GLS Operational Experience

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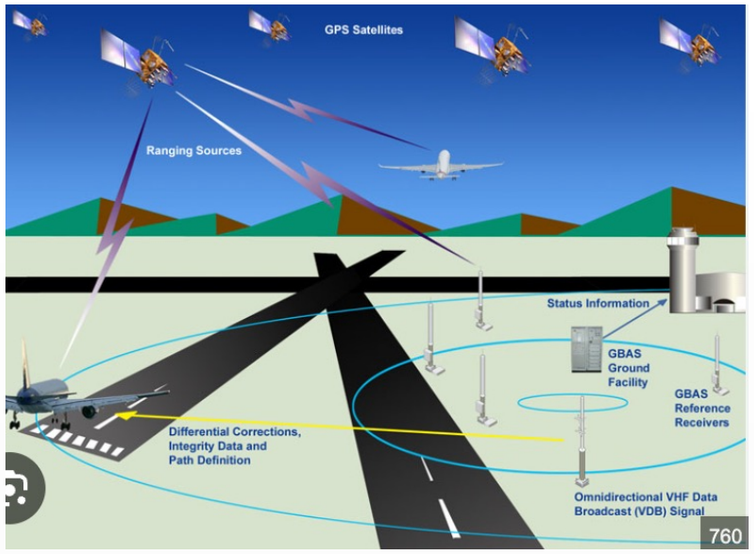
Chief Technical Pilot, Flight Operations
IGBWG Melbourne May 2026

Agenda

- History
- Fleet Status
- Benefits
- In-Service Issues
- Next Steps

Standing on the Shoulders of Others



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History

2005 - Boeing GLS launch customer - 737NG

2007 - GBAS Beta-Trial Sydney Kingsford-Smith SLS-3000+ – YSSY – including Autoland

2008 - Airbus GLS launch customer – A380

2008 -Portable GBAS trials – Boeing/Honeywell/Alaska Airlines/Qantas Juneau Alaska

GBAS SLS-4000 Sydney (YSSY)

GBAS SLS-4000 Melbourne (YMML)

