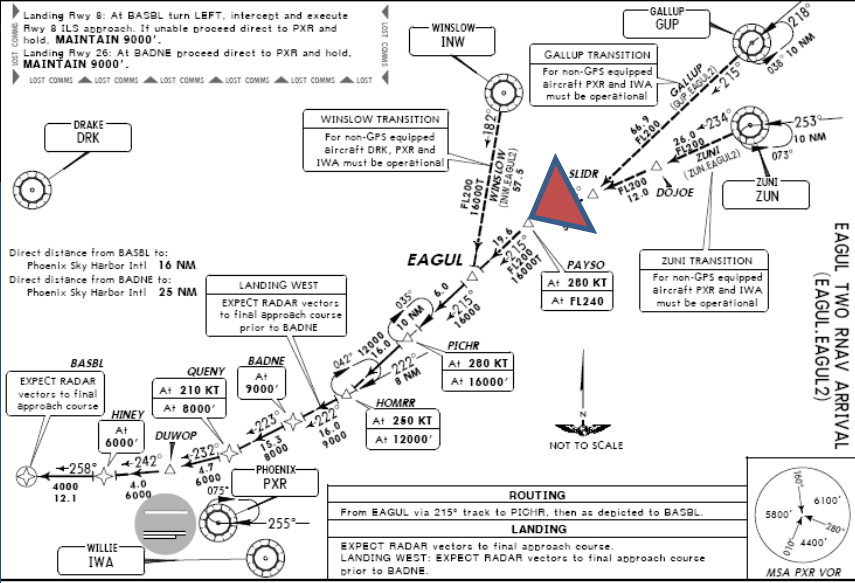


PHX/PHX PHOENIX SKY HARBOR INTL	PHOENIX ARIZ RNAV STAR
DATE 127.57	Alt Elev 1135'
Alt Srt: INCHES	Trans level: FL150
Trans alt: 1500'	
1. Turbulent air alt only.	
2. DME/DME/IRU or GPS required.	
3. Radar required.	
4. File GALLUP or ZUNI transition only.	
5. File GALLUP or ZUNI transition only.	
6. WINSLOW transition assigned by ATC for hazardous weather avoidance only.	

JARPPEN  
 1 ARR 08  
 (0-2D) EFB 10 ARR  
 PHOENIX ARIZ  
 RNAV STAR

# Flight Idle

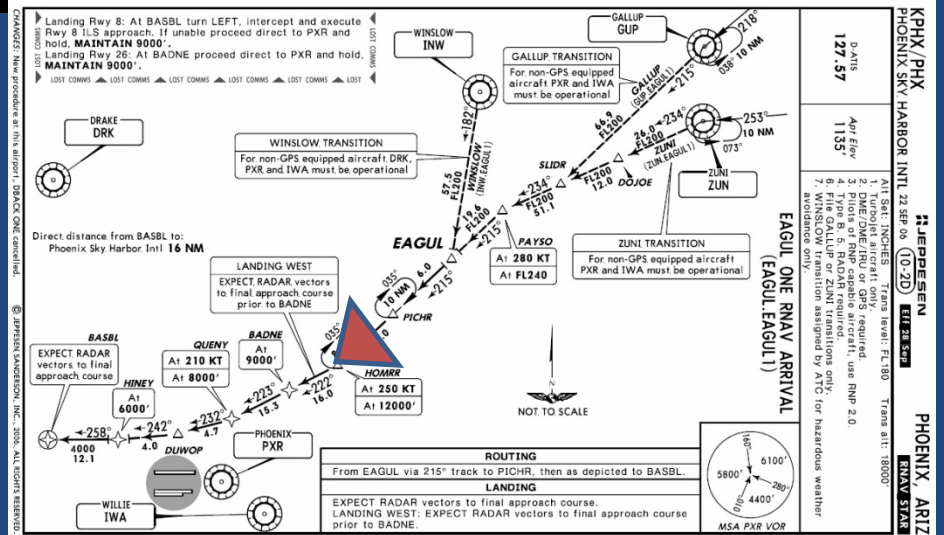




KPHX/PHX PHOENIX SKY HARBOR INTL	
DATS	127.57
Arr Elev	1135'
Alt Srt: INCHES	Trans level: FL150
Trans alt: 1500'	
0-20' ELEV 10 APT	
<b>JARPPSEEN</b> 1 ARR 08 <b>PHOENIX ARIZ RNAV STAR</b>	

