# OUR POST-COVID VIEW ON SMART TRANSPORTATION

An Appendix to Engineering The New Normal.



@Copyright Engineering. All rights reserved.

# WHAT ARE WE DISCUSSING?

I	What happened	2
II	Our vision of the market	4
ш	Our Positioning and Solutions	6
IV	Building the New Normal	16



The Covid-19 emergency represents a stress test for the transportation industry and for its operators: public and private companies, airports and railway infrastructures managing authorities, etc. Even more delicate is the situation for local public transport, which has to ensure access to cities for people and goods without any service interruption. New security measures, characterized by social distancing, have questioned the rules and practices of passenger transport. **How to react to the current liquidity crisis resulting from the collapse of demand?** It is essential to manage today's challenges to guarantee the existing demand for a "safe" mobility and, at the same time, to look towards the future, investing without hesitation. The latter will be vital for those who want to be ready and competitive during the phases of recovery: indeed, this is the time to carry out interventions that in normal conditions would have brought disruptions and limitations to transportation services.

The urgency is now to **employ innovative technologies** to support rational travel planning, in order to ensure a balance between the different modes and spaces available, and the best possible speed, ensuring adequate frequency of public transport.

We must invest to **streamline travel**, ensuring maximum safety for people (social distancing on docks, airport gates, etc.) as well as public transport's frequency. This involves synchronizing communication (to operators and users) and rebuilding trust with passengers (e.g. ensuring enough space within all means of transportation, sanitation, etc).

Almost all companies operating in the transport sector are therefore called to make a real leap forward to innovate and improve the service in its complexity, combining efficiency and passenger security.



# OUR VISION OF THE MARKET

In Engineering we support the evolution of the market with a particular focus on the safety of people and infrastructures. Taking advantage of these competences, even in the post-Covid period, **our offering portfolio represents an innovation program** that can create value for all players in the sector: a portfolio of services, products and solutions, ranging from ranging from automation and control systems, to systems for monitoring, diagnostics and maintenance of infrastructures, from physical security systems for operators and users to network security, with an offer increasingly aimed at a new kind of mobility.

We adopt **Digital Twin** technology to perform simulations to understand and predict real-time behavior of infrastructures, acquiring data from IoT sensors. We provide **Virtual Collaboration** solutions for the remotization of field activities with **AR/MR/VR** and support **construction sites management** according to all Covid-19 safety protocols. We offer solutions to manage **controlled access to common areas**, **Video Analysis systems**, simulation tools to manage flows and analytics tools to manage open areas (terminals, parking lots) and users.

#### Smart Infrastructure **Smart Transportation Smart Mobility** RAIL & ROADS AIRPORTS PORTS LONG HAUL PUBLIC TRANSPORT **MOBILITY AS A SERVICE** 惖 0 ÷ ::: 備马 æ O Automatic Fare Collection O Safety Systems O Automatic Vehicle Mana TLC Systems On-board Systems O Data Analytics User Centered Focus Integrated Proc & Infrastructure Automation & intellige Capabilities O Pricing & Pay Models O Security DATA MONETIZATION ENABLING SERVICES UX & Service A Business Digital C & Strateg Cloud Ser ENABLING TECHNOLOGIES Al & Advanced Robotic Process Digital Cybersecurity 充 ют • AR / VR / MR Blockchain

# Smart Transportation

# OUR POSITIONING AND SOLUTIONS

Engineering works on a global level with the main players of the Transport and Infrastructure market to ensure the **reliability and safety of data-based mobility services** dedicated to people, goods and infrastructures.

In detail:

- we provide solutions for the transport and for infrastructures that enable the movement of people and goods
- we support organizations that manage railway and metropolitan transport networks in providing services and solutions and in ensuring the safety of infrastructures and passengers
- we collaborate with Central and Local Public Administration providing solutions for the management of local and regional public transport and integrated sustainable mobility projects.