GLS Displaced Threshold Operations

Trial RNP-AR to GLS

Qantas Group Fleet Status

Qantas Mainline

79 737NGs

10 A380s

14+12 787-9/10

5 + 43 A321XLR

24 A350-1000

Jetstar

11 787-8

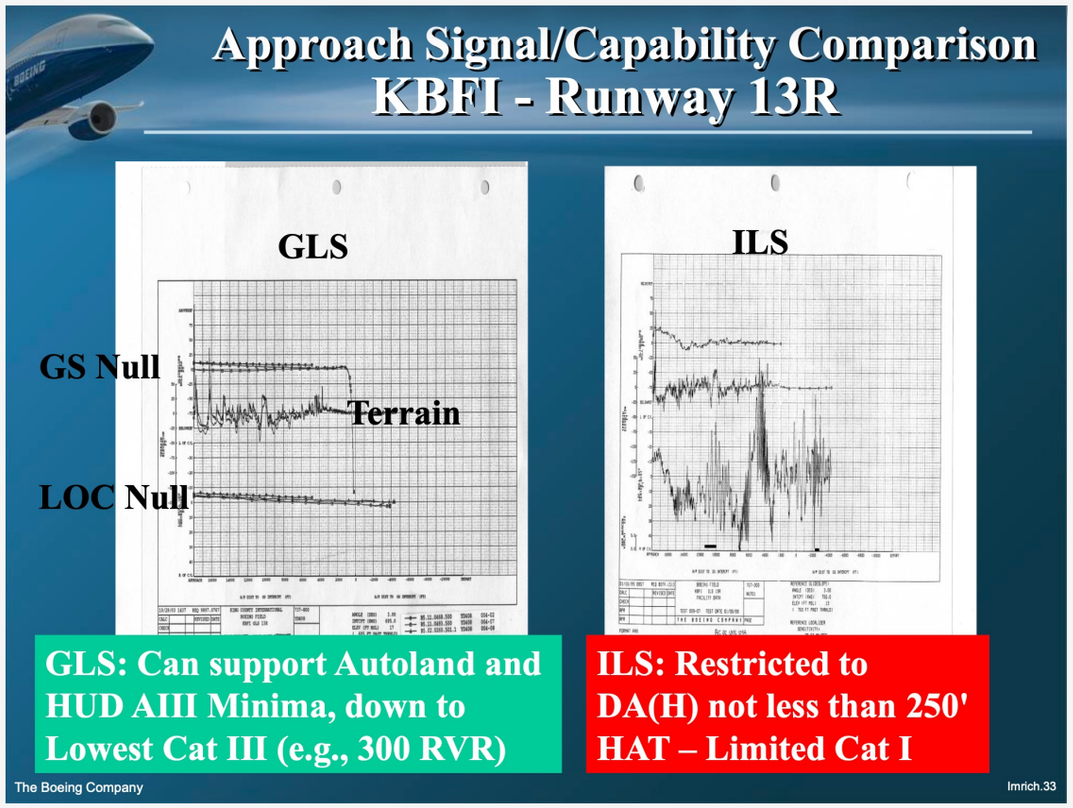
30+ A320

A220 – not offered in production!

Qantas Group GLS Experience

- 100s of thousands of approaches conducted since 2005
  - Manually flown and Autoland
  - 6+ GBAS locations
  - Thousands of pilots
  - 4+ aircraft types
  - All weather conditions
  - Year round over 20 years (some breaks due SLS-3000+ to 4000 transition and the odd lightning strike!)

Realised Benefits



Amazingly smooth, stable lateral and vertical approach paths in all directions

Consistent pilot interface, minimal differences

Precision approach capability where none existed – YMML 09 & 34

Not affected by ILS limitations

Alternate minima planning benefits, redundancy

Complimentary interoperability with RNP-AR

- both can combine to provide smooth, stable, predictable, environmentally and community friendly approach paths

