PHX Arrivals – An Optimized Point of View

EWG Meeting
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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 (CO₂) 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
Flight Idle
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

PHX Northeast Arrivals

Graph showing flight level and altitude (FL) versus ground distance (nm) for different flight profiles. The graph includes points for various locations and flight conditions.
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
Thank You!

Questions?

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