

A digital twin for Milan Bergamo Airport

The green light has been given for the AVIO project developed by SACBO, the companies TXT e-tech and SORINT.tek, and the University of Pavia for the study and prototyping of a “digital twin”, creating an advanced simulation to improve management of all phases of ground operations and the training of airport workers. The project is being co-funded by the “Ministry of Enterprise and Made in Italy” via the complementary NRPP fund.

Milan Bergamo Airport will see the creation of a “digital twin” with the AVIO project, created and developed together with a series of partners to optimise the management of ground operations through improvements in situational awareness and decision-making processes.

These improvements will be the result of the studying and prototyping of a digital twin of the airport, which will gather and integrate real-time data from a series of sources, including artificial vision algorithms based on analysis of video images from existing video cameras positioned throughout the area, representing and viewing important information for “Airport Operations Coordination (AOC)” in an integrated, modern and intuitive manner. The digital twin will also be used for virtual reality training of ground crew, allowing staff to enhance their experience by drawing on the advantages offered by this specific form of advanced technology.

The project is being co-funded by the “Ministry of Enterprise and Made in Italy” via the fund complementary to the National Recovery and Resilience Plan (NRPP), CUP B49J24002200005. The project is the result of well-orchestrated collaboration between 4 important entities operating in the fields of software engineering and aviation: SACBO (project coordinator and operator of Milan Bergamo Airport – BGY) together with TXT e-tech, a digital-enabler company, SORINT.tek, a company from the SORINT.lab group specialised in the development of Advanced Analytics and IoT solutions, and the University of Pavia.

The collaboration between the 4 partners, which will cover a period of three years, is aimed at taking advantage and making the most of the opportunities offered by the relaunch plan in terms of accelerating digital innovation in the aviation sector. This will have significant technological impact on Milan Bergamo Airport and, more broadly, will facilitate the creation of similar evolved processes in Italian airport management, contributing to the achievement of the European Union’s digitalisation goals and strategically strengthening its current position in these fields.

SACBO, in its role as proponent and user of AVIO, will be providing a technologically advanced infrastructure equipped with a High-Performance Computer (HPC) from HP Enterprise equipped with a substantial number of high-performance Nvidia GPUs, which will allow partners to develop the airport’s digital twin and virtual-reality training environment. In addition, innovative computer equipment will be used, such as hyperspectral video cameras and a de-icing simulator for staff training via VR (Virtual Reality).

As a result, SACBO will be able to benefit from simulations to improve the awareness and decision-making of airport coordinators and the abilities of ground crew.

“A project that looks to the near future and to technological evolutions in airport management.” – stressed Giovanni Sanga, President of SACBO – *“As well as providing its know-how, the operator of Milan Bergamo Airport will be a forerunner in the development of digital twins for Italian airports.”* *“The AVIO project will play a central role in the digital airport ecosystem”* – added Amelia Corti, Managing Director of SACBO – *“increasing collaboration between stakeholders, allowing increased efficiency for ground operation processes, and improving safety and security levels as well as service levels, also leading to benefits for passengers in terms of customer experience”*.

TXT, in its role as technical manager for the project, will be providing its experience and its skills in the development of digital twins, with particular focus on UX/UI (User Experience and User Interface) for natural interaction with operators. TXT will also be handling the development of Virtual Reality training, with the use of its proprietary product WEAVR. *“AVIO represents a significant opportunity for us in terms of further developing our XR applications in the airport field, an area in which we are developing our offer and our presence”* – stated Michele Sesana, Innovation Manager TXT – *“This will also allow us to further develop the functionality of our WEAVR product through the management of critical infrastructure, enhancing it with functions such as the management of large digital twins and a set of innovative forms of human-machine interfaces”*.

SORINT.tek will be supplying artificial vision systems that classify and trace the movements of vehicles and people through the use of the most modern object detection and tracking technology, with a focus on developing a system that not only identifies, classifies and traces both vehicles and people, but that also understands, in real time, the actions carried out by various ground-based figures (both people and vehicles). The information gathered will be sent to the digital twin via a flow of data managed by an IoT hub, which will transform the flow of raw data into validated and refined data that can be used directly by the digital twin.

Marco Pozzi, General Manager of Sorint.TEK: *“The AVIO project allows for the application of consolidated skills in a particularly challenging environment in terms of the quality and complexity of the data, integrating them into an IoT hub that will handle full integration between IoT applications and AI systems”*.