# Maintaining Idle Descent





# Slight power increase

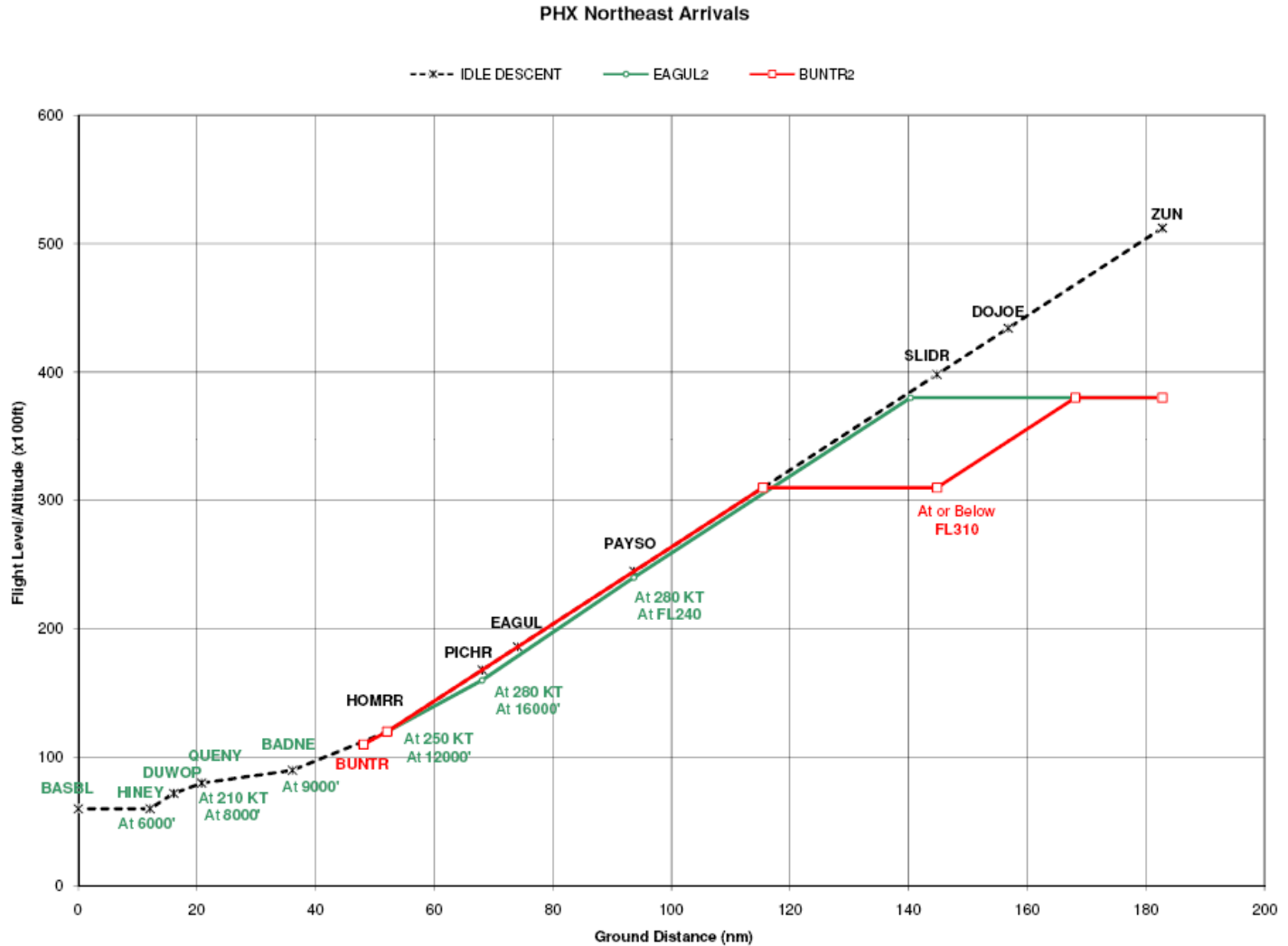


# EAGUL Enroute Profile

- Enroute Profile produces savings of
  - 3 gallons per flight
  - over \$500,000 annually for arrivals into PHX @ \$2.50/gal. *US Airways performance analysis based on charted procedure*

Or does it?

# Comparing Profiles



# Quantifying Conventional Profiles

- Challenging
  - Altitudes are “Expect” altitudes
  - Controller may “step down” causing “level offs”
  - Speed variations if no charted speeds
  - Profiles will vary
    - Some pilots will stay higher longer
    - Some will start down early, affecting compression
  - Increased need for off route vectors
- The unpredictability is difficult to measure

# Capturing the Data

- MITRE Analysis
  - Using actual Conventional and RNAV profiles
  - Snapshot of the realistic savings
  - Awaiting the release of en route descent analysis



# Looking Ahead

- ZAB continues to explore enhancements to all PHX STARs
  - Adjustments to published speeds
  - Adding additional constraint waypoints to reduce controller workload and provide consistency
  - Publishing altitudes on existing conventional STAR



**U·S AIRWAYS**

**Thank You!**

Questions?

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