

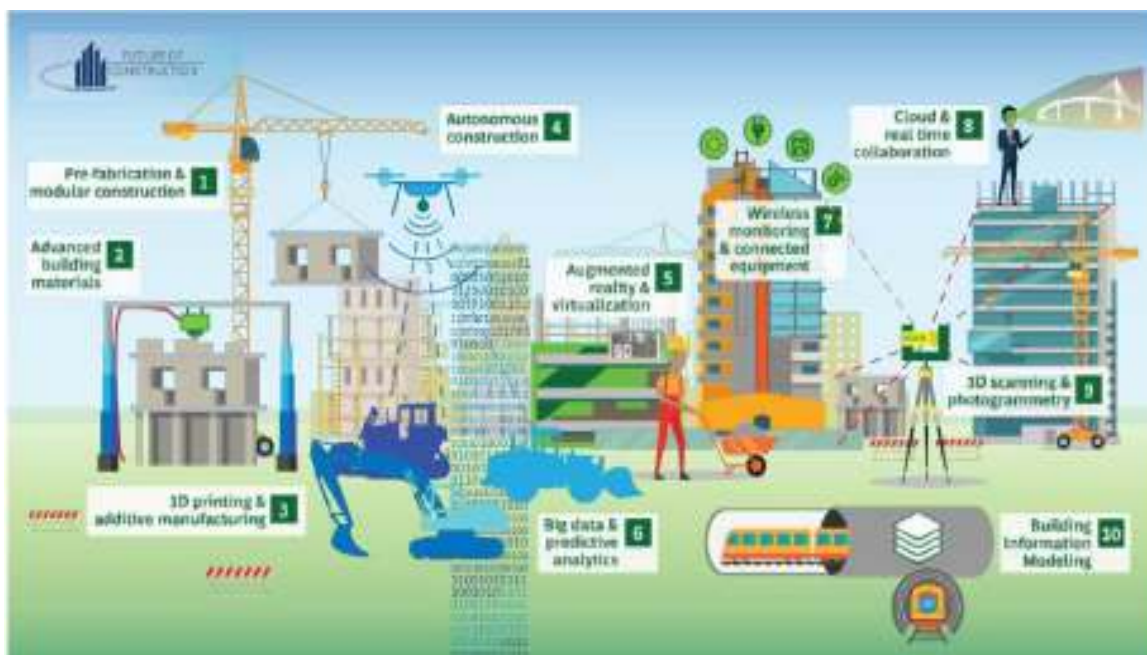


Construction site 4.0: Digitalization of Construction Worksites

Digitalization in Construction Worksites



Infrastructure and construction industry is still today one of sectors staying out in the new technological era, known as the Fourth Industrial Revolution (*according to World Economic Forum*)



DIGITAL TECHNOLOGIES

IoT

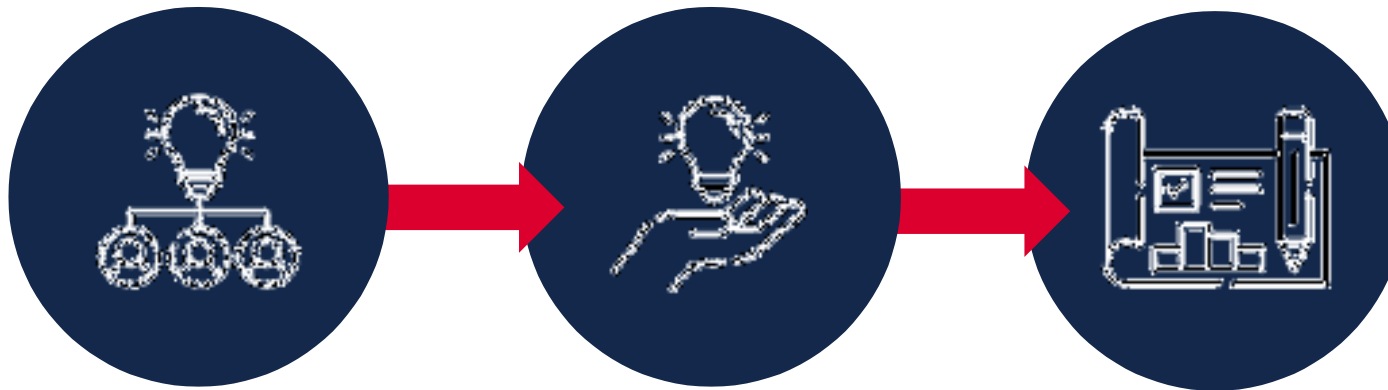
Drones (unmanned vehicles)