UniPV, the only research institute in the partnership, will be focusing on the main aspects of innovation that require particular attention from a scientific as well as an applicative viewpoint. In particular, UniPV will be working on studying advanced forms of event identification concerning vehicles and aircraft on the basis of video transmissions; data modelling with a semantic approach based on graphs that allow for the integration of information from a range of different sources and the extraction of user-centric viewpoints; the use of identification techniques via advanced sensors to be employed outdoors and on dedicated vehicles; the analysis and optimisation of human-

machine interfaces on the basis of airport management operating procedures, and methods for the optimisation of interactive management of airport resources. In carrying out these studies, UniPV aims to make ample use of artificial intelligence to improve integration between functional components and accelerate the production of highly innovative solutions.

SACBO is the operator of Milan Bergamo Airport, the third busiest Italian airport behind Fiumicino and Malpensa, with 17.3 million passengers in 2024. Over the years, thanks to constant profitability and the body of investments made by SACBO with its own resources, the airport has developed service infrastructure and both the technical and operational capacity to fulfil its role as a strategic link between the territory and both national and European transportation routes, which in turn connect to the rest of the world. The new works aimed at expanding the terminal will allow, by the end of 2025, for a new check-in area and new security control stations, with latest-generation machinery implemented to streamline procedures. At the same time, works have been completed in preparation for the construction of the terminus for the future rail link with Milan.

The airport generates over 11,500 direct jobs, i.e., positions for activities related directly with the airport, a number that increases to approximately 30 thousand when considering collateral and indirect employment, producing 8% of the GDP for the Bergamo area.

The new Airport Development Programme for 2030 provides for 450 million in investments, representing the long-term vision of SACBO, which is focused on development and sustainability.

TXT is an Italian technology group with a significant international presence that represents a hub for innovation and advanced skills for the digitalisation of company products and processes and the creation of practical value in highly complex sectors. A veritable integrated ecosystem of top-quality tech companies, TXT is able to operate across a wide range of markets, with specific focus on Aerospace, Defence and Digital Finance, where the group draws on its particular aptitude for innovation and its capacity for technological development and latest-generation engineering. Its in-depth knowledge of digital transformation processes is best applied to sectors such as Public Administration, Health, Manufacturing and Transportation, fields in which the company has developed innovative projects throughout Italy. The combination of technological skills and the capacity to create innovative client experiences has allowed TXT to also expand in the field of MarTech. The Group, founded in 1989, has been on the Milan Stock Market (Star segment) since 2000, and has a turnover of more than EUR 300 million (2024 data). With more than 3 thousand employees in 20 branches worldwide, TXT is a global tech player with a solid presence in America, Asia and Europe.

SORINT.tek S.r.l. is the Advanced Analytics and IoT Business Unit of the SORINT.lab group, a European leader in advanced technology consultancy. SORINT.tek creates, manages and provides end-to-end support for data-driven strategies for partners and clients, from the design and implementation of Big Data and Fast Data architecture to the development of artificial intelligence and automation solutions and to the representation of information to aid company decision-making. It has gained considerable experience in the development of platforms and components for Big Data Analytics, from descriptive and diagnostic reporting to the most recent and advanced techniques in terms of machine learning and deep learning. It also has considerable experience in a range of

domains and sectors, including the Internet of Things and Industry 4.0, thanks to its proprietary IoT Asset Management and Operation Intelligence platform MangroviaIoT. SORINT.tek – Where Insight and Innovation Converge.

The **University of Pavia** is an Italian higher education institute that boasts centuries of excellence, with three Nobel Prize winners and numerous illustrious scientists having served on its teaching staff, including Alessandro Volta, Antonio Scarpa and Gerolamo Cardano. In its role as a high-intensity research institute, it is home to innovative equipment, laboratories and infrastructure, and collaborates on many national, European and international projects with institutions, enterprises and businesses in both the public and private sectors. The Department of Electrical, Computer and Biomedical Engineering is the second largest department at the University of Pavia, with more than 70 professors and over 200 PhD and post-PhD researchers. The department participates in a wide range of projects funded by the EU, and played an influential role in the setting up of five spin-offs in the biomedical area (analysis and interpretation of sequencing data in the clinical and research sectors, as well as software solutions for the public health system).

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Bergamo, 03 April 2025