

One hundred days of COBRA CENTRAL: challenges and benefits of cross-border airspace design enhancement (EUROCONTROL MUAC)

At the start of 2022 the final part of the Cooperative Optimization of Boundaries, Routes and Airspace project (COBRA) became operational. Launched in June 2020 by two air navigation service providers – DFS Deutsche Flugsicherung (DFS) and EUROCONTROL's Maastricht Upper Area Control Centre (MUAC) – COBRA revises common boundaries to improve flight paths, reducing the need for coordination and tactical interventions in one of the most complex airspace structures in the world. Airspace users benefit from optimal profiles and shorter routes that reduce fuel burn and lower emissions. The final Central COBRA package, together with the West package implemented in October 2021, has the potential to save up to 1,233 flight hours, 3,781 tons of fuel and 11,910 tons of CO2 annually, based on 2019 traffic figures.

Herbert Koppe, COBRA CENTRAL responsible planner and operational expert for EUROCONTROL MUAC, was one of the architects of the project.

After 100 days of operational COBRA CENTRAL what has been the feedback from controllers?

Feedback received from many air traffic controllers (ATCOs) during training and after implementation confirms the expectation that the new airspace design simplifies the interface between MUAC and Karlsruhe Upper Area Control Center (KUAC). Arrival and departure flows are better positioned in relation to overflights and offered more opportunities than before. Overflights are now better aligned with the implementation of free route airspace (FRA) in both air navigation service providers (ANSPs), bringing filed routings closer to day-to-day practices.

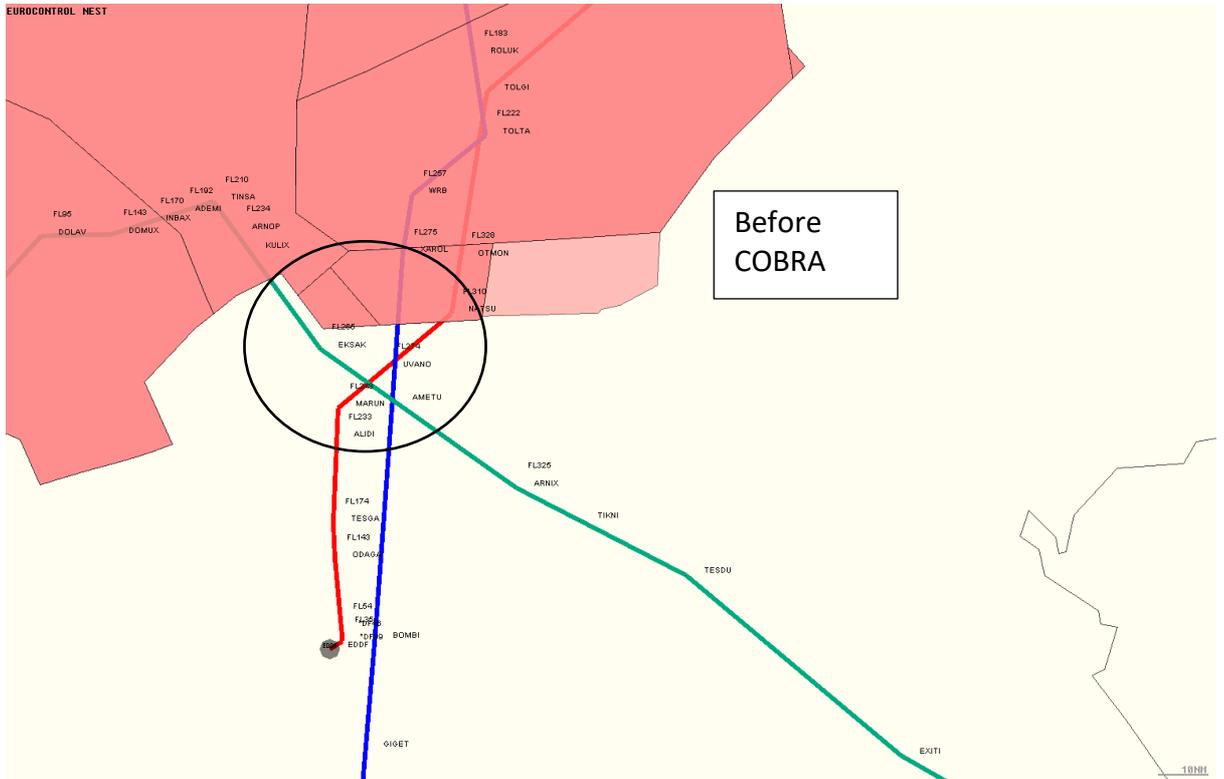
ATCOs find the new airspace layout to be more logical today as opposed to the prior structure which was designed more than forty years ago. During this time, we've had increased traffic and regulations resulting in the need to create many alternative procedures to ensure the utilisation of the airspace in a safe manner. The new solution has resulted in increased efficiency of our air routes and decreased workload for our controllers.

