WIDE AREA MULTILATERATION
A MULTITUDE OF ANTENNAS INSTEAD OF RADAR DISHES

GÖTZ ARDEY HEAD OF COMMUNICATION, NAVIGATION AND SURVEILLANCE SERVICES

Götz Ardey is an engineer with a doctorate in aerospace sciences from the University of Braunschweig, Germany, and an MBA from Cranfield UK. He joined skyguide in 2012 and is currently head of the Communication, Navigation and Surveillance division (CNS Services). As such, he is responsible for implementing the Wide Area Multilateration technology (WAM), which will replace the conventional secondary Radar technology in civil aviation. As Ardey explains, "WAM constitutes a surveillance solution superior to Radar in respect of cost and performance."

SKYGUIDE **First, could you explain what Multilateration is?**

GÖTZ ARDEY Multilateration is a proven surveillance technology consisting of a network of antennas connected to a central processing and tracking system that can determine positions of aircraft equipped with a transponder. Widely adopted for airport ground surveillance, a number of implementations for coverage of larger airspaces have been achieved in the last years across several ANSPs, to complete but also to replace conventional secondary Radar.

For which reason is skyguide replacing conventional Radar with WAM technology?

GA Secondary Radars represent a mature and robust technology that is in use for surveillance purposes all over the world. However, the technology has properties that can turn into advantages or disadvantages, highly depending on the kind of deployment of the Radar. For example, since Radar signals behave like normal light, they can be blocked or reflected by obstacles. With mountains and lakes, Switzerland presents a very demanding geographical environment and requires a relatively large number of expensive Radars in order to cover its airspace. WAM works with a larger network of small antennas distributed in valleys and on the mountains. Therefore, they light up the airspace in a more efficient and flexible way: WAM constitutes a surveillance solution for skyguide superior to Radar in respect of cost and performance.

Why is the WAMS.CH programme needed to introduce WAM technology?

GA This transformation of technologies will take some years and will have to follow and adapt to possibly changing targets and constraints. A single project setup embracing such dimensions and uncertainties would be very difficult to manage. The WAMS.CH programme is suitable for supporting the WAM implementation and related projects and ensuring that at the end, these will deliver the expected results.

What are the main steps of this programme?

GA The deployments will have to be completed before the legacy Radars come to their end of life, including a period of parallel operation to ensure accuracy and stability of the WAM system. First, we will deploy WAM for the need of the coverage of the terminal control areas of Zurich and Geneva until 2020. The rest of Switzerland will follow until 2022. Other projects may then be considered to exploit the WAM capabilities for new functionalities and demands. Apart from the Multilateration, the programme will also facilitate the use of Automatic Dependent Surveillance - Broadcast (ADS-B).

Why invest in WAM instead of jumping directly to the more advanced ADS-B?

G A The ADS-B system is expected to become a major surveillance technology for civil use worldwide. This technology relies essentially on satellite based navigation systems, which allow aircraft equipped with dedicated transponders to broadcast their position and other data. This means that the determination of the aircraft's position depends on the aircraft's own avionics. Although ADS-B will become mandatory in Europe and the US by June 2020, exemptions and exceptions (e.g. military aircraft, old and ferry flights) will limit the use of ADS-B. In order to ensure coverage of all traffic, the need for surveillance systems will still exist. WAM is a suitable solution to prepare for ADS-B: every single Multilateration sensor is de-facto an ADS-B receiver. By implementing WAM, a network of ADS-B coverage stations will be available, creating the opportunity to implement ADS-B in parallel.

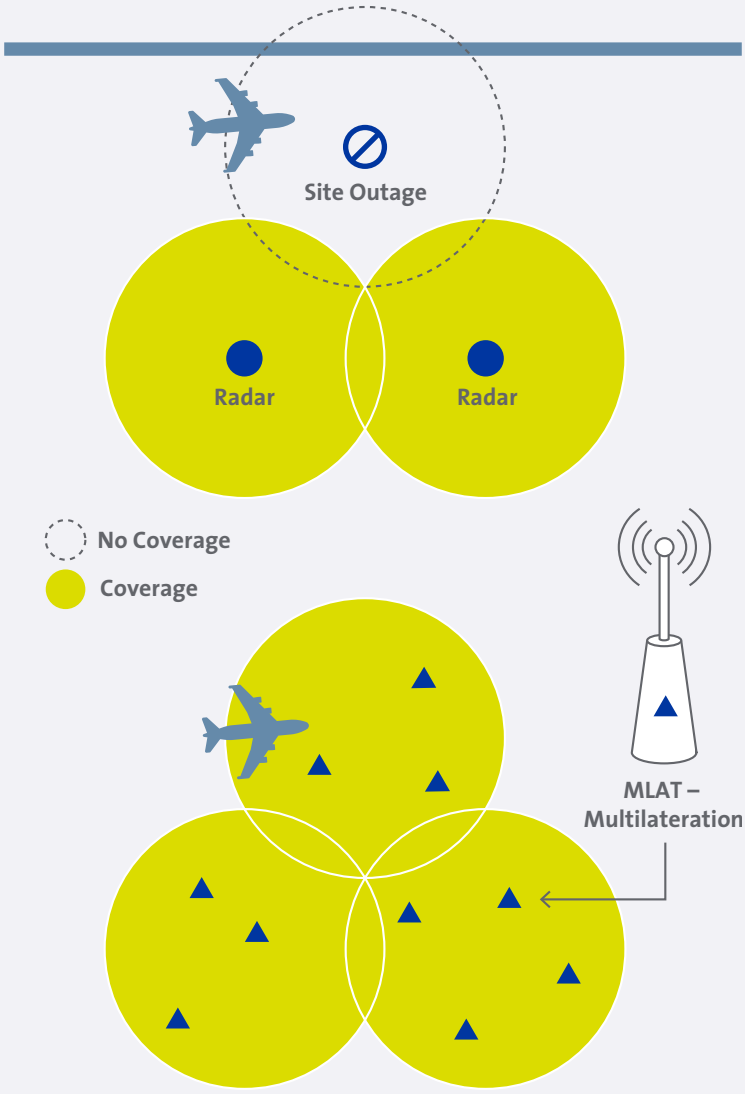
What will be the main challenges?

G A WAM will have to be ready to ensure continuity of the surveillance service before our ageing Radars will arrive at the end of life. There is a certain urgency to get the first WAM projects implemented to ensure a seamless transition while minimizing the risks and bringing the expected operational and financial benefits. The transition from a Radar-centric to a more holistic view will demand a review of the business and operational requirements to define for which ATM services the surveillance picture is needed.

Are there any risks linked to WAM? And how do you mitigate them?

G A While we are pushing forward to implement Multilateration, we need to ensure a flawless performance of this new surveillance system. That's why we are planning to have a longer phase of parallel operation to compare the output of the new technology with the previous one. Moreover, our neighbours at Austro Control have already been operating a WAM system for the last four years. We are very fortunate and proud to extend our close relations with Austro Control into our WAM deployment where they will be supporting us with their expertise in the planning and roll- out phases.

"WAM CONSTITUTES A SURVEILLANCE SOLUTION FOR SKYGUIDE SUPERIOR TO RADAR IN RESPECT OF COST AND PERFORMANCE"



RADAR VERSUS WAM COVERAGE