

Air traffic control

Business



**ASSIGN
BUSTER**

Company: Ipswitch Inc. Customer: Air Traffic Control Submitted by: MCC International Date: July 1999 (GERMANY) German Air Traffic Control has introduced a new communication procedure for its air traffic controllers: the “digital intercom”.

This project makes great demands on the reliability of the WAN and LAN connections which have been set up for the purpose, and requires backup connections, which, in case of a failure of the primary connection, must be up and running within a maximum of five seconds. The responsibility of the German Air Traffic Control [Deutsche Flugsicherung GmbH (DFS)] is to make sure that the traffic in German air space operates safely, correctly and smoothly. The DFS, which changed its name from the Federal Institution for Air Traffic Control in 1993, is primarily responsible for ensuring flight safety. It is also jointly responsible for the punctuality of flights and has to ensure that air traffic flows are dealt with in an even smoother and more economical manner than before. For voice communication between controllers, the DFS currently uses two different systems: the voice transmission system [Sprachvermittlungssystem (SVS)] and the intercom system [Gegensprechsystem (GSD)]. With the voice transmission system, the controllers communicate in the same way as over a normal telephone connection; their workstation is equipped with a telephone receiver and a dial or keypad.

It is possible to communicate by phone within a site and between two sites. This system is now being replaced by the digital intercom system. Intercom systems are generally used when voice information has to be transmitted and when no action, like picking up the receiver, is required from the

recipient. This is usually the type of contact between control towers and landing or take-off traffic controllers.

The “ Digital Intercom System” Project

As part of the “ Digital Intercom System” Project [“ Gegensprechsystem, digital” (abbreviated “ GS? D”)], the existing system is being gradually replaced by a digital system, which still requires a microphone and a loudspeaker, but which operates over Telekom digital cable connections from site to site.

So far two regional control centres have been equipped with GS-D systems: the centre Nord in Bremen and the centre Mitte in Langen near Frankfurt/Main. Each airport is assigned to a centre by proximity. Beside the two centres, the control towers of Frankfurt, Stuttgart and Hamburg, Bremen and Nuremberg airports have totally been converted to the new digital intercom system; the conversion of Munich, Hanover and Leipzig is scheduled to take place this year. Implementation of the “ Digital Intercom System” project was assigned to the Hamburg office of Media Consult International GmbH (MCI), which won the invitation for tenders for the GS-D in 1996. MCI is a 100% subsidiary of Studio Hamburg GmbH, which in turn is a subsidiary of Norddeutscher Rundfunk. Their business interests cover manufacturing and assembly of equipment for the broadcast industry, and studio technology as well as consulting, planning, project engineering and marketing.

Technical implementation

The GS-D solution, which MCI developed under the leadership of project engineers Stephan Möller and Martin Fischer, is based on the intercom system of the British manufacturer Drake, which specialises in aviation, defence and simulation applications. The system consists of several intercom stations (for the centre and the respective control towers) combined with an audio-matrix of the Drake model DCS 3000 on both sides. Each DCS matrix unit is comprised of two processor cards, an Ethernet and a master clock card, two matrix cards, an interface for the control station, an audio-code card and a card with serial interfaces. Both matrixes are connected through an Ethernet line as well as an audio-trunk line (i. e.

, telecommunication lines) with three voice channels. This allows intercom communication within a site as well as between two sites. The Ethernet connection between the two sites is used for data transmission (for the setting up of the connection between the two matrixes, amongst other things) in parallel to the voice communication. Besides the active Drake matrix there is always a back-up matrix (DCS 4416) available, which is used for testing or replacing modules. For safety reasons, the important modules are installed in duplicate in the matrix; as soon as one fails, the corresponding backup hardware is automatically activated.

Networking between tower and centres

The connections between each control tower and the associated centre are complex.

The voice connections are set up over three digital line interfaces, which code and compress the audio data linearly. The compression takes place according to G. 728 in a bandwidth of 3.1 kHz. The connection is made through a dedicated Telecom PCM2 line with two data channels and a transmission rate of 64 kbits per channel. If a dedicated line fails, the connection is set up again over an ISDN line within just five seconds.

What's happening on the network? WhatsUpGold can tell you

In each control tower, as well as in the central control center, there are always two PCs up and running, the SSÜ and the TEC-PC. The SSU (“Systemsteuerung und-überwachung” = “steering and monitoring system”) is responsible for monitoring all the hardware at the site; each device on the Drake system can be tested separately with the control software. The whole installation is configured through the technical PC (TEC-PC). PSP Net sells Ipswitch's WhatsUp Gold software in Germany. It is used to monitor all the devices and represents all the monitored devices with coloured icons.

Devices that are no longer responding turn red after four consecutive unanswered pollings. In general devices responding correctly are displayed in green, those which have not responded to one polling are displayed in light green and those which have already missed two or three pollings are shown in yellow. To avoid a display featuring too many colours or one with continuously changing colours, DFS has configured WhatsUp Gold so that yellow means “running” and red means “not responding.” WhatsUp Gold has a range of notification methods (pager, e-mail, audible or visual alarm) that can inform the administrator when a problem occurs. At DFS they don't

use the notification function because the technicians responsible for monitoring the system are sitting in front of the PC where the monitoring software runs. According to Stephan Möller, WhatsUp Gold's biggest asset is the excellent price/performance ratio it offers and the fact that it is easy to install and configure: The software can be installed and set-up in a few minutes without prior examination of the manual.

It is true that more expensive products from competitors such as Cisco or Hewlett-Packard offer a considerably wider range of functions, but these are not needed for the GS-Project. According to Stephan Möller, one of the major difficulties encountered in installing the GS-D system was to avoid delays in the voice building due to data collusion between computer data and matrix data. In this case, the only solution was to build a test system and undertake costly experiments at DFS. Nevertheless, the high costs were worthwhile for MCI.

Thanks to the experience gained while working on the GS-D project, the company has already received an order for a communication system from the German Federal Armed Forces.