ORGANISED BY

BDV BIG DATA VALUE ASSOCIATION

IN COLLABORATION WITH

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NTNU

SINTEF

WESTERN NORWAY RESEARCH INSTITUTE
VESTLANDSFORSKING

DATAWEEK

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DATA FJORDS: UNLOCKING AI FOR INDUSTRY & SOCIETY

5-6 May 2026 / Oslo

SUPPORTED BY

The Research Council of Norway

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DATAWEEK

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ORION

Digital Twin methodologies and frameworks

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Scott Young

Head of R&D at AugmentCity

Registered UK & Norwegian Architect of over 25 years experience.

AUGMENT CITY

- Norwegian based Graphical Digital Twin company est 10 years ago.
- Working with over 100 partners worldwide, incl. municipalities, universities and tech partners.
- Specialising on visualising “what-if” scenarios, including climate change and energy.
- Currently working on 3 EU Horizon projects.

NORWAY
CANADA
SLOVENIA
PORTUGAL
CABO VERDE
BRAZIL

Cabo Verde

PORT ENERGY CONSUMPTION

Visualization of energy consumption in Porto Grande (ships, operating machines, ev's and buildings).

Norway

CRUISE SHIP ENERGY CONSUMPTION

Sustainable energy management and CO2 reduction in port and urban development areas.

USAGE

Iberia

PV's & FAULT ANALYSIS

Advanced and predictive O&M (Operation and Maintenance) tools for PV farms.

Slovenia

WAVE GENERATION / REALTIME SENSOR DATA

Visualisation of Sigma WEC devices & generated electricity in different (demo) global locations.

GENERATION

Brazil

RIO DE JANERIO POWERGRID

Visualization of impact of renewables into the bulk power system.

Canada

ENERGY PLANT

Data-centric solutions for efficient, reliable power generation, transmission & distribution.

GRID / SYSTEMS

HUMAN CENTRIC DIGITAL TWIN (AUGM)

DIGITAL BREAKTHROUGH COMPONENTS

- Sensor Technologies (SINTEF)
- Data & Models Interoperability (RWTH)
- Asset Management (INESC)
- Data Driven Decision Systems (IMT)

ENERGY DATA SPACE

- PV Data Hub
- Acoustics Vibration Data
- Port Stakeholder Data
- Transmission Data
- Operator System Training Data
- Demographic, Pollution, Bathymetric, Weather

USE CASES

1: Cape Verde/ Norway
RES vs Fuels optimisation in ports (UTA & SUAS)

2: Iberia
Large PV farms operation and maintenance (EDP)

3: Slovenia
Ocean wave technology convertor operation and maintenance (SIGMA)

4: Brazil
Distributed co-simulation infrastructure (UFRJ)

5: Canada
Operations of Power Generators, TSO & DSO (ALBE)

ENERGY VALUE CHAIN

- Research excellence and leadership
- Policy-makers decisions through Digital Twin
- Contribution to standards and regulation
- Business innovation and green investments

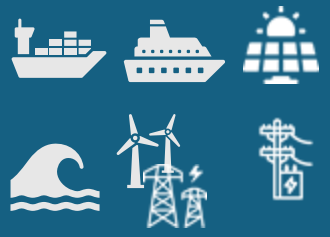
COLLABORATION

- BRIDGE
- GAIA-X
- DAIRO/BDVA
- FIWARE
- ENERSHARE (HOE)...

DIMENSION

- Europe: FR, DE, IT, PT, SL, NO
- Mission Innovation Countries : BR, CA
- Worldwide: CV

