Air traffic control: new VoIP-based voice communications system takes off

With the transition to broadband transmission infrastructures and the demand for interoperable radio-communications networks, air traffic control authorities are facing formidable tasks. The technologically superior VoIP-based communications systems from Rohde & Schwarz can help manage these tasks. The new R&S®VCS-4G fully IP-based voice communications system rounds out the product portfolio. ATC organizations can now rely on voice communications systems from a single source – from the microphone to the antenna.

VoIP is the future

Voice over IP (VoIP) is the technology of the future in air traffic control (ATC) and air defense (AD) sectors. After years of transferring radar data for air traffic management over IP networks, IP technology is now expanding its way into voice communications. Reduced infrastructure costs are one benefit: If a common network is used to transport voice and data, only a single network needs to be planned, installed and operated. The trend towards VoIP will be accelerated by the successful standardization of VoIP in the ATC sector by the EUROCAE Working Group (WG67) and the adoption of these standards by the ICAO.

Leading air traffic control authorities worldwide, including Europe’s EUROCONTROL and the US Federal Aviation Administration (FAA) have spoken out in favor of deploying VoIP in ATC voice communications systems in the future. Other ATC authorities such as ROMATSA in Romania have been successfully operating VoIP-based ATC systems for some time now using products from Rohde & Schwarz and Rohde & Schwarz Topex SA.

FIG 1 Rohde & Schwarz systems are used at more than 200 airports in more than 80 countries. ATC organizations can now rely on voice communications systems from a single source – from the microphone to the antenna.
Application examples of VoIP systems from Rohde&Schwarz

The R&S®VCS-4G voice communications system:
IP-based, scalable, decentralized

The new R&S®VCS-4G is an enhancement of a voice communications system developed by Rohde&Schwarz Topex SA (see box). The system provides the complete infrastructure, from the controller working positions to the radio stations, which are usually physically separate from each other. In addition to communications between air traffic controllers and pilots, the system supports the full range of ATC features, even beyond the borders of individual ATC systems. The R&S®VCS-4G is fully IP-based and fulfills the EUROCAE ED137 standard. ATC authorities now have access to a solution that offers all of the benefits of VoIP and ensures interoperability worldwide between different parties.

Conventional TDM-based voice communications systems have a central switching center. If this central switching center fails, several or even all controller working positions are affected. The decentralized architecture of the R&S®VCS-4G prevents this from occurring. Each controller working position routes its traffic independently. Since there is no dependency on central switching centers, the voice communications system from Rohde&Schwarz and Topex:
Rohde&Schwarz took a major step forward in the expansion of its product range for ATC with its acquisition of a majority stake in the Romania-based company Topex, a manufacturer of telecommunications equipment for government organizations and private enterprises. The company’s products include voice communications systems for ATC authorities, which Rohde&Schwarz has now integrated into its product portfolio as the R&S®VCS-4G. The two companies are a perfect match, particularly in the ATC sector: Rohde&Schwarz possesses solid expertise in radios and RF systems, while Topex is experienced in voice communications systems. Both companies offer innovative, technologically advanced products and have used VoIP in ATC applications for some time now. In the future, Topex will operate under the name Rohde&Schwarz Topex SA.
Rohde&Schwarz is highly available and extremely fail-safe. ATC authorities can scale the flexible R&S®VCS-4G to meet their requirements, from a single controller working position to a complete area control center (FIG 2). This decentralized system can be easily expanded when more capacity is needed. In a centralized architecture, future expansion must be taken into account from the start, which in turn entails making the necessary investments up front.

The graphical user interface of the R&S®VCS-4G can be configured for each customer (FIG 3). In addition to voice communications, data applications such as airport video surveillance, weather information and alarm functions can also be integrated. Air traffic controllers can use this additional information to assess and quickly respond to critical situations.

The R&S®VCS-4G also protects earlier investments since it can be integrated into existing infrastructures with radios with analog audio interface, TDM-based voice communications systems or conventional telecommunications networks.

**Single source solution:**
from the microphone to the antenna

The R&S®VCS-4G rounds out the Rohde&Schwarz portfolio of future-oriented, IP-based voice communications systems for ATC and air defense. ATC authorities benefit from dealing with a single provider who can offer everything from a single source – from the microphone to the antenna. System integration is simpler and less expensive, and project risks are reduced to a minimum.

Alternatively to the R&S®VCS-4G, Rohde&Schwarz offers very compact solutions for VoIP-enabled communications for small systems with one or only a few controller working positions: the R&S®GB4000V audio unit and the R&S®GB4000T control unit (both shown in FIG 2). Using these system components, it is very easy to implement VoIP-based communications systems for ground-to-air communications such as are needed in a small tower or for apron control.

The R&S®RCMS II IP-based remote control and monitoring system provides a software solution for monitoring and controlling the entire voice communications network from a single central location or from several distributed workplaces. Monitoring encompasses both the R&S®Series4200 radios and the R&S®VCS-4G VCS system.

**Summary**

The new R&S®VCS-4G voice communications system rounds out the portfolio of ATC and AD communications system solutions available from Rohde&Schwarz. From the controller microphone to the radio antenna, the company’s product portfolio has the right solution to meet the individual requirements of ATC authorities. Rohde&Schwarz is also assuming technological leadership in the area of IP-based solutions for ATC voice applications. In this complex field with its growing technological demands, ATC authorities can now refocus on their primary task: air traffic safety. Because the fact is, systems from Rohde&Schwarz simply work.

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