In order to guide market players in the creation of their **New Normal**, we have identified the lines of action that these can follow and our solutions in the short and medium / long term. **Digital Transformation** represents an important challenge and opportunity for transportation infrastructures and mobility. This market is evolving facing innovative challenges to be able to:

- Guarantee adequate transport capacity to minimize impact of restrictions
- Comply promptly with quickly evolving health and safety procedures
- Minimize impact on company profitability
- Communicate and assure confidence to passengers and employees



#### **First Steps in a Post Covid World**

**Digital Transformation** is playing a crucial role in this scenario and must be further leveraged. Within a mass transport context, the main measure adopted by most governments is social distancing. Technology can help assuring and monitoring a safe and viable transport service.

The lines of action represented in the previous table are described in more detail below, specifying the challenge to be met and our solutions and skills that can support it.

#### Protect Productivity

#### Ensure business continuity and staff health with a new organization of the workplace and the adoption of Smart Working

#### The challenge

As long as we will live with the virus and comply with social distancing rules, all players in the sector will have to ensure the safety of travelers and workers of the sector.

#### Our offer

In Engineering we have created solutions that allow to manage and monitor social distancing of operators, combining a deep knowledge of the processes with the various rules imposed by the bodies in charge of emergency management.

 Smart Proximity: our integrated platform that monitors and foresees risky behavior of personnel in the workplace, intervening in real time if safety distances are violated, in any environment, indoor and outdoor.

To redesign the work organization and enable Smart Working activities, we have developed cloud platforms that support the digitalization of work and the **Digital Workplace** through collaboration tools that guarantee secure sharing of information, allowing companies to operate in different locations, at global level:

- Digital Workplace and remote collaboration tools, both from the market (Microsoft Office 365) and developed by us with open source and secure technology, to enable innovative and effective ways of working, thanks to worker-oriented technologies and organizational models. In particular, the LiveBox suite manages secure collaboration and information sharing, and enables workflows to automate business processes. In addition, the GO module is a product designed for organizations that, by employing staff abroad, have to fulfill the obligations deriving from Legislative Decree 81/08, supporting their resources while traveling and introducing advanced monitoring and analysis tools.
- Change Management programs to support the New Normal through strategies and tools useful to organize, incentivize and supervise the efficiency and productivity of the employee, and to ensure that he has the right training and assistance.



# Increasing the efficiency of operating processes of companies by freeing up their resources towards activities with greater added value

#### The challenge

Employing Robotic Process Automation (RPA) processes to provide the right value to human time through:

- reduction of downtime in a process through automated asynchronized tasks
- reduction of staff training times through automated support in carrying out an activity
- reduction of audits and compliance checks thanks to the continuous monitoring of a robot
- aggregation of information from heterogeneous data sources.

#### Our offer

- We use RPA and Advanced Process Automation solutions to free economic, physical and human resources from work activities that require more basic skills, allowing companies and organizations to redirect them towards activities with greater added value. In this way we enhance the human dimension of work, improving end user satisfaction and optimizing the organization's performance.
- We provide Consulting, Implementation Services, Managed Services, Software Packages or Cloud-based service platforms.





Understand and predict real-time transportation and critical infrastructure systems, manage user flows and common areas (terminals, parkings, etc.)

#### The challenge

It is necessary to exploit the full potential of **Artificial Intelligence** and the **Internet of Things**, which with its intelligent sensors has led to the increasingly widespread adoption of management and decision strategies based on the <u>Digital Twin</u>: the sensors collect information on the current state of the infrastructure and the mathematical model anticipates the analysis of abnormal behavior or that, more generally, deviates from the expected behavior, hence supporting the decision-making process.

#### Our offer

- From the Design (or planning) and Build (or construction) phase of the infrastructures to continuous monitoring in the Operation and Maintenance phases, and thanks to our skills and knowledge of the Digital Twin, we support decision-making processes from the infrastructure design phase to monitoring during operation, integrating IoT and AI & Advanced Analytics technologies.
- e-SCM: our system that allows you to manage the construction site, during the construction phase, from an administrative and regulatory point of view (including the authorizations needed to operate) and to monitor workers, assets used, status of activities and human resource allocations. The system also allows the management of PPE, regulations, training and health surveillance.
- a new Business Intelligence Platform for transport service managers that allows to perform demand analysis and proactive service planning, in order to quickly understand the changes in the service and monitor interventions:
  - Analysis of the new demand based on actual crowding volumes of areas (stations, stops, terminals, vehicles)
  - Monitoring of sanitizations and evaluation of costs
  - Relationship between the gradual recovering of movements and any rise in infection (second wave)
  - Forecast analysis of the possible demand based on the measured crowding
  - Analysis of lost sales in the lock-down time and re-projection of results on the second-third quarter
  - Analysis of the status of personnel and resources (employment, availability, etc.)

