



Leonardo AW189 Helicopter CMC Electronics CMA -6024 GLSSU GBAS Certification Flight Test Results

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GBAS Certification Flight Test on AW-189

Leonardo Helicopters AW189 Flight Test Aircraft



GBAS Certification Flight Test on AW-189

AW189 Characteristics:

- 8.6-ton class helicopter, focused on affordability, mission reliability and dependability
- Markets:
 - Civil or para-public and governmental passenger transport operations;
 - EMS (emergency medical service);
 - Offshore, oil and gas;
 - Search and Rescue (SAR);
 - Corporate and VIP;
 - Law enforcement as well as homeland security.



AW189 GBAS Certification Avionics



AW-189 Avionics

A fully integrated system comprising:

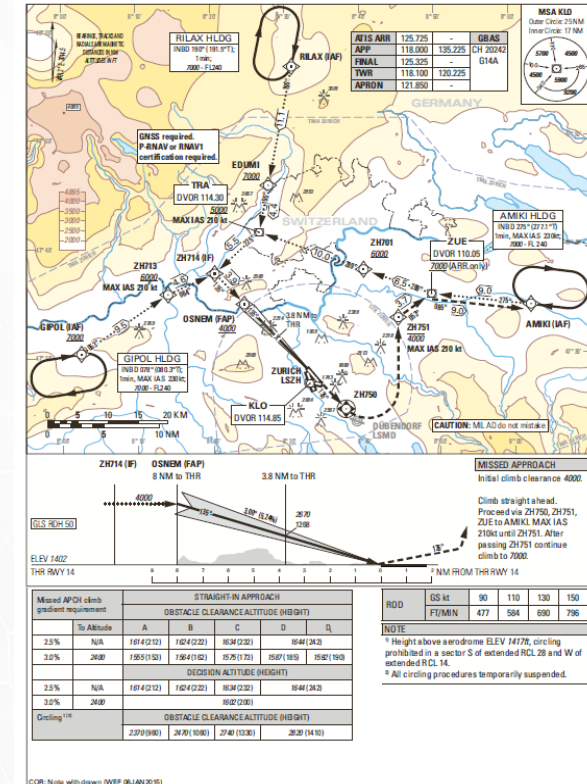
- four 8" x 10" color Active Matrix Liquid Crystal Displays (AMLCDs),
- dual 4-axis dual-duplex Automatic Flight Control System (AFCS),
- dual FMS (Flight Management System) with
 - RNP Performance and Monitoring Alerting system,
 - guarantees any RNP navigation specification included in PBN manual (4th Ed.) up to 0.3nm,
- Situational awareness information on cockpit displays
 - radar, TCAS II, synthetic vision, HTAWS,
- includes an integrated redundant aircraft management and monitoring system with HUMS function.
- SBAS and GBAS Precision Approach

AW189 GBAS Certification Avionics



SBAS/GBAS Receiver: CMA-6024

- ARINC 743C Compliant, standard connectivity, can be customized
- Is a GAST-C sensor, includes GAST-D authentication check,
- Meets/exceeds RTCA/DO-229E/DO-253(current and new), TSOs: C145e Beta-3, C146e Delta-4, C161A, C162A, Class GAEC-C/G1
- Satisfies guidance AC20-138D (including Change 1 & 2) as a SBAS & GBAS sensor.
- Is completely DAL-A (both GPS/SBAS/GBAS receiver and the VDB receiver)
- Is a complete, self-contained SBAS and GBAS approach receiver but designed purposefully for either retrofit or new build integration.
 - Can be integrated with a FMS, various options possible
 - Can use any ARINC-739a MCDU or similar controller, FMS, and so on, may communicate via the ARINC-739 interface or the ARINC-743 data bus.
- **Outputs include:**
 - GBAS positioning on the Approach bus
 - VDB Received Signal Level (RSL) and Error Vector Magnitude (EVM), accurate to within 3dB.
 - VDB is Class B with X=9, Y=0, Z=15, outstanding dynamic range and sensitivity, superior to Class A.
- **Future Evolution: GAST-D... once the regulatory guidance has been published...**



GBAS Approach to Zurich

Details:

- Zurich RW14 GLS approach main parameters :
 - Standard 3-degree glide path angle.
 - GBAS antenna located north of airport close to the RW14 threshold
 - Transit power is approximately 46-48dBm (<10Watts),
 - GBAS channel corresponds to 114.05MHz.
 - Maximum Use Distance, Dmax is 42km,
 - Vertical Alert Limit is 10m,
 - Lateral Alert Limit is 40m,
 - Approach TCH (Threshold Crossing Height) is 50ft.

