Mattijs HERTSENS
Hervé DEMULE
Airspace World, 14 May 2025

# Setting New Measurement Standards with the CNS Drone SkyRF®

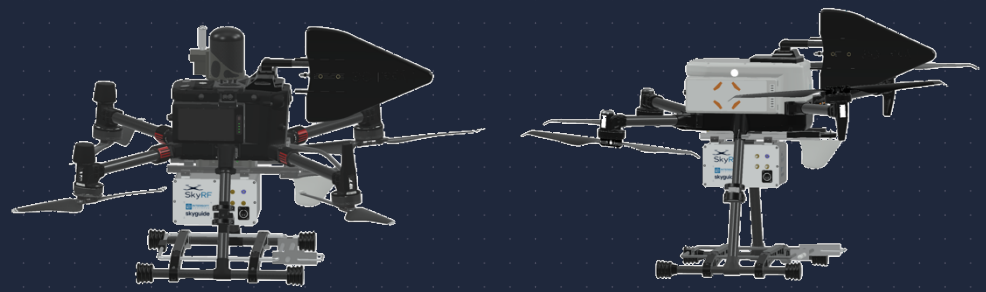
# Agenda

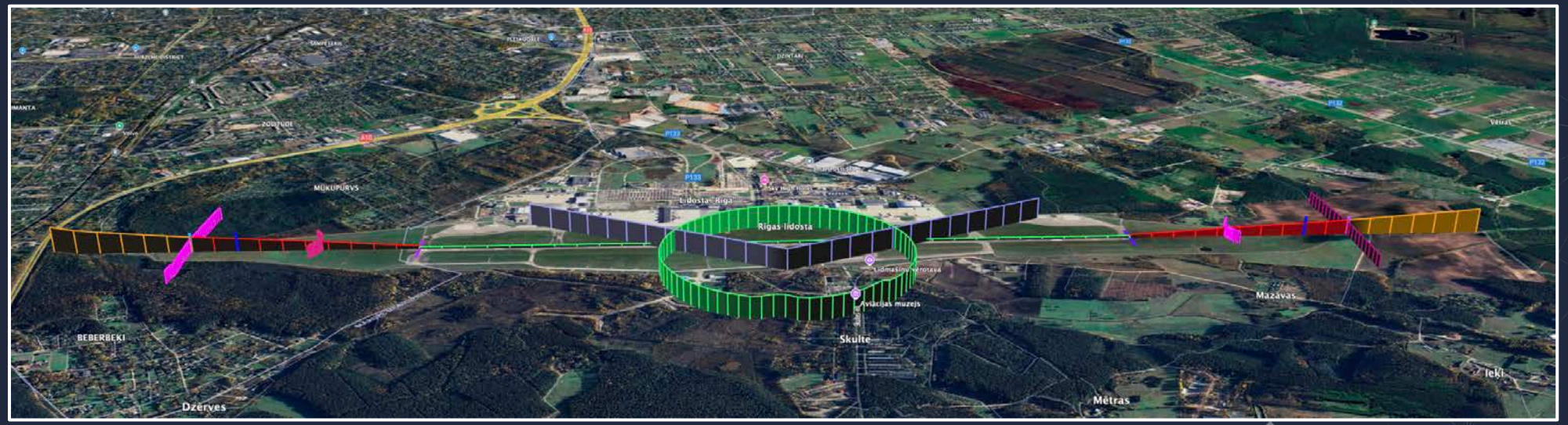
[15min] New Measurement Standards
- › Our Experience
- › Expanding area of activity
- › Latest improvements

[5min] VOR / DME Drone Check Demo

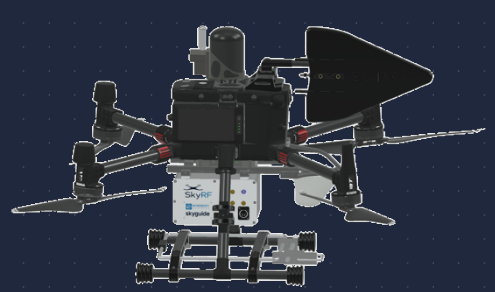
[5min] Q&A

- Platforms DJI M350 – IF800 – IF1200A
- Product vs Service
- CNS
- Prepare > Measure > Analyse > Solution