Tighter touchdown footprints with Autoland/HUD

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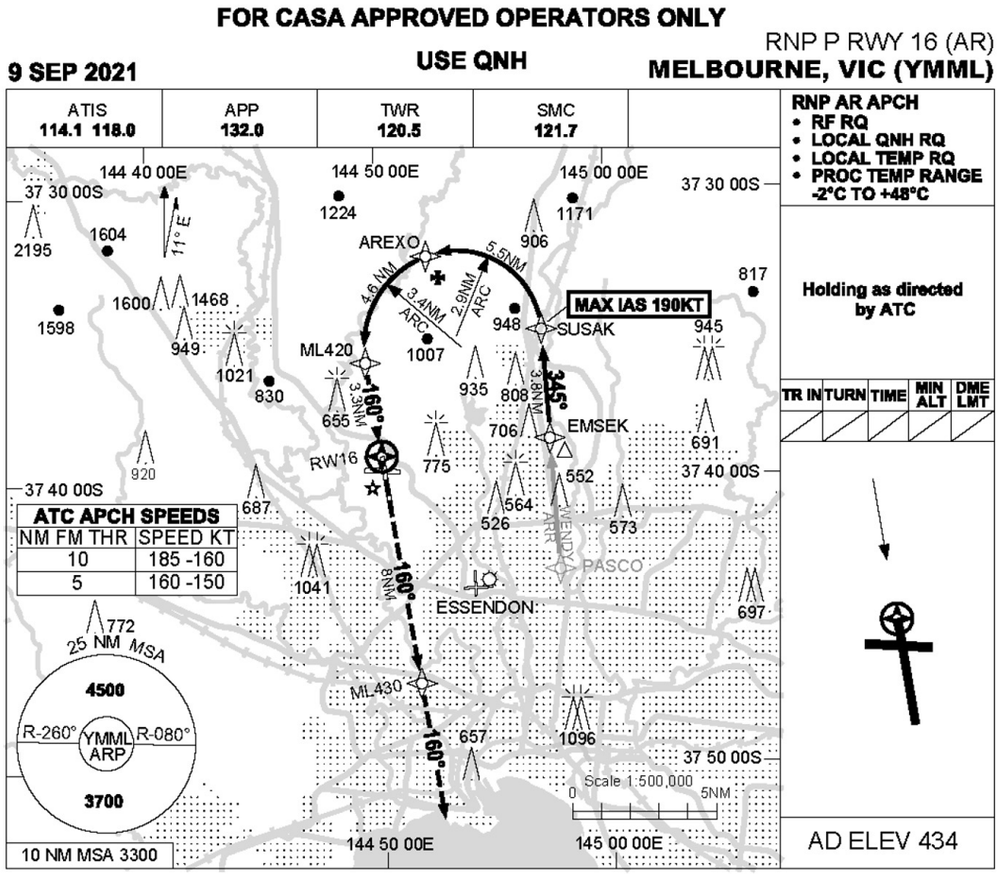