Project Start



Overview

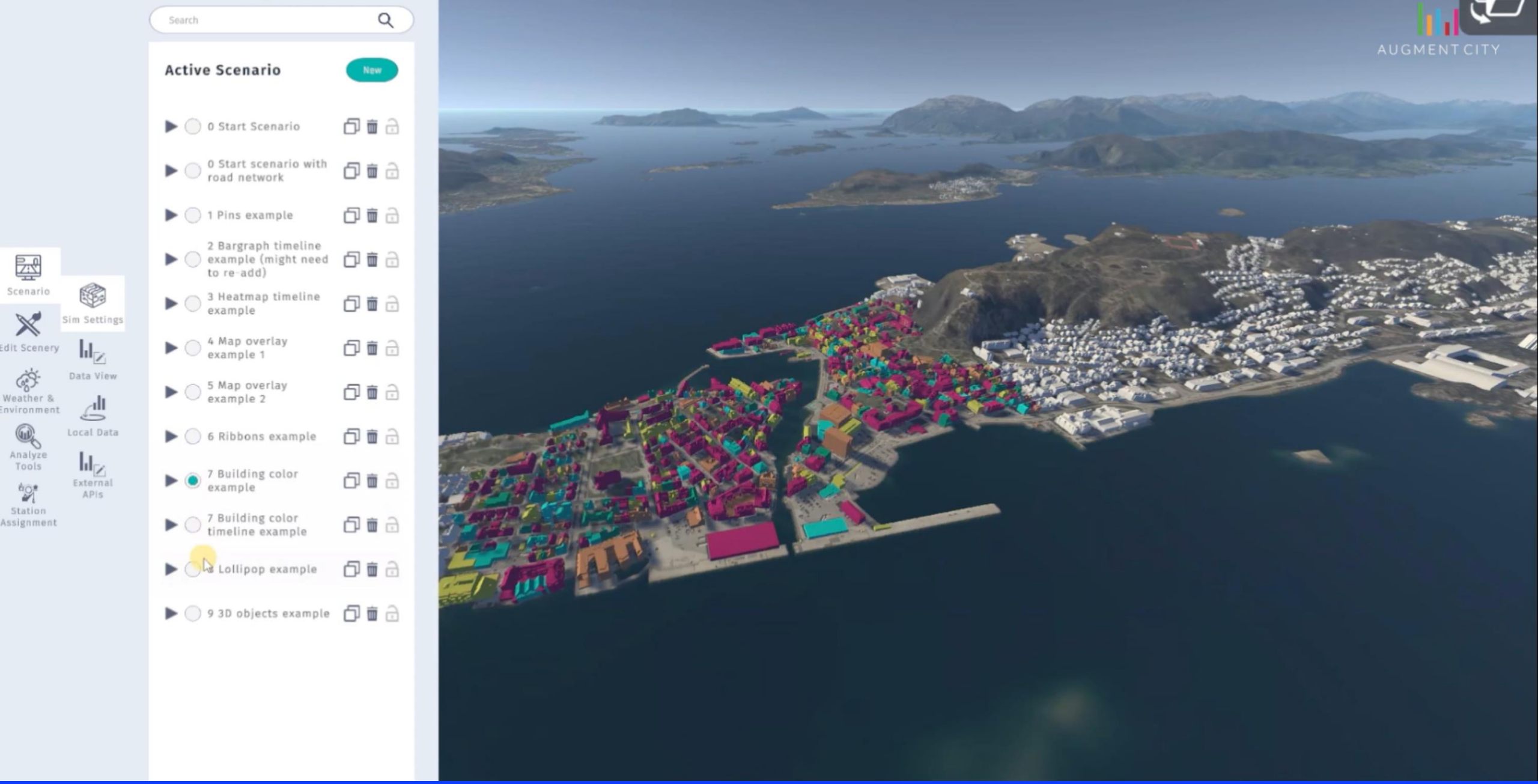
Project

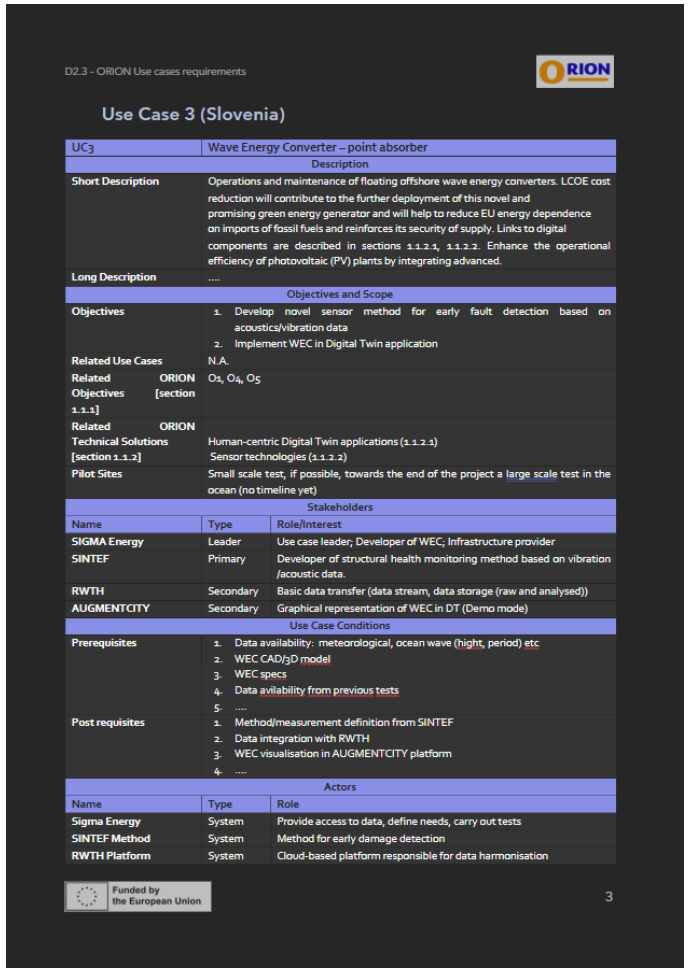
Project End

Complete GDT

GDT Training

GDT End User Story


Search
Active Scenario
New
0 Start Scenario
0 Start scenario with road network
1 Pins example
2 Bargraph timeline example (might need to re-add)
3 Heatmap timeline example
4 Map overlay example 1
5 Map overlay example 2
6 Ribbons example
7 Building color example
7 Building color timeline example
8 Lollipop example
9 3D objects example
Scenario
Sim Settings
Edit Scenery
Data View
Weather & Environment
Local Data
Analyze Tools
External APIs
Station Assignment
AUGMENT CITY



D2.3 – ORION Use cases requirements

ORION

Use Case 3 (Slovenia)