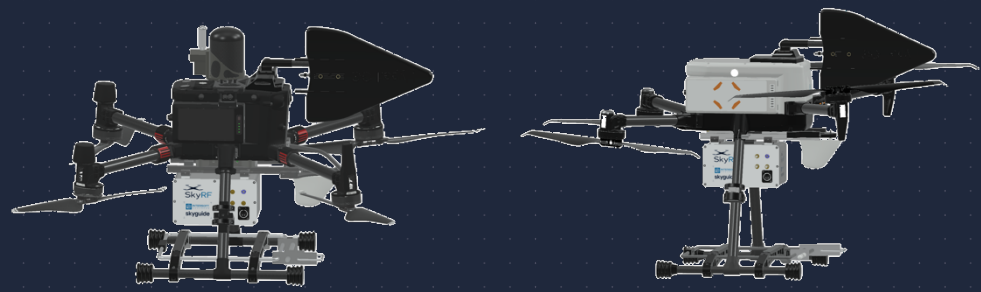


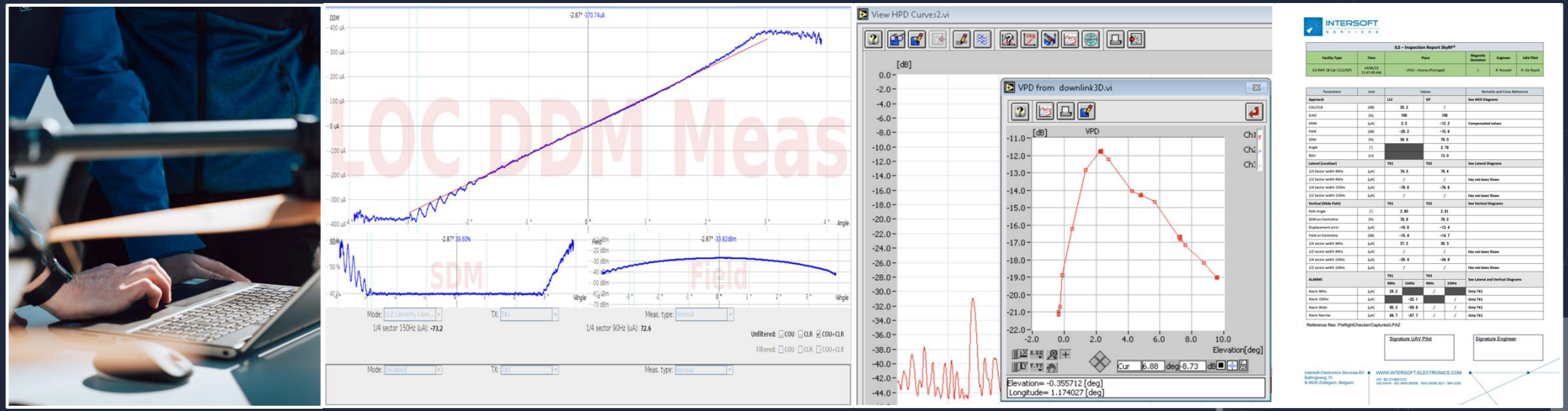


- Platforms DJI M350 – IF800 – IF1200A
- Product vs Service
- CNS
- Prepare > Measure > Analyse > Solution

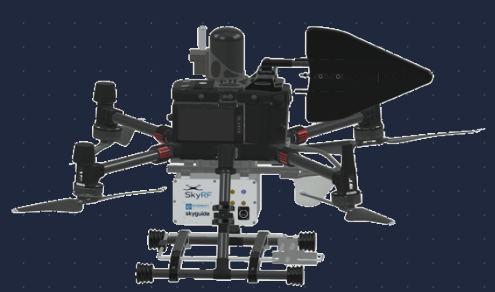


- Platforms DJI M350 – IF800 – IF1200A
- Product vs Service
- CNS
- Prepare > Measure > Analyse > Solution





- Platforms DJI M350 – IF800 – IF1200A
- Product vs Service
- CNS
- Prepare > Measure > Analyse > Solution



# Expanding area of activity

- Operational Systems and demonstrations
  - 🇨🇭 Skyguide, Switzerland
  - 🇧🇪 Skeyes and BAF, Belgium
  - 🇦🇪 DANS, Dubai
  - 🇵🇹 Nav, Portugal
  - 🇪🇸 ENAIRE, Spain
  - 🇺🇸 FAA and USAF, United States
  - 🇩🇪 Friedrichshafen and Kaufbeuren, Germany
  - 🇦🇺 DHMI, Turkey
  - 🇹🇷 Malaysia
- Ongoing Projects
  - 🇱🇻 LGS, Latvia
  - 🇵🇱 PANSA, Poland
  - 🇧🇦 BHANSA, Bosnia and Herzegovina