Artificial Intelligence & Robotics

Enhanced BIM & Digital Twin technology

Wearable Technology for Workers

Construction Site 4.0



One among many answers to support digitalization in construction worksites but in our case the result of genuine **Innovation Process** building on:

- *Our expertise in the safety of construction works*
- *Our expertise in the management of construction sites*
- *Our expertise as system/technology integrator*
- *Our knowledge of the most advanced technologies in the construction sector*
- *Specific recent projects experience in both industrial and construction sites*

What is?

The **Construction Site 4.0** is a **temporary and articulated production system** that is part of a wider **one** interacting with a **number of stakeholders** with extremely different profiles, **aimed at guaranteeing operational continuity** in compliance with the related regulatory framework through the use of the **most advanced technologies**

The Construction Site 4.0 does **not replace** the responsible persons at the job site and their responsibilities as set by laws, **but it is configured as a tool to support and / improve their work / duties** according to the needs of the commissioner and stakeholders





Needs addressed and streams integrated

Needs addressed:

- Increasing operator's safety
- Minimising work interruptions and consequent delays
- Reducing risks of economic and legal damage

Streams integrated:

- Site Safety and Security integrated with site processes
- Environmental Management
- Waste Management
- Vehicle and Equipment Management
- Access Management



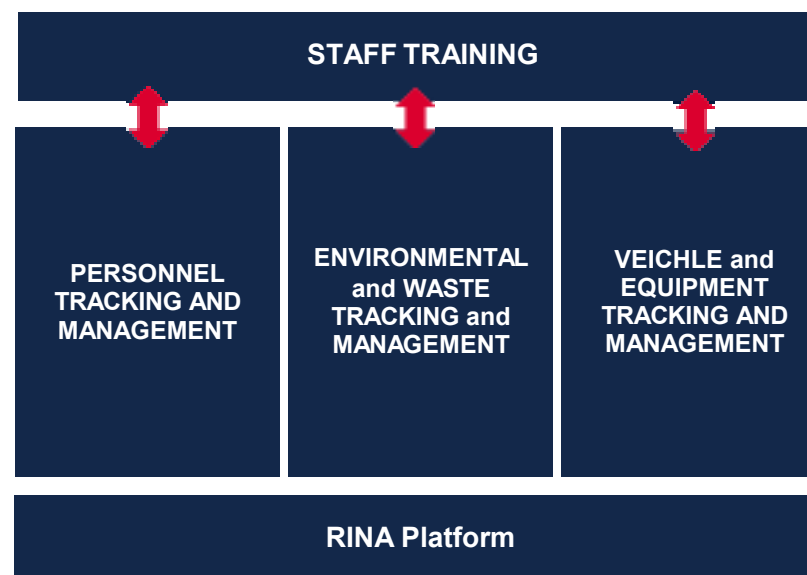
The Constuction Site 4.0 is Connected & Collaborative

How it is structured

The **Construction Site 4.0** is structured through the **use of different technological tools** that respond to the needs in the field

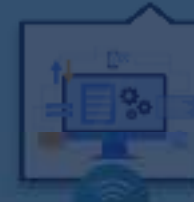
The tools are integrated through a **Single Management Platform** and organised in 3 sections: **Personnel Tracking and Management**; **Environmental and Waste Tracking and Management**; **Vehicle and Equipment Tracking and Management**

The Construction Site 4.0 is equipped with **sensors, cameras, monitoring units, RFID codes**, etc. that communicate with a **single management platform, the “RINA Platform”** that integrates the different data stream into a single solution



The **RINA platform** «digitalizes» the site and monitors persons, equipments, materials (IN/OUT) within it, providing a single access point to support decisions

Construction Site 4.0



Materials Management
Each material within a construction site is to be categorized with an identification code through **RFID and/or QR Code labeling**. Access to Database through **RINA Platform**.



