ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

TECHNOLOGIES FOR AIR TRAFFIC CONTROL

Researches in Air Traffic Control domain include a variety of experimental studies of solutions to deal with the dramatically growing traffic and its complexity with a focus on safety and efficiency.

Technologies in Air Traffic control involve different disciplines, such as Human Machine Interface Design, Virtual Reality, Augmented Reality, Human Factors, Operational Research, RPAS integration in manned traffic. Researches in this domain are aligned with the Single European Sky Programme, setting the future features of Air Traffic Management.

The research of the University of Bologna covers a wide range of issues:

- Design and development of Virtual and Augmented Reality systems for enhanced visualization and interaction in operative scenarios
- Prototyping of innovative concepts of Human Machine Interfaces for future ATM (Air Traffic Management) systems
- Definition of long term future Automation Scenarios and Concept of Operations
- Experimental platforms for Air Traffic Control simulations
- Integration of RPAS in manned Air Traffic Control
- Optimization networks for Air Traffic Control
- Policy making, Legal and regulatory aspects in Air Traffic Management, including studies on the introduction of automated technologies and standardised and interoperable systems

HIGHLIGHTS

In Horizon 2020 the University of Bologna has been granted for the following projects in the SESAR Exploratory Research Framework:

- **The University of Bologna is involved in the project PJ05-W2_DTT - Digital Technologies for Tower.** The project investigates a SESAR solution called "HMI Interaction modes for Airport Tower" that addresses the development of new human machine interface (HMI) interaction modes and technologies at the Controller Working Position.

- **Coordinated by the University of Bologna: RETINA - *Resilient Synthetic Vision for Advanced Control Tower Air Navigation* project.** The increasing interest in Synthetic Vision (SV) and Augmented Reality (AR) technologies has led various analysts to positively esteem the adoption of new tools enabling pilots and controllers to seamlessly operate under Visual Meteorological Conditions and Instrument Meteorological Conditions. For the RETINA Project, the University of Bologna has been awarded with the prestigious Jane's Award for the best Enabling Technology for ATC in 2018.

- **The University of Bologna participated to DOMINO - Novel tools to evaluate ATM systems coupling under future deployment scenarios, SESAR.** The overall objective of Domino is to develop a set of tools, a methodology and a platform to assess the coupling of ATM systems from a flight and a passenger perspective.

- **The University of Bologna participated to MINIMA - *MItigating Negative Impacts of Monitoring high levels of Automation.*** The MINIMA project will help to understand and mitigate OOTL (Out Of The Loop) phenomena of air traffic controllers in highly automated environments by means of physiological measurements. The Experimental phase of MINIMA took place at the Virtual Reality Lab of the University of Bologna.

- **The University of Bologna participated to AUTOPACE - *Automation Pace H2020-SESAR.*** The project performs fundamental research on psychological modelling to predict how future automation would impact on air traffic controllers (ATCo) performance and to identify competences and training to cope with the effects of automation on humans.