NAVAID GROUND SYSTEM INSPECTIONS WITH UAS & R&S®EVSD1000

Michele D'Onofrio - UAS Project Manager, Techno Sky
Korkmazer Semahat - Product Manager Spectrum & Signal Analyzers

ICAO Air Navigation Systems Workshop – NAM/CAR/SAM
Mexico City
September 2025

ROHDE&SCHWARZ
Make ideas real

R&S®EVSD1000 VHF/UHF NAV/DRONE ANALYZER

RF sensor High Accuracy and precision for efficient drone inspection of Terrestrial Navigation Systems

- Rohde & Schwarz Navigation Analyzers
- Accuracy & Precision
- Calibration

NAVAIDS GROUND CHECK WITH UAS IN ITALY BY TECHNO SKY

Fully automated solution with progress overview

- Techno Sky profile
- UAS fleet
- NAVAIDS Ground Check
  - Checks of equipment
  - Operational scenarios
  - Description of the solution
  - UAS solution benefits
- Progress overview and next steps

NAVIGATION ANALYZERS BY ROHDE & SCHWARZ

1996

R&S®EVS200
First VHF/UHF airnav/com analyzer

R&S®EVS300
2003

2013

R&S®EDS300
DME/Pulse Analyzer

R&S®EDST300

TACAN/DME station tester

2016

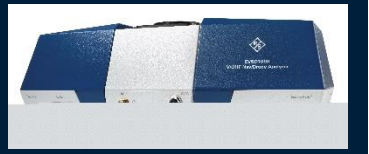
R&S®EVSG1000

2017

R&S®EVSF1000

R&SEVSD1000

2023



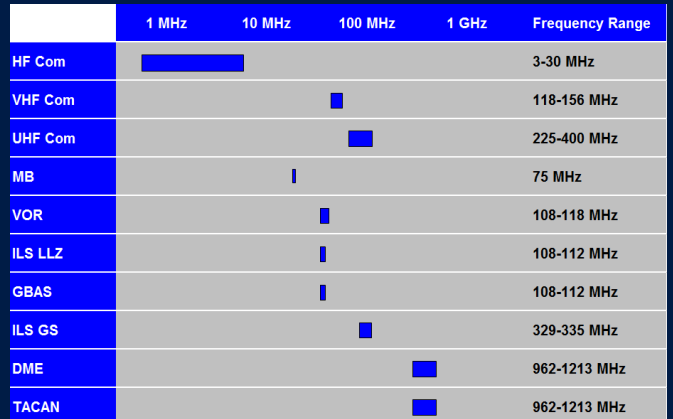
Key Requirements & Test receiver accuracy

ICAO requirements
NavAid Ground Systems

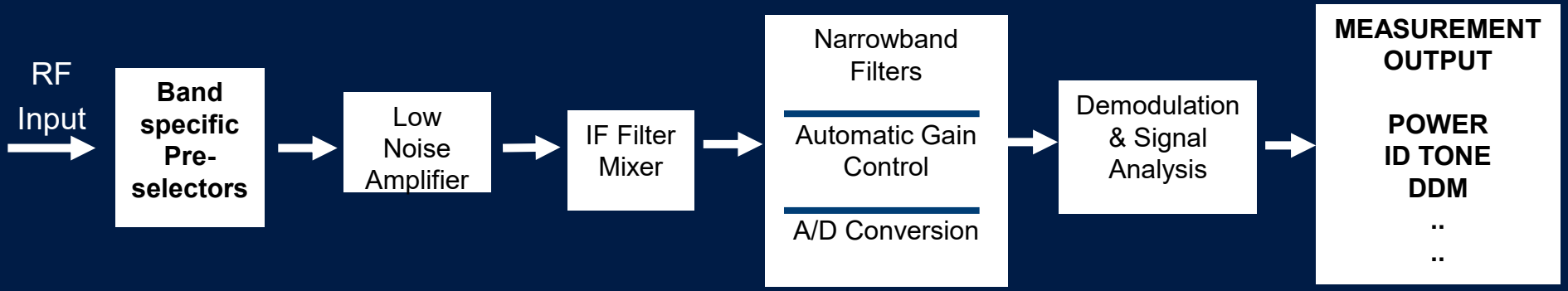
- Periodic inspections: Regular inspection to ensure operational integrity should include
  - Checks of equipment
  - Signal Quality
  - Overall system performance
- Calibration and Testing:
  - Performed at regular intervals to ensure accuracy
  - Include functional testing, performance checks and verification of signal coverage

Test & Measurement Instrument

- **Accuracy:** the degree to which the measured value conforms to the true value.
- **Precision:** the degree to which repeated measurements under unchanged conditions show the same results



PRECISION - R&S®EVSD1000



- Enhanced Accuracy and Precision of measurements in the presence of strong signals from other systems (e.g. ATC COM, …) on the runway achieved via:
- Band- specific preselectors
  - Enables filtering out unwanted signals and noise outside desired band
  - Provides protection against test receiver overloading
  - Increase the sensivity
- High sensitivity
  - Ability to detect the weak signals effectively:
  - Help increasing the dynamic range for effective interference anlysis
- Wide Dynamic Range
  - enables the detection of both weak and strong signals

Specifications

Frequency

Frequency range		70 MHz to 410 MHz
Frequency resolution		10 Hz
Preselection filter ranges	marker beacon	74.7 MHz to 75.3 MHz
	ILS LLZ, VOR, GBAS	108 MHz to 118 MHz
	COM 1	118 MHz to 145 MHz
	ILS GS, COM 2	220 MHz to 410 MHz

[© Rohde & Schwarz; R&S®EVSD1000 VHF/UHF Nav/Drone Analyzer]

Rohde & Schwarz

Techno Sky UAS at airports for NAVAIDS

About instrument calibration

- To verify that instruments perform to their specifications, they must be **calibrated**
- Initially performed during manufacturing
  - Afterwards, performed at periodic intervals
- Requires the use of other instruments, systems, software and procedures
  - Performed by trained calibration specialists
- Values for various instrument parameters are measured
  - If parameters are no longer in the acceptable range, components are adjusted to move parameters back into the expected range
- Results are collected into a calibration report

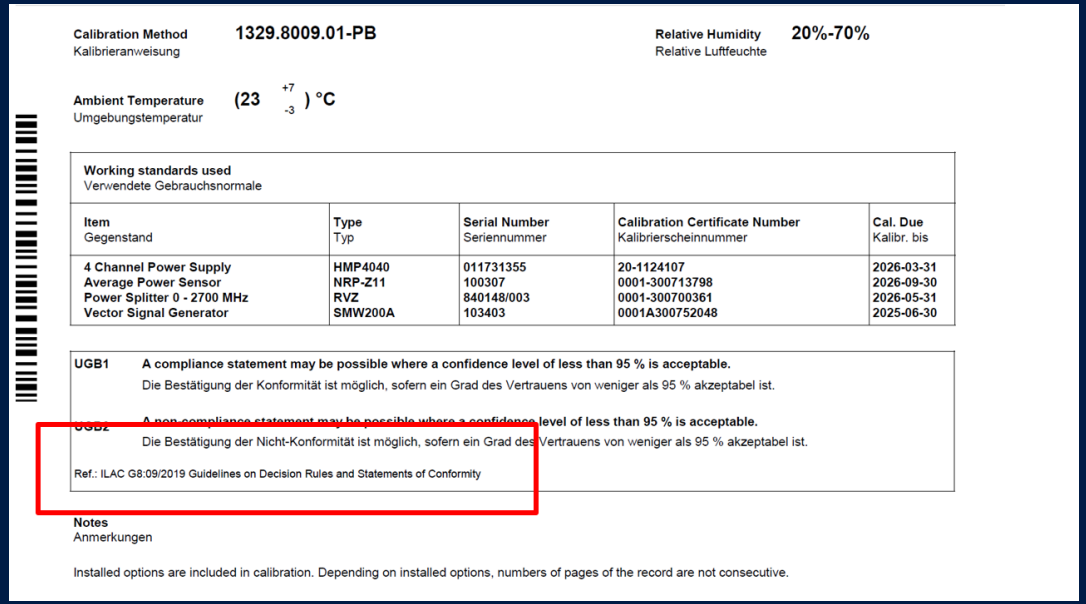
ACCURACY & TRACEABILITY

- Datasheet & Specifications
- Available on R&S Product Web pages to our customers