# Expanding area of activity

skyguide INTERSOFT SERVICES SkyRF

SkyRF skyguide INTERSOFT SERVICES

# Expanding area of activity > SkyRF in Action



INTERSOFT SERVICES

**ILS – Inspection Report SkyRF®**

| Facility Type | Time | Place | Magnetic Deviation | Engineer | UAV Pilot |
|---|---|---|---|---|---|
| ILS RWY 18 Cat I (LLZ/GP) | 14/06/23 11:47:00 AM | LPAZ – Azores (Portugal) | / | R. Rosseel | D. De Ruyck |

| Parameters | Unit | Values | | Remarks and Cross Reference |
|---|---|---|---|---|
| **Approach** | | LLZ | GP | See AXIS Diagrams |
| COU/CLR | [dB] | 25.2 | / | |
| ICAO | [%] | 100 | 100 | |
| DDM | [µA] | 2.5 | -12.2 | |
| Field | [dB] | -20.2 | -15.9 | |
| SDM | [%] | 39.9 | 79.0 | |
| Angle | [°] | | 2.78 | |
| RDH | [m] | | 13.0 | |
| **Lateral (Localizer)** | | TX1 | TX2 | |
| 1/4 Sector width 90Hz | [µA] | 74.3 | 76.4 | |
| 1/2 Sector width 90Hz | [µA] | / | / | |
| 1/4 Sector width 150Hz | [µA] | -76.9 | -76.6 | |
| 1/2 Sector width 150Hz | [µA] | / | / | |
| **Vertical (Glide Path)** | | TX1 | TX2 | |
| Path Angle | [°] | 2.80 | 2.81 | |
| SDM on Centreline | [%] | 78.9 | 79.2 | |
| Displacement error | [µA] | -10.9 | -13.4 | |
| Field on Centreline | [dB] | -15.4 | -14.7 | |
| 1/4 sector width 90Hz | [µA] | 37.2 | 36.3 | |
| 1/2 sector width 90Hz | [µA] | / | / | |
| 1/4 sector width 150Hz | [µA] | -35.4 | -34.9 | |
| 1/2 sector width 150Hz | [µA] | / | / | |

| ALARMS | | TX1 | | TX2 | |
|---|---|---|---|---|---|
| | | 90Hz | 150Hz | 90Hz | 150Hz |
| Alarm 90Hz | [µA] | 29.2 | | / | |
| Alarm 150Hz | [µA] | | -25.1 | | / |
| Alarm Wide | [µA] | 65.3 | -59.8 | / | / |
| Alarm Narrow | [µA] | 84.7 | -87.7 | / | / |

Reference files: PreflightChecker/Captures/LPAZ

Signature UAV Pilot

INTERSOFT SERVICES

**DME/(D)CVOR – Inspection Report SkyRF®**

| Facility Type | Time | Place | Magnetic Deviation | Engineer | UAV Pilot |
|---|---|---|---|---|---|
| DME-DVOR | 18/03/24 14:33:00 PM | PAS – Zurich (Switzerland) | / | R. Rosseel | D. De Ruyck |

| Parameters | Unit | Values | | Remarks and Cross Reference |
|---|---|---|---|---|
| **Radial CVOR** | | TX1 | TX2 | See RADIAL Diagrams |
| Measured Direction | / | From the VOR | / | Only TX1. |
| Azimuth Error | [°] | -0.9 | / | Mean value, only TX1. |
| AM Mod 30Hz | [%] | 30.1 | / | Only TX1. |
| AM Mod 9960Hz | [%] | 34.3 | / | Only TX1. |
| **Orbit CVOR** | | TX1 | TX2 | See ORBIT Diagrams |
| Measured Direction | / | Clockwise | / | Only TX1. |
| Azimuth Error | [°R] | -1.3 | / | Mean value, only TX1. |
| AM Mod 30Hz | [%] | 30.1 | / | Only TX1. |
| AM Mod 9960Hz | [%] | 32.3 | / | Only TX1. |

