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Διαδίκτυο των Πραγμάτων - Internet of Things

Πρακτικές εφαρμογές και
ωφέλειες για τις
επιχειρήσεις με ορίζοντα
ένα ζωντανό
οικοσύστημα IoT





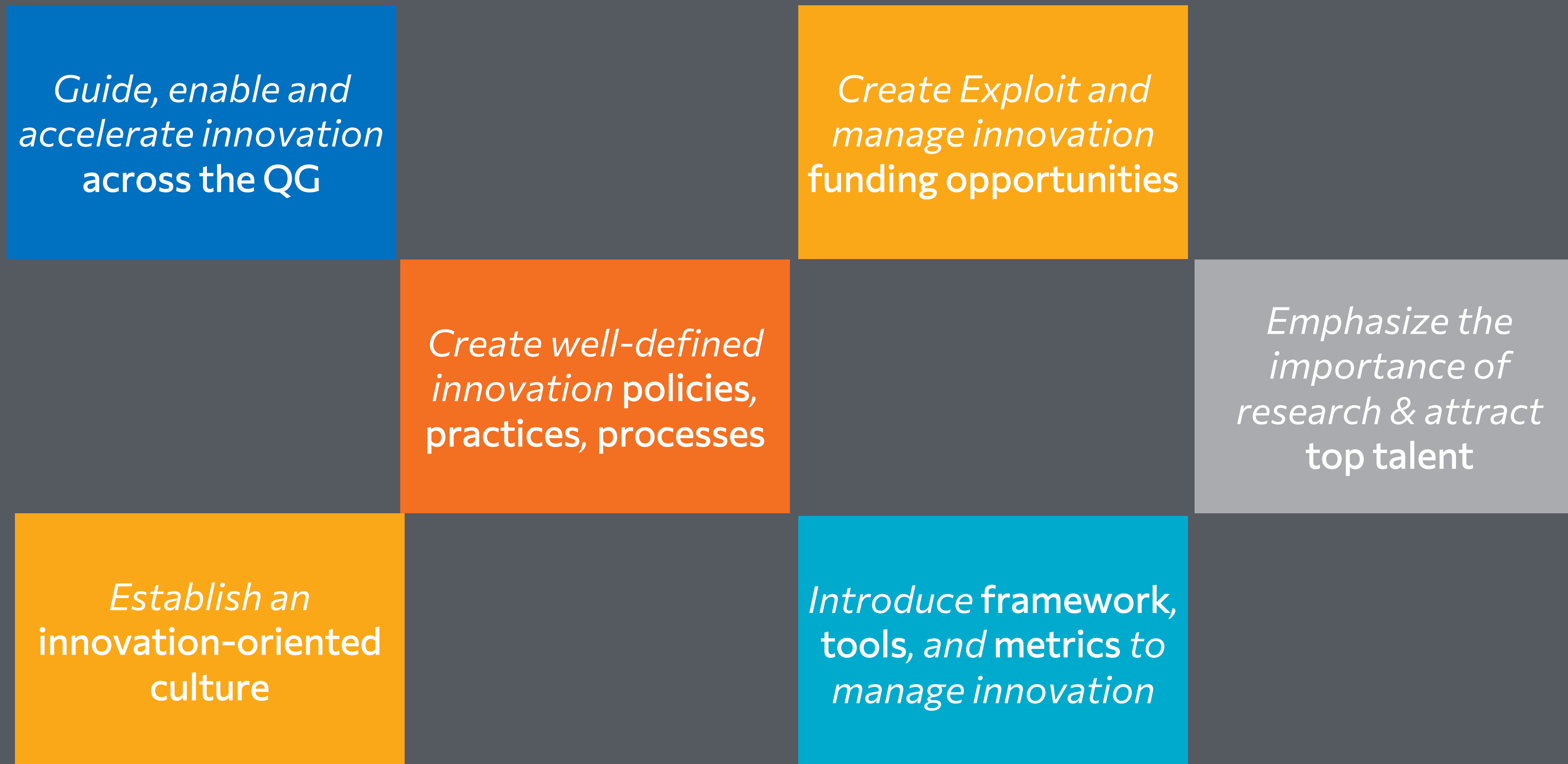
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iQnovus
an Open Innovation Ecosystem

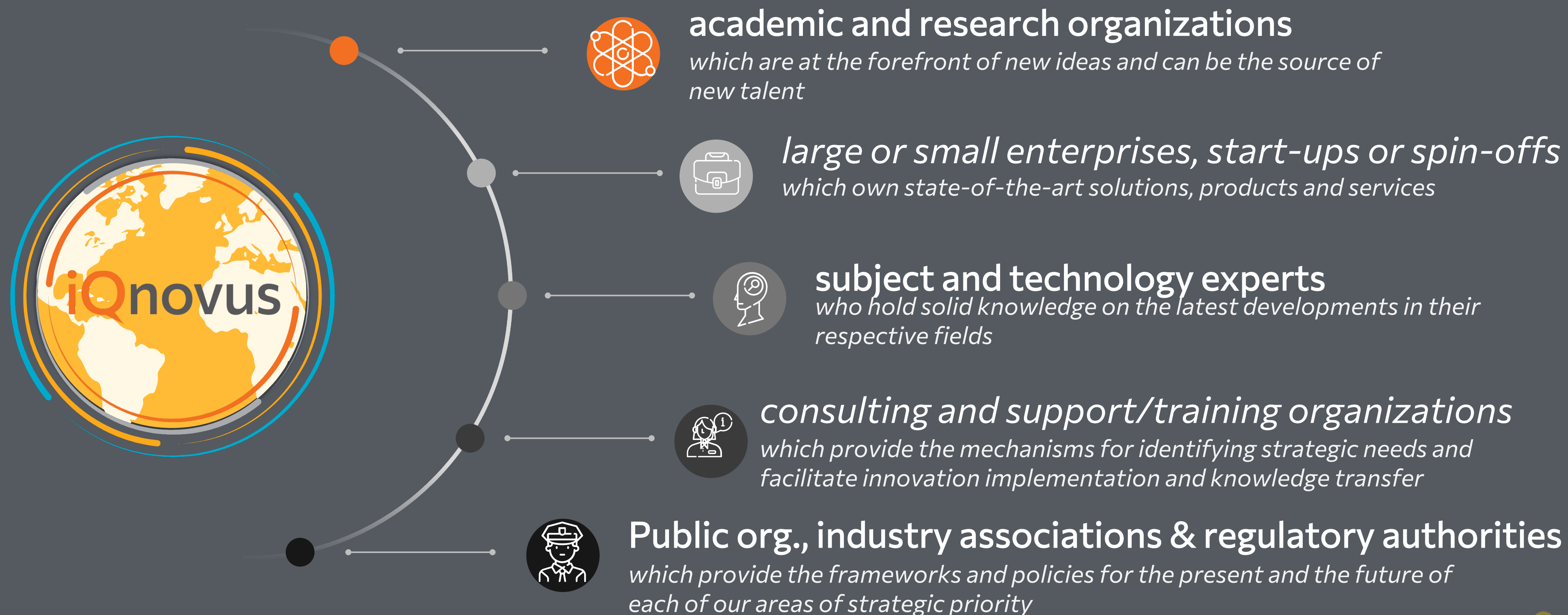


iQnovus – innovation towards an open vibrant ecosystem

Foster & Facilitates the Research and non-linear Innovation in Uni Systems and across the Quest Group



An open vibrant ecosystem



An open vibrant ecosystem

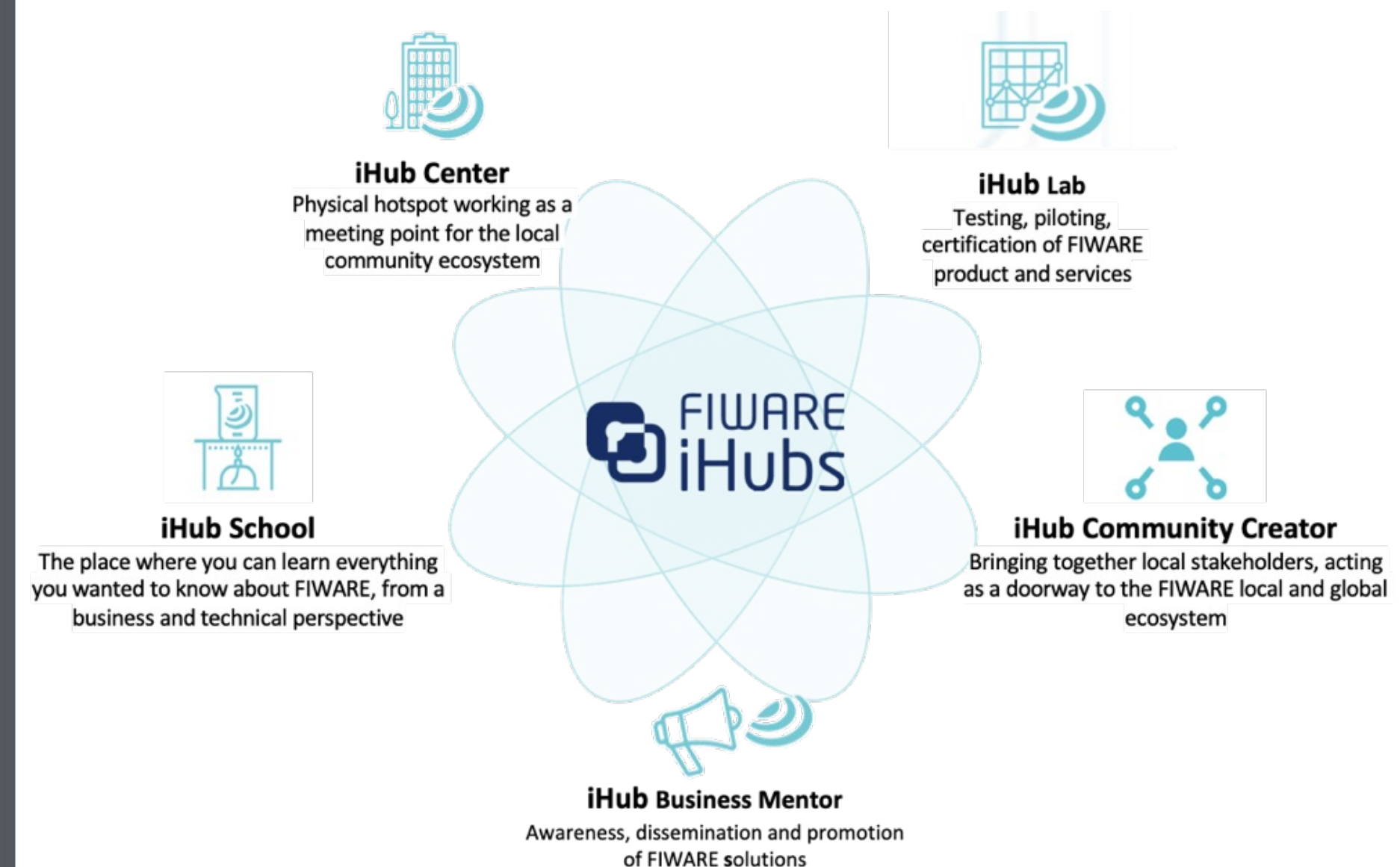
Supporting innovation & collaboration
(October 2020)



The Cluster aims at developing and promoting IoT technological innovation through coordinated efforts of its members.

More than 45 Key members comprises of research centers, universities, large companies, SMEs with specific expertise and start-ups, each one playing its own and significant role in the ecosystem

Uni FIWARE Greek iHub
(October 2020)





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Internet of Things

Smart Buildings



Smart Building – The problem

The Data collected by HR, from employee satisfaction questionnaires, revealed that 4 indoor environmental factors affected employee satisfaction levels.