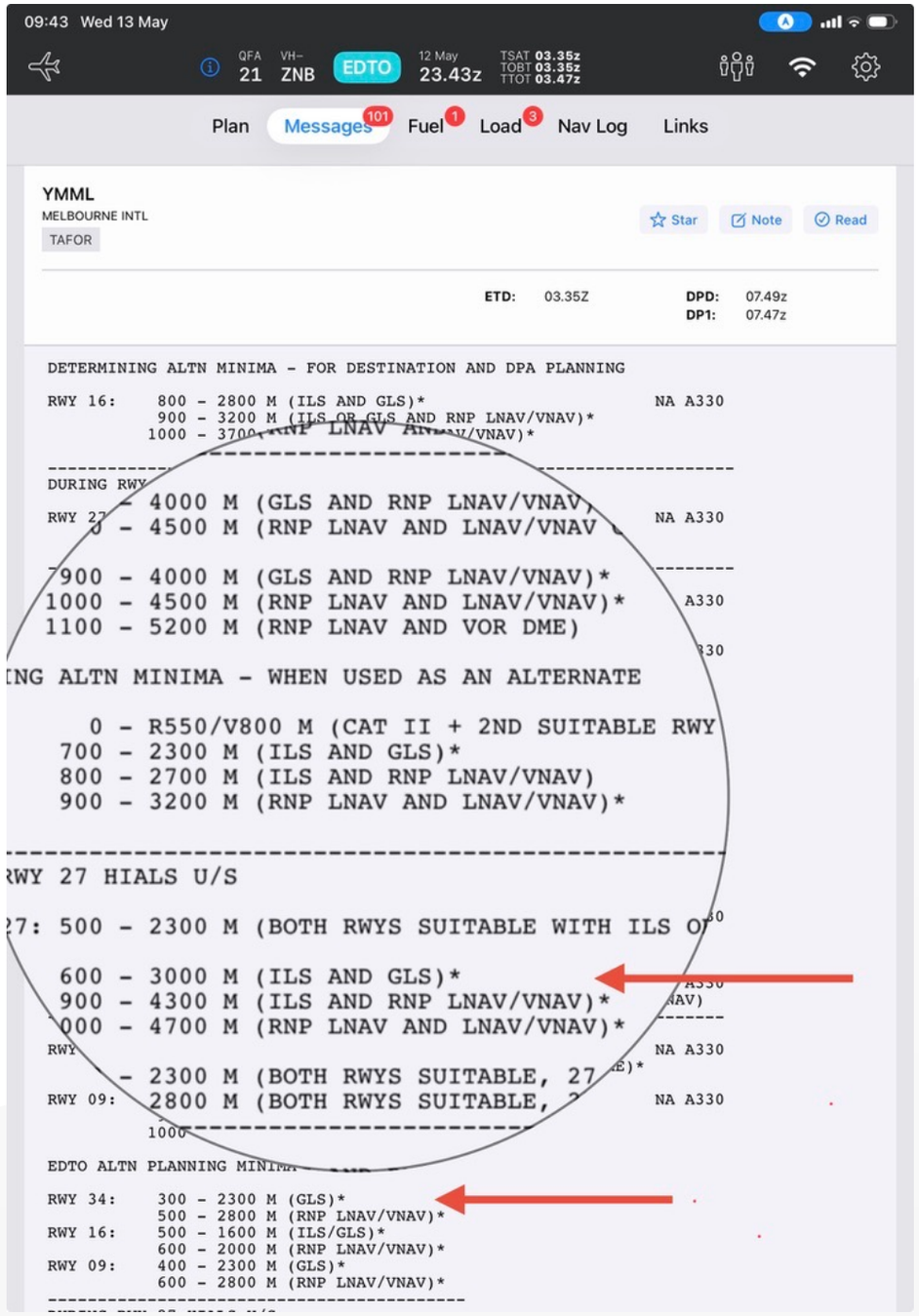
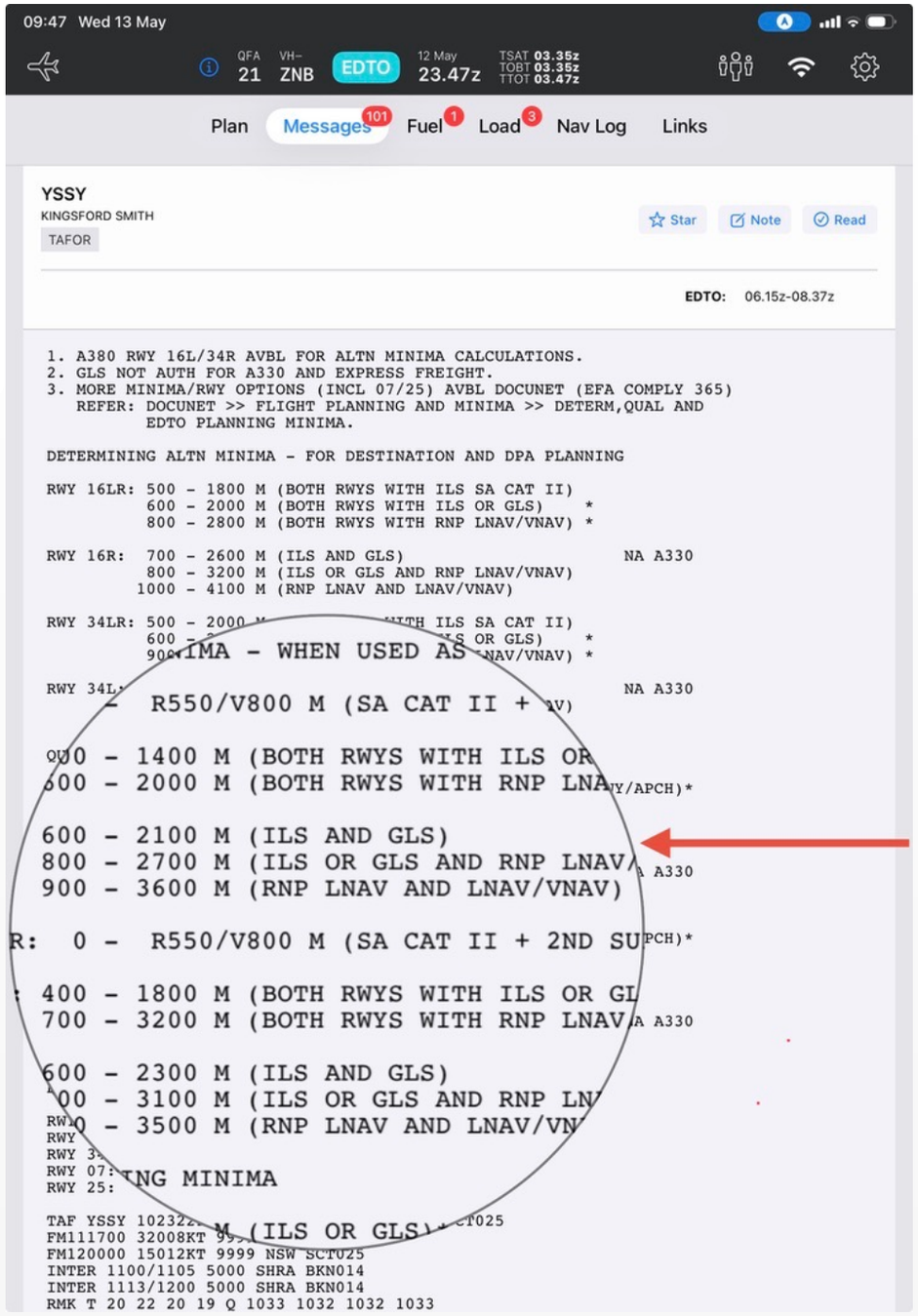
Realised Benefits – Displaced Threshold YMML 16



