

The approach to service innovation

ATM is constantly engaged in the experimentation and use of new technologies applied to mobility services and the commitment to an increasingly sustainable offer is a fundamental principle of the Group's strategic plan.

In this context, the ATM Group has developed distinctive skills in the creation of platforms for the integrated management of mobility information and has also launched an internal programme aimed at finding innovative and technological strategic solutions for its employees in order to improve the quality of the working environment.

Numerous projects were implemented in 2023 for the purpose of technological innovation for both internal and external customers; among others, we highlight:

- **Maintaining Skills**

During 2023, the Skills Maintenance platform was released as part of the management of the personnel training process aimed at both the attainment and maintenance of certifications and authorisations for operational safety tasks required by current national legislation (Ansfisa), and the management of courses related to the obligations imposed by Legislative Decree 81/08, or other requirements of various kinds such as the management and delivery of managerial courses.

The platform also allows for the controlled distribution and availability of the documentation required to regulate job-related activities with particular regard to those with an impact on operational safety.

- **Data Analytics project to optimise Full Electric bus management with Focus on Opportunity Charger and Deposits**

The data analytics project on full electric bus data and charging infrastructure was successfully launched in mid-2023 and is expected to be completed in early 2024. During this period, the primary objective of modelling data from heterogeneous sources was achieved, incorporating detailed information from service scheduling, AVM data, bus telemetry sensors and charging infrastructure, including opportunity chargers.

A significant achievement of the project was the effective automation of data collection, which simplified the monitoring process. The analysis of consumption from different perspectives, such as car, line, ride, table and charging infrastructure, was made possible by the complete integration of data.

The data will be accessible through reporting on the company platform, offering a consolidated view. Furthermore, usability can be extended via individual production tools such as Excel and Power BI, allowing users to explore and analyse data in a customised way. With the completion of the project, it is expected that the benefits of this initiative will be further consolidated by contributing to better management and optimisation of full electric buses.

- **PoC machine learning on Full Electric bus data**

A trial of machine learning as a Proof of Concept (PoC) for a small number of lines aimed at optimising the recharging of full electric buses was initiated during the April-September 2023 period.

The analysis of travel and energy consumption data contributed to a deeper understanding of operational dynamics.

Preliminary results indicate the need for further adaptations and adjustments. Despite the difficulties, this process is an important step in the mission of sustainable innovation. In addition, PoC provided an opportunity to enhance data collection from field systems, paving the way for future optimisations and improvements.

- **Sale of dematerialised tickets through 'Maas Operators' of the Municipality of Milan**

The Municipality of Milan, within the framework of the National Recovery and Resilience Plan (PNRR) and in accordance with the indications of the Ministry for Technological Innovation and Digital Transition (MITD) and the Ministry of Sustainable Infrastructure and Mobility (MIMS), has launched in 2023 an experiment aimed at the development of new services to mobility based on the MaaS paradigm - "*Mobility As A Service*" and has identified, through the publication of a public notice for expressions of interest, a number of subjects admitted to the role of "*MaaS Operators*".

In this context, ATM set up a digital platform called 'SmartTicketing' through which MaaS Operators could sell dematerialised tickets in QR Code format through their APPs. This platform has been built using technologies that allow ATM's digital ticketing services to be shown according to standards and modern protocols in order to guarantee optimum levels of interoperability, data security and event traceability.

The trial was launched in July and has seen in 2023 over forty thousand QR code digital tickets issued through the APPs of four participating operators (MyCicero, UnipolTech, UrbanNext, WeTechnology).

- **Metro Line M4 Tablet Operators**

Following the opening of the new M4 Metro Line in 2023, all M4 line attendants (around 90) have been equipped with a mobile application on mobile devices (tablets).

This allows them to carry out and track daily checks at the various stations and on the trains of the M4 line, which provide citizens with a daily commute from one part of Milan to another. The greatest advantage of using the application is the ability to track and manage a fault in order to get maintenance staff to intervene promptly, as well as to maintain a high level of inspection throughout the network of the new M4 line.