A holistic approach required to solve the problem



Indoor Environmental Quality

(IEQ) - Aspects

Thermal Comfort

Measure
Air temperature,
humidity
in the working area

Air Quality

Measure
CO2 levels
in the working area

Lighting Quality

Measure
quality of lighting
in the working area

Acoustic Comfort

Measure
noise
in the working
area

IEQ - The IoT System / Sensors

3D camera sensor



The APS-90E combines a smart, highly dynamic stereoscopic camera with enough on-board computing power to pack precise image processing



Environmental sensors



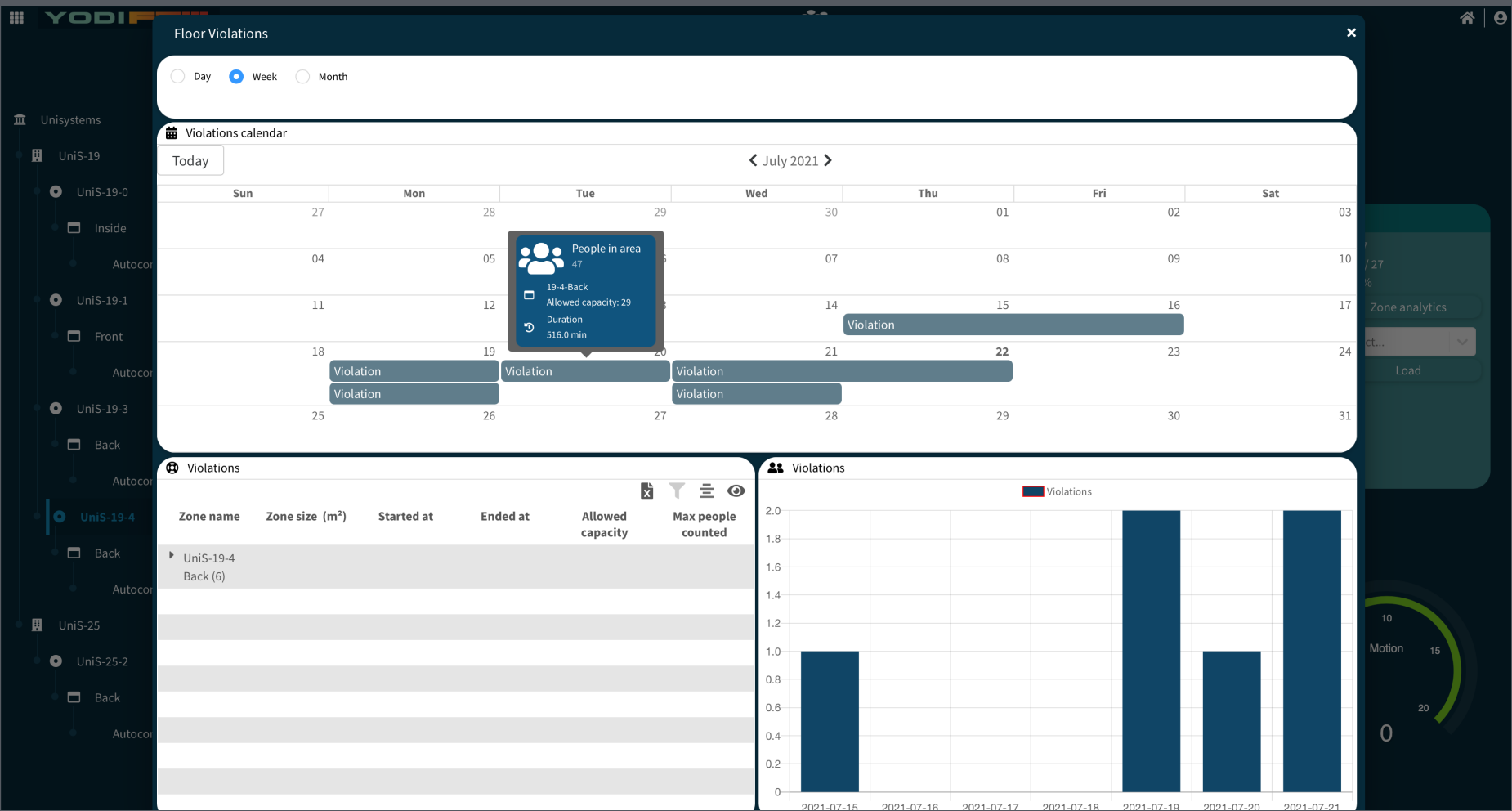
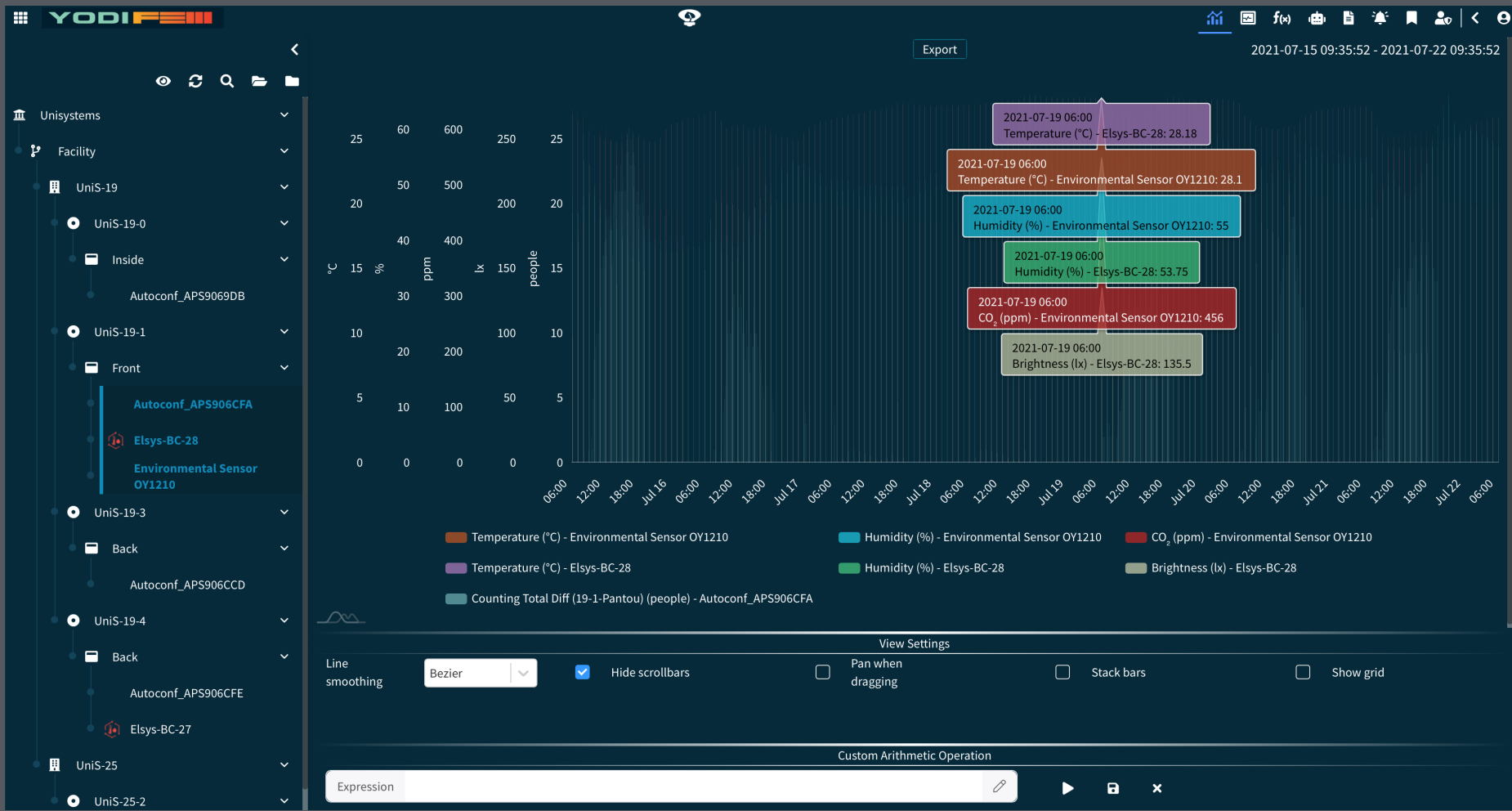
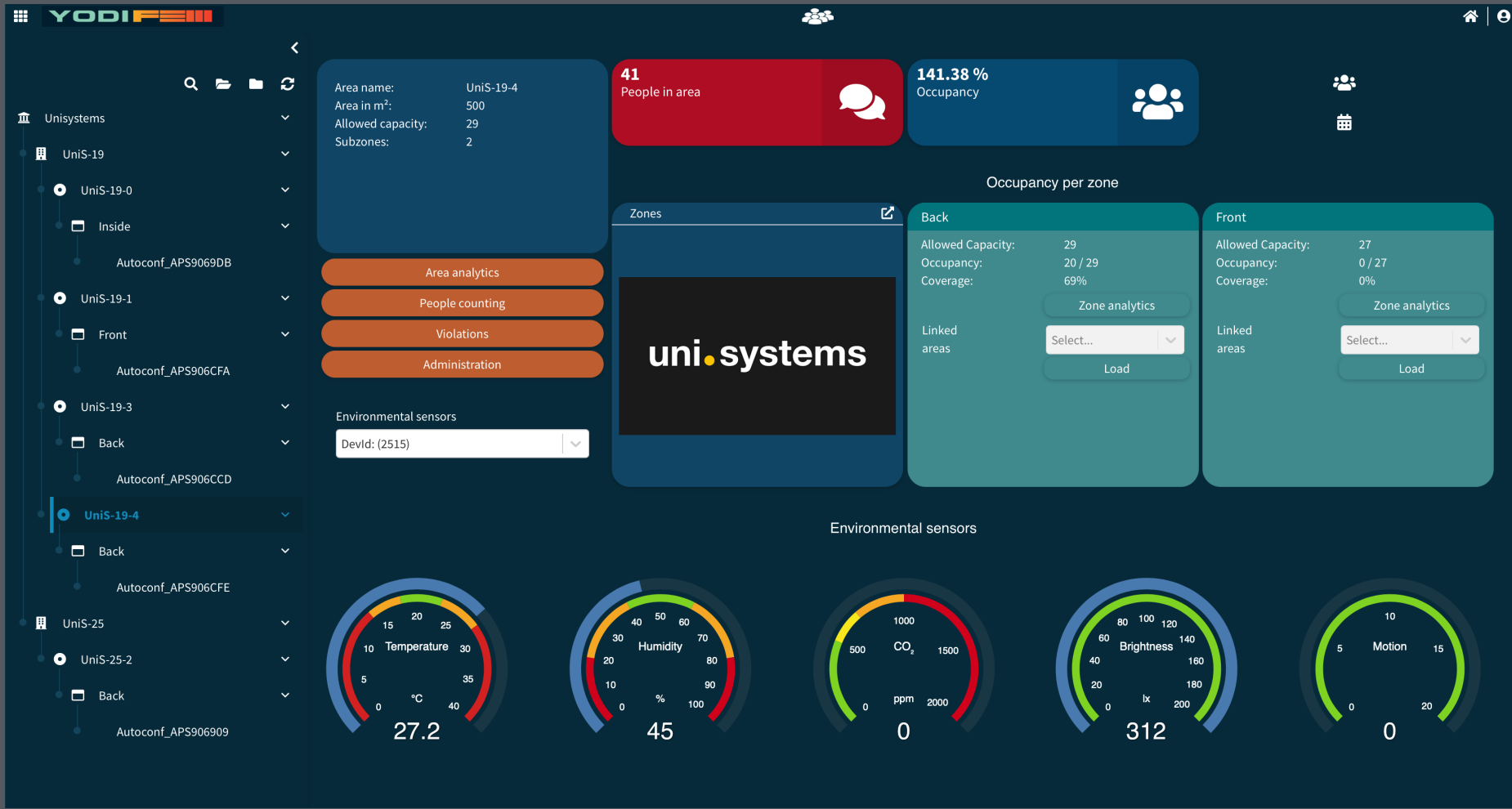
Elsys ERS Sound LoRaWAN is equipped with internal sensors for measuring indoor temperature, humidity, light, motion, and sound levels.