Alternate Planning Minima





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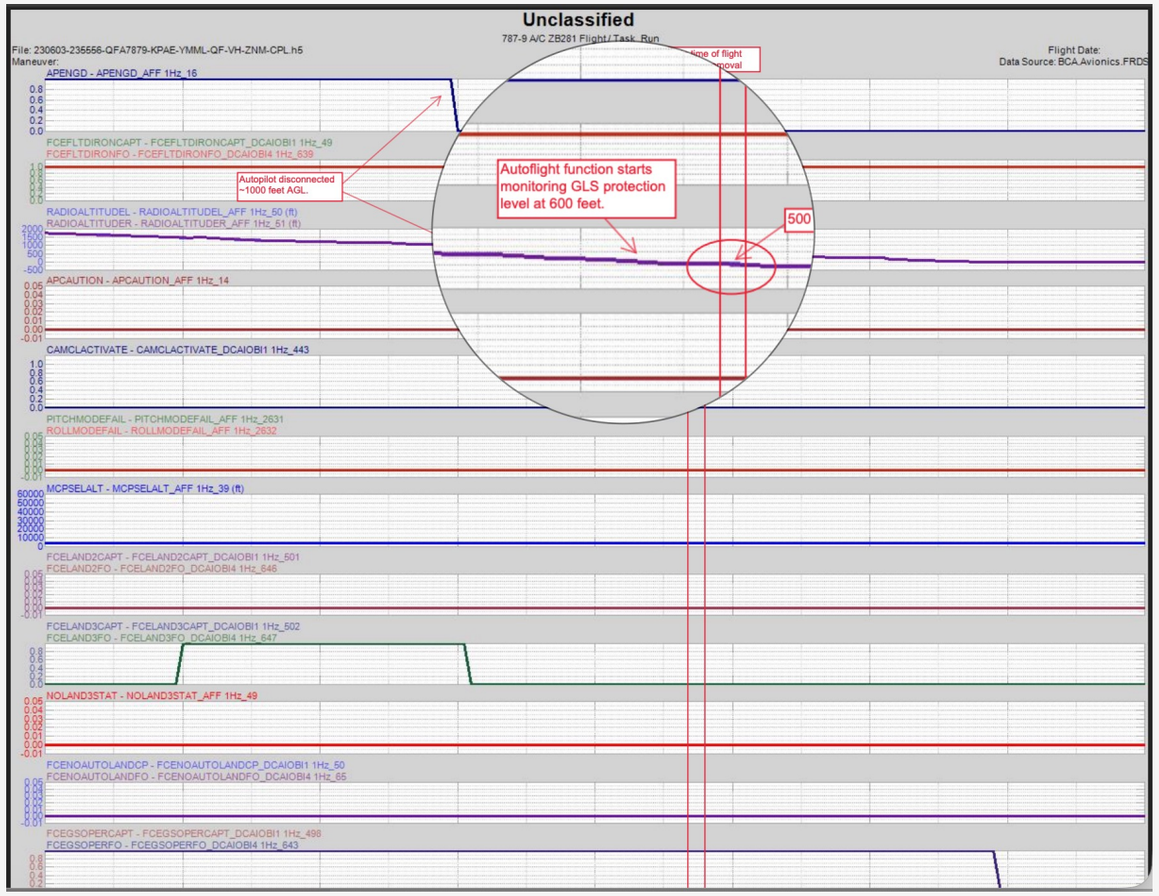
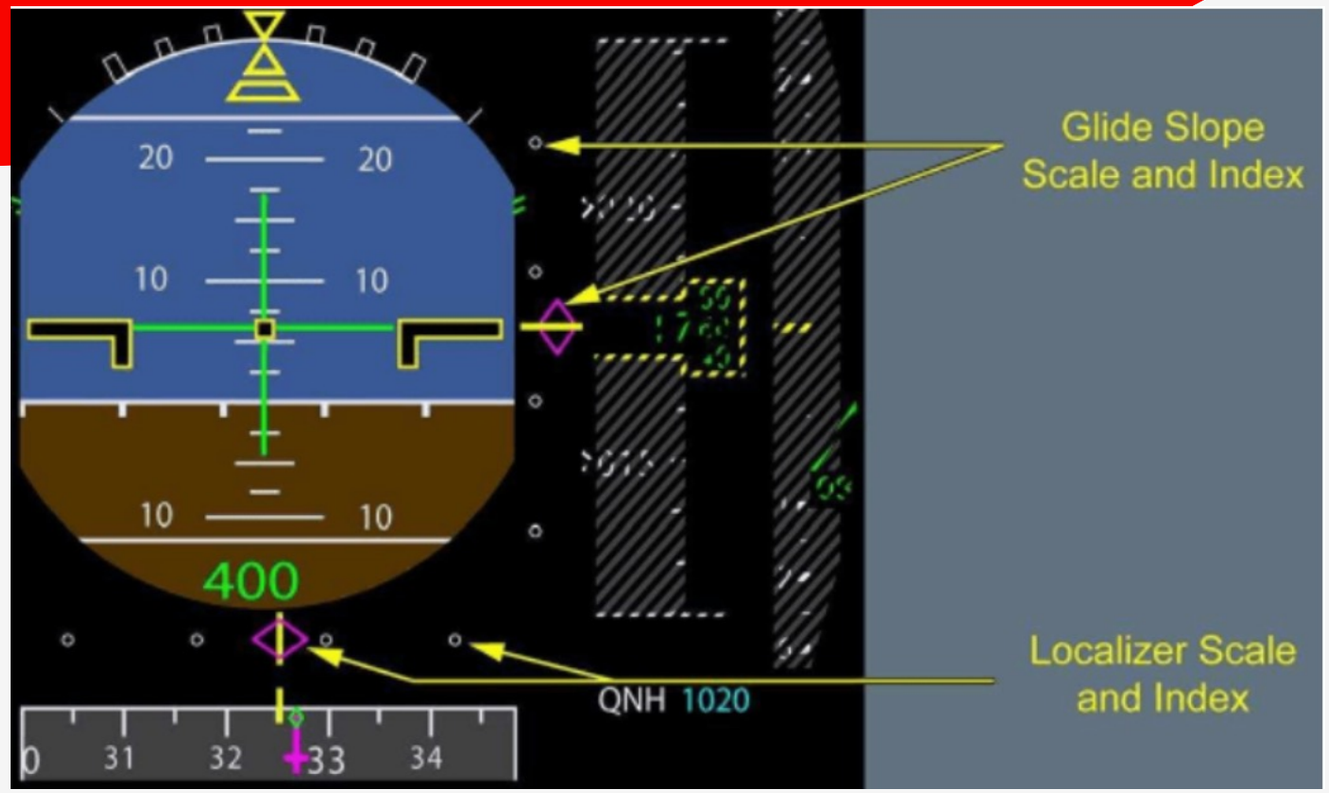
In-Service Issues