© Rohde & Schwarz; R&S®EVSD1000 VHF/UHF Nav/Drone Analyzer

- Recommended Calibration interval – 1 year
- Traceability of calibration results to internationally recognized metrology labs, e.g. ILAC (About ILAC International Laboratory Accreditation Cooperation)

- Calibration services
- Supporting main accounts with (setting up) their own calibration procedures – Option EVSG-Z11



Calibration Method 1329.8009.01-PB
Kalibrieranweisung

Relative Humidity 20%-70%
Relative Luftfeuchte

Ambient Temperature (23 $^{+7}_{-3}$) °C
Umgebungstemperatur

Working standards used
Verwendete Gebrauchsnormale

Item Gegenstand	Type Typ	Serial Number Seriennummer	Calibration Certificate Number Kalibrierscheinnummer	Cal. Due Kalibr. bis
4 Channel Power Supply	HMP4040	011731355	20-1124107	2026-03-31
Average Power Sensor	NRP-Z11	100307	0001-300713798	2026-09-30
Power Splitter 0 - 2700 MHz	RVZ	840148/003	0001-300700361	2026-05-31
Vector Signal Generator	SMW200A	103403	0001A300752048	2025-06-30

UGB1 **A compliance statement may be possible where a confidence level of less than 95 % is acceptable.**
Die Bestätigung der Konformität ist möglich, sofern ein Grad des Vertrauens von weniger als 95 % akzeptabel ist.

UGB2 **A non-compliance statement may be possible where a confidence level of less than 95 % is acceptable.**
Die Bestätigung der Nicht-Konformität ist möglich, sofern ein Grad des Vertrauens von weniger als 95 % akzeptabel ist.

Ref.: ILAC G8:09/2019 Guidelines on Decision Rules and Statements of Conformity

Notes
Anmerkungen

Installed options are included in calibration. Depending on installed options, numbers of pages of the record are not consecutive.

NAVAIDS GROUND CHECK WITH UAS IN ITALY BY TECHNO SKY

Fully automated solution with progress overview

- **Techno Sky profile**
- UAS fleet
- NAVAIDS Ground Check
  - Checks of equipment
  - Operational scenarios
  - Description of the solution
  - UAS solution benefits
- Progress overview and next steps

TECHNO SKY PROFILE
BRIEF INTRODUCTION

- It is an ENAV Group Company
- Responsible for the **managing and maintaining the entire range of hardware/software platforms and systems used to deliver air navigation services.**
- The company handles the technical/operational management of:
  - 4 Area Control Centres (ACC) at Brindisi, Milano, Padova and Roma
  - 45 airports
  - 44 RADAR systems
  - 121 telecommunications centres
  - 68 weather systems
  - 239 navigational aid systems
- Since 2017 Techno Sky S.r.l. has become a registered **UAS Operator**

TECHNO SKY PROFILE
UAS OPERATOR ACTIVITIES

RADOME Inspections

Communication Antennas Inspections

Aerodrome Infrastructures Inspections

ILS Ground Check

TECHNO SKY ILS GROUND CHECK: BRIEF HISTORY

2017 — Techno Sky UAS Operator

2018-2019 — Airports test under ENAC conditions and approvals (Brescia and Forlì airports) VLOS-EVLOS Operation

February 2020 — ENAC Declaration of Compatibility ILS measures with both UAS and GCV means of measurement

July 2021 — Release of Operational Authorization at Torino airport in BVLOS conditions

July 2022 — GENERIC Operational Authorisation BVLOS ILS Ground Check

June 2023 — GENERIC Operational Authorisation Aerodrome infrastructures inspection

October 2024 — Operational Authorisation A Treviso airport for BVLOS operatoions simultaneous with air manned traffic

How we were:
Ground check vehicle

R&S®EVSF1000

How we are:
DVI^2AM® Drone

R&S®EVSD1000

Rohde & Schwarz

Techno Sky UAS at airports for NAVAIDS

NAVAIDS GROUND CHECK WITH UAS IN ITALY BY TECHNO SKY
Fully automated solution with progress overview

- Techno Sky profile
- **UAS fleet**
- NAVAIDS Ground Check
  - Checks of equipment
  - Operational scenarios
  - Description of the solution
  - UAS solution benefits
- Progress overview and next steps

UAS Current Fleet

6 Nimbus PPL-612 PLUS EVO XL

- MTOM: 25 Kg
- FTS: EASA DVR (Light UAS 2511)
- Parachute
- GNSS + RTK navigation

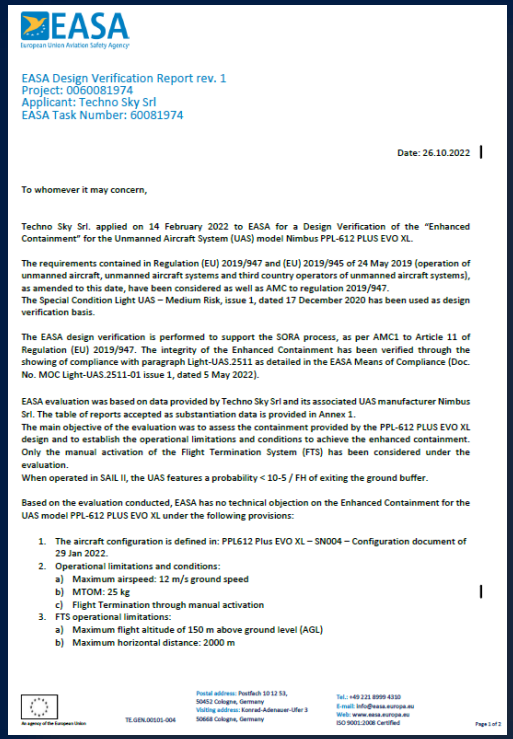
2 Nimbus PPL-418

- MTOM : 10 Kg
- FTS: MOC EASA Light UAS 2511
- Parachute
- GNSS + RTK navigation

Payloads:

- ILS receiver
- Multispectral
- Speaker
- EO/IR camera
- LIDAR
- HF RADAR

EASA DESIGN VERIFICATION REPORT
ENHANCED CONTAINMENT (SEPTEMBER 2022)



EASA
European Union Aviation Safety Agency

EASA Design Verification Report rev. 1
Project: 0660081974
Applicant: Techno Sky Srl
EASA Task Number: 60081974

Date: 26.10.2022

To whomever it may concern,

Techno Sky Srl. applied on 14 February 2022 to EASA for a Design Verification of the "Enhanced Containment" for the Unmanned Aircraft System (UAS) model Nimbus PPL-612 PLUS EVO XL.

The requirements contained in Regulation (EU) 2019/947 and (EU) 2019/945 of 24 May 2019 (operation of unmanned aircraft, unmanned aircraft systems and third country operators of unmanned aircraft systems), as amended to this date, have been considered as well as AMC to regulation 2019/947.
The Special Condition Light UAS – Medium Risk, issue 1, dated 17 December 2020 has been used as design verification basis.