UC3	Wave Energy Converter – point absorber	
Description		
Short Description	Operations and maintenance of floating offshore wave energy converters. LCOE cost reduction will contribute to the further deployment of this novel and promising green energy generator and will help to reduce EU energy dependence on imports of fossil fuels and reinforces its security of supply. Links to digital components are described in sections 1.1.2.1, 1.1.2.2. Enhance the operational efficiency of photovoltaic (PV) plants by integrating advanced.	
Long Description	....	
Objectives and Scope		
Objectives	1. Develop novel sensor method for early fault detection based on acoustics/vibration data 2. Implement WEC in Digital Twin application	
Related Use Cases	N.A.	
Related ORION Objectives [section 1.1.1]	O_3, O_4, O_5	
Related ORION Technical Solutions [section 1.1.2]	Human-centric Digital Twin applications (1.1.2.1) Sensor technologies (1.1.2.2)	
Pilot Sites	Small scale test, if possible, towards the end of the project a large scale test in the ocean (no timeline yet)	
Stakeholders		
Name	**Type**	**Role/Interest**
SIGMA Energy	Leader	Use case leader; Developer of WEC; Infrastructure provider
SINTEF	Primary	Developer of structural health monitoring method based on vibration /acoustic data.
RWTH	Secondary	Basic data transfer (data stream, data storage (raw and analysed))
AUGMENTCITY	Secondary	Graphical representation of WEC in DT (Demo mode)
Use Case Conditions		
Prerequisites	1. Data availability: meteorological, ocean wave (hight, period) etc 2. WEC CAD/3D model 3. WEC specs 4. Data avilability from previous tests 5.	
Post requisites	1. Method/measurement definition from SINTEF 2. Data integration with RWTH 3. WEC visualisation in AUGMENTCITY platform 4.	
Actors		
Name	**Type**	**Role**
Sigma Energy	System	Provide access to data, define needs, carry out tests
SINTEF Method	System	Method for early damage detection
RWTH Platform	System	Cloud-based platform responsible for data harmonisation

Funded by the European Union

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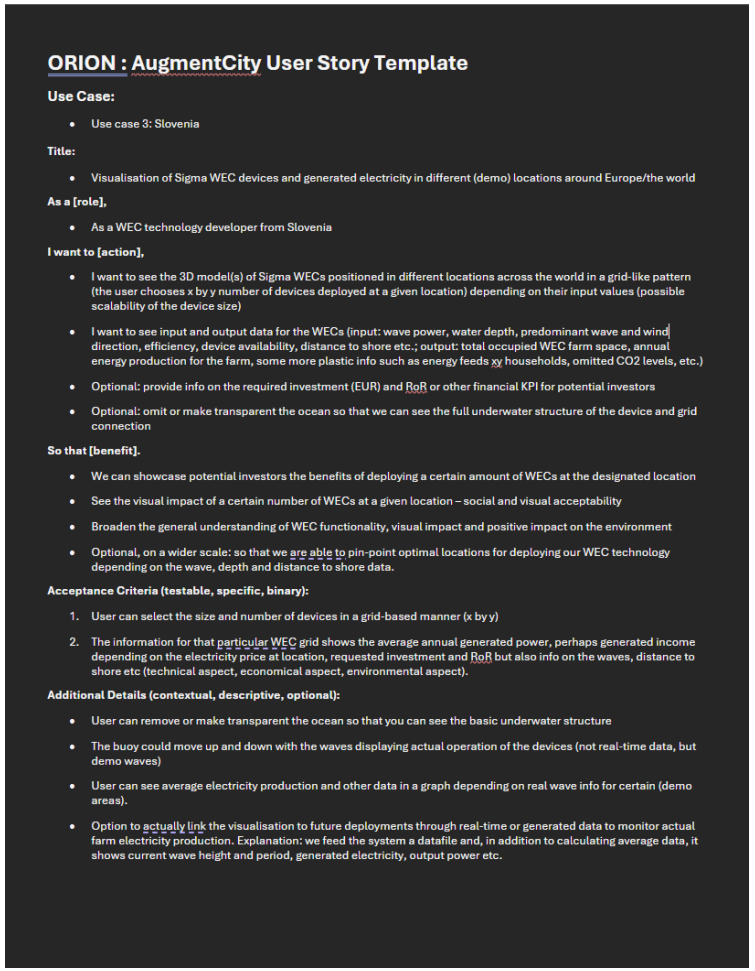
Use Case template : WP2 (technical focus)



ORION : AugmentCity User Story Template

Use Case:

- Use case 3: Slovenia

Title:

- Visualisation of Sigma WEC devices and generated electricity in different (demo) locations around Europe/the world

As a [role],

- As a WEC technology developer from Slovenia

I want to [action],

- I want to see the 3D model(s) of Sigma WECs positioned in different locations across the world in a grid-like pattern (the user chooses x by y number of devices deployed at a given location) depending on their input values (possible scalability of the device size)
- I want to see input and output data for the WECs (input: wave power, water depth, predominant wave and wind direction, efficiency, device availability, distance to shore etc.; output: total occupied WEC farm space, annual energy production for the farm, some more plastic info such as energy feeds xy households, omitted CO2 levels, etc.)
- Optional: provide info on the required investment (EUR) and RoR or other financial KPI for potential investors
- Optional: omit or make transparent the ocean so that we can see the full underwater structure of the device and grid connection

So that [benefit].

- We can showcase potential investors the benefits of deploying a certain amount of WECs at the designated location
- See the visual impact of a certain number of WECs at a given location – social and visual acceptability
- Broaden the general understanding of WEC functionality, visual impact and positive impact on the environment
- Optional, on a wider scale: so that we are able to pin-point optimal locations for deploying our WEC technology depending on the wave, depth and distance to shore data.