737 (GLU-925) & 787 (Honeywell INR)

- Single side course deviation data removed from view, impacts Autoland
- *The difference in left and right GLS vertical deviation can indicate that one of the INRs excluded more satellites that the other for use in its GLS deviation calculations*



In-Service Issues



A321XLR (GLU-2100) “Drop-Out”

Passing approximately 1,000ft on approach to RW34 YMML whilst utilising the GLS for the conduct of an approach in day VMC conditions (CAVOK), with trainee Captain as PF, both autopilots engaged in approach mode, a brief (approximately 5 second transient failure of the GLS (glideslope only) indication occurred on the Captain side. Normal indications remained on the F/O side. When normal glideslope indications returned on the Captain side the F/O side glideslope indication instantaneously failed for a similar time period of 5 seconds before returning to normal indications. No further issues occurred during the remainder of the approach to landing. ATC contacted on arrival who confirmed no apparent issues with the GLS installation known during this time period.

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In-Service Issues

Dual GPS Failure

Caused by latched fault incurred while experiencing RFI through the Middle East. INR reset task introduced for all transits either side of known GPS-RFI affected areas.

Next Steps - 737 and 787 Cat II – Flight Director and Autoland

Section Autopilot Flight Director System, continued from previous page A201431

- Primary Flight Controls in Normal mode
- LAND 3 annunciated
- Autoland status annunciation displayed for each pilot
- Independent ILS displayed for each pilot:
  SGL SOURCE APPROACH alerting message not displayed
- Independent radio altitude sources displayed for each pilot:
  SGL SOURCE RAD ALT alerting message not displayed

This AFM provision does not constitute operational approval or credit for Category III use of the system.