| Parameters | Unit | Values | | Remarks and Cross Reference |
|---|---|---|---|---|
| **Radial DME** | | TX1 | TX2 | See RADIAL Diagrams |
| Measured Direction | / | From the VOR | / | Only TX1. |
| Range Error | [m] | 11.5 | / | Only TX1. |
| Reply Rate | [%] | 82.7 | / | Only TX1. |
| Field | [dB] | -32.3 | / | Only TX1. |
| **Orbit DME** | | TX1 | TX2 | See ORBIT Diagrams |
| Measured Direction | / | Clockwise | / | Only TX1. |
| Range Error | [m] | 16.2 | / | Only TX1. |
| Reply Rate | [%] | 79.1 | / | Only TX1. |
| Field | [dB] | -37.1 | / | Only TX1. |

Reference files: VOR DME DroneChecker/Captures/PAS

Signature UAV Pilot

Signature Engineer

Intersoft Electronics Services BV
Ballingsweg 15
B-9620 Zottegem, Belgium

WWW.INTERSOFT-ELECTRONICS.COM
VAT BE 0740951533
ING BANK - BIC BBRUBEBB - IBAN BE89 3631 1864 5285

# Expanding area of activity > SkyRF in Action

skyguide INTERSOFT SERVICES SkyRF

INTERSOFT SERVICES SkyRF

**PAPI REPORT**
**2025-05-06**

## Inspection Information

| | | | |
|---|---|---|---|
| Airport | Friedrichshaven | FDH | EDNY |
| Inspection Type | PAPI Inspection | Inspection Date | 06/05/2025 |
| Runway | 06 | PAPI Installation | 06 |
| Drone Pilot | Mattijs Hertsens | Pilot ID | KZIY32DJ45FJIVG |
| Drone Type | M350 RTK | Drone Serial Number | KHY-345-GER-EFR |
| Facility Technician | Samy Kramer | Results | PASS |

## Inspection Results

### Vertical

| | A | B | C | D |
|---|---|---|---|---|
| Nominal | 2.5 | 2.83 | 3.17 | 3.5 |
| Light Angle | 2.52 | 2.80 | 3.15 | 3.48 |
| Correction | +0.02 | -0.03 | -0.02 | -0.02 |
| Relative Brightness | 249 | 251 | 251 | 248 |

### Horzizontal

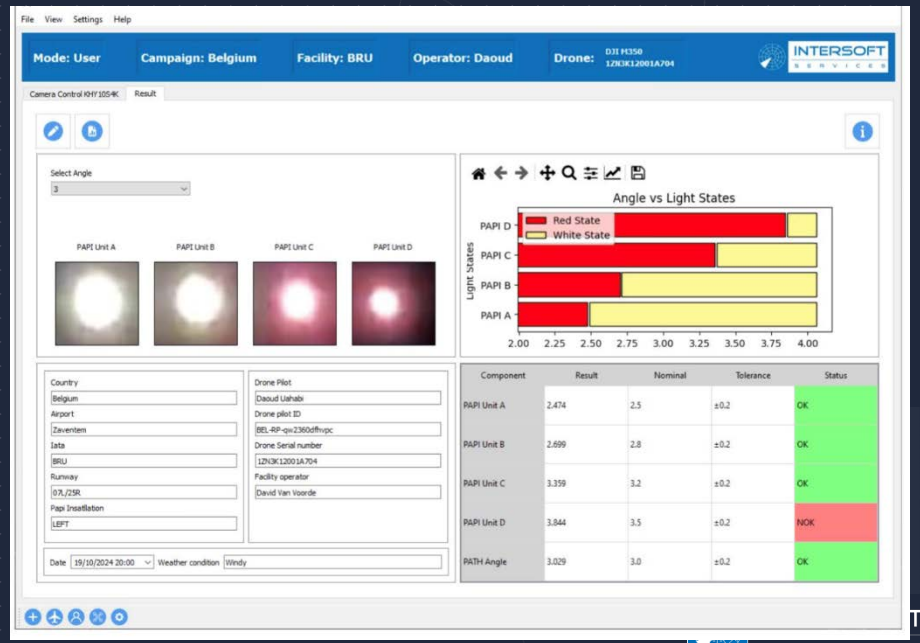
| | Angle |
|---|---|
| Minimum | -11.71 |
| Maximum | +11.80 |

