Air Traffic Control
Operating Procedures

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<sub-title>
i1 – ATC is a key component in a successful PBN implementation.

i2 – ATC operating procedures to accommodate PBN.
   • Standards & methods
   • Phraseology
   • Education

i3 – PBN sequencing and transitional environments.
Action i1 – ATC key component in successful PBN implementation.

• Buy in - Benefits described in terms of ATC
• Clear responsibilities defined
• Transition plan implemented
• ATC is sometimes an afterthought in the PBN design process
  • Good design enables ATC participation
  • Include ATC early in a collaborative design process
Action i2 - ATC operating procedures to accommodate PBN.

i2 – ATC operating procedures to accommodate PBN.

• Design in updated techniques
  • CDO
  • CCO

• Phraseology
  • Proposed “Descend on”, “Climb on” phraseology

• Education
  • Concept of operations
  • In terms of ATC benefits
  • Reduced radio transmissions
  • Increased track predictability
  • Increased safety
Section i3 – PBN sequencing and transitional environments.

Managed by design, education and technique

- **Point merge**

- **Structured decision points**

- **Defined Interval**

- **Required Time of Arrival**

[Diagram of PBN sequencing and transitional environments]
Practical Experiences and Air Traffic Management

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17 October 2012

Greener Skies over Seattle
Issue/Challenge

i1 – Design/Implement PBN instrument procedures into a complex airspace, with a mixed fleet, all while providing an environment for research.

i2 - Evaluate concepts, research alternatives and establish requirements resulting in full implementation of PBN technologies within SEA/BFI airspace and NAS-wide.

i3 - Implementation of new procedure, rule making, and TFM/training.
Actions

Connect RNAV STARs with all RNAV, RNP, RVFP, and ILS Approaches.

Keys to Success:
- ATC/Pilot use
- Repeatable in all WX
- TFM
Collaboratively Innovating and Implementing PBN – Greener Skies over Seattle

Connecting RNAV STARs with RNP, RVFP, and ILS Approaches
RNAV vs. Conventional STAR
Build speeds and altitudes into procedures
Results

• Predictable tracks, speeds, and reduced radio communications

• Allows ATC to clear aircraft on any instrument approach procedure to all runways

• Overlay different types of PBN IFP, covering all weather conditions, keeping ATC/flight deck/TFM simple
Lessons Learned

• Integrate new PBN flight procedures alongside conventional routes in collaboration with all stakeholders

• Connect STARs to all approaches and runways

• Build in speeds to allow for ATM/TFM predictability
THE FLOOR IS YOURS