Low Weather Minima - ILS Automatic Landing - Fail-Passive

The autopilot system has been shown to meet the airworthiness, performance and integrity criteria applicable to Category III as specified in FAA Advisory Circular 120-28D Appendix 3 for a fail-passive automatic landing system, when coupled to an ILS beam using U.S. Type III ILS facilities and the following criteria satisfied:

- Primary Flight Controls in Normal mode
- LAND 2 annunciated
- Autoland status annunciation displayed for each pilot
- Independent ILS sources displayed for each pilot:
  SGL SOURCE APPROACH alerting message not displayed
- Independent radio altitude sources displayed for each pilot:
  SGL SOURCE RAD ALT alerting message not displayed

This AFM provision does not constitute operational approval or credit for Category III use of the system.

Low Weather Minima - Autopilot ILS Approach

The autopilot system has been shown to meet the airworthiness, performance and integrity criteria applicable to Category II as specified in FAA Advisory Circular 120-29A, Appendix 3 for automatic approach when coupled to an ILS beam using U.S. Type II or III ILS facilities with the following criteria satisfied:

- Primary Flight Controls in Normal mode
- LAND 3 or LAND 2 annunciated
- Independent ILS sources displayed for each pilot:
  SGL SOURCE APPROACH alerting message not displayed
- Independent radio altitude sources displayed for each pilot:
  SGL SOURCE RAD ALT alerting message not displayed

This AFM provision does not constitute operational approval or credit for Category II use of the system.

Low Weather Minima - Autopilot GLS Approach

The autopilot system has been shown to meet the airworthiness, performance and integrity criteria applicable to Category II as specified in FAA Advisory Circular 120-29A, Appendix 3 for automatic approach and the airworthiness and performance criteria as specified in FAA Advisory Circular 120-28D Appendix 3 for automatic landing when coupled to GLS guidance provided by a ground facility that meets the requirements for CAT I GBAS as defined in ICAO Annex 10 amendment 85 with the following criteria satisfied:

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Section Autopilot Flight Director System, continued from previous page A201431

- Primary Flight Controls in Normal mode
- LAND 3 or LAND 2 annunciated
- Independent GLS sources displayed for each pilot:
  SGL SOURCE APPROACH alerting message not displayed
- Independent radio altitude sources displayed for each pilot:
  SGL SOURCE RAD ALT alerting message not displayed

During anomalous ionospheric conditions, some GBAS systems may exhibit undetected vertical errors exceeding 32.8 feet (10 meters) and lateral errors exceeding 55.8 feet (17 meters). Such errors could prevent satisfactory autoland performance and therefore operational mitigations may be required to ensure vertical and horizontal errors do not exceed these levels during CAT II operations.

This AFM provision does not constitute operational approval or credit for Category II use of the system.

Low Weather Minima - Flight Director ILS Approach

The flight director system has been shown to meet the airworthiness, performance and integrity criteria applicable to Category II as specified in FAA Advisory Circular 120-29A, Appendix 3 for manual approach using flight director guidance on the Head Down Display (HDD) or Head Up Display (HUD) using U.S. Type II or III ILS facilities with the following criteria satisfied:

- Primary Flight Controls in Normal mode
- Independent ILS sources displayed for each pilot:
  SGL SOURCE APPROACH alerting message not displayed
- Independent radio altitude sources displayed for each pilot:
  SGL SOURCE RAD ALT alerting message not displayed
- Independent Flight Director guidance sources displayed for each pilot:
  SINGLE SOURCE F/D alerting message not displayed

This AFM provision does not constitute operational approval or credit for Category II use of the system.

Low Weather Minima - Flight Director GLS Approach

The flight director system has been shown to meet the airworthiness, performance, and integrity criteria applicable to Category II as specified in FAA Advisory Circular 120-29A, Appendix 3 for manual approach using flight director guidance on the Head Down Display (HDD) or Head Up Display (HUD) using GLS guidance provided by a ground facility that meets the requirements for CAT I GBAS as defined in ICAO Annex 10 amendment 85 with the following criteria satisfied:

- Primary Flight Controls in Normal mode
- Independent GLS sources displayed for each pilot:
  SGL SOURCE APPROACH alerting message not displayed
- Independent radio altitude sources displayed for each pilot:
  SGL SOURCE RAD ALT alerting message not displayed
- Independent Flight Director guidance sources displayed for each pilot:
  SINGLE SOURCE F/D alerting message not displayed

This AFM provision does not constitute operational approval or credit for Category II use of the system.

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Thank you