Materials
Management



Construction Site 4.0



Geofencing for areas control

The system monitor in real time the presence of personnel in one or more operating dangerous areas. The system has a **multisensor reading** capability, in addition to the great detection range.



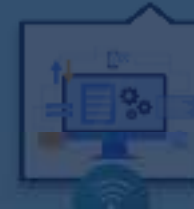
Geofencing for
areas control



Materials
Management



Construction Site 4.0



Environmental
Monitoring System

Geofencing for
areas control

Materials
Management

Access control



Environmental Monitoring System

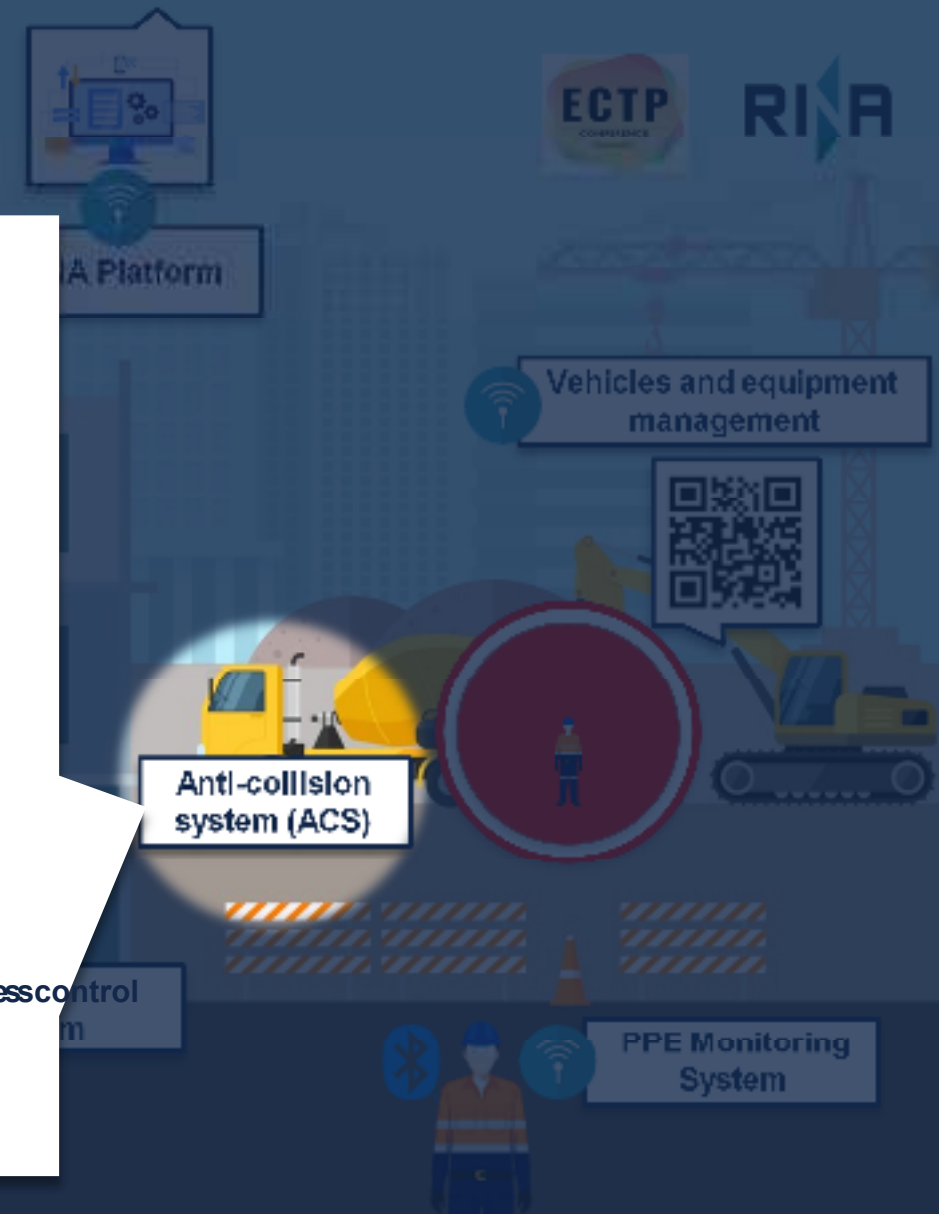
Environmental data on **emissions** are collected and transmitted in real time to **RINA Platform**. AI algorithms and ML techniques are used to compare the monitoring results to baseline, considering also meteo conditions, ongoing operations etc.