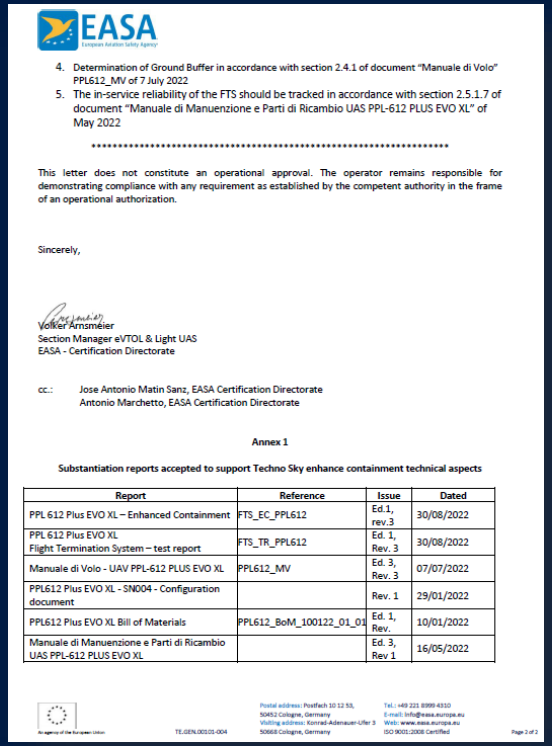
The EASA design verification is performed to support the SORA process, as per AMC1 to Article 11 of Regulation (EU) 2019/947. The integrity of the Enhanced Containment has been verified through the showing of compliance with paragraph Light-UAS.2511 as detailed in the EASA Means of Compliance (Doc. No. MOC Light-UAS.2511-01 issue 1, dated 5 May 2022).

EASA evaluation was based on data provided by Techno Sky Srl and its associated UAS manufacturer Nimbus Srl. The table of reports accepted as substantiation data is provided in Annex 1.
The main objective of the evaluation was to assess the containment provided by the PPL-612 PLUS EVO XL design and to establish the operational limitations and conditions to achieve the enhanced containment. Only the manual activation of the Flight Termination System (FTS) has been considered under the evaluation.
When operated in SAIL II, the UAS features a probability < 10-5 / FH of exiting the ground buffer.

Based on the evaluation conducted, EASA has no technical objection on the Enhanced Containment for the UAS model PPL-612 PLUS EVO XL under the following provisions:

1. The aircraft configuration is defined in: PPL612 Plus EVO XL – SN004 – Configuration document of 29 Jan 2022.
2. Operational limitations and conditions:
   a) Maximum airspeed: 12 m/s ground speed
   b) MTOM: 25 kg
   c) Flight Termination through manual activation
3. FTS operational limitations:
   a) Maximum flight altitude of 150 m above ground level (AGL)
   b) Maximum horizontal distance: 2000 m

Postal address: Postfach 10 12 53, 50452 Cologne, Germany
Visiting address: Konrad-Adenauer-Ufer 3 50668 Cologne, Germany
Tel.: +49 221 8999 4310
E-mail: info@easa.europa.eu
Web: www.easa.europa.eu
ISO 9001:2008 Certified



EASA
European Aviation Safety Agency

4. Determination of Ground Buffer in accordance with section 2.4.1 of document "Manuale di Volo" PPL612_MV of 7 July 2022
5. The in-service reliability of the FTS should be tracked in accordance with section 2.5.1.7 of document "Manuale di Manuenzione e Parti di Ricambio UAS PPL-612 PLUS EVO XL" of May 2022

****

This letter does not constitute an operational approval. The operator remains responsible for demonstrating compliance with any requirement as established by the competent authority in the frame of an operational authorization.

Sincerely,

Volker Ansmeier
Section Manager eVTOL & Light UAS
EASA - Certification Directorate

cc.: Jose Antonio Matin Sanz, EASA Certification Directorate
Antonio Marchetto, EASA Certification Directorate

Annex 1

Substantiation reports accepted to support Techno Sky enhance containment technical aspects

Report	Reference	Issue	Dated
PPL 612 Plus EVO XL – Enhanced Containment	FTS_EC_PPL612	Ed.1, rev.3	30/08/2022
PPL 612 Plus EVO XL Flight Termination System – test report	FTS_TR_PPL612	Ed. 1, Rev. 3	30/08/2022
Manuale di Volo - UAV PPL-612 PLUS EVO XL	PPL612_MV	Ed. 3, Rev. 3	07/07/2022
PPL612 Plus EVO XL - SN004 - Configuration document		Rev. 1	29/01/2022
PPL612 Plus EVO XL Bill of Materials	PPL612_BoM_100122_01_01	Ed. 1, Rev.	10/01/2022
Manuale di Manuenzione e Parti di Ricambio UAS PPL-612 PLUS EVO XL		Ed. 3, Rev 1	16/05/2022

Postal address: Postfach 10 12 53, 50452 Cologne, Germany
Visiting address: Konrad-Adenauer-Ufer 3 50668 Cologne, Germany
Tel.: +49 221 8999 4310
E-mail: info@easa.europa.eu
Web: www.easa.europa.eu
ISO 9001:2008 Certified

NAVAIDS GROUND CHECK WITH UAS IN ITALY BY TECHNO SKY

Fully automated solution with progress overview

- Techno Sky profile
- UAS fleet
- **NAVAIDS Ground Check**
  - **Checks of equipment**
  - Operational scenarios
  - Description of the solution
  - UAS solution benefits
- Progress overview and next steps

ILS GROUND CHECK: INTRODUCTION

- ICAO Doc.8071: ILS ground measurements are recommended
- ILS Localizer and Glidepath signals are today measured with a special vehicle equipped with a telescopic mast, a measurement antenna and ILS receiver.
- Today, Techno Sky can perform ILS ground check with UAS at all italian civil airports with single runway

ILS GROUND CHECK: INTRODUCTION

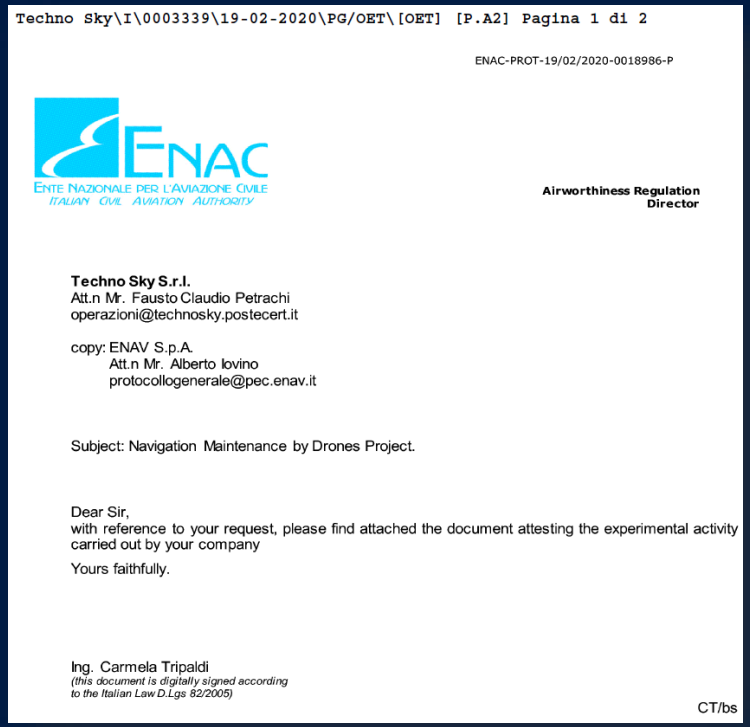
- 2017-2020: Trials with a purpose-designed measurement Techno Sky UAS solution equipped with a compact ILS receiver/analyzer, a dipole antenna and a proper flight planning software
- ILS signal-in-space compliant with ICAO tolerances for Ground Check (Annex 10 Vol I) and Doc. 8071
- February 2020: ENAC declared compatibility of UAS ILS measurement with respect to GCV
- July 2022: Authorization from ENAC to perform ILS inspection at single runway airports