Acceptance Criteria (testable, specific, binary):

1. User can select the size and number of devices in a grid-based manner (x by y)
2. The information for that particular WEC grid shows the average annual generated power, perhaps generated income depending on the electricity price at location, requested investment and RoR but also info on the waves, distance to shore etc (technical aspect, economical aspect, environmental aspect).

Additional Details (contextual, descriptive, optional):

- User can remove or make transparent the ocean so that you can see the basic underwater structure
- The buoy could move up and down with the waves displaying actual operation of the devices (not real-time data, but demo waves)
- User can see average electricity production and other data in a graph depending on real wave info for certain (demo areas).
- Option to actually link the visualisation to future deployments through real-time or generated data to monitor actual farm electricity production. Explanation: we feed the system a datafile and, in addition to calculating average data, it shows current wave height and period, generated electricity, output power etc.

GDT End User Story template : WP4 (visual focus)

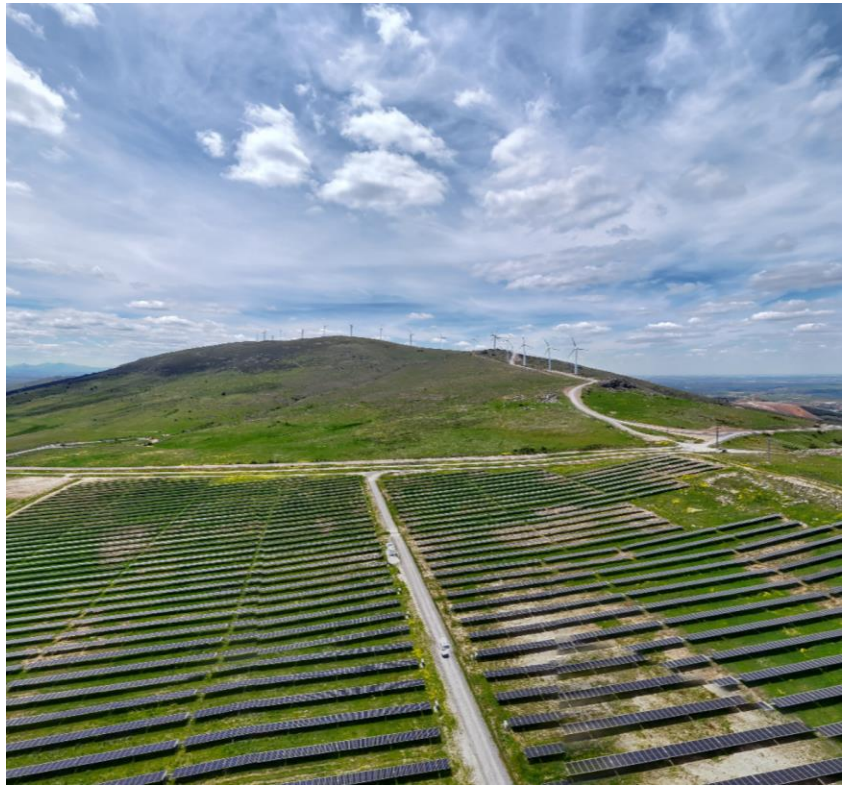
GDT End user story asks the **Use Case** to envisage what they expect to see and do with the GDT at the end of the project when they login into the software.