| Signature | Note |
|---|---|
| | |

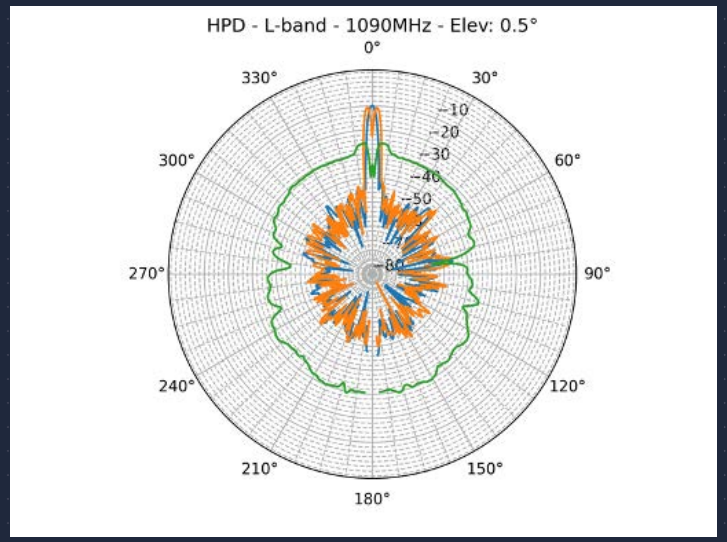
Intersoft Electronics Services BV
Ballingsweg 15
B-9620 Zottegem, Belgium

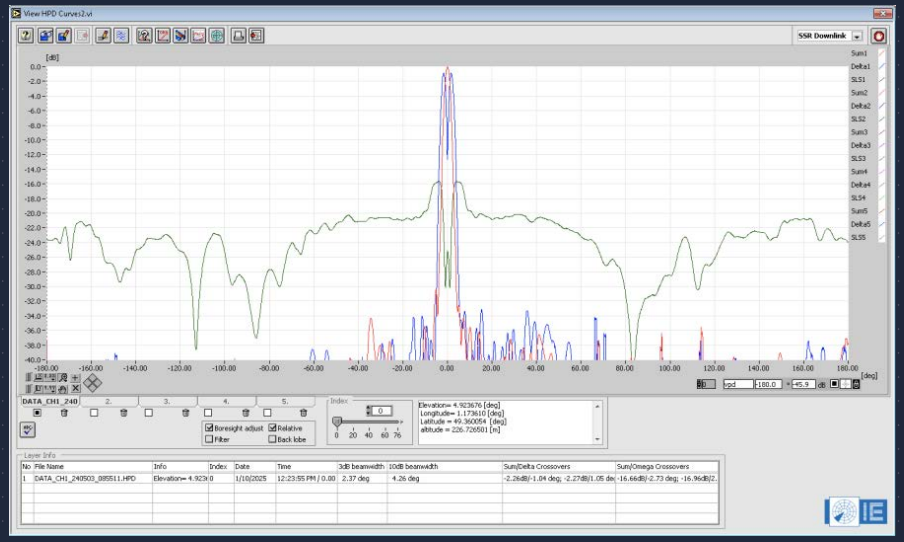
WWW.INTERSOFT-ELECTRONICS.COM
VAT BE 0749651533
ING BANK - BIC BBRUBEBB - IBAN BE89 3631 1864 5285