The OY1210 LoRaWAN CO2 meter is designed to measure carbon dioxide, temperature and humidity in indoor environments.



IEQ - The IoT System / Platform



Smart Building - Results

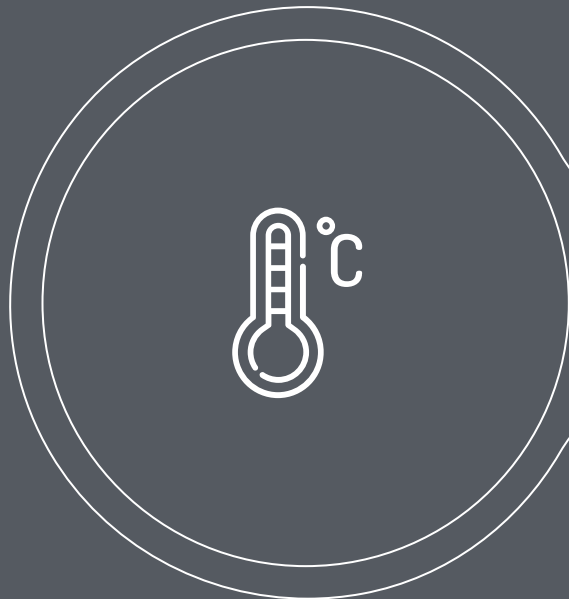
The Smart Building solution enabled us to:

- *Successfully measure and understand IEQ metrics*
- *Make data-driven decisions*
- *Provide a highly efficient living ambience that includes safety, comfort and a good quality of working experience*
- *Helps our employees achieve their best possible performance*

We are able manage to optimize operations by:

- *Remotely monitor all systems and building performance*
- *Diagnose problems and recommend solutions*
- *Identify opportunities to save costs and improve comfort & well-being*

Smart Building – Next Steps



Smart IEQ & People Count

Smart measuring Indoor air quality, thermal, acoustic and lighting levels and match with wellbeing of building occupants, etc.



Smart Parking

Smart management of parking facilities, parking signage, payments, special purpose parking lots , etc.



Smart Hot Desking

Smart management of workspace, that allow design seating plans, seat booking , meeting rooms bookings, in real time that meet employee's needs.



Smart Task Management

Real-time tracking and optimization of building energy consumption.



Smart EV Charging

Smart Smart Charging means you can intelligently manage how your electric vehicle charges by connecting it to the grid



Smart HVAC

Smart enabling the heating, ventilating and air conditioning (HVAC); monitoring temperature, humidity, air quality, etc.



Smart Energy Monitoring

Real-time tracking and optimization of building energy consumption.



Smart Solar Water Heater Monitoring

Real-time manage of facilities SSWH & energy efficiency with occupants needs.



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Internet of Things

Industry 4.0





Altair Chimica

Altair Chimica was the first European producer of potassium hydroxide (KOH) to adopt membrane cell technology to remove mercury from its products (2005-2008).

The new chlorine-potassium production plant, built from scratch in a green field project to avoid any potential risk of mercury contamination in old infrastructure, was the first plant of its kind in Europe and, from a technological point of view, is still among the most advanced in the world for the production of very high purity inorganic potassium derivatives.

Altair Chimica works every day to promote a **useful** and **sustainable innovation** of products, processes and technologies, collaborating closely with the **Universities of Florence** and Pisa and with the CNR (National Council for Research), the largest Italian institution for applied research: this collaboration has already led to several patent registration procedures.

Environmental Safety Challenge 1

First challenge has been the collection of environmental data collected by a number of drones

*One moving on the chemical plant perimeter to assess and eventually **detect** the **presence** of **contaminations** which can be **dangerous** for the **population**.*

Chemical Plant Control & Management Challenge 2

*The aim was of **never stopping** the production since most of the complex and large industrial plants cannot be stopped without **incurring** in **relevant costs** for the **restart**.*

*Thus, predictive maintenance was implemented to **reduce** the time to stop and **may prevent** damages to other parts of the production processes.*

Industry 4.0 – Altair chemical plants



Industry 4.0 – Altair chemical plants

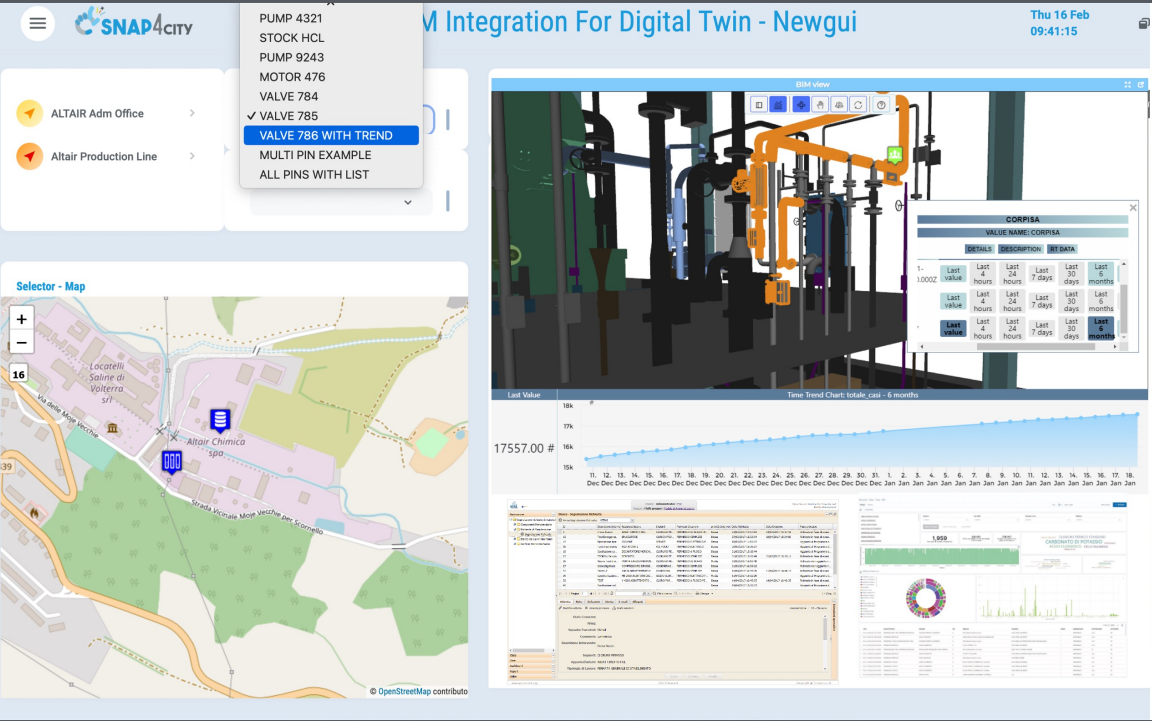
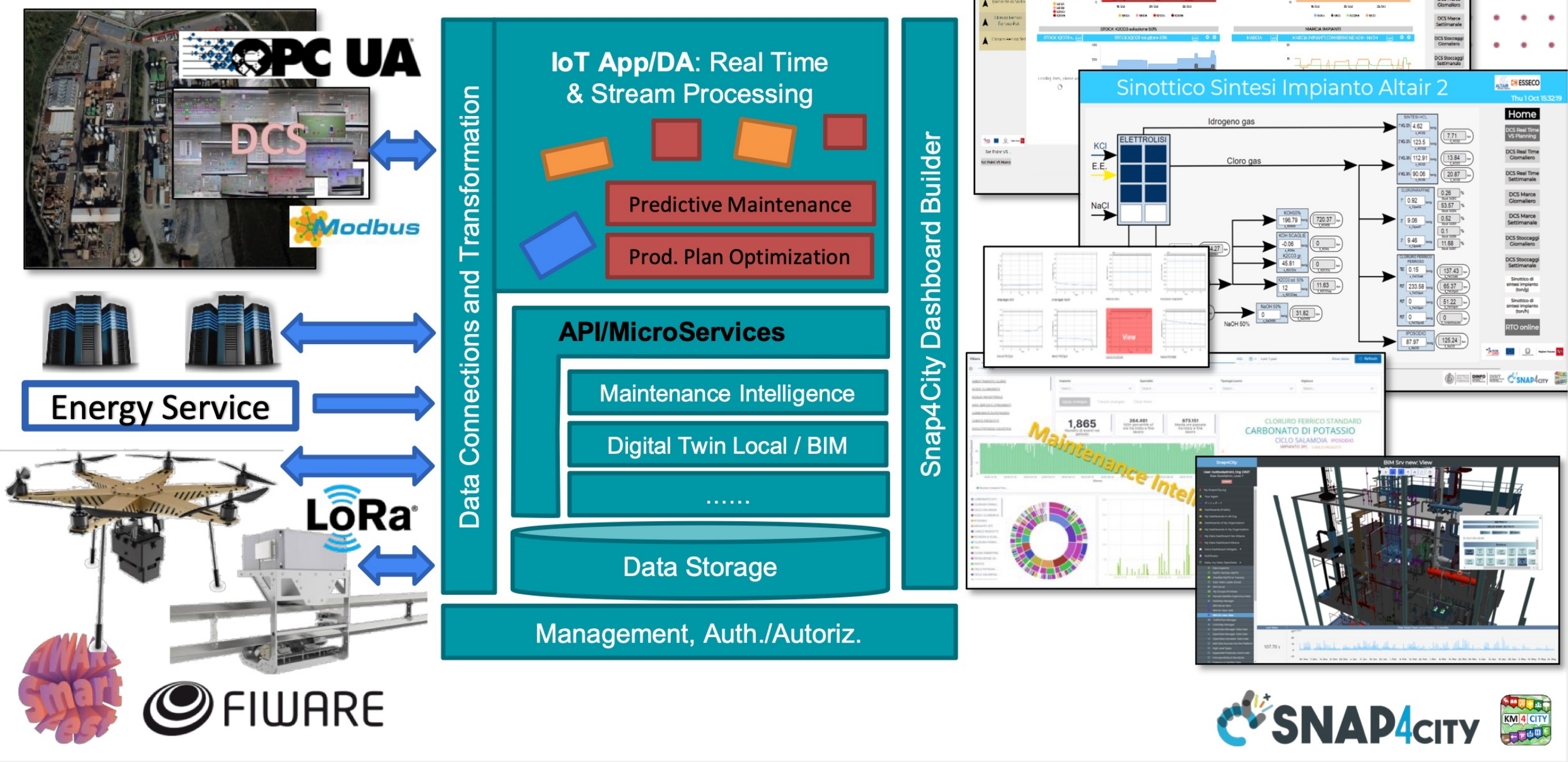


Innovation took place amongst

<i>Infrastructure</i>	<i>Strategic plan</i>	<i>Environment</i>	<i>Social</i>
Manage the production at a higher level of integration in the factory, Monitor production lines, use a wide number of variables (from the machines, industrial plant, maintenance, etc.) Apply machine learning for optimization, prediction and anomaly detection	Perform what-if analysis concerning critical conditions, planning production, system thinking on smart decision support systems	Monitor & Predict environmental pollutants of any kind and alerting, informing city users	Monitor, measure, and alert on critical cases informing city users The first usage of FIWARE technology by Snap4City was in the fields of Smart Industry and Smart Cities.

Industry 4.0 –
Altair
chemical
plants

MicroService Architecture



Industry 4.0 – Altair chemical plants



Production Monitoring

access at the consumption monitoring of the production process with progressive daily view and weekly view (the global production of the day and of the week) from any locations and devices

KPIs & Data Analytics

compute and view KPIs of the production efficiency from any devices and locations & view the real time and history of data and KPIs regarding resulting production wrt. to planned

Production Plan Proposed

perform multiple plans using different parameters and exploit support to make decision about the activation of preferred plan

Machine Learning

provide access to re-examine past process productions and plans to learn to improve the performance

Data ingestion & flows

Plant Status & External Services

includes about 400 data sources/streams collected/produced by the DCS/SCADA control systems changing every second.