How we were:
Ground check vehicle

How we are:
DVI^2AM® Drone

ENAC ATTESTATION LETTER

Certification of compatibility of ILS measures with both UAS and GCV solutions



Techno Sky\I\0003339\19-02-2020\PG/OET\[OET] [P.A2] Pagina 1 di 2

ENAC-PROT-19/02/2020-0018986-P

ENAC
ENTE NAZIONALE PER L'AVIAZIONE CIVILE
ITALIAN CIVIL AVIATION AUTHORITY

Airworthiness Regulation Director

Techno Sky S.r.l.
Att.n Mr. Fausto Claudio Petrachi
operazioni@technosky.postecert.it

copy: ENAV S.p.A.
Att.n Mr. Alberto Iovino
protocollogenerale@pec.enav.it

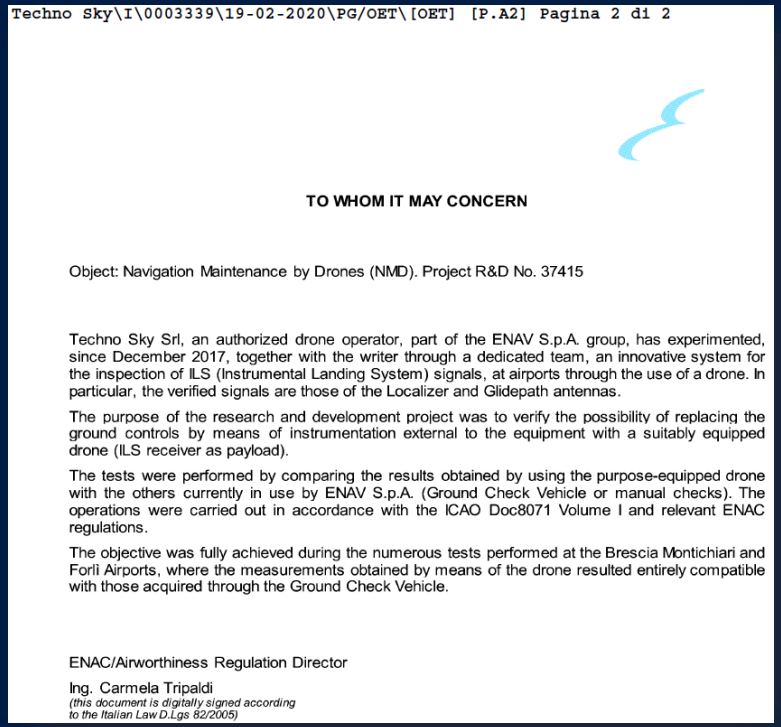
Subject: Navigation Maintenance by Drones Project.

Dear Sir,
with reference to your request, please find attached the document attesting the experimental activity carried out by your company

Yours faithfully.

Ing. Carmela Tripaldi
(this document is digitally signed according to the Italian Law D.Lgs 82/2005)

CT/bs



Techno Sky\I\0003339\19-02-2020\PG/OET\[OET] [P.A2] Pagina 2 di 2

TO WHOM IT MAY CONCERN

Object: Navigation Maintenance by Drones (NMD). Project R&D No. 37415

Techno Sky Srl, an authorized drone operator, part of the ENAV S.p.A. group, has experimented, since December 2017, together with the writer through a dedicated team, an innovative system for the inspection of ILS (Instrumental Landing System) signals, at airports through the use of a drone. In particular, the verified signals are those of the Localizer and Glidepath antennas.

The purpose of the research and development project was to verify the possibility of replacing the ground controls by means of instrumentation external to the equipment with a suitably equipped drone (ILS receiver as payload).

The tests were performed by comparing the results obtained by using the purpose-equipped drone with the others currently in use by ENAV S.p.A. (Ground Check Vehicle or manual checks). The operations were carried out in accordance with the ICAO Doc8071 Volume I and relevant ENAC regulations.

The objective was fully achieved during the numerous tests performed at the Brescia Montichiari and Forlì Airports, where the measurements obtained by means of the drone resulted entirely compatible with those acquired through the Ground Check Vehicle.

ENAC/Airworthiness Regulation Director

Ing. Carmela Tripaldi
(this document is digitally signed according to the Italian Law D.Lgs 82/2005)

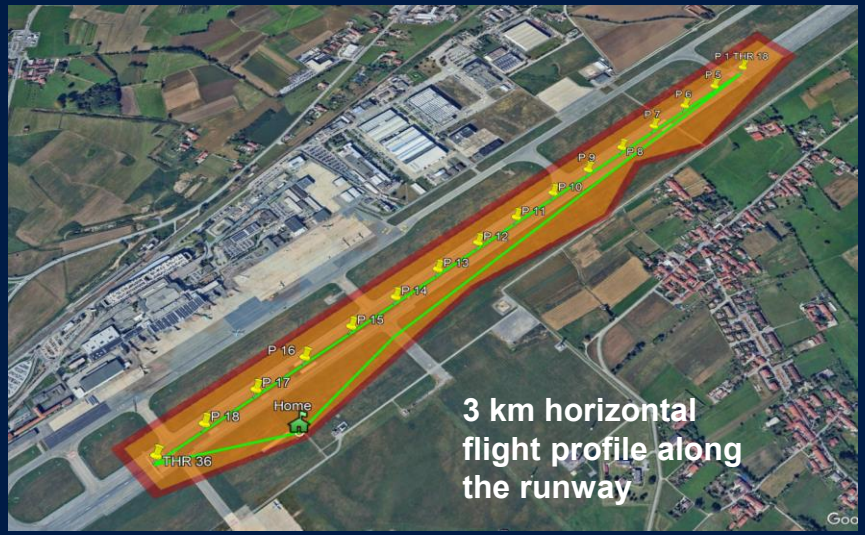
NAVAIDS GROUND CHECK WITH UAS IN ITALY BY TECHNO SKY
Fully automated solution with progress overview

- Techno Sky profile
- UAS fleet
- **NAVAIDS Ground Check**
  - Checks of equipment
  - **Operational scenarios**
  - Description of the solution
  - UAS solution benefits
- Progress overview and next steps

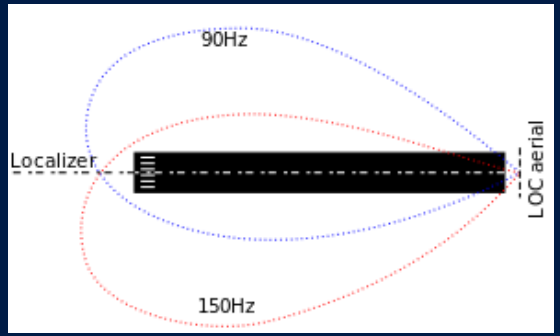
ILS GROUND CHECK – LOC COURSE ALIGNMENT

- BVLOS conditions
- Absence of manned traffic within the airport
- Operations take place at night or within a dedicated “SPOT” coordinated with ATS and Apt. manager

- Automatic flight trajectory along runway centerline

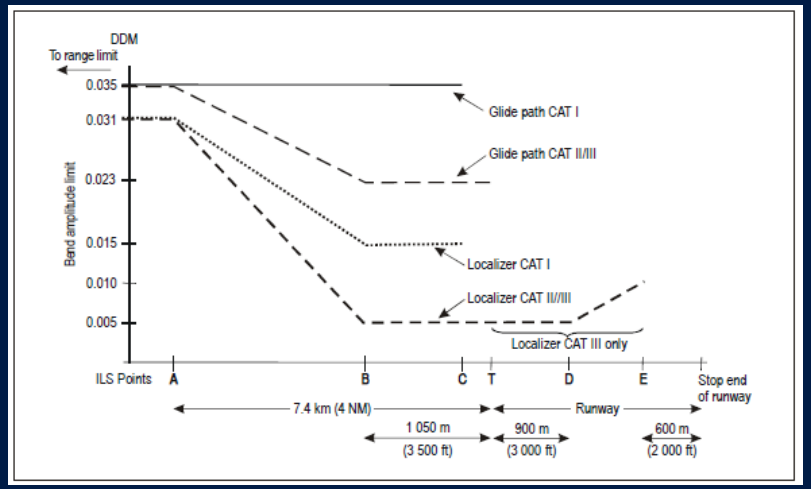


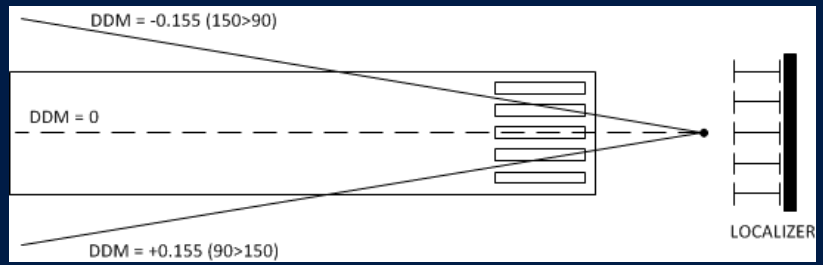
- Horizontal flight cruise speed 10 m/s
- 4-8 m AGL along the runway centerline
- Mission duration ~10 min