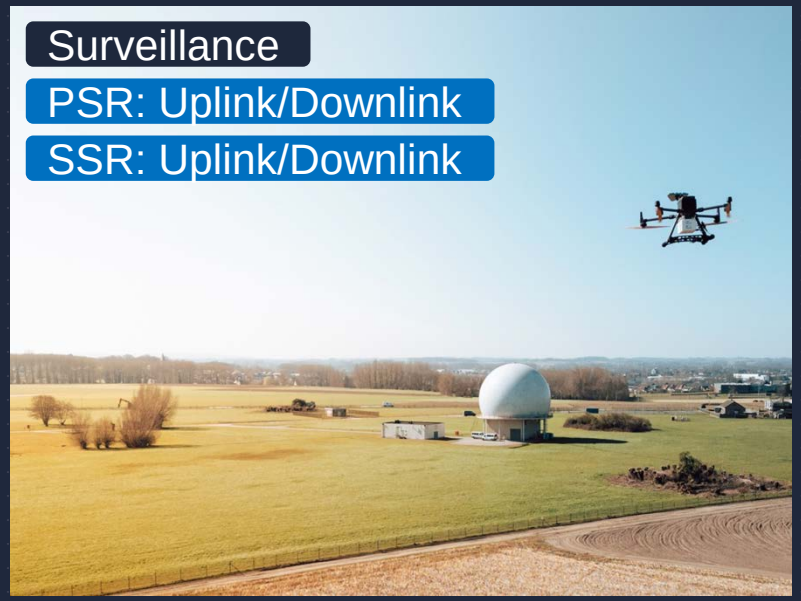

- Facility
- Drone Pilot
- Drone



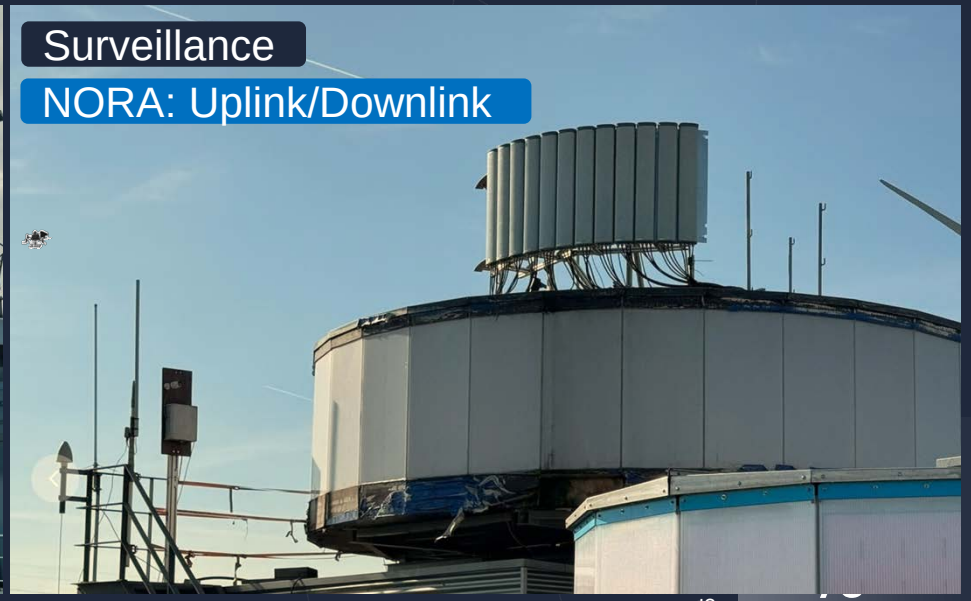
# Expanding area of activity > SkyRF in Action