The platform also acquires data from heterogeneous data sources that may already be available (e.g. proximity sensors, booking systems, ticketing, access control, video surveillance, company management, Open Data) and allows you to evolve towards predictive logics, also through integration of AI modules.

- innovative solutions to support Operational Centers for:
  - Rapid identification of critical areas and situations through video analysis displaying graphical and intuitive heat maps linked to with a high flow of users
  - Carrying out remote commands on the infrastructures (gates, turnstiles, etc.) for the proactive management of the flows of travelers in areas with high turnout (Crowd Management)
  - Timely communication to field staff to solve critical situations
- innovative solutions to optimize crowd management through the use of Digital Twin & AI. These simulate the flows of passengers arriving and departing in a railway and airport terminal with the dual objective of anticipating the emergence of possible critical events, understanding how to deal with such problems, validating ex ante the impact on the routes for travelers inside the terminals or the modification of the existing conditions. With a hybrid approach between modeling and simulation we are able to carry out:
  - Graphic modeling of passengers on the layout of the terminal, based on the arrivals and departures of the carriers, also taking into account the points of interest (commercial premises, waiting areas, ticket offices, display boards, etc.)
  - Graphic modeling of the entrance and exit doors (to and from the protected area). The authorized operator can act on the gates and turnstiles (e.g. opening / closing / change of direction) as an operating lever to manage unexpected and unwanted situations.





### Protect Business

Guarantee IT security and data protection, safeguarding the systems supporting infrastructure and the safety of travelers

#### The challenge

All players in the sector must guarantee industrial security (OT - Operational Technology), which has become an increasingly central issue in light of the growing pervasiveness of digital innovation in critical infrastructure management.

The growing diffusion of IoT presumes the interconnection of systems and devices and the integration of sensors and devices in the network, which generate and exchange huge amounts of data in real time. This creates an expansion of the attack surface where it is easier to receive cyber threats.

#### **Our offer**

Thanks to our knowledge in Cybersecurity and the solutions of Cybertech, a Group company specialized in IT security, we are able to offer solutions and skills on:

- segmentation of the network, which is divided into non-communicating parts or separated by security checks in order to limit a possible problem in a single segment, preventing the spread of the threat
- solutions for access control to information systems and privilege management, which
  regulate authorizations on individual components of a system in order to prevent access by
  unauthorized and potentially compromised devices or users
- network monitoring and log analysis, useful both for detecting intrusions and as a support for investigative and analysis activities
- specialist vulnerability assessment and penetration testing activities
- organizational models more generally known as Cybersecurity Governance.



We also provide our SOC (Security Operation Center), which allows you to

- manage the safety alarms received by the Safety Monitoring
- analyze the causes of intrusions in IT systems
- **obtain useful information** to determine the nature and impact of the cyber attack
- guarantee the control, monitoring and 24/7 identification of security events.

Thanks to our skills and solutions, we can identify, prioritize, analyze, classify and subsequently notify the functions in charge of any potential or actual cybersecurity threats and incidents detected; we can therefore limit and contain IT threats, allowing the customer to quickly restore the normal operation of services and systems.



## Grow Business

Innovation of public transport services and monitoring of environmental parameters to guarantee sustainable mobility

#### The challenge

Innovate transportation services with enabling technologies to optimize the management of social distancing rules and vehicle traffic and optimize travel operations avoiding critical issues and accidents.

#### **Our offer**

- Solutions for the management of operations, for security systems with advanced video analysis, for baggage and cargo management, for infrastructure monitoring and maintenance
- Measurement system for crowds on public transport and in stations and public areas (stops, stations, docks, depots, etc.) through the acquisition and analysis of data from heterogeneous sources such as:
  - Beacon
  - Images and video streams
  - Access control systems

our platform detects the presence of individuals and measures crowding with respect to the set parameters.