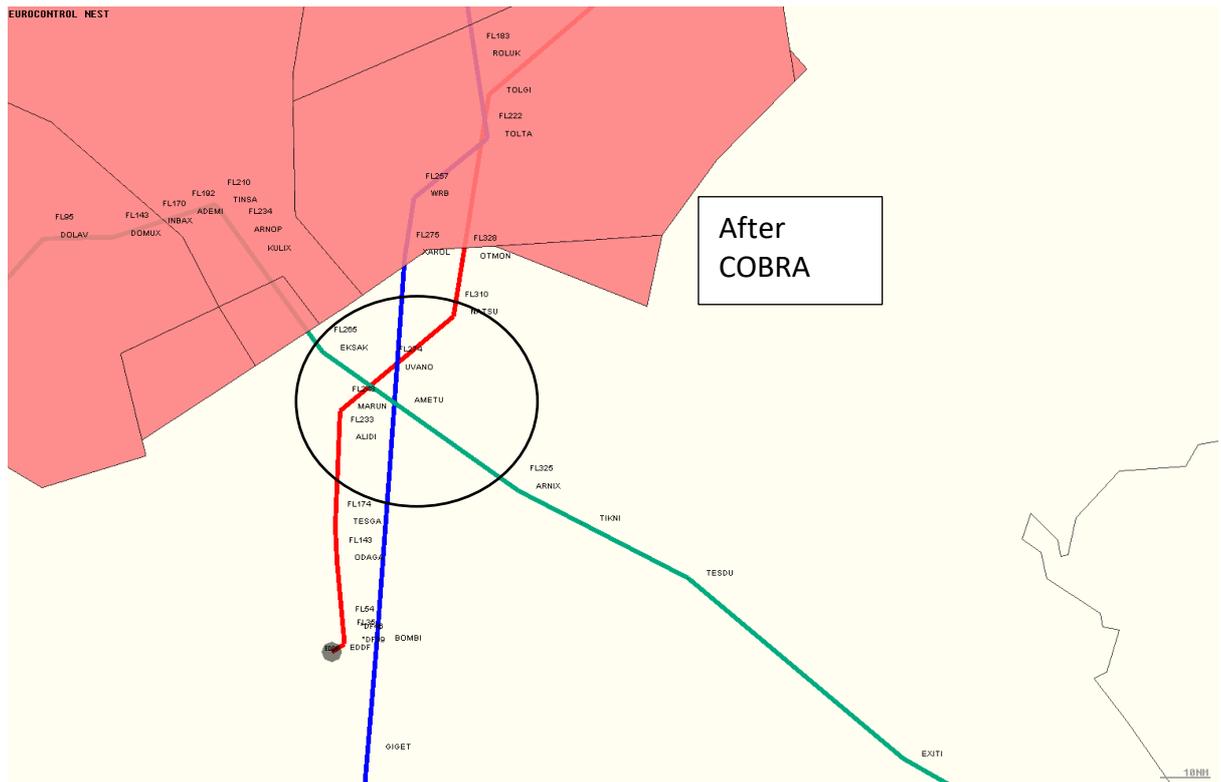
From an airspace designer perspective what were the key challenges?

Prior to the introduction of COBRA, MUAC and DFS had an acceptable working relationship, with room for improvement. There was tension due to different interpretations of the alternative procedures. During this program the key challenge was to build trust between the participants and working towards a common solution in where not only the airline operators (A/Os) benefit, but also the ATCOs from both ANSPs. As the work began and the teams got to know and trust each other, the improvements came along very quickly to a great collaboration that feels like we're all part of one team.

How complex is this airspace?

At the interface between MUAC and KUAC we have multiple profiles which have a vertical movement, making the coordination between the ATCOs challenging, especially with unexpected events (weather, regulations, A/O requests). The picture below shows a conflict situation before and after COBRA implementation. The benefit here is the fact that the conflict point has moved away from the border and is now with 1 instead of 2 sectors.





How did cooperation between KUAC and MUAC work – is COBRA an exceptional programme or do you cooperate in airspace redesign projects on a daily basis?

The cooperation now is extraordinary but started by gaining trust and respect. Today the cooperation is great and extends to other projects. We work towards ‘common interests’ as one team to solve topics together.

What were the most difficult technical/institutional challenges to implementing COBRA?

The most difficult legal challenge was changing the UIR boundary involving States and eventually the PC, which led to a change of the ‘Maastricht Agreement’. The most complicated technical changes to the MUAC system were the HMI features which had to be configured in order to reduce the workload to the ATCOs.

An example of the complicated human-machine interface (HMI) work that needed to be done was the (pre-)validation of sub-systems required to establish the inner and outer boundaries for correct system support. These boundaries were defined in the program to be able to release traffic on contact between involved sectors, leading to multiple scenarios where each organisation had different distance requirements. This had to be aligned to a single way of working.

Such a program requires a great deal of collaboration across the airspace, how were airlines and military incorporated into the project?

Only secondarily. Both ANSPs have a lot of experience regarding the requirements of A/Os, so we took that as starting point and kept them in the loop as much as possible via the A/O brief. Different airlines have different requirements, and this can become complex. It works better to start with what is known from the past and then have monthly coordination meetings with them to ensure they are comfortable with our way of working.

Do you envision a program such as COBRA being expanded to more airspace sectors in the future?

The short answer is yes. This project has shown that we could expand in the future as airspace will always be interconnected.

MUAC has only recently kicked off a multi-year project called “DAMN” (Dynamic Airspaces in MUAC and the Network), in which we will study the use of dynamic airspaces (both vertical and horizontal) in our area of responsibility and across the border. The aim of the study is to identify where we can use dynamic airspaces in neighboring sectors in order to optimise ATCO productivity. If successful, this could lead to increased capacity in multiple sectors, reducing delay and improving sustainability in the network. The study phase will end in 2026, with possible implementations thereafter.

Anything else you feel would be important to share?

We’re really happy that the outcome of the COBRA project met our expectations. It was an excellent opportunity to use the ATCOs during the COVID period where traffic was low, in order to prepare for when traffic picks up again.