Solution PJ.04-W2-29
Digital Smart Airports

The need for European airports to become more operationally efficient is fundamental. This SESAR project will develop concepts, tools, and procedures to increase the predictability and resilience of airport operations, improving the punctuality of flights in a safe and environmentally sustainable manner.

The Solution Digital smart airports is part of the project Pj04-W2 Total Airport Management. It consists of three parts (subsolutions):

- Airside/Landside performance management
- MET performance management
- ENV performance management

The aim of the Solution is to improve airport/network integration for large and medium/regional airports, improve airport airside/landside integration, reduce the impact of MET aspects on airport operations, make further investigations about how environmental aspects could be monitored and managed in day-to-day airport operations. This will be achieved through increasing the coordination between the Airport and the Network, validating the concept of regional connected airports. On the airport side, the project will have a focus on the airport hypervision concept, and how airport operations could be better predicted with anticipated impact, managed in a pro-active way and synchronized in various situations. This includes the development of performance and role-based dashboards as well as what-if, prediction, and impact assessment tools. Here data-driven airport operations management and digital technologies are required enablers, as connected, data-based, intelligent toolboxes supporting all airport stakeholders must be developed.

To ensure that full benefits are achieved and that the expected performance improvements are realized in the context of overall ATM Network, close coordination will take place with other projects, particularly those addressing network management, airport airside and runway throughput, enhanced arrivals and departures as well as the overall integration within the program.

Airport performance can be degraded in many various ways, and some of the usual factors are known, which cannot be easily eradicated. However, once an issue happens, airports can be better prepared to deal with potential performance consequences, to limit the impact on their operations, and to recover faster.

The subsolution MET performance management aim at Proactive management of MET impacts on the AOP (Airport Operation Plan). Meteorological impacts on the AOP are proactively managed by decision support functionalities that can assess the impact of key meteorological conditions on airport performance and that can propose pre-defined solution scenarios. Local and/or network-based business intelligence/machine learning and "what-if" should support this whole decision process. The main challenges for enhanced MET performance management relate to minimizing airport operation disruptions caused by MET events affecting the air traffic landing or taking off from the airport. There is a need of the integration of MET information into the APOC and to provide adequate decision support tools (e.g. impact assessment tools, 'what-if' scenarios, etc.) when dealing with MET disruptions at the airport. R&D is also needed to address predictability aspects against MET conditions and associated probability of occurrence thresholds. It will be supported by dynamic information about the uncertainty of weather forecast, provided by probabilistic interpretation of weather forecasts (Ensemble Prediction). This subsolution is targeting V3 completed maturity level by the end of SESAR Wave 2 (2019 - 2022).

MicroStep-MIS intends to contribute by providing its knowledge and expertise in aviation meteorology through the work on technical and partially operational aspects of the Solution. MicroStep-MIS continues in the work done in SESAR Wave 1 project Pj04-02 on the development of the advanced aviation weather decision support system (AAWDSS) including the observation as well as forecasts of hazardous weather phenomena for management of its impacts. We participate in the RTS V3 validation exercise led by PANSA with the support from the University of Warsaw and DLR (thunderstorm nowcasting). That includes also an integration of AAWDSS with PANSA Advanced Tower system (for prediction of TTOT, TSAT and taxi times).