It can operate by acquiring information from any systems already available:

- via APP that acquire the beacons positioned in the points of interest (vehicles, stops, etc.)
- through the acquisition of data from any attendance detection system
- by means of video analysis of images and / or video streams acquired from video surveillance systems already available or newly installed. In particular:
  - Video Analytics systems constantly check whether passengers wear protective masks
  - Thermal scanners identify individuals with body temperature beyond the allowed limits
  - If placeholders are defined, it is detected whether the passengers are in allowed locations
  - Using existing cameras we implement algorithms for counting passengers

To improve the travel experience, reduce waiting times in shared areas thus ensuring the safety of travelers are provided through specific APPs capable of integrating travel time forecasting including queues in waiting areas, gates, check-ins, security checks, etc.

At the same time, an automatic system for seat reservation on line buses has been implemented to plan the trip, indicating the desired ascent and descent stops. The platform verifies, on the basis of the reservations already acquired, the availability of places on the requested route and manages the acceptance of the request.







Support with Virtual Collaboration remote field activities and site management according to Covid-19 safety protocols

#### The challenge

In order to guarantee maintenance and Technical Inspection activities in this historical moment, it is increasingly necessary to adopt processes and tools to carry out even complex activities remotely.

In addition to safeguarding the safety of operators, our solutions bring significant reduction in costs lallowing to arrange activities differently from the past. Technologies also enable Virtual Collaboration features that allow you to document the activities carried out to capitalize on all the experiences in the field. This new way of carrying out the activities allows you to better manage the experience of qualified personnel who can become the technological focal point of operators in the field with less technological experience.

#### Our offer

- SPACE1, by OverIT, an Engineering Group company, based on AR / MR / VR technologies, for the management of work progress remotely and for testing materials
- Geocal, by OverIT, to improve the activities on the field controls through drones and other automation toolse

# Diversify and evolve mobility with a new approach to services and environmental impact

#### The challenge

Everyone is wondering about the present and future of the transport of goods and people, where to direct investments and which direction to take also by calling into question our lifestyles and behaviors. It is not easy to change the rules of the game without capitalizing quickly and bravely using technological developments.

#### Our offer

Only by changing the current paradigm of public transport can companies continue to guarantee a vital service for the community, managing this historical moment as a point of discontinuity. Systems that guarantee **flexible transport** and **social distancing** are associated with Smart payment and support solution for MaaS services.

**MaaS (Mobility as a Service)** is a business model for the provision of services with the personalized use of a bundle of public and private transport: trains, buses, taxis, cars, bike sharing and more. Consequently, information to the public can make the flow of users more efficient towards transport services and increase integration between multiple means.

In the use of private vehicles, our sharing solutions will facilitate non-polluting transport. In fact, interest in **measuring and controlling environmental parameters** impacted by traffic is increasing and real-time traffic measurement is needed for dynamic and adaptive management of vehicle flows, so as to allow access to communication routes with environmental sustainability criteria.





16 ANGLO IPIISH

111

THE R. P. LEWIS CO., LANSING MICH. OTHER DESIGNATION. INCOMPANY AND A DESCRIPTION OF A DESCRIP

-----

den S

R MIR AND

15

11111

111111

111111

אווווו

F

1111 11 R.

---------------------------

There's no doubt the world has changed. New values, new rhythms, new models. Everyone is wondering how to rebuild and what direction to take. It is a time when the answer has to be found by asking the right questions. Questioning the status quo. The rules of the game have changed and perhaps the game itself will change. How to combine the definition of core values to generate ideas, how to learn from other markets, or how to capitalise quickly on technological developments.

New Normal will speed up the use of data to create value: these recent months have shown the power of data transversality and how, around them, we can create quickly services and virtuous ecosystems. **The walls between one vertical and the other will increasingly be mental barriers**, we must then give life to new partnerships, designing and creating digital ecosystems based on technologies transversal and enabled by vertical services. These are the most important challenges to face. And we at Engineering have the strategic vision and operational capacity to accompany our customers in this challenging journey. Every day, we experiment and measure the potential for change of the new enabling technologies coming out on the innovation scene. But we also know how to do this gradually and strategically, in order **to ensure the harmonious and sustainable evolution** of the complex system of skills, processes, infrastructures and services of the organisational context in which we operate.