All this results in greater satisfaction and a better travel experience for citizens, as they travel in a comfortable and constantly functioning environment.

This project ensures that the infrastructure and trains are safeguarded through constant monitoring of their state of operation, proper maintenance and a high degree of safety for citizens.

- **SCADA FULL ELECTRIC - Sarca and Giambellino depots and charging points (Opportunity Charge)**

In order to guarantee the supervision of the charging status of the electric buses, the SCADA system was activated, which monitors in real time the operating status of the electric cabins and charging stations installed in the Sarca and Giambellino depots and the in-line charging points (OC). The supervisory system also integrates the Energy Management System (EMS) function, which allows recharging to be managed smartly, optimising electricity consumption based on the hourly cost of energy, the individual car's service start time and the maximum available power.

- **Stadler bidirectional trams**

The first bi-directional trams have been equipped with ATM's AVM system for the monitoring and management of surface fleets and will soon be in service. In order to ensure the proper functioning of these new trams, double-cab management was designed and implemented. In addition, the new vehicles in question are equipped with an infotainment system that will provide passengers with new audio-visual schedules integrated with next-stop announcements.

- **ATM network**

In order to support the critical *Operational Technologies* (OT) systems used to manage the operation of metro lines 1, 2 and 3, a dedicated high-availability data network with a length of more than 80 km was set up in each station of the above-mentioned lines. The network is based on the state-of-the-art Shortest Path Bridging (SPB) protocol, and is characterised by a very high-speed, redundant fibre optic backbone and the presence of 2 access switches at each station, which are able to offer the necessary connectivity to all existing and future OT systems. The data network is designed to guarantee the Disaster Recovery function that will be activated at the San Donato site over the next year.

- **Technologies for smart mobility**

In December 2023, the public tender for the management and maintenance of the Smart City mobility and safety IT systems and applications was awarded to the grouping formed by A2A Smart City and ATM for a duration of 12 years. This is therefore an important consolidation of ATM's role in the field of innovative technologies for mobility and the smart city used in Milan, such as centralised traffic light control for dynamic traffic management, infomobility with variable message panels, infraction detection systems for access to LTZs, reserved lanes or for running red lights or exceeding speed limits. The service also includes the management of complex LTZs such as Area B and Area C with related authorisation and payment management systems. Also included are the main software systems of the Local Police Operations Centre (intervention management and removal management) as well as the TETRA mobile radio infrastructure used for communication with road patrols.

- **Adjustment of LTZ Area C, Area B.**

ATM, as the technological partner of the Municipality of Milan, has been working constantly on the adaptation of all infrastructures and systems related to the Area B and Area C LTZs with the

aim of maintaining the adherence of IT platforms to all the new measures approved by the Municipal Administration.

Specifically, during the course of 2023, the Municipality of Milan adopted a series of measures to contain traffic and improve air quality, also introducing new traffic bans and environmental exemptions.

Particularly important were the activities to adjust the Area C platform in order to make a revision and adjustment of all entry tickets.

- **Parking**

In order to adopt more stringent measures to combat Parking Spaces fee evasion, ATM has worked to make its control systems more efficient. During 2023, the number of vehicles, equipped with ANPR cameras to automatically check the regularity of payments, was increased to a fleet of 11 vehicles.

Solutions to replace the current handhelds with more user-friendly and technologically high-performance solutions were also tested and evaluated.

- **Integration of ADI alert flows with fines from LTZs**

The Municipality of Milan has developed a service to notify fines to citizens.

The service is open to all those who register on the municipality's website and expressly request to join by indicating the number plate to be "watched out for". For this service, ATM has been asked to make available during 2023 the checks for infringements raised by the systems in the LTZs, Area B and Area C, reserved lanes and speed controls. Therefore, integrations were developed with the above-mentioned fines systems to send the information of the fines to the City of Milan.

The new flows produced complement those already in place for roadside Parking Spaces checks.