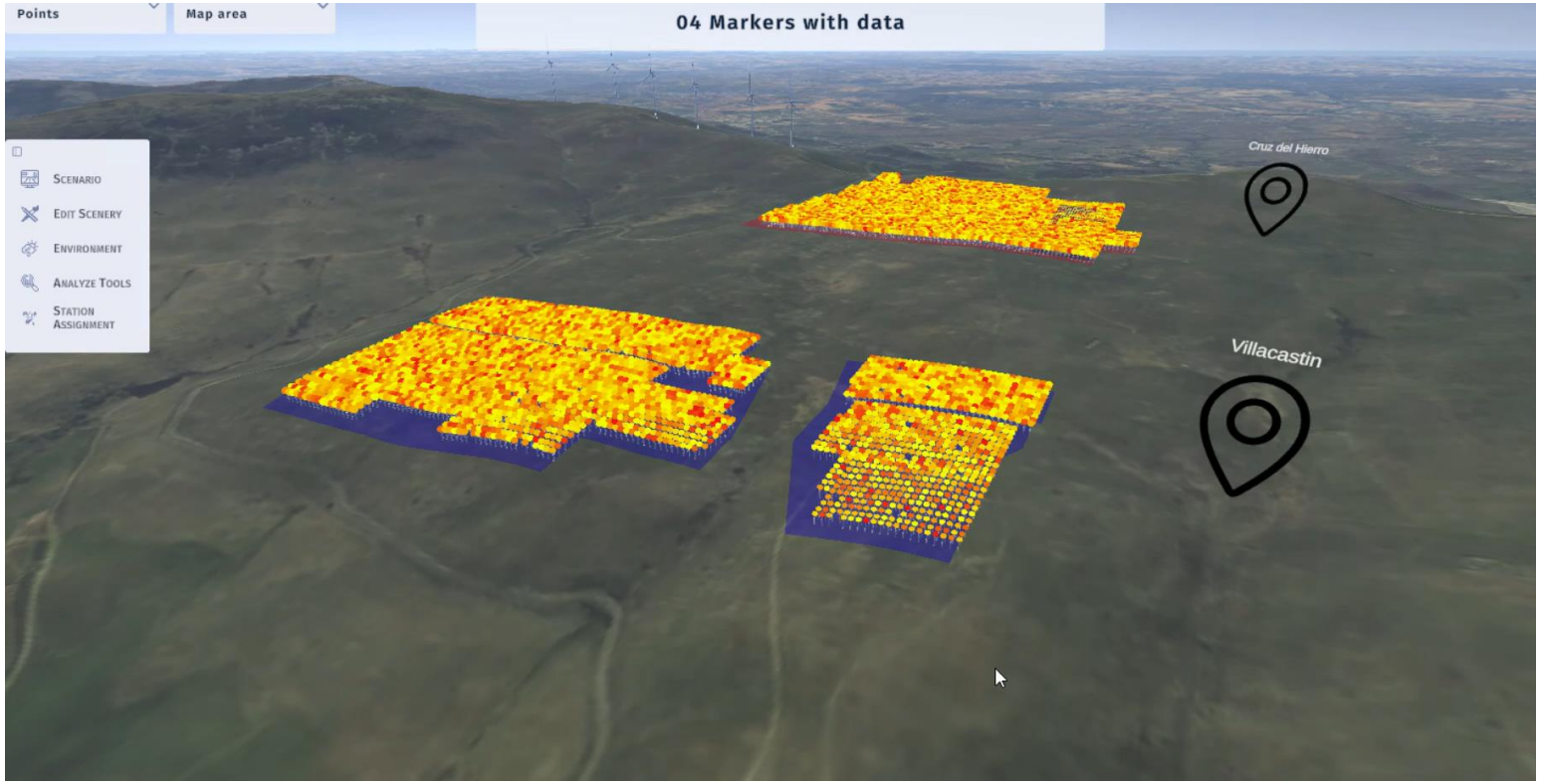
It asks them to describe visually (not technically) these expectations (plus acceptance criteria) from an end user perspective.

This gives us a clearer focus when developing throughout the project.

Want

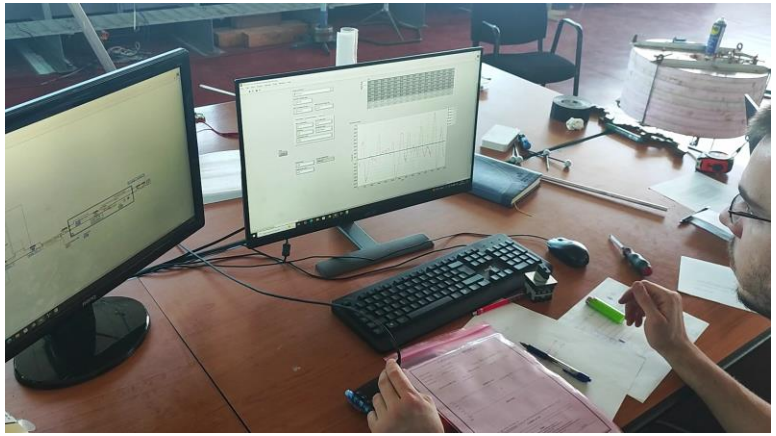
- View real-time energy consumption data for technical buildings, lighting, cranes, port equipment, and cooling systems in warehouses or port areas.
- See data on energy flow between the port and power grid, CO_2 emissions from ships (when not using shore power) and port operations, and weather forecasting systems.

