Key messages of Research Workshop
Single European Sky and Resilience in ATM
15-16. September 2022
Sofia/Bulgaria

The workshop discussed how the functioning of the air traffic management critical infrastructure can be safeguarded in turbulent times, characterized by growing, diverse and conflicting demands that bring tension and uncertainty to routine operations. It was acknowledged that aviation serves as a catalyst of the European economy and air traffic control as its integral part contributes to safe and efficient air transport thus supporting mobility to the benefit of citizens. The pandemic has demonstrated the importance of keeping the airspace open at all times and thus maintaining deliveries of basic supplies such as goods, medicine and facilitating citizen repatriation.

Exogenous shocks, such as the pandemic and geopolitical conflicts, have led to a high traffic volatility and to a low predictability of air traffic.

While the Green Deal as a European answer to tackle climate change is asking for a reduction to zero emissions by 2050, the issue of national security has gained more importance. For these reasons, the workshop set out to provide insights as to if, and how, the provision of air navigation services needs to be adapted to be equally robust and flexible, and thus to become more resilient.

The key findings of the workshop are:

- We live in a world with recurrent systemic shocks which makes resilience more and more important. Resilience enhancers are e.g. redundancies and buffers, liquidity and flexibility. Resilience enhancers come at a cost whereas the benefits of resilience will only occur when there is a shock. Thus, market forces do not incentivize resilience.
- Whereas traffic demand evolves on a daily, weekly or monthly basis, capacity is determined usually by years or decades ahead. ANSPs need to develop their operational capabilities continuously which is in contradiction to short-term business plans of airlines. Airlines schedule flights based on passenger demand and constraints such as availability of slots, aircraft and staff – constraints of ANSP are not a significant part of this plan and therefore an iterative and collaborative capacity planning could provide benefits for the whole aviation system.
- High uncertainty on future traffic demand due to conflicts, wars, pandemics or social unrest and with possible diametrically opposite scenarios puts ANSPs in a dilemma: Whether to cut costs, investments, and activities to stabilize the current financial situation or to overcome lack of financial means in the short run by continuing to invest in staff and technology to prepare for returning high traffic demand.
- The cost structures of ANSPs are largely fixed with minimal variable costs. Thus, they have little leverage when a fall in demand leads to harsh revenue decline, causing liquidity and financing issues and unused operational capacity. Similarly, unexpected demand hikes are hard to manage without pre-planned resources, and result in capacity issues that impact the passenger experience and often increase the environmental footprint due to deviations. A more environmentally friendly flight plan could be facilitated

by the Network Manager as airlines do not always use full potential of available routes in flight planning.

- The current SES regulation in force since 2004 is based on the assumption of steady air traffic growth without significant changes in demand or disruptions. Its foundation are traffic forecasts with a five-year perspective, and it may not sufficiently address interdependencies between the different key performance areas.
- Current performance and charging regulation can balance small changes in traffic demand and manage low levels of traffic volatility. Currently, there is no permanent mechanism to manage strong fluctuations or a significant loss of revenues. In addition, there are neither permanent provisions that ANSPs' costs will be covered in such circumstances nor that the financial liquidity to run the operations will be maintained.
- Limiting ANSPs' potential to generate revenue may endanger the entire air transport system by severely affecting the operational and financial resilience of ANSPs.
- Operational and financial resilience go hand-in-hand. ANSPs should be predominantly operationally resilient when traffic is high and predominantly financially resilient when traffic is low. As infrastructure providers, ANSPs need to invest anti-cyclically, which runs counter to the airlines' short-term business model.
- The first step to improving resilience of air navigation services needs to include both financial and operational buffers to manage increased volatility and traffic shortfalls. Hence monitoring accuracy of traffic forecasts and volatility with meaningful indicators, paired with a sensible risk assessment, is essential to determine the buffers required.
- To ensure the preparedness of ANSPs economic stress tests would provide certainty about the general financial strength of an ANSP. The task will be to determine for each ANSP its tipping point, meaning that after reaching this point a recovery will be lengthy and at a high cost. The stress test can be complimented with a constant monitoring of predicted traffic scenarios. Interdependent operational and financial objectives need to be adjusted depending on the actual traffic evolvement to assure a long-term efficient solution including external environmental costs.
- The concept of the commons in terms of shared infrastructure may support resilience in air traffic management. The same applies for cross-border services which may support ANSPs to provide capacity. However, these concepts may not be helpful in a situation when all areas experience a downturn in traffic as it was the case during COVID-19 or all areas suffer capacity shortages due to unforeseen traffic demand as in 2018/2019 in the core area.