Sesamo is today a well-proven platform for toll collection, gate automation and dematerialised electronic ticketing. Its agile and modular software architecture was created in 2005 to manage a wide range of applications related to transit management at the Mont Blanc motorway tunnel.
This case history describes the successful projects that Aitek has developed for TMB-Geïe: a technological partnership consolidated over the years that has allowed our company to grow and become an absolute benchmark in the panorama of toll collection systems and more.
Mont Blanc, where it all started...

This is not just the story of a successful project. It's the story of a long common process of growth, a technological collaboration that has gone far beyond the usual “supplier-customer” relationship.

This partnership was born in the early 2000s, when Aitek became a technical supporter of TMB-Geie, the French-Italian authority that manages the operation of the Mont Blanc motorway tunnel. The opportunity to completely renew the toll collection software in a complex operating scenario such as the Mont Blanc Tunnel was a very exciting challenge for the Aitek's developer team.

Thanks to the collaboration with the IT department of the TMB-Geie and the continuous search for the best technological solutions to meet the customers’ requirements, the result was the development of state-of-the-art tolling systems.

In addition, the experimentation of new technologies and the implementation of ideas and intuitions has allowed Aitek to lay the foundations for the development of new application platforms for the management of functionalities beyond motorway toll collection.

Over the years, these projects have produced great benefits for both TMB-Geie, because it has equipped itself with one of the most advanced toll collection systems and a series of complementary facilities able to optimize the relationship with its customers, and for Aitek, because it has been able to exploit the results of these activities to develop new applications that can increase its business.

In order to understand the evolution and complexity of the interventions carried out over the years, let's take a step back and look at the steps of this partnership.

In the beginning was the toll collection...

It all started in 2005, when the IT department of TMB-Geie decided to update the software for the management of the toll lanes and the center system, relying on Aitek's experience gained at the most important Italian motorway operator.

The first step involved the recompilation of the software already in use and the implementation of a series of evolutionary interventions aimed at improving the efficiency of the collection process.

The new system immediately proved to be highly efficient thanks to its modular architecture, based on the use of a set of software modules that have the task of managing specific functionalities. The integration of these modules according to operational needs allows the development of software applications capable of managing the entire toll collection process.
Sesamo takes its first steps

These solid foundations formed a 'primordial soup', made up of technological and architectural choices, which led to the birth of Sesamo, the Aitek's modular platform employed for applications in different operating scenarios.

Thanks to the development of software modules for a wide range of features, Sesamo systems are able to manage complex systems, ensuring the efficiency and security of logistics and transport infrastructures.

From the modules that process images acquired by cameras to detect vehicle number plates or container codes, to the algorithms for the acquisition - via laser scanners – of the shape of vehicles in transit at a gate, it’s as if the software modules of the Sesamo suite were available on a supermarket shelf... just put in the cart the modules you need to meet the functional requirements of your project and you're done!

The satisfaction for the results, combined with the effective working relationship established between the IT departments of the two companies, led TMB-Geie to strengthen the "technological partnership" with Aitek, involving it in the development of further solutions. In the following years, the Aitek’s scope of action has expanded, thanks to the development of further applications.

Vehicle flow regulatory system

Proper management of the flow of vehicles leaving the toll lanes to enter the tunnel is essential to ensure a smooth and safe traffic flow within the tunnel. To this end, the Mont Blanc Tunnel has always been equipped with a vehicle flow regulatory system that manages the opening of the bars at the toll lane according to the class of vehicles waiting and the class of the last vehicle authorized to access.

In 2010 Aitek replaced the pre-existing "mechanical" system, which detected vehicles at the toll lanes and their class by means of a series of inductive loops placed on the road surface, with a network technologies-based vehicle flow regulatory system.

A special Sesamo algorithm, in compliance with the traffic and behavioural regulations in force at TMB-Geie, enables the access of vehicles waiting at the toll lanes according to their European pollution category class and the class of the last authorised vehicle.

The aim of the system is to prevent the creation of unauthorized "caravans" of heavy vehicles or the time interval between the access of one vehicle and the next is too short.
At 4,807 metres, Mont Blanc is the highest and most imposing mountain in Europe. Located on the border between Italy and France, it is part of the Graian Alps and represents the watershed between the Aosta Valley and Upper Savoy. Predominantly granite in nature, bristling with spires and ridges, carved by deep valleys into which numerous glaciers flow, Mont Blanc is a natural environment of boundless beauty, a paradise for mountaineers who can tackle incomparable routes on rock and ice.

