

TAKING HELICOPTER FLIGHT SAFETY TO THE NEXT LEVEL



© Airbus Helicopters + PAD (Production Autrement Dit)

Airbus Helicopters chooses the Rohde & Schwarz GNSS test setup based on the R&S®SMBV100A vector signal generator as the ideal high-performance hardware-in-the-loop (HiL) simulator solution.

At a glance

In their constant endeavors to enhance helicopter flight safety, Airbus wanted to implement localizer performance with vertical guidance (LPV) approach procedures to allow a safe approach at small airports or heliports without the need for a ground infrastructure. This has clear applications in various emergency rescue operations and oil platform or military-related missions. Airbus selected Rohde & Schwarz as a suitable GNSS vendor who fully supports the hardware-in-the-loop (HiL) testing method and also offers unique industry-leading products, excellent solution competency and first-class customer support.

Summary

- ▶ **Customer:** Airbus Helicopters SAS, Marignane, France
- ▶ **Task:** Implementation of LPV approach procedures on their helicopters
- ▶ **Challenge:** GNSS testing simulation with full support for hardware-in-the-loop (HiL) testing method
- ▶ **Product:** R&S®SMBV100A vector signal generator and GNSS simulator
- ▶ **Key benefits:** Full real-time remote control and easy integration into HiL environment, excellent price/performance ratio, quality of support services, free software updates

Case Study | Version 02.00

ROHDE & SCHWARZ

Make ideas real





© Airbus Helicopters + PAD (Production Autrement Dit)

About Airbus Helicopters SAS

As an international pioneer in the aerospace sector, Airbus offers a variety of helicopter types capable of operating in demanding environments and weather conditions, serving commercial, government, military and law enforcement customers worldwide. From design and engineering to production and in-flight operations, Airbus is dedicated to enhancing the safety and security of flight operations for all helicopter types, quickly addressing the latest requirements and developments in this field.

To assure safety in take-off, landing and lower airspace flight situations, Airbus utilizes modern aviation instrument approach procedures such as localizer performance with vertical guidance (LPV). This procedure uses the highly accurate geopositioning data offered by GNSS together with a wide area augmentation system (WAAS), making it an ideal solution for flying in low visibility conditions without any ground support. This procedure enables aircraft to perform safely even in the most demanding scenarios, such as emergency rescue operations and oil platform or military missions.

“The R&S®SMBV100A is a very versatile and powerful tool. The support Rohde & Schwarz provided to fine tune the vector signal generator to our needs was awesome. We now have an affordable solution to test LPV approaches with hardware in the loop (HiL) at all our test benches.”

Ramiro Rodriguez, Expert in Avionic Integration Means,
Airbus Helicopters S.A.S.

Background

The International Civil Aviation Organization (ICAO) has created a set of new performance based navigation (PBN) guidelines. With the aim of enhancing operational safety in critical situations such as take-offs, landing approaches and poor visibility flights in lower airspace, the agency promotes the use of a localizer performance with vertical guidance (LNAV/LPV) satellite based augmentation system (SBAS). This instrument based landing system procedure can work without any help from the ground infrastructure, ultimately decreasing costs. The ICAO has created a rollout plan for the deployment and certification of such SBAS procedures.

In accordance with ICAO guidelines, the European Aviation Safety Agency (EASA) has implemented regulatory procedures for certifying these new navigation systems in modern helicopter designs. In order to integrate LPV systems into the helicopter avionics design, Airbus has created a series of sophisticated test procedures to prove full functionality under the relevant EASA regulations.

Test procedure

Before testing LPV approach procedures in real flight, initial assessments are made using simulated signals on the helicopter test system – a specially prepared rig with a full-featured avionics system that includes the flight management system (FMS) and automatic flight control systems (AFCS) with all relevant actuators and sensors. While actual flight testing is an essential milestone for obtaining final certification, rig testing is beneficial because the prototype’s functionality, performance and failure handling can be systematically monitored under controlled, reproducible and safe conditions.

Solution

Rohde&Schwarz was selected by Airbus after an extensive search for a suitable GNSS vendor who offers full support for the HiL testing methodology. The two companies enjoy a longstanding cooperation. Airbus selected the R&S®SMBV100A vector signal generator and GNSS simulator as the ideal HiL testing solution.

The R&S®SMBV100A offers real-time remote control and can be easily integrated into a dynamic HiL environment. The HiL simulator was used to supply metrics such as position coordinates, kinetic parameters and vehicle attitude information to the R&S®SMBV100A, which then updates the simulated receiver movement in real time.

The R&S®SMBV100A is connected to the helicopter antenna input where it feeds in the GNSS signal for the satellite based augmentation system (SBAS).



R&S®SMBV100B vector signal generator

Continuing the success story of the well-known R&S®SMBV100A, Rohde & Schwarz has introduced the compact midrange vector signal generator R&S®SMBV100B. As the direct successor, it supports all functionality of the R&S®SMBV100A and introduces new class-defining standards for outstanding spectral purity, unprecedented output power and easy, intuitive touchscreen operation. Always in line with the latest specifications of major digital communications standards such as 5G NR, LTE and WLAN, the R&S®SMBV100B is the preferred test solution for receiver and component characterization. The R&S®SMBV100B can be equipped with a multitude of GNSS options, turning the instrument into a reliable, full-featured GNSS simulator. Thanks to its advanced simulation capabilities, realistic and complex yet repeatable GNSS scenarios can be run under controlled conditions.

The Rohde & Schwarz vector signal generator executes the position attitudes calculated by the FMS based on the desired helicopter flight plan. The GNSS receiver then calculates the position, which is fed back to the FMS, determining the next flight point, and the loop continues.

To ensure a consistent series of test simulations in order to verify requirements such as a vertical alert limit (VAL) at 12 m (40 ft), it was essential for the simulation solution to repeatedly obtain the required GNSS signal with high precision and minimum deviation over the span of several hours. The R&S®SMBV100A successfully completed this task, effectively demonstrating the instrument's full strength and performance.

Customer benefits

Excellent performance at an affordable price made the R&S®SMBV100A the ideal candidate instrument, providing timely R&D support to Airbus engineers.

The Rohde & Schwarz high-quality support service featuring e.g. free firmware updates makes sure that Airbus engineers will stay at the cutting edge of technological advancements for many years to come.

With a globe-spanning network of subsidiaries, Rohde & Schwarz experts are always close to their customers and partners. Pairing these experts with excellent instrument performance and reliable long-term support services has allowed Airbus to follow ambitious development roadmaps and reduce costs and risks at the same time.

Service that adds value

- ▶ Worldwide
- ▶ Local und personalized
- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

Sustainable product design

- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
- ▶ Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

Certified Environmental Management

ISO 14001

Rohde & Schwarz training

www.training.rohde-schwarz.com

Rohde & Schwarz customer support

www.rohde-schwarz.com/support