ILS GROUND CHECK – LOC COURSE ALIGNMENT

- Dynamic analysis of Localizer, carried out across the runway axis at a costant speed and altitude, allows to analyse the magnitudes of interest (DDM, SDM, 90/150Hz Modulations)
- Ensuring that the ILS signal-in-space performs within the specified tolerances according to ICAO rules (Annex 10 Vol I)
- Ground check compliant with ICAO Doc.8071 test procedures

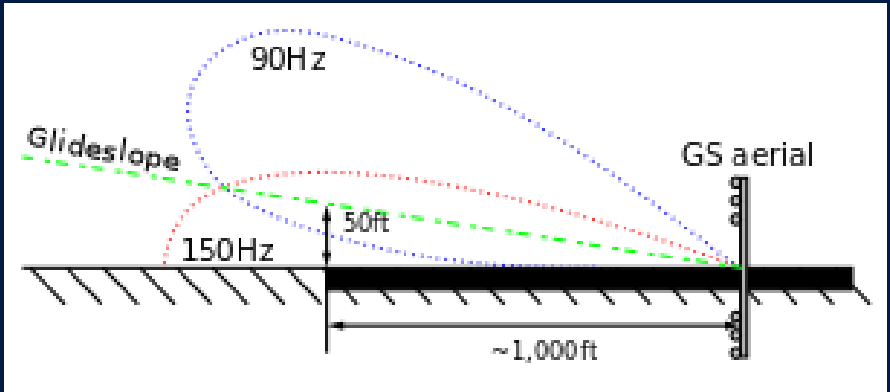




ILS GROUND CHECK – MONITORING GP ANGLE

- BVLOS conditions
- Absence of manned traffic within the airport
- Operations take place at night or within a dedicated “SPOT” coordinated with ATS and Apt. manager

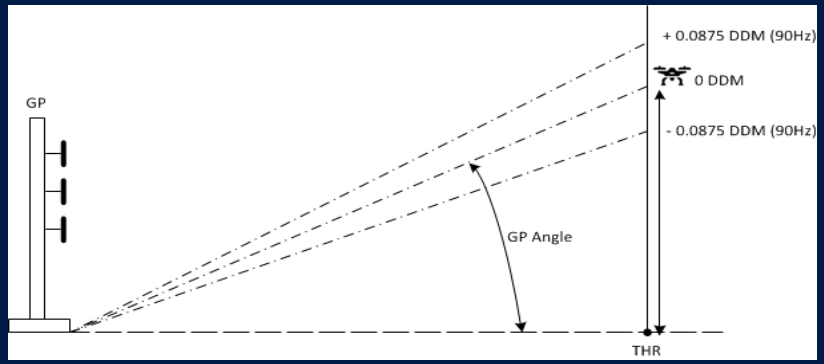
- Vertical flight profile to measure the ILS GP signal up to 25 m AGL
- Mission duration ~5 min

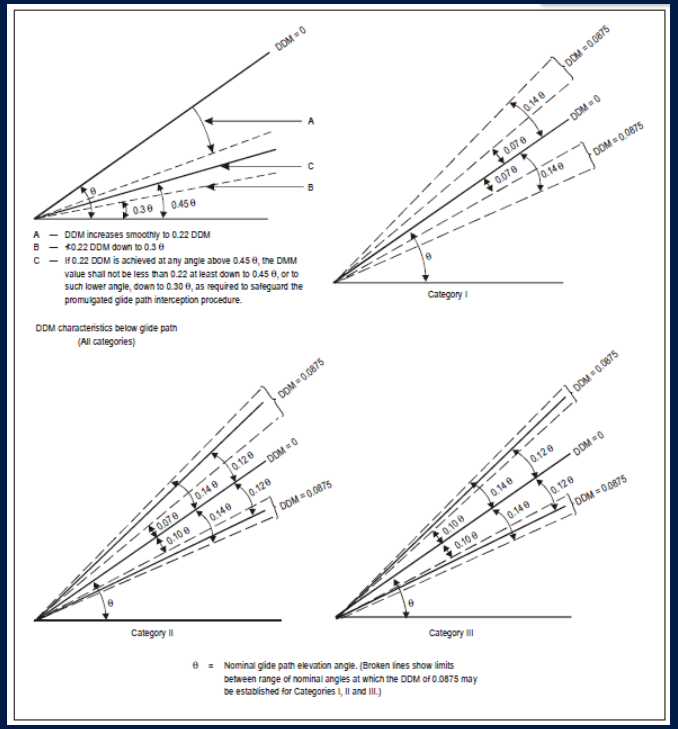


- Automatic flight trajectory over runway threshold

ILS GROUND CHECK – MONITORING GP ANGLE

- Static and dynamic analysis of GP signal, carried out raising the drone to a predetermined altitude on a fixed point. DDM analysis and its temporal stability at several altitudes of the runway perpendicular.
- Ensuring that the ILS signal-in-space performs within the specified tolerances according to ICAO rules (Annex 10 Vol I)
- Ground check compliant with ICAO Doc.8071 test procedures





ILS GROUND CHECK

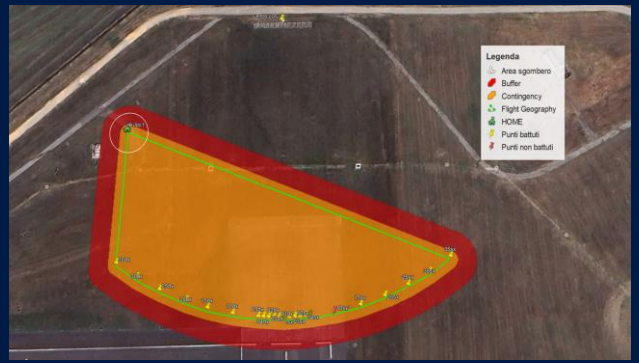
- BVLOS conditions
- Absence of manned traffic within the airport
- Operations take place at night or within a dedicated “SPOT” coordinated with ATS and apt. manager
- Mission duration ~5 min

LOC Sensitivity

- Flight along RWY THR from -107 m to 107 m
- Altitude 6-8 m AGL

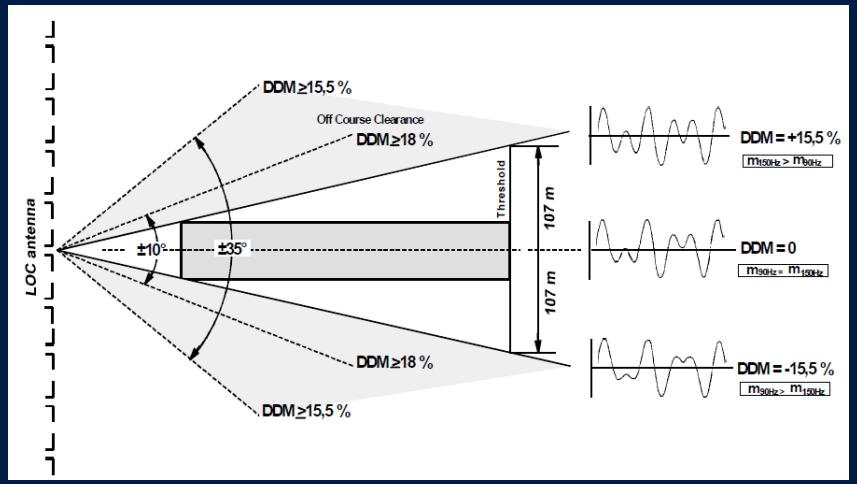
LOC Off-course clearance

- Flight along an arc of ±35° with a radius of 150 m from the center of the LOC antenna
- Altitude 6-8 m AGL



