EUROCONTROL's Software Team celebrates **30 years of operational service in Karlsruhe**

The EUROCONTROL Karlsruhe Team has been at the sharp end of air traffic control (ATC) for over 30 years, and 'systems' is their key-word. They have worked with those who plan systems, those who pay for systems, those who produce systems, and those who operate and use systems. Jürgen Hein, Head of the EUROCONTROL Software Team in Karlsruhe, is *"very pleased to be celebrating the 30th anniversary". He and his team are "proud to have driven the development, maintenance and formulation of requirements to support the provision of air traffic control services in one of the most important ATC centres in the core area of Europe".*

In 2006 the Karlsruhe Centre handled approximately 1,400,000 movements, with a peak day of over 4,700 flights and a peak hour of over 300 flights.

Original concept

In the late 1960s, civil aircraft movements increased to such an extent that by 1970 traffic was approximately double the forecast made in 1965 (when plans for the creation of Maastricht Upper Area Control Centre (UAC) were being proposed). This traffic density, combined with airspace limitations and a complex route structure, specifically in the upper airspace of the Federal Republic of Germany, made it necessary to redefine the operational concept. In order to deal with the increase in traffic and to achieve an optimum degree of safety, it was considered necessary to integrate the civil and military air traffic control functions in the Federal Republic of Germany. Consequently, Belgium, Luxembourg, the Netherlands and the Federal Republic of Germany decided that an ATC centre needed to be built to control the upper airspace in south-west Germany. Their intention was described in a "Declaration of Intent" which was officially approved by the EUROCONTROL Permanent Commission in 1970 – and so the Karlsruhe concept was born.

EUROCONTROL took advantage of the work that had already been done in the building and setting-up of its first UAC in Maastricht and used that Centre as a blueprint for Karlsruhe. In 1971, EUROCONTROL staff were recruited, and the building was inaugurated in 1972 . ATC operations with Bundesanstalt für Flugsicherung (BFS) controllers started with a Karlsruhe Automatic Data Processing and Display System (KARLDAP A). This system was used for the provision of air traffic control in the upper airspace above 24,500 feet within a geographical area roughly corresponding to central and south-west Germany. KARLDAP 1 was modelled on the MADAP system used at Maastricht UAC and provided integrated radar data and flight plan processing. Since both systems used the same standards, an automatic exchange of flight data could be ensured, with the aim of reducing telephone coordination to a minimum.

However, just before the Centre was due to become operational, the basic political framework changed, and in 1976 the Permanent Commission approved the German request for the BFS to take over responsibility for the Karlsruhe UAC infrastructure by 1983. A special contract between the BFS and EUROCONTROL was agreed, under which software development and maintenance for the KARLDAP system was to continue to be carried out by a team of EUROCONTROL staff. The Software Team Karlsruhe is now part of the EUROCONTROL Directorate of Air Traffic Management Strategies, Stakeholder Implementation Service.

In 1993, German ATC was "privatised", and the air traffic control body Deutsche Flugsicherung GmbH (DFS)

1977-2007

"For the last thirty years a EUROCONTROL Team has been providing an excellent service to the Karlsruhe ATC Centre," said Victor M. Aguado, EUROCONTROL Director General. "Continually adapting to the challenging aviation environment and changing information technology needs, the Team has successfully met the Centre's operational and growing traffic requirements."

became the national service provider. The Software Team continued to perform ATC tasks in Karlsruhe until 1995 when the agreement between EUROCONTROL and DFS changed. Although the DFS took over responsibility for the system, EUROCONTROL was still required to supply staff to maintain KARLDAP. After 1995, DFS staff and contractors joined the team in order to replace EUROCONTROL staff who were retiring.

On 26 February 2007, the Karlsruhe Software Team celebrated 30 years of successful software development and maintenance for the KARLDAP system. It has been an impressive partnership that has worked well over the decades. The DFS has given notice of termination of the contract, which comes to an end on 30.6.07. The contract has been replaced with a special agreement that will permit between five and eight EUROCONTROL staff members to stay in Karlsruhe. The KARLDAP system is scheduled to be replaced with a new system in late 2008 or early 2009.

26.2.77 **Karlsruhe UAC begins operations with the KARLDAP-A system (separated radar and flight plan processing). The system consists of IBM mainframes (360/158) and peripheral computers (Telefunken TR86). Radar data processing is performed by a hardware plot processor.**

7.12.80 The KARLDAP-1 system (derived from the MADAP system in the Maastricht UAC) is introduced, with integrated radar and flight plan processing. The hardware plot processor is used as back-up. Interface with ODS and radar data input is performed by a peripheral computer complex (TR86). AFTN communication and input of MET messages is performed by DCTS, a system based on mini-computers (Mitra15).

1983 One of the first activation message (ACT) exchanges is implemented between Maastricht and Karlsruhe UAC. Connections with ZKSD Frankfurt follow.

1985 The hardware replacement of the KARLDAP main computer complex (mainframes and peripherals) begins.

1988 Transition to a UNIX-based software development system. A hardware replacement study begins for the KARLDAP Peripheral Computer Complex (KPCC) and Operational Display System (ODS) incorporating local area networks and 2k x 2k raster displays.

1989 The communication system KIDS (based on personal computers) replaces DCTS. OLDI connections using the OLDI Short-Term ICD with Zurich, Reims and Prague is implemented.

1993 The new KARLDAP PCC (Concurrent Computer) and ODS (Hughes) come into operation. KUAC is one of the first centres to be equipped with colour raster-scan displays.

1994 The DFS decides on a common procurement with Maastricht to use COPS-compliant displays. The KADS (Karlsruhe Advanced Display System) software contract is awarded to Siemens.

Short Term Conflict Alert (STCA) is implemented

1995 The communication system is re-hosted (KDCS replaces KIDS).

1996 KADS is integrated into the KARLDAP system and the new operations room becomes operational.

1999 New mainframes and peripherals (s/390) come into operation.

2001 Traffic throughput increases via horizontal splitting of sectors (level-split concept).

2003 New message-logging system (AMLS) is implemented to replace ageing IBM printers.

2004 Basic Mode-S radar data processing is implemented. Migration of the batch system from OS/390 to z/OS.

2005 KARLDAP is extended to include the Berlin upper airspace.

2006 Conspicuity Codes concept and Mode-S evaluation are implemented.