IoT devices allowed to collect sensor data from the element plant which are not directly connected to the control of a single production line (e.g., the storage temperature, traffic data outside the industry, the condition of the trucks).

Orders

which are collected from administrative and marketing databases, may be changing every few minutes. From this data source, it is possible to compute the production targets of the next days for each single product on the basis of order, recurrent orders, and preventive stocks.

Production Parameters

which are used for setting the plant activity, target efficiency, quality level of productions, preferences in reusing energy and consuming derived intermediate products instead of selling them, target KPIs values, etc.

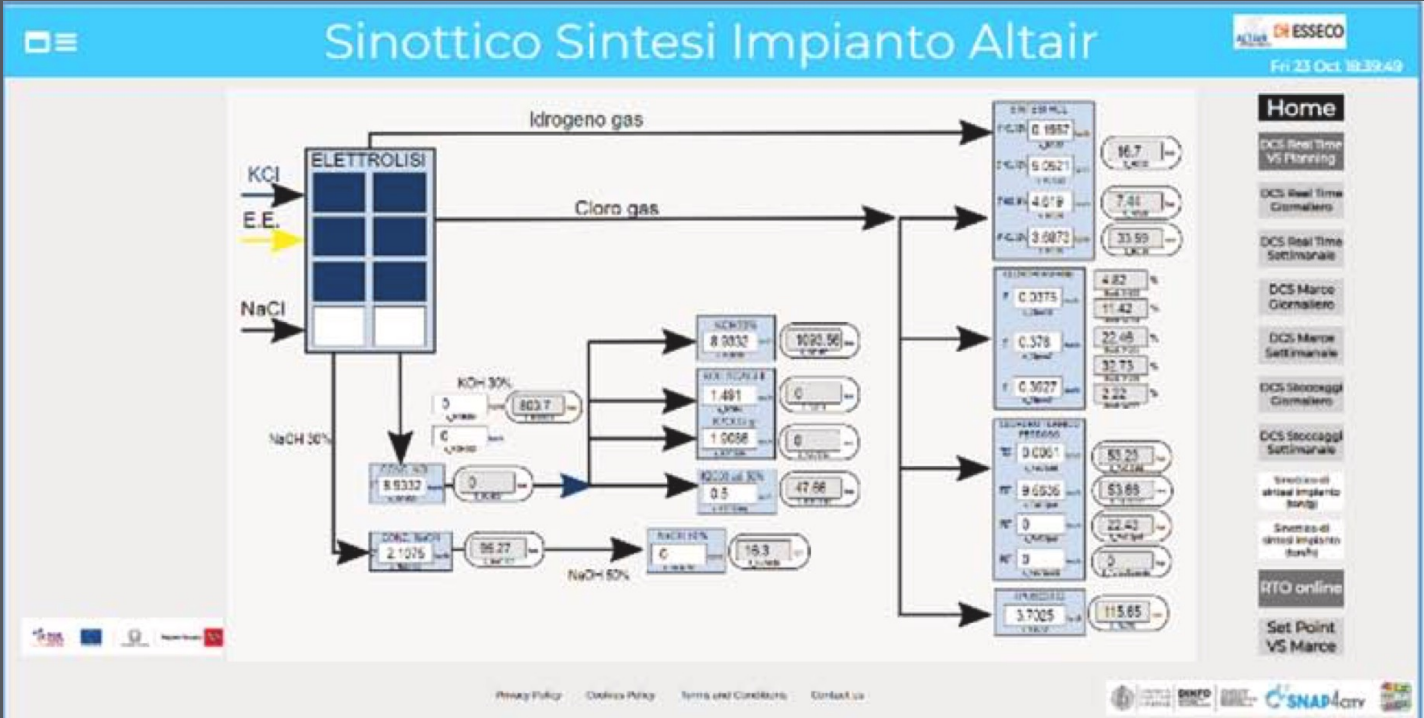
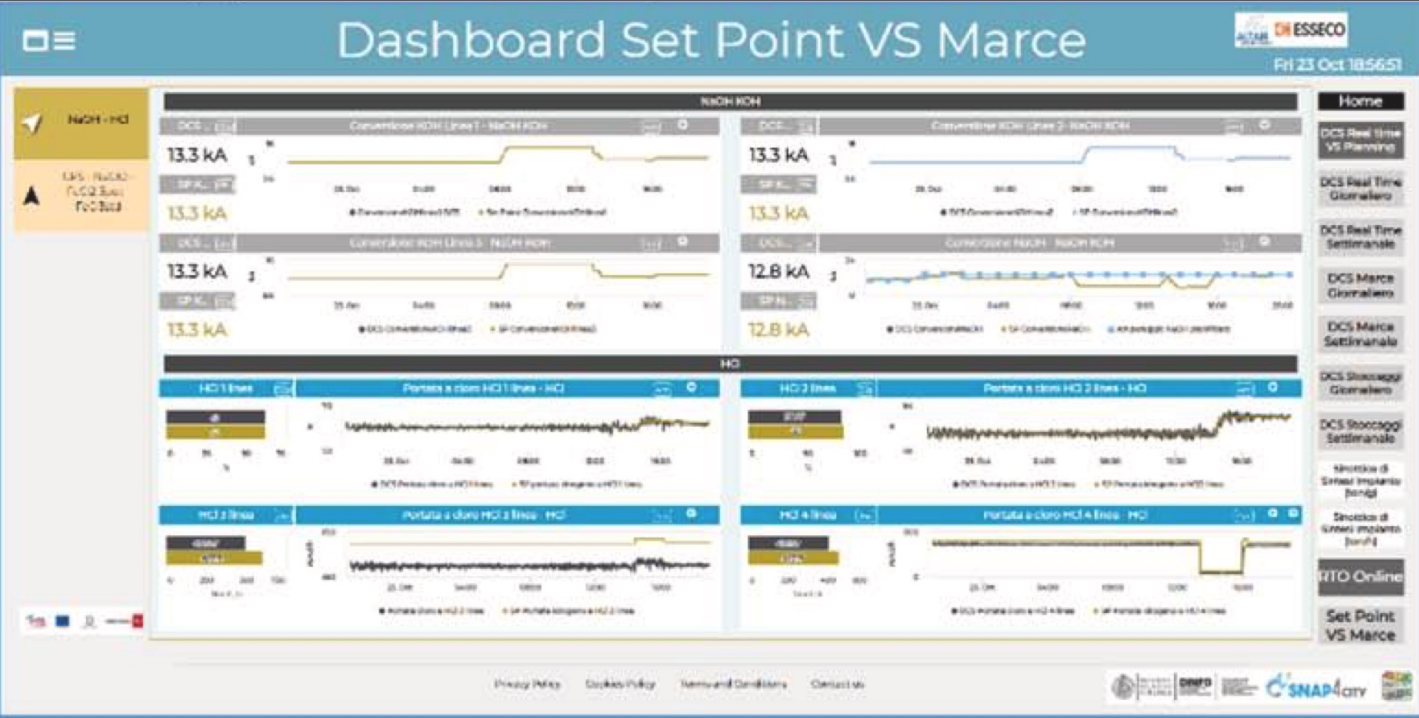
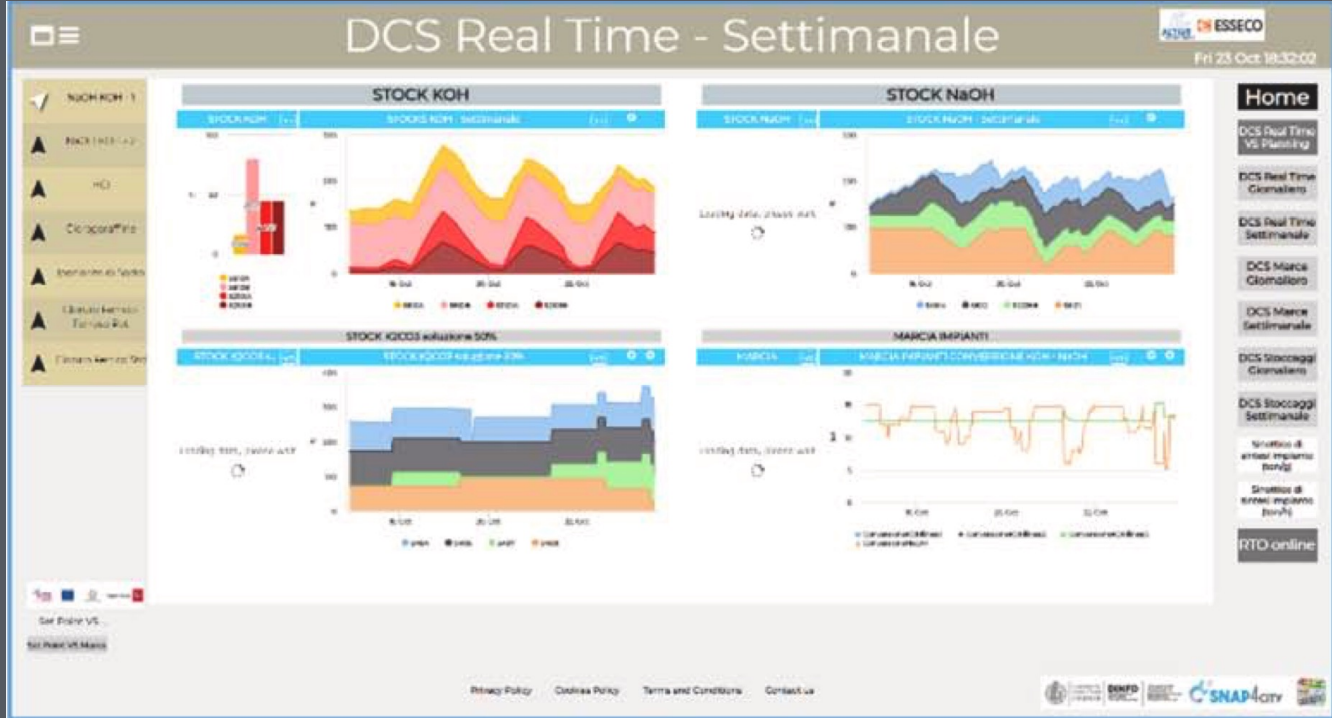
Other Costs

which are collected from external providers via External Services which may change every day such as:

- (i) Energy Costs, since the plant is producing energy & compare it wrt local market/grid (for the next 24h, with a resolution of 1 hour),
- (ii) Delivery & transportation costs/conditions, planning, etc



Decision Maker - Dashboards & Reporting



Production Data - last week & real-time

Production settings vs. real-time values

Production Data in real-time

Optimized Production Planner

Home
Optimized Production Planner

Parameters (TabPar)	DCS (OPC-UA)	Administrative data (AS400)	Administrative Consolidated Planning data (AS400)	Energy data	Other Parameters	Planning result	Outcome	In production
2020-09-25 18:47:36	2020-10-23 18:49:02	2020-10-23 18:49:29	2020-10-23 18:49:29	2020-10-24 23:00:00	2020-07-24 18:43:00	2020-10-23 18:49:39		☒
2020-09-25 18:47:36	2020-10-23 17:22:03	2020-10-23 17:21:46	2020-10-23 17:21:46	2020-10-23 23:00:00	2020-07-24 18:43:00	2020-10-23 17:22:08	completato	☐
2020-09-25 18:47:36	2020-10-22 18:36:02	2020-10-22 18:36:27	2020-10-22 18:36:27	2020-10-23 23:00:00	2020-07-24 18:43:00	2020-10-22 18:36:54	completato	Si
2020-09-25 18:47:36	2020-10-22 17:09:02	2020-10-22 17:08:59	2020-10-22 17:08:59	2020-10-22 23:00:00	2020-07-24 18:43:00	2020-10-22 17:09:13	completato	No
2020-09-25 18:47:36	2020-10-21 18:00:02	2020-10-21 17:59:47	2020-10-21 17:59:47	2020-10-22 23:00:00	2020-07-24 18:43:00	2020-10-21 18:00:12	completato	Si
2020-09-25 18:47:36	2020-10-21 06:52:02	2020-10-21 06:52:41	2020-10-21 06:52:41	2020-10-21 23:00:00	2020-07-24 18:43:00	2020-10-21 06:52:59	completato	No
2020-09-25 18:47:36	2020-10-20 18:26:02	2020-10-20 18:26:19	2020-10-20 18:26:19	2020-10-21 23:00:00	2020-07-24 18:43:00	2020-10-20 18:26:37	completato	Si
2020-09-25 18:47:36	2020-10-20 09:47:03	2020-10-20 09:47:05	2020-10-20 09:47:05	2020-10-20 23:00:00	2020-07-24 18:43:00	2020-10-20 09:47:21	completato	No
2020-09-25 18:47:36	2020-10-19 18:13:02	2020-10-19 18:13:09	2020-10-19 18:13:09	2020-10-20 23:00:00	2020-07-24 18:43:00	2020-10-19 18:13:21	completato	Si
2020-09-25 18:47:36	2020-10-19 09:51:02	2020-10-19 09:51:08	2020-10-19 09:51:08	2020-10-19 23:00:00	2020-07-24 18:43:00	2020-10-19 09:51:59	completato	No

