Flight centric ATC with airstreams ('FC2A')

Summary

BACKGROUND We are facing a change of the complete paradigm of the air transportation. The recent drop in air traffic may lead to a very slow recovery after the crisis ends. Recent reporting from ICAO and ACI highlighted that the recovery will need to take into account the evolution of the demand and the customer confidence in the means of transportation. Now, more than ever, an air transportation system **reliable, safe, environment friendly and agile**, should be put in place. For the future challenges, the optimal use of the resources should be managed by means allowing us to tune the capacity of services of the air national service providers to meet the demand and variation of this demand. Our project will take its roots in two different but complementary concepts: the **Flight Centric Air Traffic Control (FCA)** and the **Dynamic Flow Corridors**, also called **Airstreams**.

FLIGHT CENTRIC AIR TRAFFIC CONTROL (FCA) European airspace is divided into sectors to provide safe services for aircraft travelling through the airspace. Changing this to a flight-centric structure opens the opportunity to distribute the traffic more evenly, and to avoid lost productivity in under-loaded sectors. Aircraft may be under the responsibility of the same controller across two or more geographical sectors. This concept has been pushed by SESAR PJ 10-01B. Some benefits of this approach have clearly been identified, such as: **reduced fuel consumption and emissions; enhanced predictability; improved operational and cost efficiency; maintained levels of safety**. In the SESAR JU COTTON, project an important step has been done by connecting this concept to the **Dynamic Airspace Configuration (DAC)** concept.

The flight-centric solution requires a set of issues to be solved: the flight-centric solution will usually require the aircraft to remain in communication with the same controller for a longer period of time than current operations; rules and methods relating to traffic allocation and coordination have to be adapted. In the event of a conflict, it is also quite important to establish which controller is responsible for its resolution. For high traffic densities, advanced conflict detection and resolution tools are required which may have multiple functions in addition to flight-centric operations. These tools can provide a look-ahead and help to allocate conflicts to controllers.

DYNAMIC FLOW CORRIDORS – AIRSTREAMS A flow corridor is defined as airspace, generally long and narrow, intended for use by aircraft intending to travel efficiently from one end of the corridor to the other, with minimal interference from all other traffic, same direction, opposite direction and crossing traffic. Three of the prominent attributes of these flow corridors that would distinguish them from today's airways are: **allowance for multiple (parallel) lanes of traffic; capitalization on advanced communication, navigation, and surveillance technology to enable changes in methods of separation, such as self-separation, potentially reduced separation standards within the corridor, or employ flight in formation; dynamic activation rules to add or remove corridor structures, as needed, throughout the day**.

OUR PROJECT The project will demonstrate that using the Dynamic Flow Corridors in the context of Flight Centric ATC, will allow us to solve the main concerns of the air traffic flow management in Europe. Leading to a more sustainable aviation and more efficient demand capacity balancing. The π-rat simulation is used not only with the traffic of a week of operations in Europe (provided by EUROCONTROL), but also with simulated traffic based on assumptions on the future demand. A comparison of the complexity measure on traffic between the current way of operation and the proposed operations using the FCA with airstreams will be performed.