GERMAN SKIES ARE ALWAYS CLEAR THANKS TO FALL-SAFE SURVEILLANCE DATA TRANSMISSION

There are few worse scenarios in air traffic management (ATM) than the loss of surveillance data.

"Controllers would be working blindfolded. It’s simply not an option”, says Hilmar Ohlhaut, Radar Data Network (RADNET) Project and Product Manager at DFS Deutsche Flugsicherung, Germany’s ANSP.

That’s why DFS worked with Frequentis to co-develop the Automatic Radar Data Transmission Equipment (ARTE) software solution, which automatically identifies any break in surveillance data sent to controller workspaces. ARTE reacts quickly and seamlessly; controllers can’t tell they’re using a backup.

“It’s the silent partner that keeps radar data current for controllers – making skies safer for our customers”, says Ohlhaut.

“ARTE is hosted on standard PC or server hardware, so avoids the risk of proprietary or specialist equipment.”

Hilmar Ohlhaut, RADNET Project and Product Manager at DFS Deutsche Flugsicherung
A SWITCHOVER SO SEAMLESS, CONTROLLERS DON’T KNOW IT’S A BACKUP

A SOFTWARE SOLUTION TO HARDWARE CHALLENGES

When you're responsible for the safety of over 8,000 flights a day, even a short-term radar blackout can have serious repercussions. “One failure a year would be one too many”, says Hilmar Ohlhaut.

Sensors across Germany feed surveillance data into DFS’s own fail-safe RADNET network. The country’s area control centres (ACCs) in Bremen, Frankfurt, Munich and Karlsruhe identify and select the data they need via on-site equipment to pass it through to controllers. DFS uses hardware duplication as a backup for this local solution. “It’s reliable”, says Ohlhaut, “but if we lost surveillance data we could have safety or capacity issues. There is too much at stake not to have an additional layer of security”. However, DFS didn’t want to add costly hardware as a second backup. The alternative? Take a flexible software approach instead.

SHARED EXPERTISE IMPROVES OUTCOMES

DFS partnered with Frequentis to create ARTE, a software solution first installed in 2001. In each ACC, an ARTE station monitors the surveillance data supply. When a problem arises, it connects to a remote ARTE server at another ACC, pulls in the needed RADNET data and delivers it to controllers.

Initial development involved close technical cooperation between the two companies, which included frequent visits to DFS headquarters in Langen and Frequentis test facilities in Bratislava and Vienna.

“Both partners brought technical expertise to the project, but it was the shared vision for safe and future-proof air traffic management that drove a successful cooperation”, says Peter Fabini, ARTE System Architect at Frequentis.

Frequentis coded the software, and now runs the project autonomously; adapting ARTE to DFS needs in the light of changes to air traffic and technology environments. ARTE now uses data transfer over IP, for example, recognising the IP-based future of ATM and network technologies.

NO MORE THAN 5 SECONDS WITHOUT DATA

The main challenge for any surveillance data backup system is speed. The backup must cut in before any noticeable gap in data availability. Equally, it must ensure the displayed data is up-to-date, which means never older than 600ms. ARTE uses a patented DFS algorithm to identify any break in data transmission longer than three seconds, and receives replacement data via DFS’s Wide Area Network (WAN) based on leased lines provided by Deutsche Telekom and a secondary WAN based on lines provided by another telecom provider (COLT). With ATM data transfer increasingly reliant on IP network providers, ARTE ensures provider independence: problems with any one provider cannot stop the flow of surveillance data.

“No controller will ever be without surveillance data for longer than five seconds”, says Ohlhaut. “Since ARTE provides the same data as the main system, the controller may not even notice the switch”. The software approach helps to reduce costs. Designed for both LINUX and Windows, it works on any standard PC or server. That also means it can be used as a standalone provider of on-demand surveillance data at facilities that don’t want to invest in specialist hardware.

In fact, ARTE is set to play a more active, operational role in the near future at DFS while the ANSP transitions both RADNET and its surveillance data hardware to meet the requirements of the EU’s Single European Sky initiative. “ARTE is a reassuring constant in a dynamic ATM environment”, says Ohlhaut.