<< 1 2 3 4 5 6 7 8 9 10 11 12 13 14 >>

Home
DCS Real Time VS Planning
DCS Real Time Giornaliero
DCS Real Time Settimanale
DCS Marce Giornaliero
DCS Marce Settimanale
DCS Stoccaggi Giornaliero
DCS Stoccaggi Settimanale

Altair Industry4.0 in numbers

#15 *Different products in the Plant Production*

133 *measured variables from the DCS data*

400 *Datasources integrated from the DCS/SCADA*

24K+ min. *assessment of real time and daily activities*

350 Gbytes *global volume per each year*

1276 *messages acquired per day*

The solution has **reduced** the time spent in recovering data to control the plant of **68%** with respect to typical time spent on monitoring the activities via excel files and reports.



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Internet of Things

Smart EV Charging

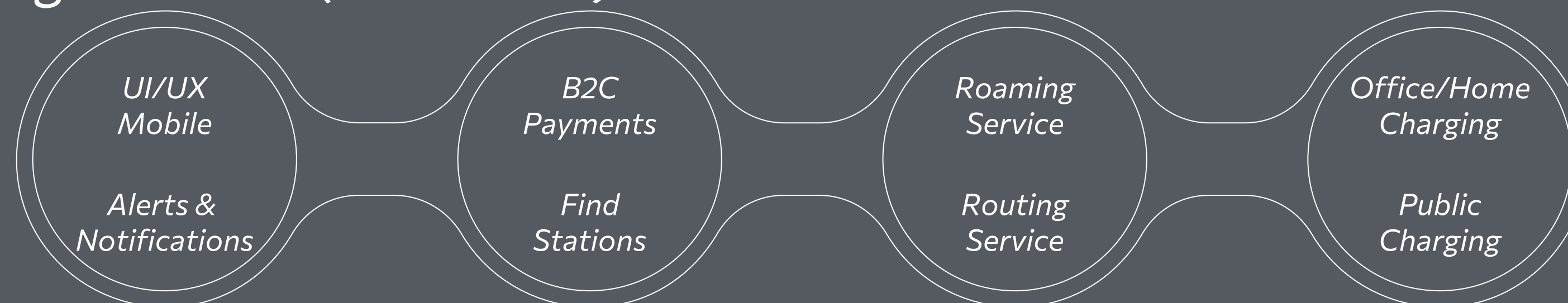


OpteCharge Solutions Ecosystem



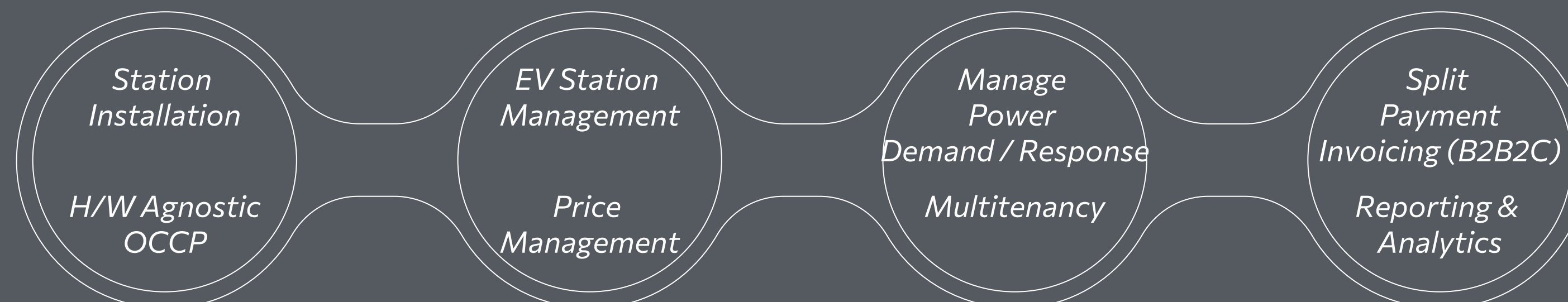
Charging Services (customer)

01



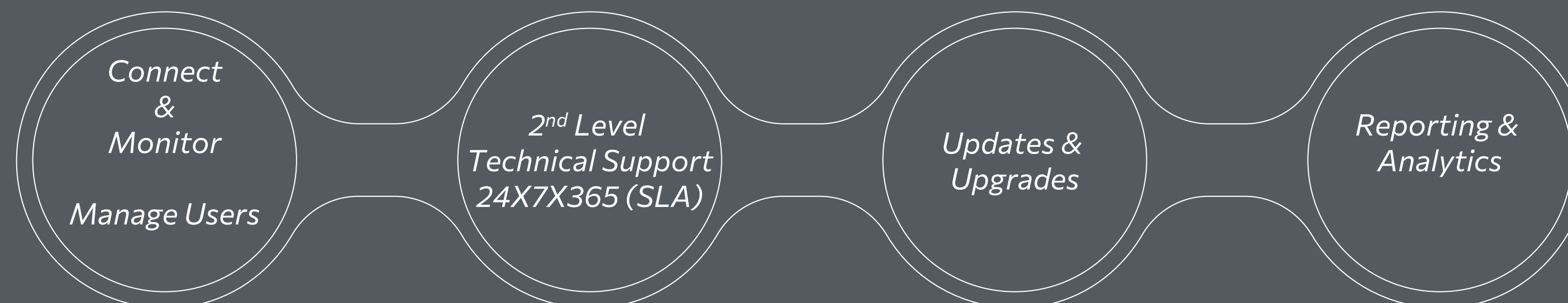
Infrastructure Services (CPOs)

02

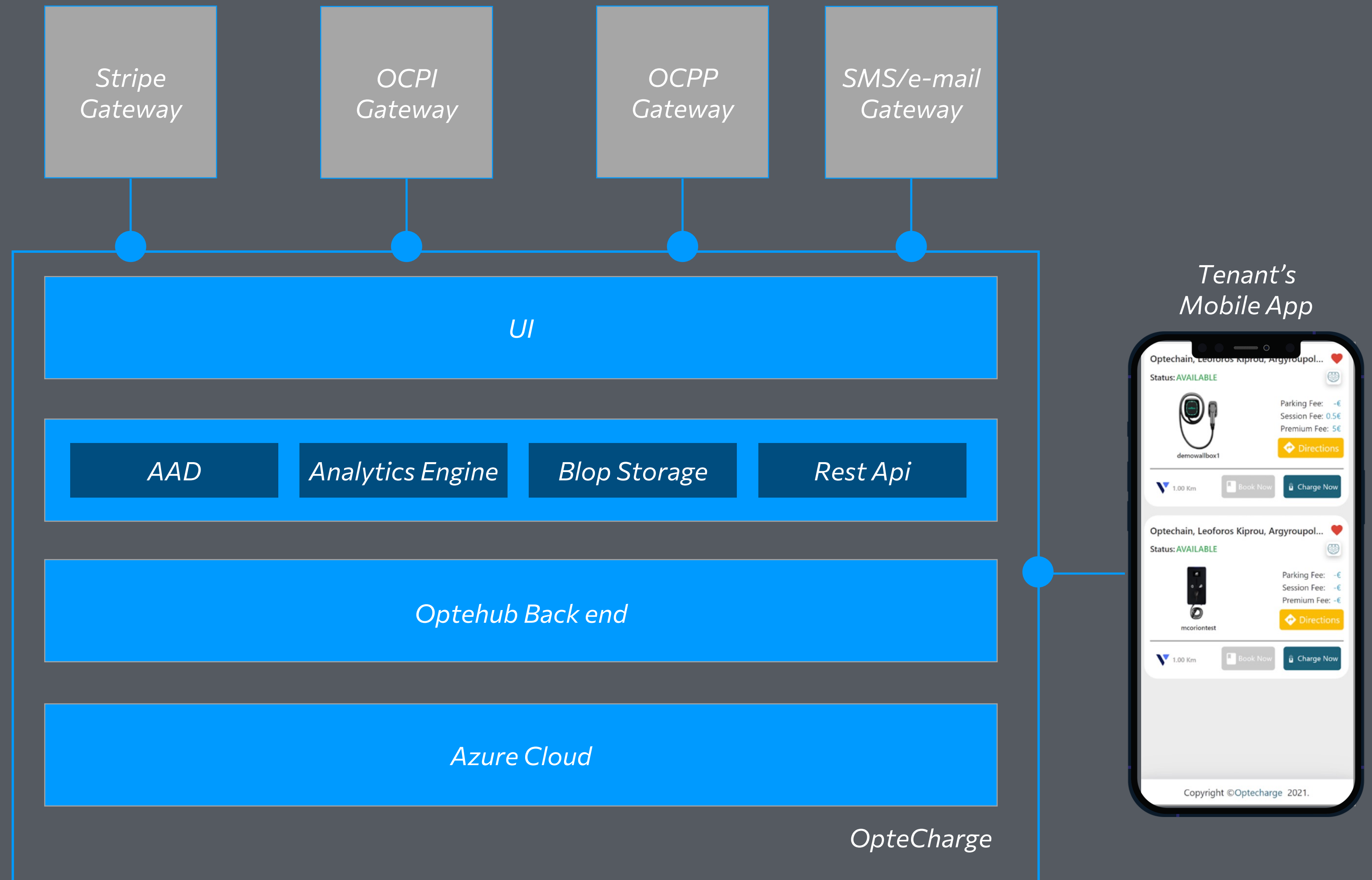


Operation Services (eMSPs)