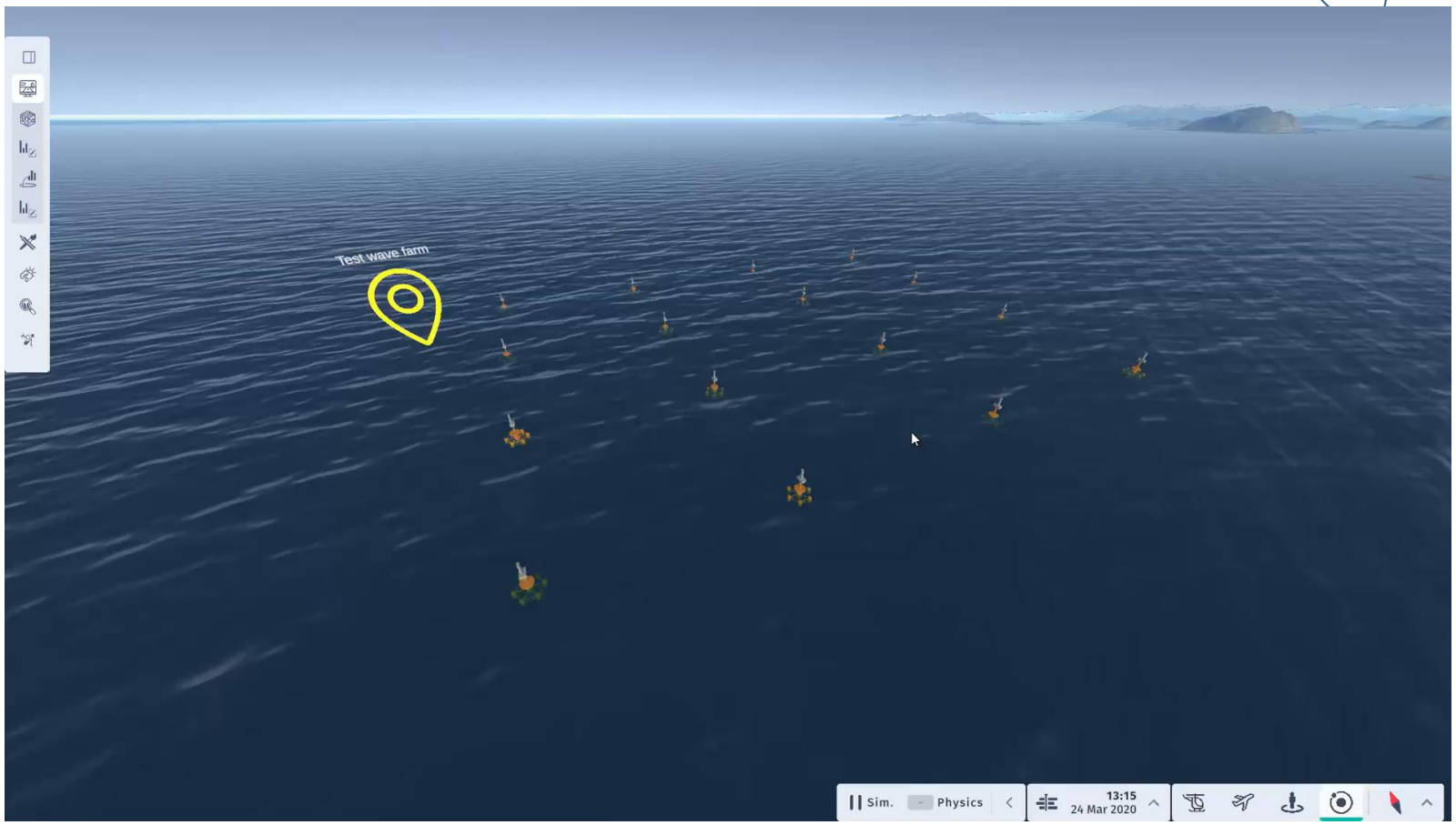




Want

- Developing a digital twin that presents the operational data and diagnose anomalies
- See all information being measured in the PV plant georeferenced (information provided from the SCADA and meteorological stations.
- Visualize all information provided by INESC's AI modules, regarding the health of the different elements of the PV farm (string inverters, power transformers, PV modules, etc).