ILS GROUND CHECK - New Operational scenarios: LOC Displacement sensitivity & Off-course clearance

- Dynamic analysis to check that LOC signal-in-space (DDM) performs within the specified tolerances according to ICAO rules (Annex 10 Vol I)
- Ground check compliant with ICAO Doc.8071 test procedures



NAVAIDS GROUND CHECK WITH UAS IN ITALY BY TECHNO SKY
Fully automated solution with progress overview

- Techno Sky profile
- UAS fleet
- **NAVAIDS Ground Check**
  - Checks of equipment
  - Operational scenarios
  - **Description of the solution**
  - UAS solution benefits
- Progress overview and next steps

ILS GROUND CHECK

Description of the solution: flight planning software

GP Vertical profile:

- Real time measurements and computations
  - GP angle (DDM, MOD%,RF)
- Real time plot
- Automatic report

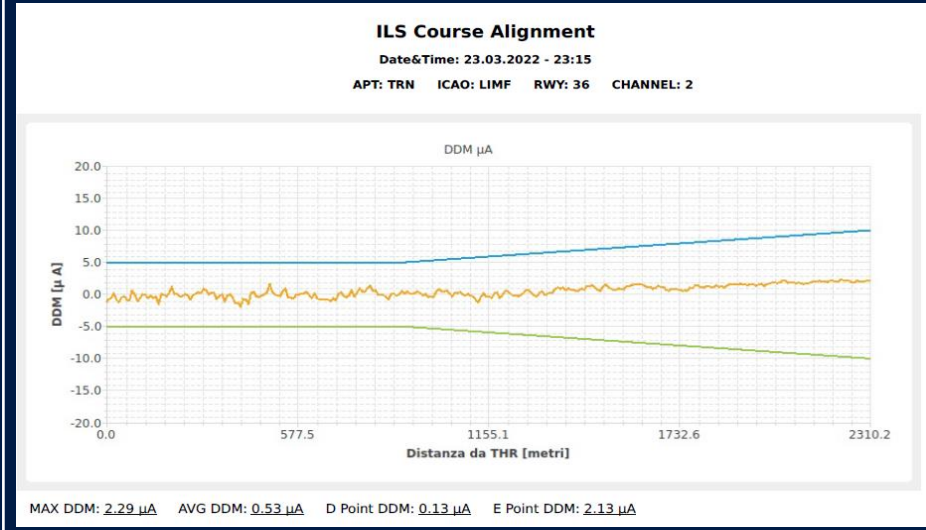
LOC profile:

- Real time measurements and computations
  - Course alignment, sensitivity and off-course clearance (DDM, SDM, MOD%, RF)
- Real time plot
- Automatic report

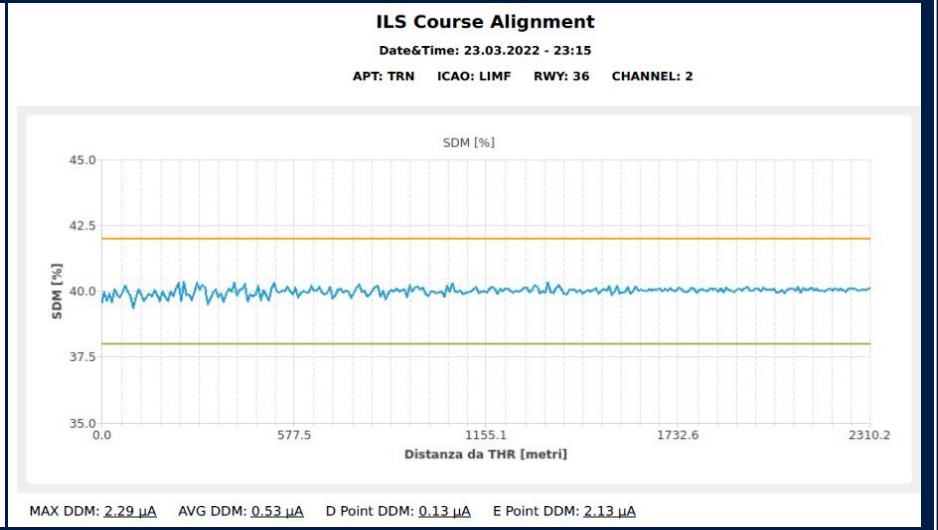
ILS GROUND CHECK

Description of the solution: Torino airport – LOC course alignment

AUTOMATIC REPORT: Difference in Depth of Modulation (DDM) trend analysis



AUTOMATIC REPORT: Sum of Modulation Depths (SDM) trend analysis

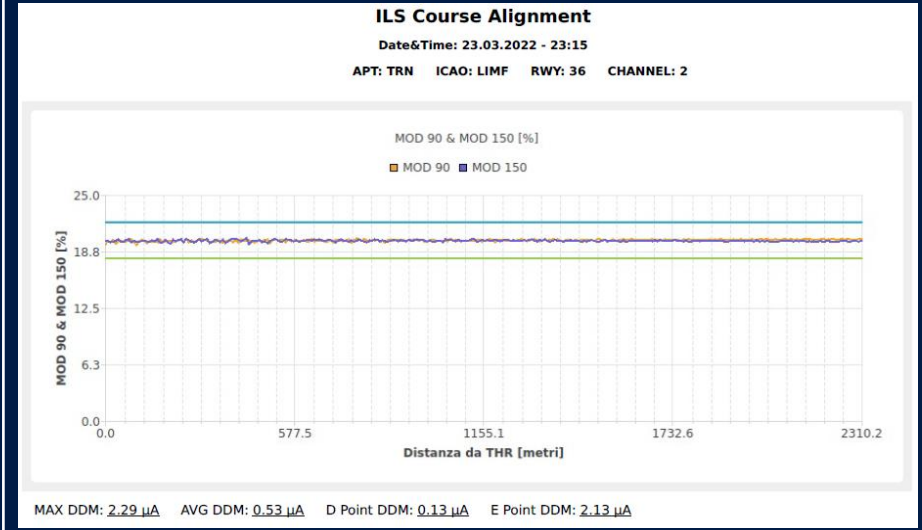


Weekly (CAT III)