03



OpteCharge Platform Architecture



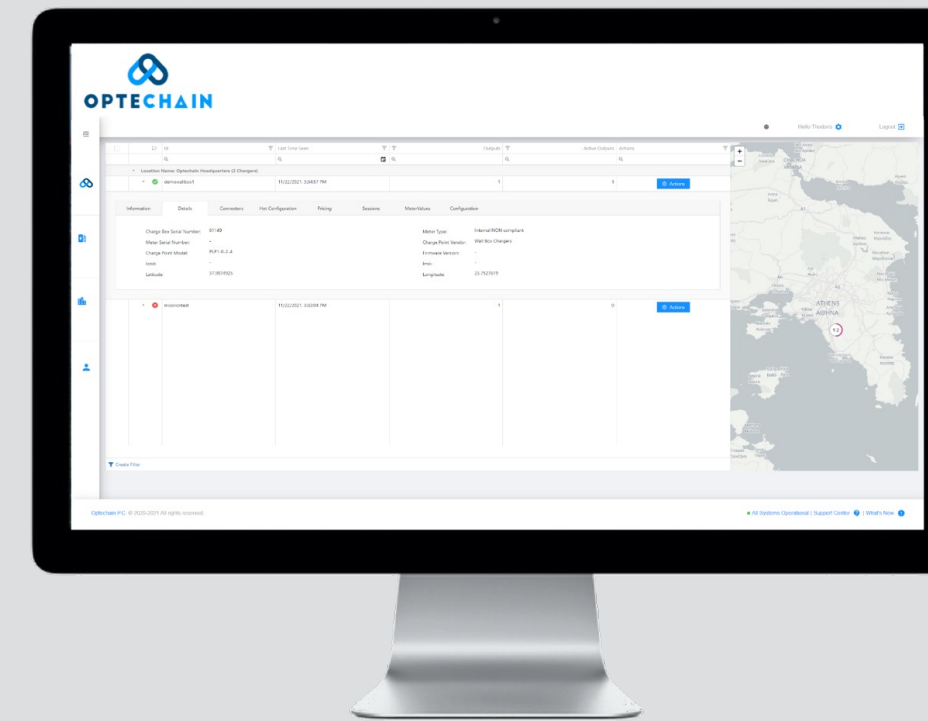
OpteCharge Platform

Admin



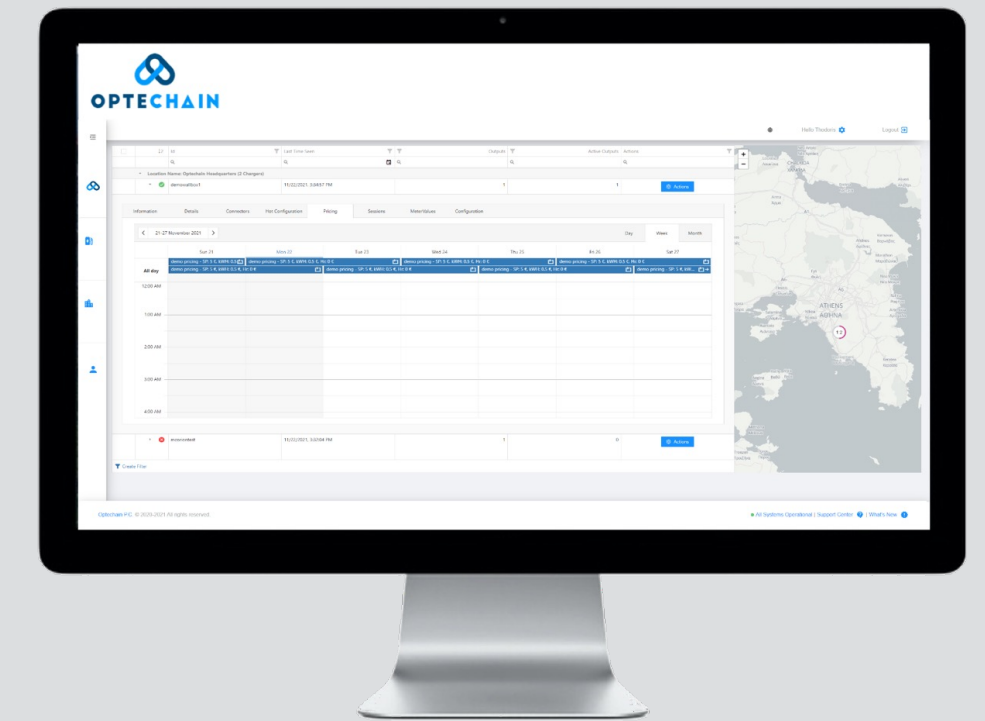
1/ User Management

- User roles & access rights
- Multitenant hierarchy
- Set up administrators of each tenant
- Set up user access for location resources



2/ EVSEs Information

- Pricing scheme of the EVSE
- Daily revenue
- Mean session duration
- QR code of the EVSE to scan & charge
- Connectors & sockets real-time status
- Voltage/Ampers



3/ EVSEs onboarding & config

- Location
- Serial number
- Firmware version
- Hot configuration

4/ Integrated with ENEX Market

- Info on the type of fuel used for electricity
- Live monitoring of hourly price of electricity
- Power observatory (analytics)

5/ EVSEs Pricing

- Set up price & tariffs plans
- Flexible remote tariff management
- Automated receipt generation and billing

6/ EVSE Charging Sessions

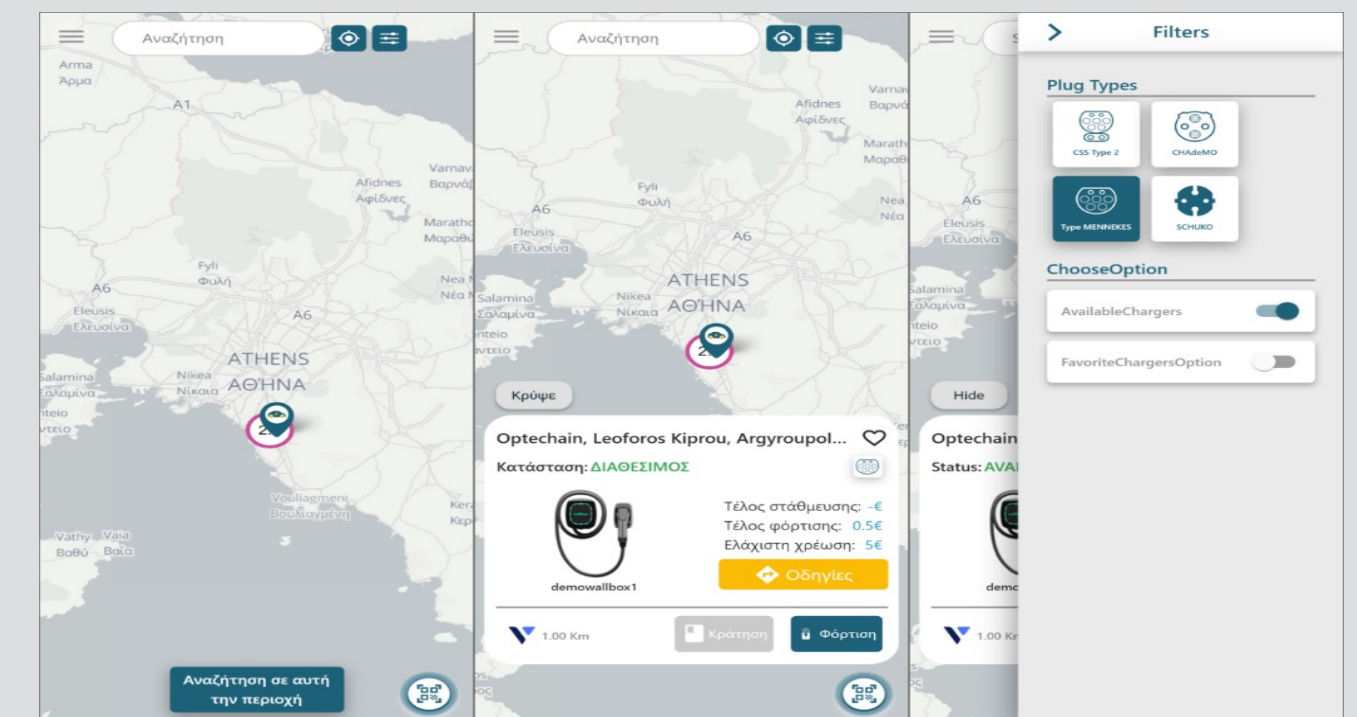
- Start-End time
- kWh requested
- Total duration
- Meter values

OpteCharge Platform Mobile App

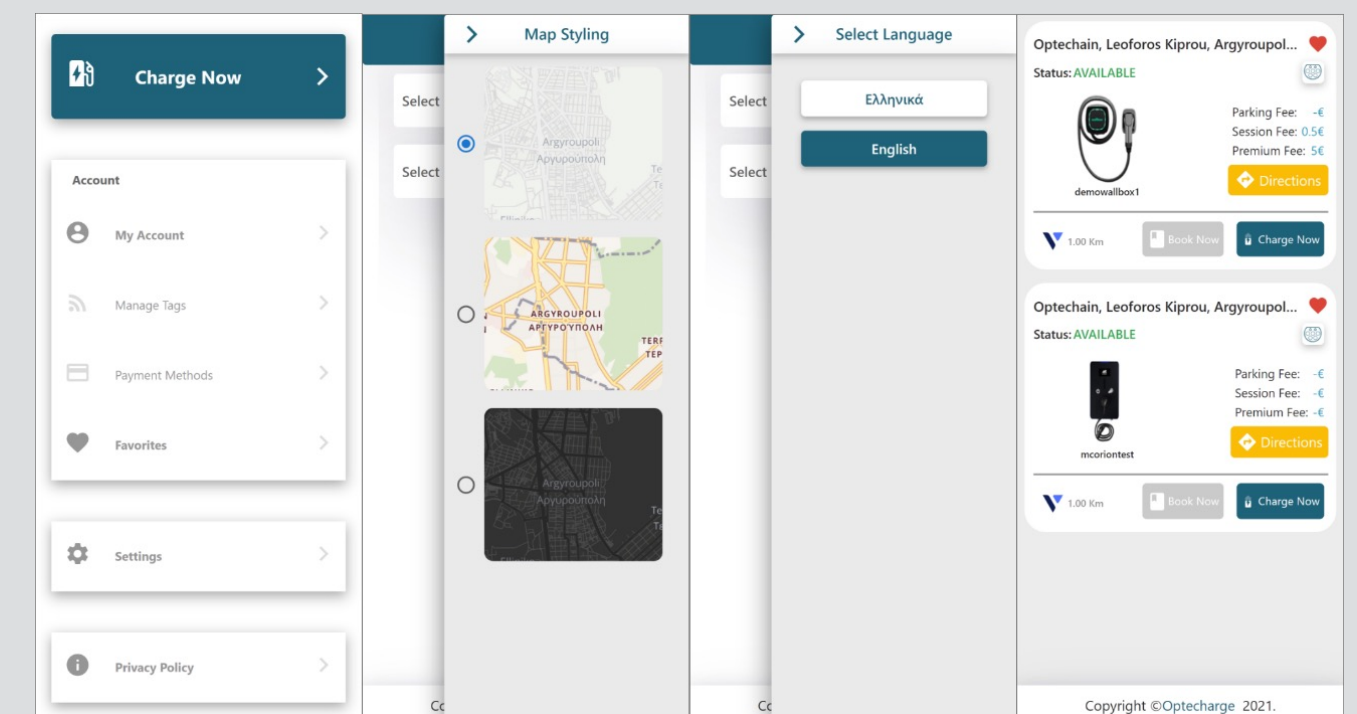


WebApp, iOS & Android apps

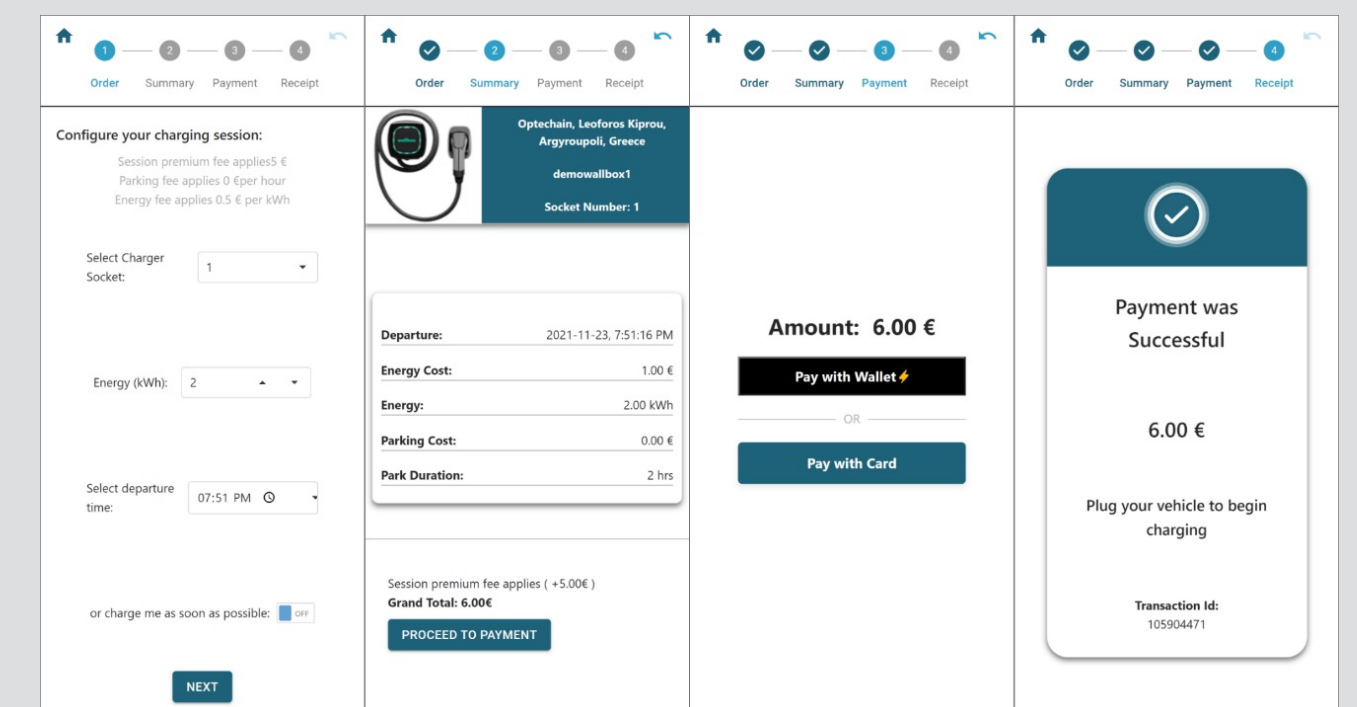
- Branded offer for your customers
- Pay / top-up Wallet Services
- Easy creation of Account & Login
- Energy & Cost Analytics
- User Personalize setting
- User profiling & recommendations
- Find available EV charging station on Map View
- Push Notifications
- Easy Charging and Payments
- Charger Booking
- In-app support