It is with this strategic ecosystem-based approach that today, we can partner with our stakeholders to build a New Normal that follows the paradigms of Digital Transformation: a path that starts with the restoration of specific business values and continues up to the recognition and involvement of the various networks of relationships and transactions that define the internal organisational system and that relate to it externally. Directly (customers, suppliers, partners, etc.) and indirectly (physical, social, economic, environmental, technological, cultural/educational system, etc.).

An intervention – the one we have adopted – that invests in innovation and not in technology: because first and foremost it focusses on the ability of the organisational body to react to the crisis, to face and resolve all the pre-existing rigidities on the supply and demand side, to then proceed to build, based on unexpressed potential and on the new value proposition, its very own specific and solid construction of the new New Normal business model.





Our toolbox consists of:

- A Co-design Framework, for the generation of ideas focussed on the innovation and transformation of the business model and for the joint design of prototypes of "ecosystem"based solutions and platforms;
- Change Management and Maturity Assessment processes, to assess the strengths and areas for improvement of the organisational system and its positioning with respect to the business context in which it operates;
- **A Multi-Industrial Experience**, for sharing the experience, skills, processes and solutions that our Group has matured in the specific business chains and which become transversal when they intersect and can enhance or condition the customer's new innovation model;
- An Ecosystem View, designed to offer integrated and coherent services models that enable "user-centred" views (e.g. Digital Citizenship, Mobility).

There is no perfect solution for overcoming this crisis and building the so-called New Normal. But there is that sought-after ability to imagine, to create and to develop the open "peer production" solution based on a collaborative, synergistic and iterative approach: always able to give the best answers to the new innovation questions.

#### WITH THE COLLABORATION OF:

#### Alessandro Castiello D'Antonio

Group Portfolio Innovation Advisor, Engineering

alessandro.castiello@eng.it

in Alessandro Castiello D'Antonio

#### **Emilio Ghiglino**

Business Strategy, Industry, Services & Infrastructures, Engineering

emilio.ghiglino@eng.it

in Emilio Ghiglino

#### **Piero Luisi**

Director Smart Government Innovation, Engineering

piero.luisi@eng.it

in Piero Luisi

# ENGINEERING

Engineering is one of the main players in the field of Digital Transformation of public and private companies and organizations, offering an innovative offer targeted at the main market segments. Together with its subsidiaries, the Engineering Group is committed to pushing the envelope as regards the application of emerging technologies. It also works in the area of system implementation and integration and on redefining processes in order to promote innovation for the benefit of businesses and Public Administrations.

> With around 12,000 professionals in 65 locations spread across Italy, Belgium, Germany, Norway, Republic of Serbia, Spain, Sweden, Switzerland, Argentina, Brazil and the USA, Engineering manages projects in over 20 countries, supporting customers in the business areas where digitalization is having the biggest impact. Its products and services cover all strategic sectors, including Digital Finance, Smart Government & E-Health, Augmented Cities, Digital Industry, Smart Energy & Utilities, Digital Media & Communication. The group aims to help change the way in which the world lives and works, by combining technological infrastructures organized in a single hybrid multicloud, the capability to interpret new business models and specialist competences in all next-generation technologies: AI & Advanced Analytics, Cybersecurity, RPA, Digital Twin, IoT, Blockchain. With significant investments in R&D, Engineering plays a leading role in research, by coordinating national and international projects thanks to its team of 450 researchers and data scientists and a network of academic partners and universities throughout Europe. One of the group's key strategic assets is its carefully considered staff training policy. Engineering, since 1999, has had its own dedicated multidisciplinary training academy, the "Enrico Della Valle" School of IT & Management. With 300 certified trainers and hundreds of courses, the School has delivered more than 19,000 days of technical, methodological and process training during the last year.

www.eng.it/en



www.eng.it

9 @EngineeringSpa

in Engineering Ingegneria Informatica Spa