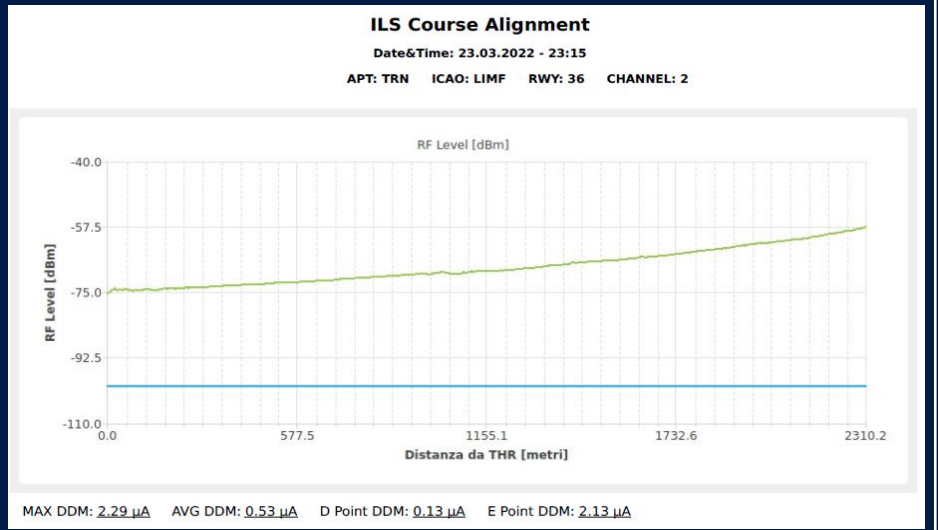
ILS GROUND CHECK

Description of the solution: Torino airport – LOC course alignment

AUTOMATIC REPORT : 90/150 Hz Modulations (MOD 90/150) trend analysis



AUTOMATIC REPORT : Measurement of electric field strength (RF) level analysis

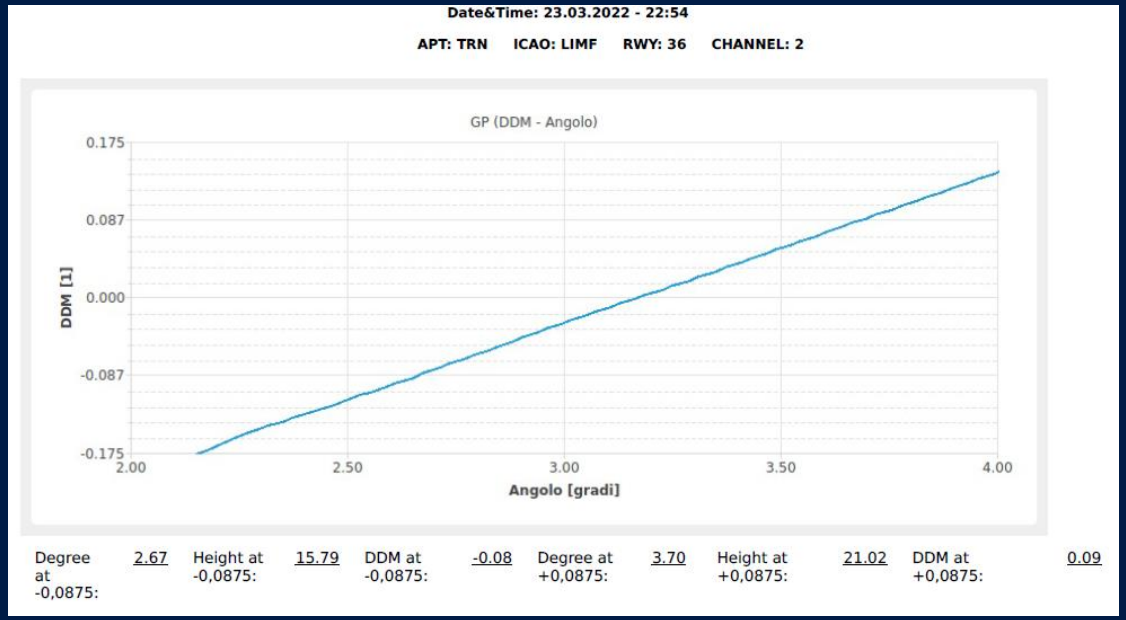


Weekly (CAT III)

ILS GROUND CHECK

Description of the solution: Torino airport – GP monitoring angle

AUTOMATIC REPORT : GP angle trend analysis

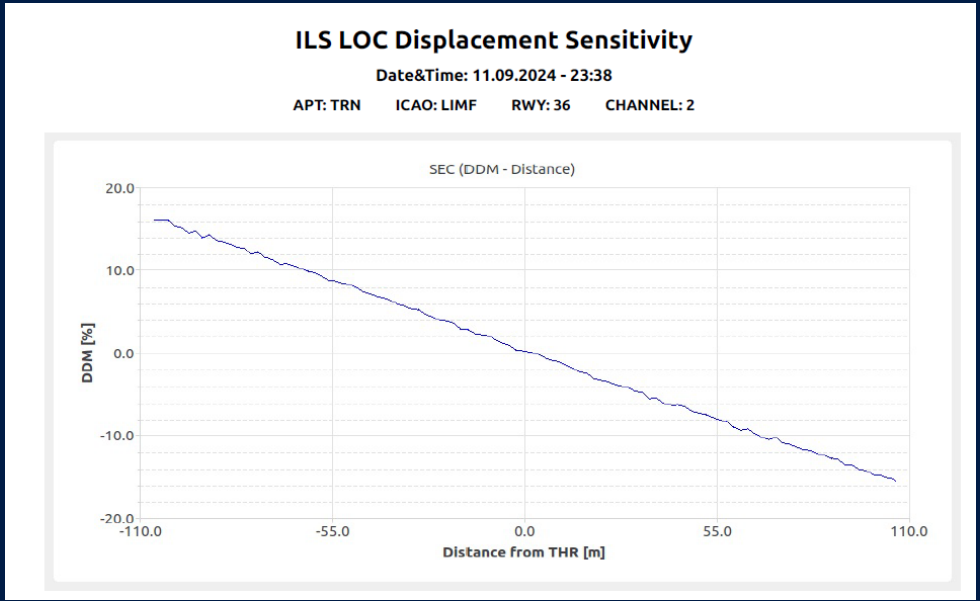


Monthly (CAT III)

ILS GROUND CHECK

Description of the solution: Torino airport - LOC sensitivity

AUTOMATIC REPORT : DDM trend analysis



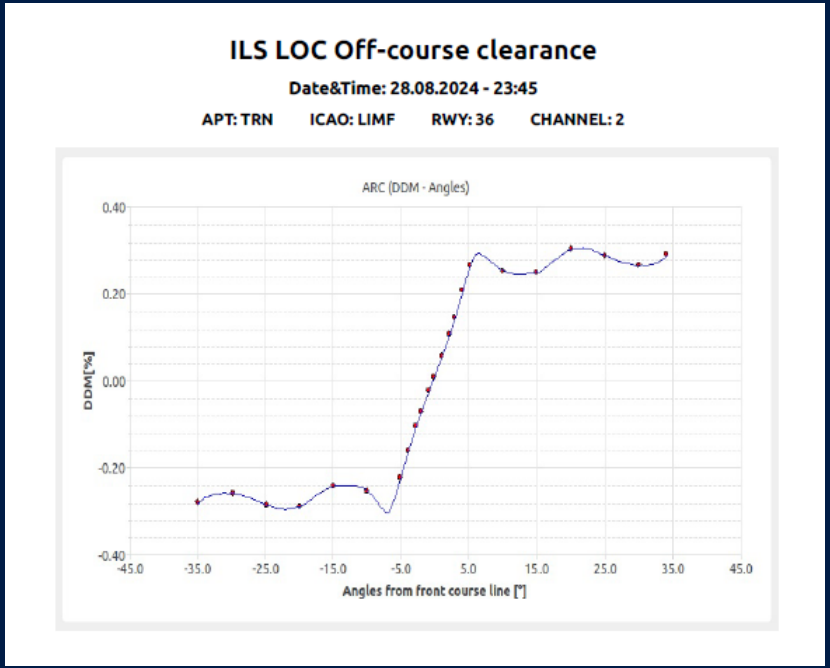
Monthly (CAT III)
Quarterly (CATII/I)