Construction Site 4.0



Anti-collision system (ACS)

Helps to **prevent the risk of collision** between **workers** and **machines** combining the use of active tags on vehicles and operators, real time geolocation, geofencing etc. On field alarms, remote control features and data analysis for safety improvement actions can be set up.



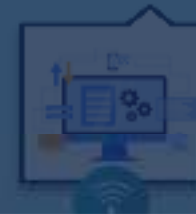
Construction Site 4.0



Access control System

The system manage, **authorize**, monitor and store every entrance/exit of authorized personnel and vehicles.





PPE Monitoring System

The system monitors the correct use of **personal protective equipment** (helmet, harness, shoes, etc.) through the continuous monitoring of the status of the BLE tags installed on the PPE. “Man down” function and related geolocation is included.



App



Control Room



RINA Platform

Vehicles and equipment management



PPE Monitoring System

Construction Site 4.0



Vehicles and equipment management

Each machine is physically associated with an **identification code (RFID and/or QR Code)**. This allows to perform any type of field inspection using devices such as **gun-like smartphone** verifying and updating the asset status.



Vehicles and equipment management



PPE Monitoring System

Construction Site 4.0



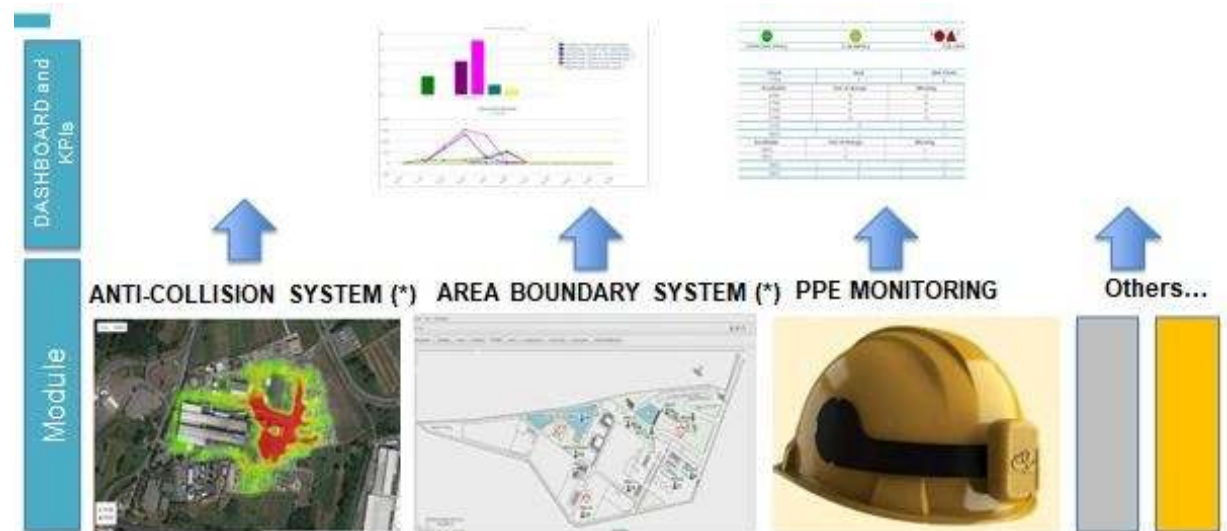
RINA Platform

RINA Platform unifies in a single interface all the features including the management systems of ACS, PPE, etc.

It can also collect external data and interfacing with other platforms.

It is interoperable with legacy systems used for the management of the

Worksite
Management



(*) module interface provided by RINA's service provider



Make it sure, make it simple.

Clemente Fuggini, clemente.fuggini@rina.org