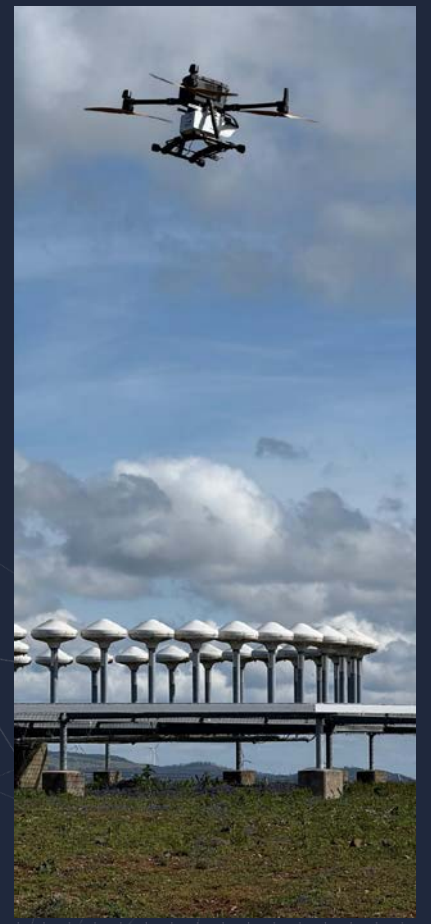


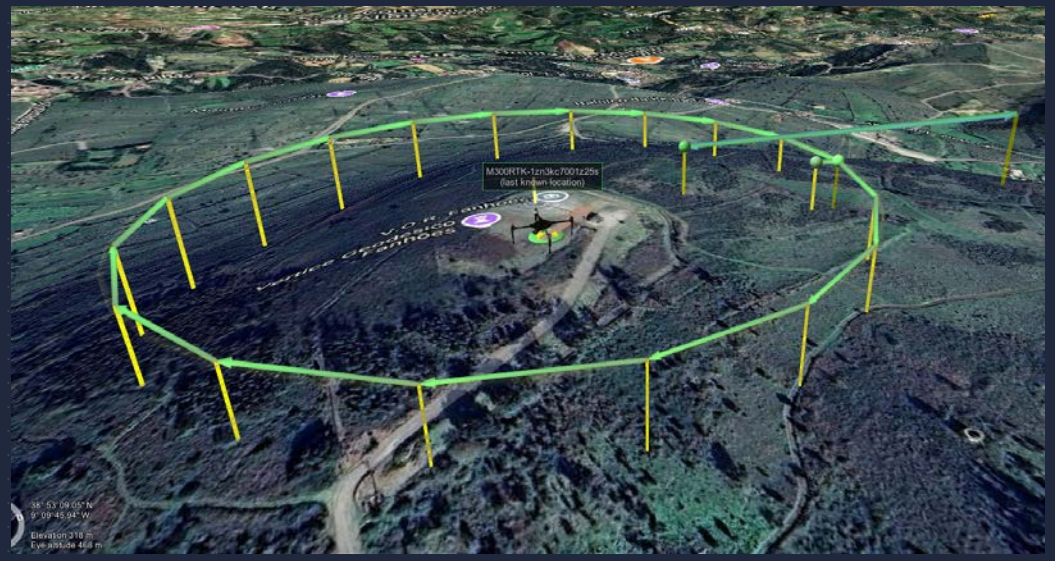


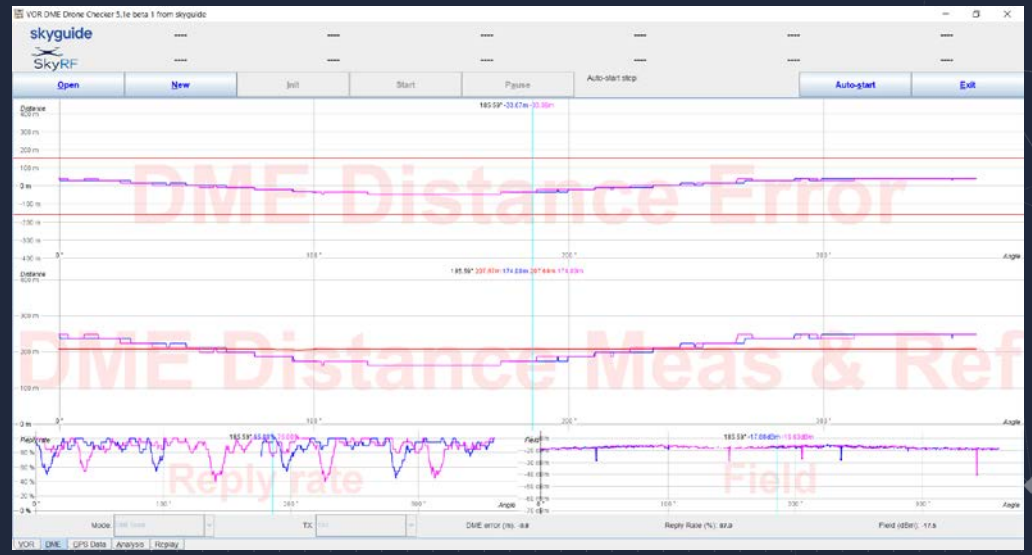
- Upcoming
  - BVLOS
  - GNSS Denied Environment
  - Improved PRI and SEC Target Generation
- Improvements
  - Surveillance: up to 18GHz
  - PAPI: Live Result Monitoring and post-processing
  - ILS/DME and VOR/DME Drone Checker Software improvements
  - Systematic DME measurements in parallel

- Finance: 50% flight check aircraft cost reduction
- Real-time: Live Results
- Safety and Capacity: Less operational disturbance of air traffic
- Environment: less $CO_2$ emission and noise disturbance
- Maturity: Operationally proven solution for more than 7 years
- CNS: Measures signal in space for the complete CNS domain

- Orbit and Radial flights
- Simultaneous VOR / DME
- Excellent repeatibility
  - VOR error = 0.5°
  - DME error = -1 m







Q&A

# Thank you for your attention!

**Skyguide**
sales@skyguide.ch

Booth H1340
At 4PM: Swiss Apero

**Intersoft**
support@intersoft-electronics.com

Booth H1530
Now: Petiscos and Portuguese wine