Qualitative Assessment of OTA Operations

Oceanic Tailored Arrivals
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Overview

• Procedure development, evaluation and revision process
• Assessment
  – Phraseology
  – Procedures
  – Coordination
  – Workload
• Recommendations
Process (what we did)

• Procedures, phraseology, support material were developed cooperatively
• Simulation walkthrough assessment conducted
• Phase 1 trials conducted in Aug/Sept 2006
• Profile and procedures revised based on pilot interviews and questionnaires, some facility observations and nightly reports; no walkthrough
• Phase 2 trials conducted in Dec/Jan 2007
Phraseology for Air-Ground Communication

Phraseology for Basic OTA:
"Descend at pilot's discretion, maintain 8000 feet."

Phraseology for OTA w/EDA:
"Cross BRINY at 11,000 feet and 240 knots, descend and maintain 8000 feet."

• Current-day clearance phraseology was workable for test, but may not be adequate for operational use
  – Increased radio communications were sometimes observed (e.g., because of mismatch between uplink altitude restriction and descent clearance to 8000’)
  – Tailored Arrival is not a pilot’s discretion descent
  – Mismatch between letter of agreement and OTA procedure
  – OTA status could not be formally stated by flight crew on check-in, requiring controller-to-controller communication to identify OTA flights.
Procedures

• Oceanic Controller
  – Event sequence timing adjusted during walkthrough and initial trials
  – Composing ATOP clearance entry:
    ✷ multi-step process was not obvious; needed coaching or “cheat sheet” support
    ✷ “cut and paste” scratchpad entry was error prone
    ✷ Format for latitude / longitude entry was unspecified
  – With simpler process for selecting OTA uplink clearance (e.g., special ATOP menu), procedure would be straightforward

• Flight Crew
  – Energy management, MCP altitude, “load-before-accept”…(will be covered by Rick Shay and Brad Cornell)
Coordination

• Simple, but critical coordinations were needed:
  – Inter-facility coordination about test activities, active runway and approach procedures
  – Nightly check that scratchpad entry was correct for that night’s OTA
  – Nightly check that all controllers on position were aware of OTA trials
• For example:
  – Intra-facility coordination:
    ◆ clearance not always available in scratchpad
    ◆ TRACON and Center radar controllers were occasionally unaware of OTA flight status
  – Inter-facility coordination:
    ◆ active runway not communicated for uplink clearance
• Tailored Arrivals coordination procedures need to be standardized
Workload

• Oceanic Controller:
  – Workload increase associated with complicated, manual ATOP entries
  – With streamlined process, task would be acceptable

• Radar Controller:
  – Workload increased when needed to move other traffic; otherwise no issues.

• TRACON Controller:
  – Workload issues similar to Center Radar controller

• Flight Crew:
  – Modest but acceptable workload increase under nominal operations
  – However, non-nominal events (e.g., runway changes) were observed that caused unacceptable workload increases
Recommendations

- Walkthrough was useful.
- Coordination is critical. There need to be simple, unambiguous, standardized and routine procedures for:
  - Center-TRACON
    - Manager-to-manager coordination about runways, procedures, flight ID.
    - Controller-to-controller flight identification before radar handoff
  - Shift change briefings
  - Air-Ground communication
- ATOP clearance selection process must be simpler
Flight Crew Observations

Use of LNAV/VNAV
- No additional training was required, ops bulletin only
- Most crews were more comfortable after only the second operation
- Today automation features (LNAV/VNAV) are used at the pilots discretion
- Operational technique is not emphasized on same level as other systems
- Current airspace procedures and operations discourage use of automation

Procedures
- Voice clearances need to be aligned with uplinked path
- “Cleared per the uplink” clearance desired
- Longer term, a TA or RNAV data tag needed to enable cross centre coordination
Flight Crew Observations

Integrated data link benefits

• Flights were conducted early when there was little traffic related workload (that’s why we did it)
• Pilots reported a slight increase in workload – expected
• The good news - TA procedures can enable reduced workload during increased traffic periods
  – Reduction in crew tasks, reduction in error points, voice clearances, crew task human factors test provide additional data
• Similar procedures can be used to deliver other complex clearances delivered by voice today
  – departure reroutes to the oceanic entry fix
  – reroutes around weather events with required entry times
• Integrated data link provides easy means to quickly, efficiently and safely deliver complex clearances to aircraft