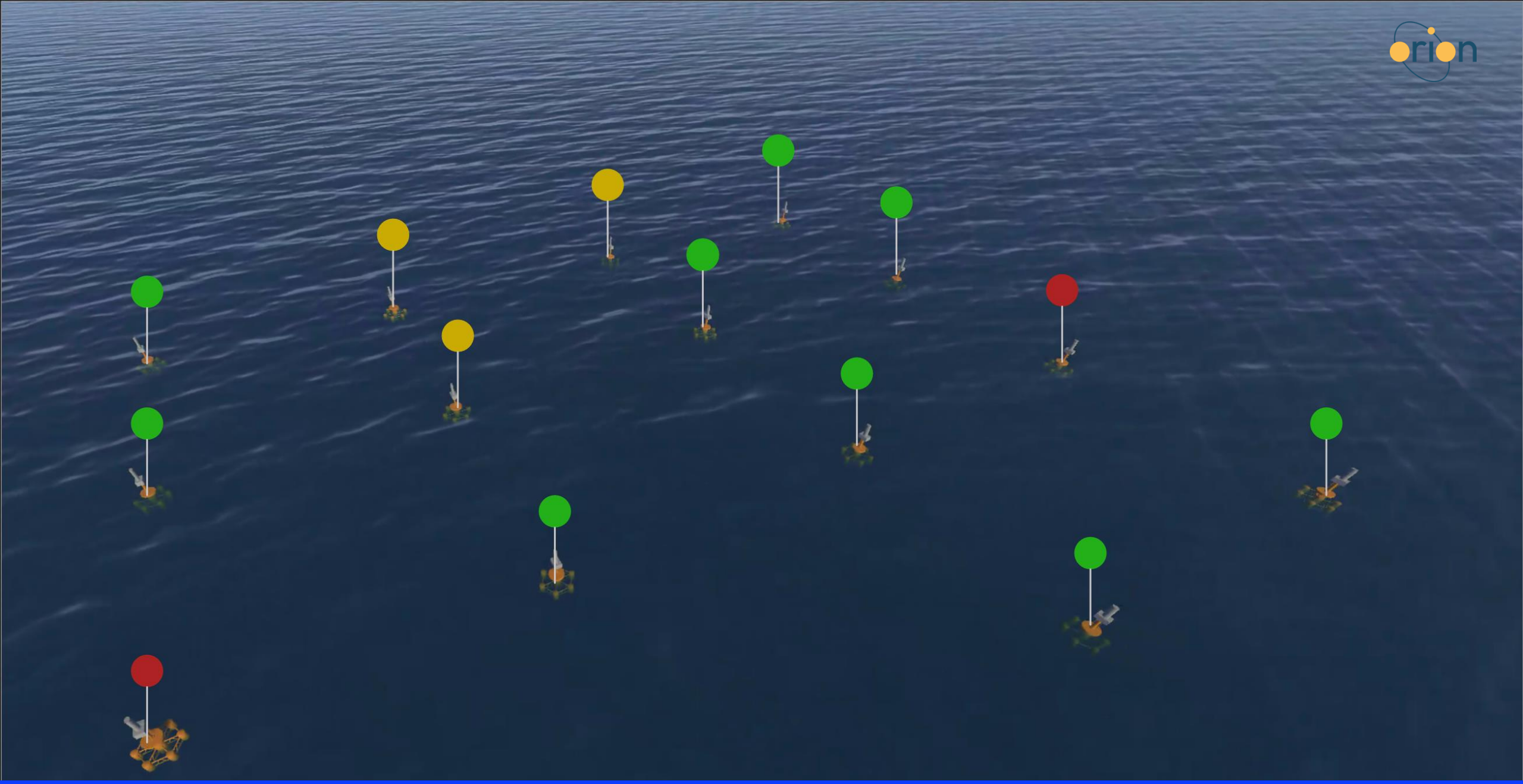


Want

- See 3D model(s) of Sigma WECs positioned in different global locations in a grid-like pattern, depending on their input values (possible scalability of the device size).
- See input / output data for the WECs (input: wave power, water depth, predominant wave and wind direction, efficiency, device availability, distance to shore etc.; output: total occupied WEC farm space, annual energy production for the farm, some more plastic info such as energy feeds xy households, omitted CO2 levels, etc.)

Want

- To have a 3D interactive Dashboard to expose our technological solution for GDS in a clearer and more practical manner, displaying the importance of this technology for the integration of renewable energy to the bulk power system