GBAS Flight Path

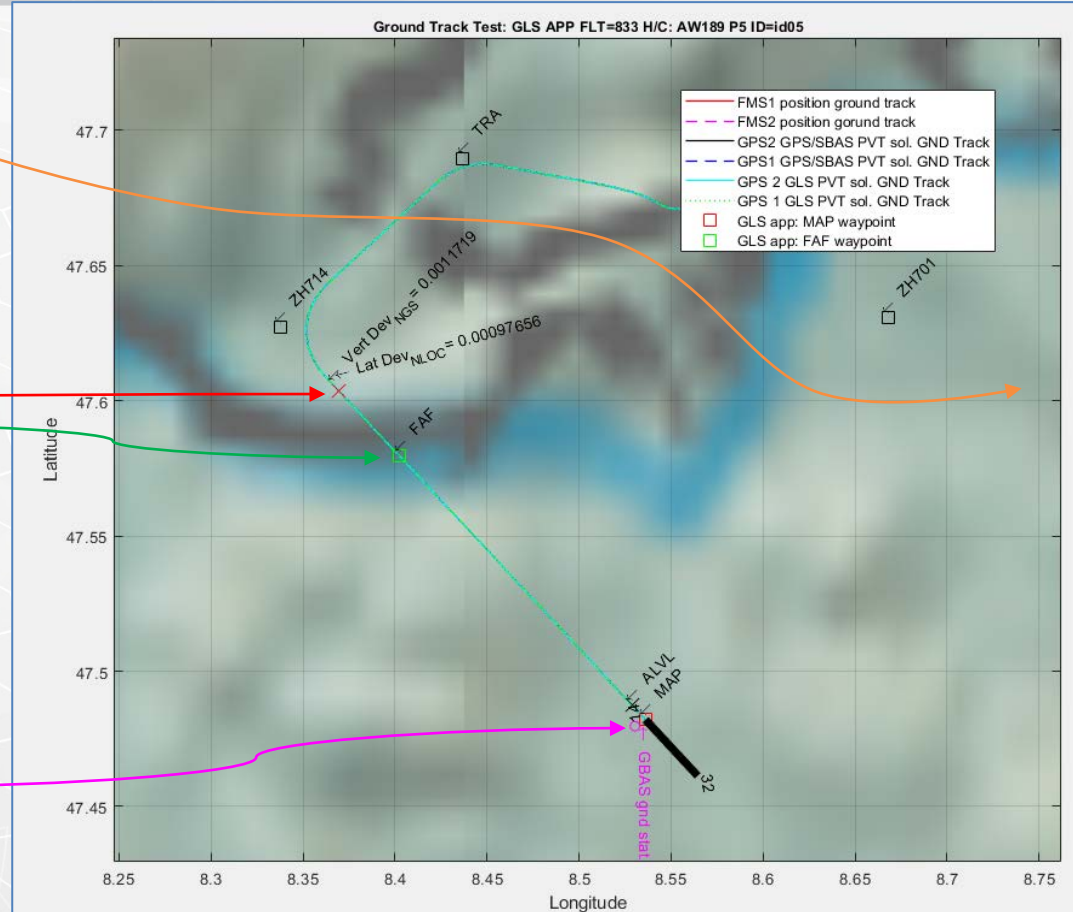
Start: initial segment of the approach at the **AMIKI IAF**.

Approach started from a 7000ft altitude with a CDO (Continuous Descent Operation) down to the FAF waypoint altitude

- Guidance to FAF: GPS lateral guidance and APV Baro-VNAV vertical guidance.
- GLS Approach capture under the FMS 3-D command
- Guidance: CMA-6024 generated GLS look-alike LOC and GS
- Capture at 2nm (**Red Cross**) to the **FAF waypoint** with minimum lateral and vertical deviations

Results:

- Tracks from both CMA-6024 GLSSUs are perfectly synchronized with each other
- The **Red Cross** on the map plot represents the GLS approach position where the selected CMA-6024 GLSSU provided direct guidance (LOC and GS) both in the horizontal and vertical planes at a continuous 20Hz rate to both FMSs.
- From the **Red Cross** to the **MAP waypoint** (10nm of GLS final approach segment).



The Cockpit View: Spot-on Center line @ 3 degree GPA throughout

Start of approach



Near final approach



There is an overall consensus among the members of the flight crew: the performance was outstanding.