Map View



User Personalization



Charging & Payment Process

OpteCharge Platform Hardware



*You Don't Know what Hardware to choose?
Problem Solved! - Hardware Agnostic*



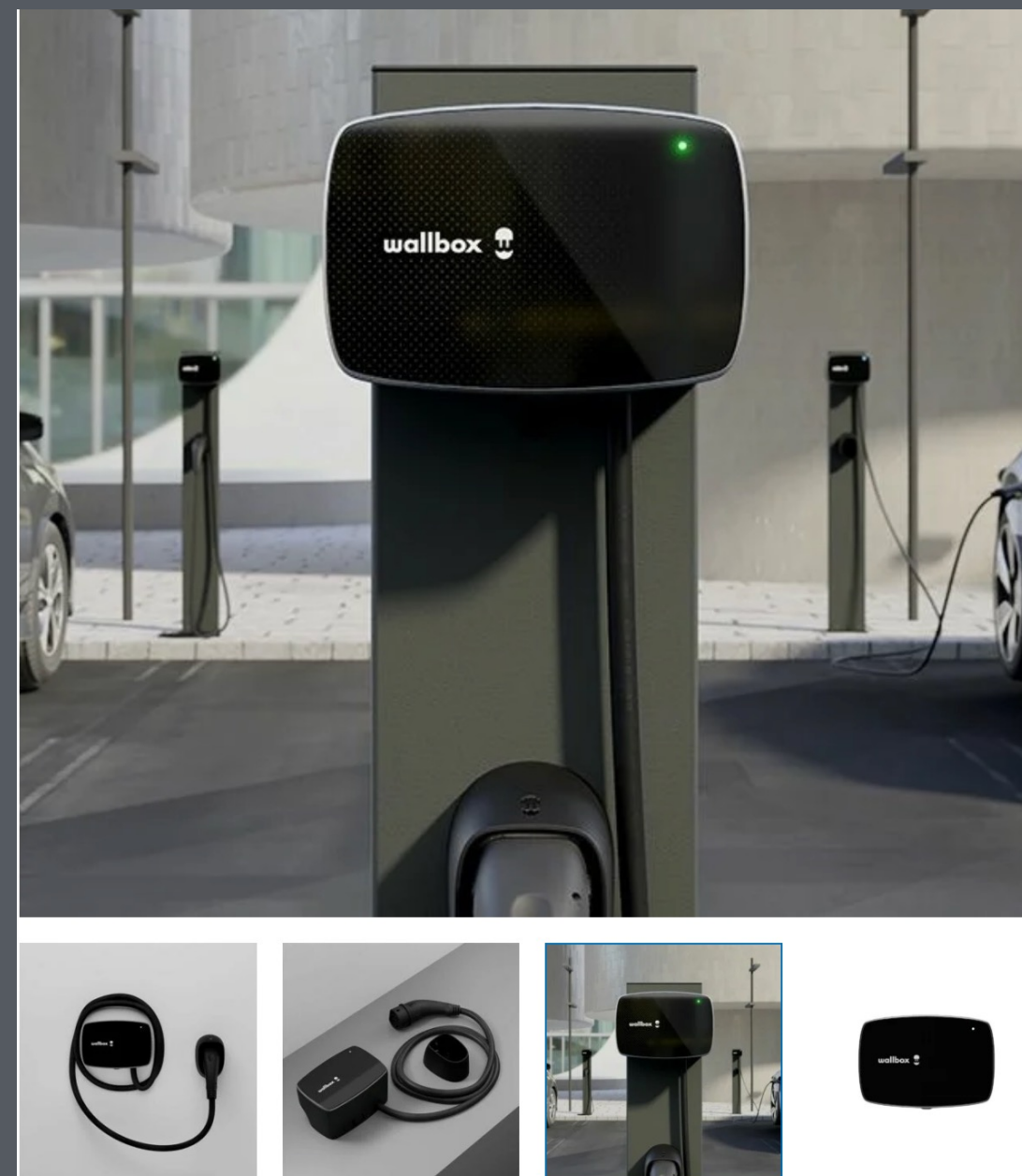
OpteCharge Platform HardWare



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25 AC EV Charger
1 DC EV Charger

Wallbox Commander 2S



Infoquest

90 AC EV Charger
1 DC EV Charger

ACS

90 AC EV Charger
1 DC EV Charger

Wallbox Supernova 60kW DC



OpteCharge Platform

Why ?



All-in-one EV charging solution

*Manage all your operations from a
single point*

Enterprise-Class SLAs

*Different levels based on clients'
requirements*

Secure to the Core

*We treat clients' infrastructure and
data with strict security protocols and
processes*

ESG

*ESG (for Environmental, Social, and
Governance) measures the
sustainability of business practices.*

Monitoring tools

*Proactive and Reactive management,
continuous monitoring and support to
ensure High Performance and
Reliability*

Smart Energy Management

*Demand Response
Battery Storage Management
Smart Load Management
Vehicle-to-grid(V2G) technology*

Value Added Services

*Combine with Digital Signage
Manage Advertising on top of EV
Chargers*

Extensive API for seamless integration

*Get control with a flexible and
continually evolving RESTful API and
integrate with existing trusted systems
like ERP, CRM, billing or a payment
system*



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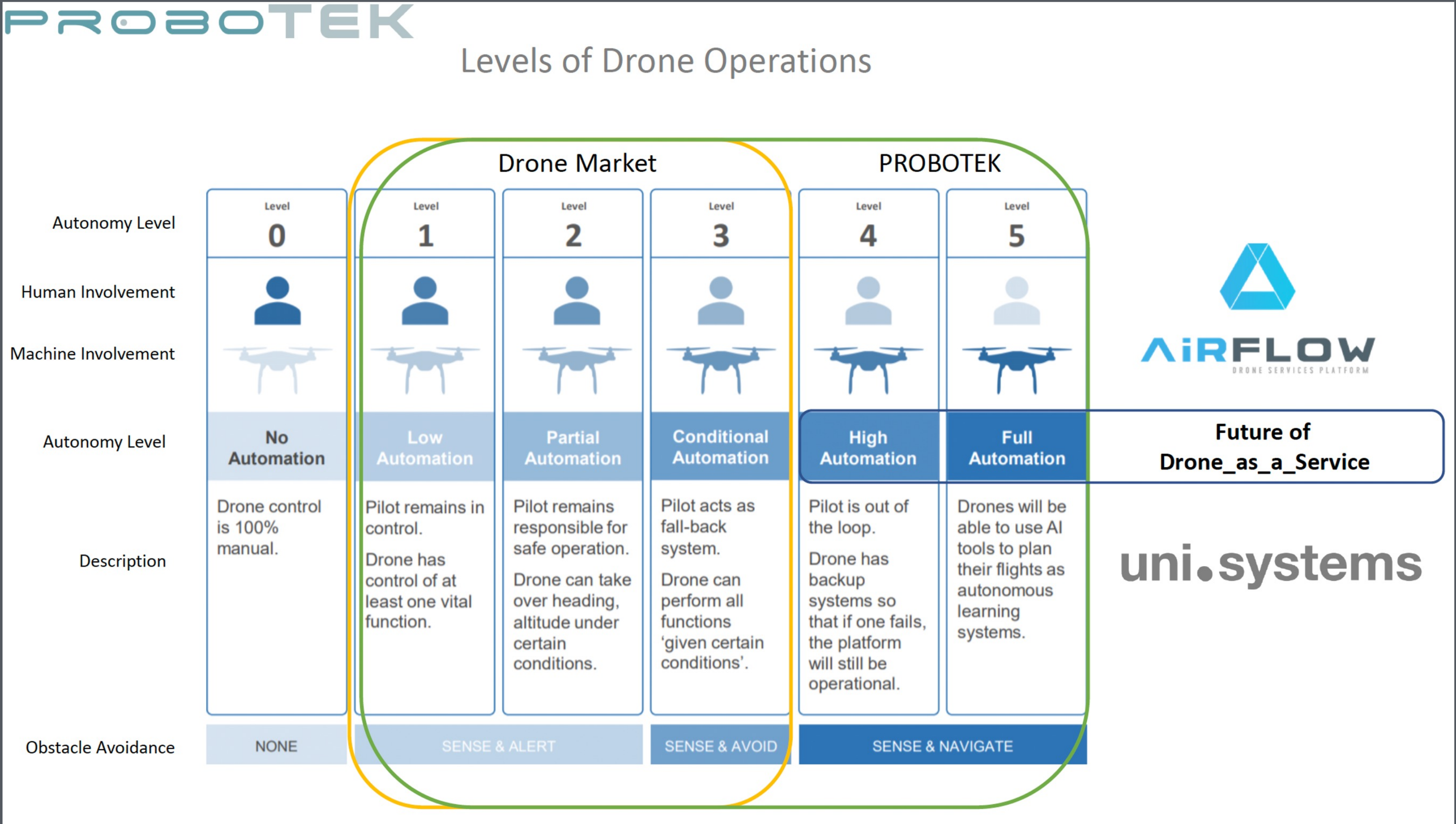
Internet of Things