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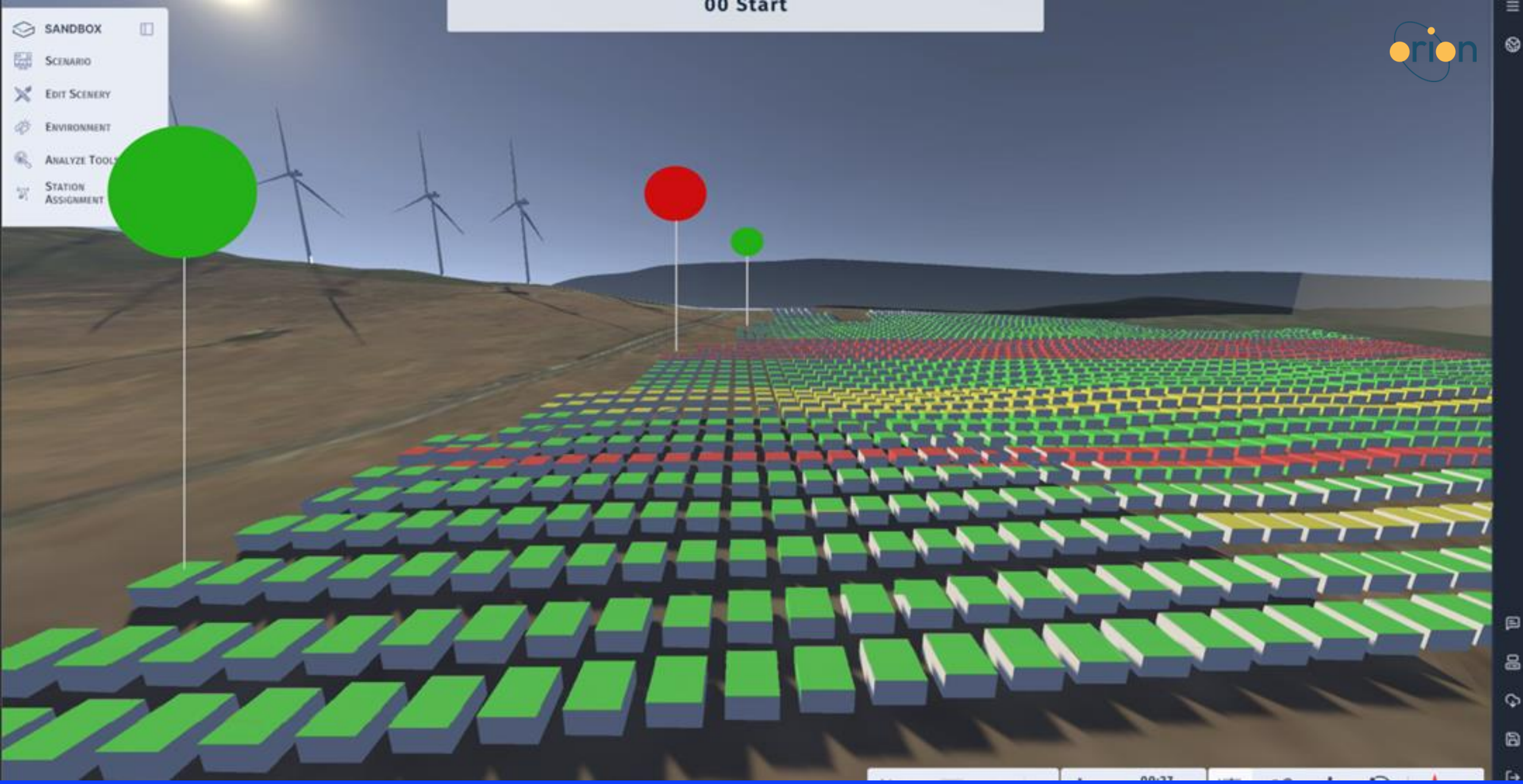
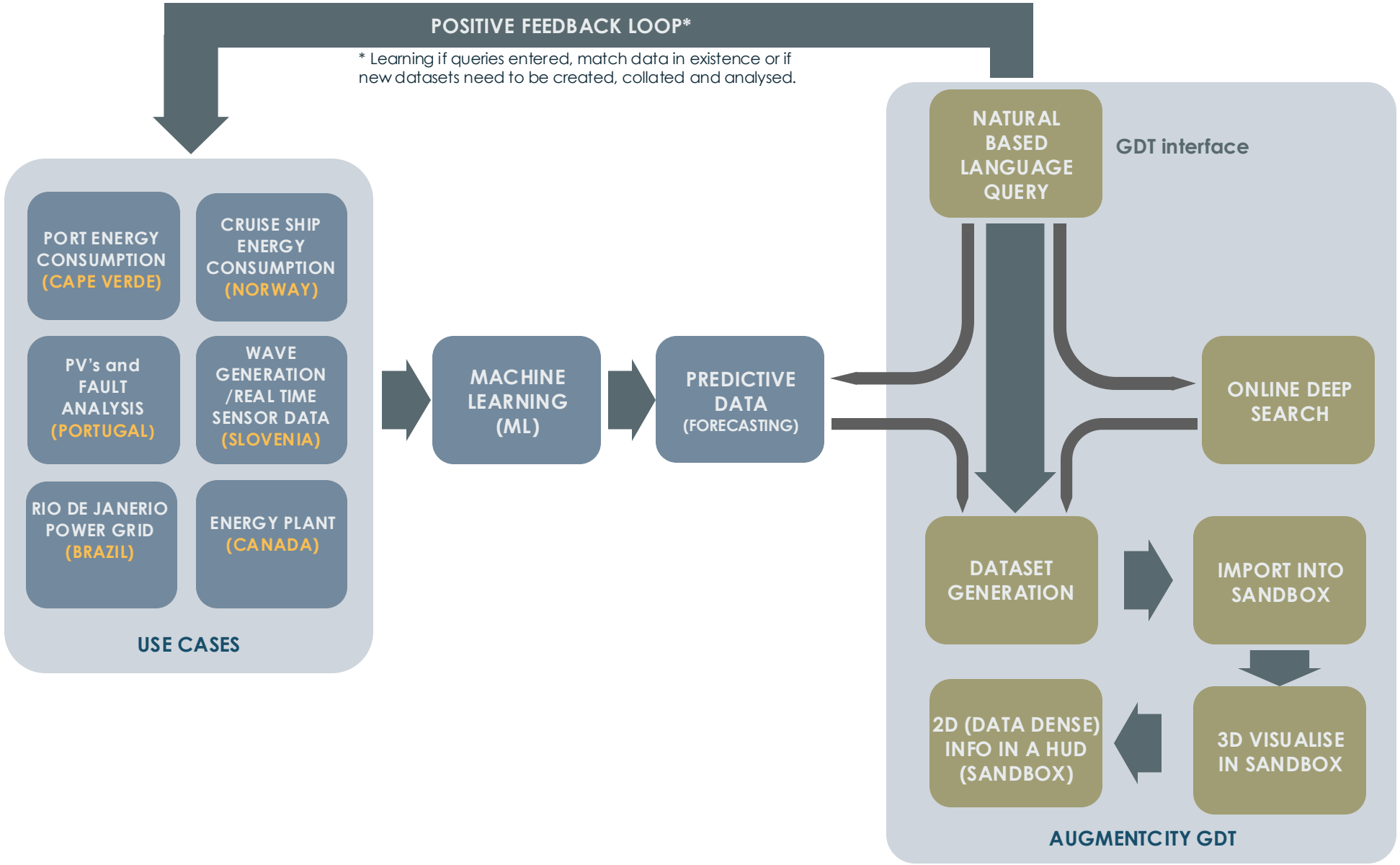
Clear communication


00 Start
SANDBOX
Scenario
Edit Scenery
Environment
Analyze Tools
Station Assignment
orion


POSITIVE FEEDBACK LOOP*
* Learning if queries entered, match data in existence or if new datasets need to be created, collated and analysed.
PORT ENERGY CONSUMPTION (CAPE VERDE)
CRUISE SHIP ENERGY CONSUMPTION (NORWAY)
PV's and FAULT ANALYSIS (PORTUGAL)
WAVE GENERATION /REAL TIME SENSOR DATA (SLOVENIA)
RIO DE JANERIO POWER GRID (BRAZIL)
ENERGY PLANT (CANADA)
USE CASES
MACHINE LEARNING (ML)
PREDICTIVE DATA (FORECASTING)
NATURAL BASED LANGUAGE QUERY
GDT interface
ONLINE DEEP SEARCH
DATASET GENERATION
IMPORT INTO SANDBOX
3D VISUALISE IN SANDBOX
2D (DATA DENSE) INFO IN A HUD (SANDBOX)
AUGMENTCITY GDT

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THANK YOU