Item	Meas Value [%]
DDM at -107m:	16.08
DDM at 0m:	0.04
DDM at 107m:	-15.50

ILS GROUND CHECK

Description of the solution: Torino airport - LOC off course clearance

AUTOMATIC REPORT : DDM trend along the arc

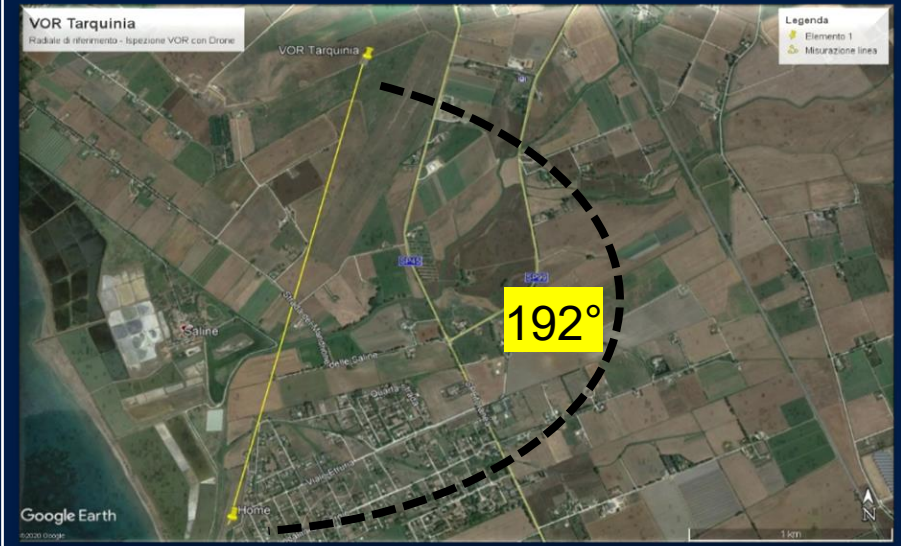


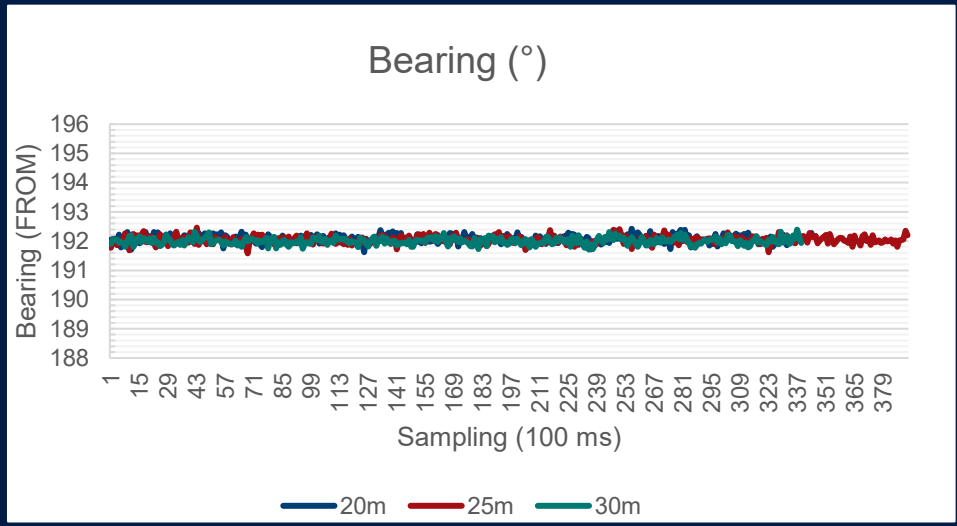
Quarterly (CAT I/II/III)

Item	Nom Value [%]	Min Value [%]	Meas Value [%]	Max Value [%]
DDM at -35.0° (distance = 150m):	≤ - 15.5	- 44.0	**-27.93**	- 15.5
DDM at -30.0° (distance = 150m):	≤ - 15.5	- 44.0	**-25.91**	- 15.5
DDM at -25.0° (distance = 150m):	≤ - 15.5	- 44.0	**-28.60**	- 15.5
DDM at -20.0° (distance = 150m):	≤ - 15.5	- 44.0	**-28.85**	- 15.5
DDM at -15.0° (distance = 150m):	≤ - 15.5	- 44.0	**-24.22**	- 15.5
DDM at -10.0° (distance = 150m):	≤ - 0.18	- 44.0	**-25.34**	- 18.0
DDM at -5.0° (distance = 150m):	N.A.	- 44.0	**-22.23**	0.0
DDM at -4.0° (distance = 150m):	N.A.	- 18.0	**-16.05**	0.0
DDM at -3.0° (distance = 150m):	N.A.	- 18.0	**-10.38**	0.0
DDM at -2.0° (distance = 150m):	N.A.	- 18.0	**-7.00**	0.0
DDM at -1.0° (distance = 150m):	N.A.	- 18.0	**-2.20**	0.0
DDM at 0.0° (distance = 150m):	0.0	- 1.5 I^ - 1.1 II^ - 0.45 III^	**0.92**	+ 1.5 I^ + 1.1 II^ + 0.45 III^
DDM at 1.0° (distance = 150m):	N.A.	0.0	**5.72**	+ 18.0
DDM at 2.0° (distance = 150m):	N.A.	0.0	**10.78**	+ 18.0
DDM at 3.0° (distance = 150m):	N.A.	0.0	**14.61**	+ 18.0
DDM at 4.0° (distance = 150m):	N.A.	0.0	**20.92**	+ 18.0
DDM at 5.0° (distance = 150m):	N.A.	0.0	**26.61**	+ 44.0
DDM at 10.0° (distance = 150m):	≥ + 0.18	+ 18.0	**25.27**	+ 44.0
DDM at 15.0° (distance = 150m):	≥ + 15.5	+ 15.5	**25.01**	+ 0.44
DDM at 20.0° (distance = 150m):	≥ + 15.5	+ 15.5	**30.43**	+ 0.44
DDM at 25.0° (distance = 150m):	≥ + 15.5	+ 15.5	**28.80**	+ 0.44
DDM at 30.0° (distance = 150m):	≥ + 15.5	+ 15.5	**26.64**	+ 0.44
DDM at 35.0° (distance = 150m):	≥ + 15.5	+ 15.5	**29.18**	+ 0.44

NAVAIDS GROUND CHECK

Description of the solution: VOR analyzer





NAVAIDS GROUND CHECK WITH UAS IN ITALY BY TECHNO SKY

Fully automated solution with progress overview

- Techno Sky profile
- UAS fleet
- **NAVAIDS Ground Check**
  - Checks of equipment
  - Operational scenarios
  - Description of the solution
  - **UAS solution benefits**
- Progress overview and next steps

ILS GROUND CHECK

UAS solution advantages

- Less expensive than current measurements vehicle
- «Green» solution
- Shorter preparation activity
- Possibility of quickly clearing the runway in case of emergency
- Quality of the measurements improved due to the higher flexibility of the drone
- Low maintenance and running costs
- Better correlation with flight inspection data for overall optimization of ILS

NAVAIDS GROUND CHECK WITH UAS IN ITALY BY TECHNO SKY
Fully automated solution with progress overview

- Techno Sky profile
- UAS fleet
- NAVAIDS Ground Check
  - Checks of equipment
  - Operational scenarios
  - Description of the solution
  - UAS solution benefits
- **Progress overview and next steps**

PROGRESS OVERVIEW AND NEXT STEPS

- Fleet increasing by at least 30 additional units and over 150 certified remote pilots in 2026
- Operations at airports with multiple runways (Milano Malpensa and Roma Fiumicino)
- Simultaneous operations at large airports following successful demo at Treviso (November 2024)

ILS Ground check List of airports	Progress status
Torino	Operational
Milano (Linate)	Operational
Venezia	Operational
Brescia	Operational
Verona	Operational
Bergamo	Q1 2026
Bologna	Q2 2026

Check of Aerodrome Infrastructures List of airports	Progress status
Olbia	Nov. 2023-Jan. 2024
Salerno	Nov. 2023
Milano (Linate)	Dec. 2023- March 2024
Pantelleria	January 2024
Roma Ciampino	March-May 2024
Treviso	Oct. 2022- March 2024
Forli	June 2024
Milano (Malpensa)	Q4 2025

PROGRESS OVERVIEW AND NEXT STEPS

Drones upgrade (Q4 2025)

- Improved layout
- Increased flight autonomy
- Enhanced HW/SW architecture
- LTE connection
- Class identification label C6,C5 and C3 (EU regulation 945/2019)

Next goals (2026)

- EVTOL for extending ILS measurement
- LUC certiticate

PROGRESS OVERVIEW AND NEXT STEPS

Docking station

- Drone always ready to use
- Automatic battery recharging system
- Automatic precision landing system
- Equipped with an internal air conditioning system

Final test successfully executed in March 2024

PROGRESS OVERVIEW AND NEXT STEPS

Drone Operation Center

- UAS command and control from any location thanks to the use of LTE technology
- LTE operator redundancy for highest safety level
- Command and control of a UAS fleet located anywhere

THANK YOU!