Access management of heavy vehicles: the "Laser" lane

In the same years, Aitek took charge of a particular type of lane, positioned between the toll barrier and the Italian tunnel entrance, specific for the management of heavy vehicles. This fully automatic, unmanned lane communicates with the vehicle flow regulatory system and manages the access of heavy vehicles from the lanes reserved for them at the toll barrier. Contrary to what its name might suggest, this lane has no laser devices, but is equipped with common field devices such as inductive loops in the road surface for vehicle detection, bar and traffic light.

Customer-oriented facilities

2012 is the year of a further qualitative leap. In addition to the toll collection activities, Aitek is committed to the development of applications for ticket generation and validation.

In addition to the prepaid subscriptions (10 or 20 journeys) or the return tickets, further options have been added over the years. These include subscriptions dedicated to particular categories such as haulage companies, which offer discounts calculated according to the total number of transits made throughout the year. Another important benefit is the “carta residente”, set up to satisfy the requirements of the border population that needs to daily travel the tunnel mainly for work.

Finally, a very successful promotion especially during the winter tourist season allows customers to purchase a journey at a reduced price using the ski pass valid for the Courmayeur ski area and the Mont Blanc Skyway. In this case, the Aitek’s software acquires data from the databases of the ski area and manages the ski pass validation at the toll lanes.

The procedure is easy: the data of the ski pass presented by the user at the tunnel barrier are acquired by the toll collector through a special reader. The lane software and center verify its validity, after which a reduced-rate transit ticket is issued.

Like the other solutions developed for TMB-GEIE, the applications for the transit management also represented a first "embryo" of the software applications for the validation of dematerialized travel tickets developed by Aitek for major Italian local public transport companies.

A bit of geography...

... and history

Inaugurated in 1965, the Mont Blanc motorway tunnel is a communication route between France and Italy that is of fundamental importance for the mobility of people and goods in Europe. It consists of a single two-way tunnel with a length of 11.6 kilometres and makes it possible to cross the Alps in just a few minutes (the time required is about 12 minutes at 60 km/h). In 2019, a total of 1.96 million vehicles passed through, with an average of 5300 vehicles per day. (Data and image source: www.tunnelmb.net).
Evolution of payment methods

Electronic payments are now customary and this also applies to motorway toll collection. In order to offer increasingly 'smart' functionalities and reduce the time needed to carry out tunnel access procedures, the Sesamo platform integrates software modules for the management of the POS system, enabling safe payment of transits and subscriptions to the Mont Blanc tunnel.

No pass, no transit!

In 2017, Aitek developed an application for the automated management of heavy vehicle transits at the Aosta regulation area. Vehicles that have an overall MAM (maximum authorized mass) exceeding 3.5 tons (Trucks, buses and exceptional convoys), before entering the Mont-Blanc Tunnel, must receive authorization at the regulation area located 44 kilometres downstream from the Italian entrance, where laser sensors placed on appropriate portals perform geometric scanning of vehicles to determine their dimensions.

Their compliance with the transit conditions is certified by a pass, issued after the dimensions of the vehicle and the European pollution category have been checked. With this pass, the driver can continue the journey to the Tunnel, otherwise the vehicle must stop at the regulation area waiting for an exceptional transit is authorized.

Also in this case, Sesamo modules have allowed the complete automation of the process, since the results of the measurement carried out by the scanners, associated with the vehicle's license plate acquired through a special camera equipped with OCR technology, are sent in real time to the system that manages the exit from the regulation area. When the driver receives the pass, the bar rises and the vehicle can continue its journey towards the Courmayeur toll plaza.

A future-oriented partnership

Innovation. This is the keyword behind all the investments made by TMB-Geie since the reopening of the Mont Blanc tunnel in 2002 after the fire three years earlier.

A virtuous process that put the most advanced technologies at the service of the safety and efficiency of plants that must manage a particularly critical infrastructure such as a motorway tunnel. This is an ideal operating scenario for Aitek, always committed to develop cutting-edge technology solutions.

The results certify this: Mont Blanc's toll collection and transit management systems are a flagship in the international panorama of ITS systems; state-of-the-art technology in one of the most complex motorway systems in terms of the variety of systems, procedures and accessory functions.
Aitek’s technologies on the roof of Europe