Smart Drones



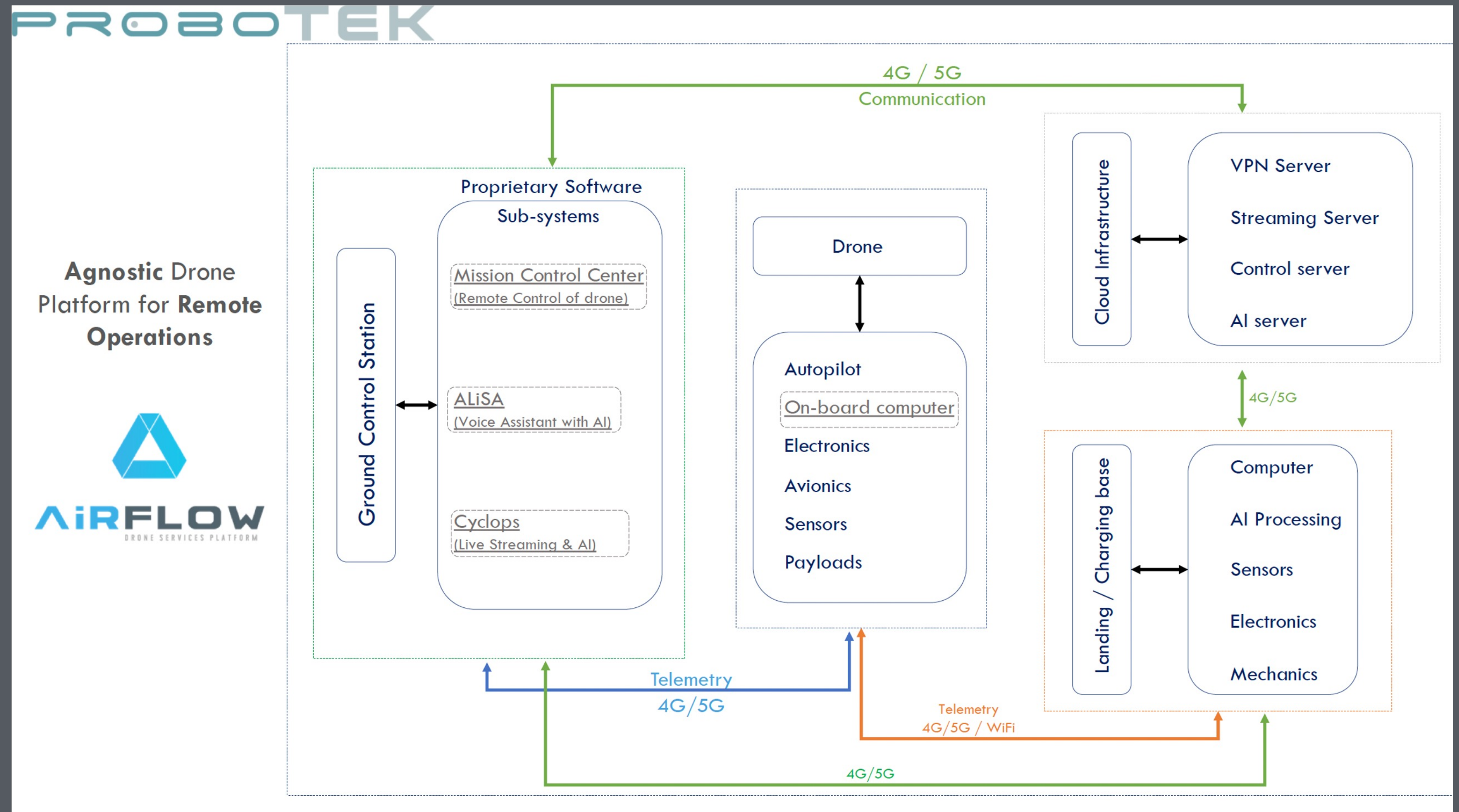
Airflow
Platform
Automation

PROBOTEK



AirFlow Platform Architecture

PROBOTEK



Airflow Platform Operations

PROBOTEK

Security & Surveillance

1. Staff shortage
2. Skill & knowledge shortage
3. Poor supervision
4. Process latency
5. Lack of automation
6. Lack of integration
7. Slow response
8. No means to verify alarms
9. Human errors
10. Human exposure to risks
11. Environmental issues

Energy & Large Line Projects

1. Large Infrastructure dispersed in remote areas
2. Difficulties to access
3. Aging Infrastructure
4. Maintenance prioritization low processes
5. Human exposure
6. Environmental issues
7. Huge unused data
8. Non-homogeneous data
9. Different expensive Equipment
10. Downtime
11. Vegetation

Transport & Delivery

1. Lack of Transparency - Traceability (customers)
2. Lack of Real-Time status
3. Inadequate Route Planning
4. Faster Fulfilment
5. Customer Expectations
6. Automating the processes
7. Seamless Communication System
8. Delays
9. Dependency on human resources
10. Increased costs
11. Drivers performance

FIRE DETECTION PILOT SOLUTION USING 5G, ARTIFICIAL INTELLIGENCE
AND DRONE TECHNOLOGY

Project in number

200

ACRES
WERE
MONITORED



230

SENSORS
WERE
PLACED



99.95%

SYSTEM
UPTIME



1,800

TOTAL
OPERATING
HOURS



23.76

MILLION
MEASUREMENTS



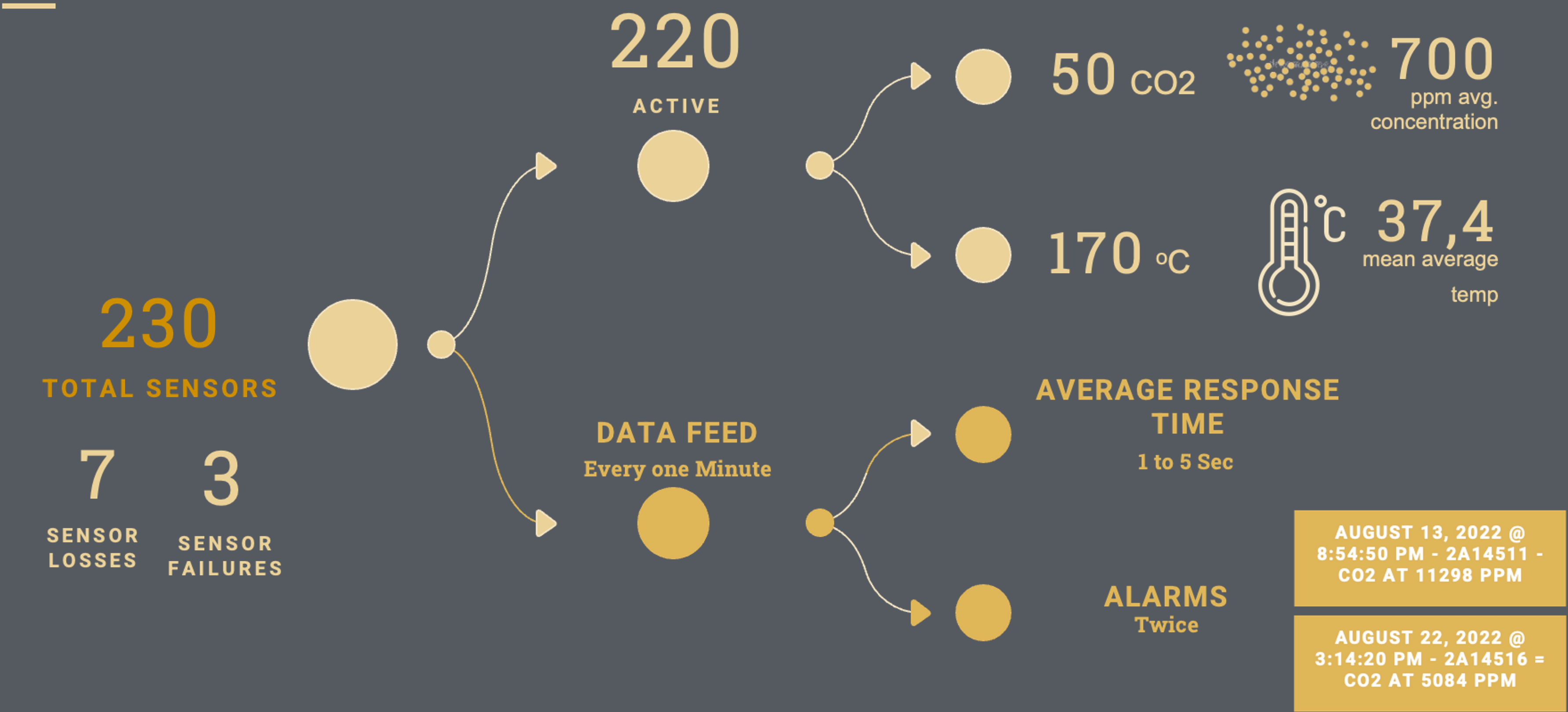
2,5

MONTHS
OF
TOTAL
OPERATION (UP
TO DATE)



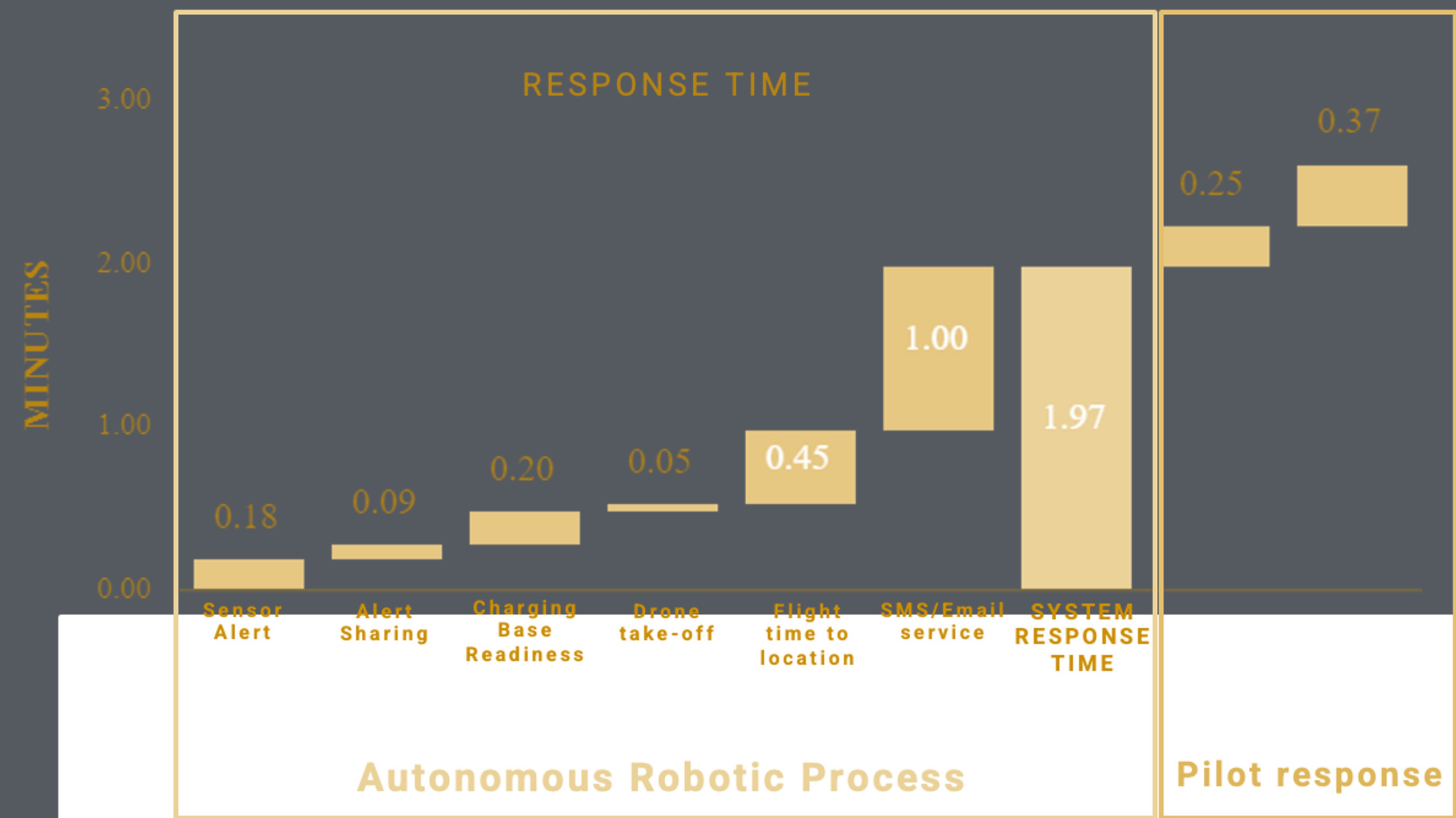
FIRE DETECTION PILOT SOLUTION USING 5G, ARTIFICIAL INTELLIGENCE
AND DRONE TECHNOLOGY

Sensors' on the filed



FIRE DETECTION PILOT SOLUTION USING 5G, ARTIFICIAL INTELLIGENCE
AND DRONE TECHNOLOGY

System Event Performance



2.59 minutes

The first 15min of a fire event are crucial

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