Space Applications for Smart and Green Cities

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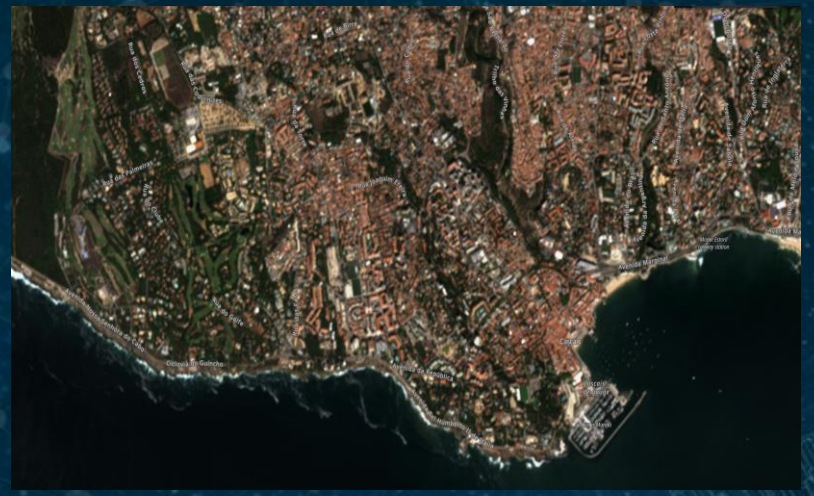
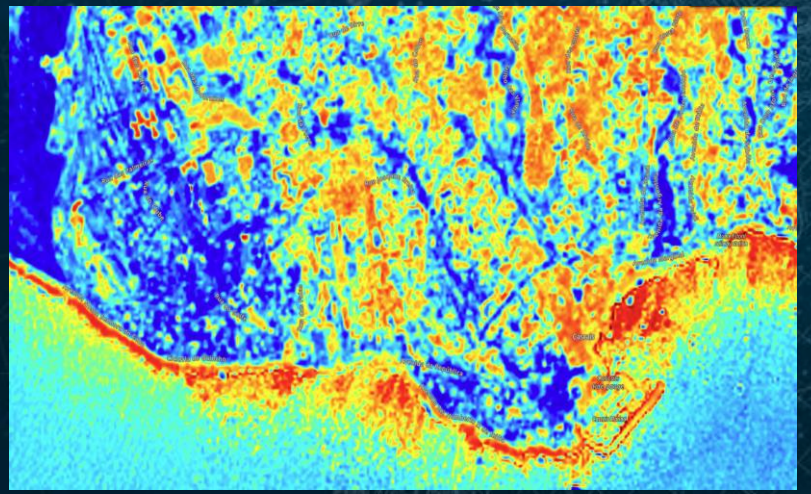
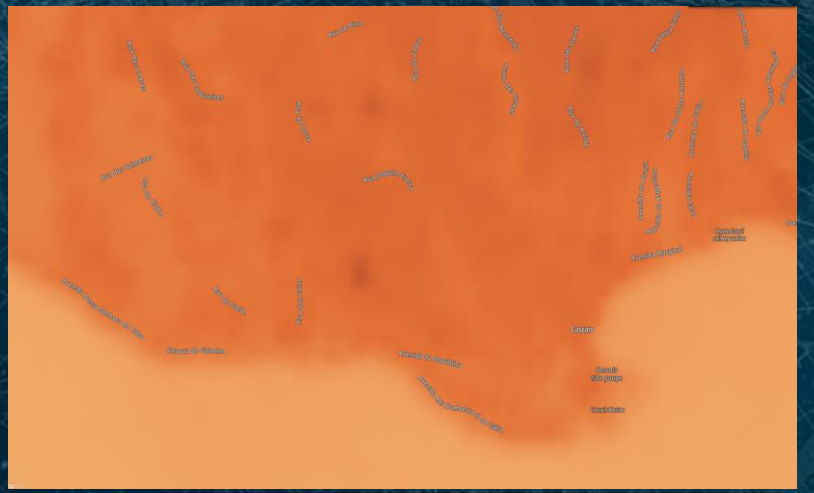
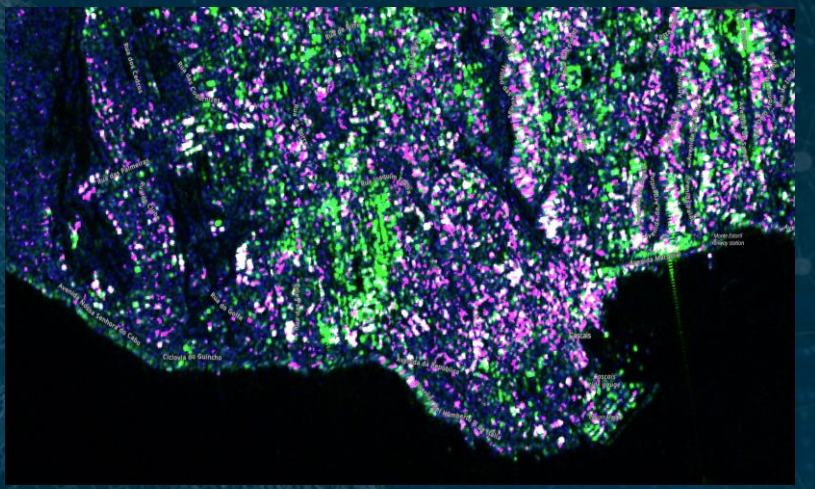
There are even more information...



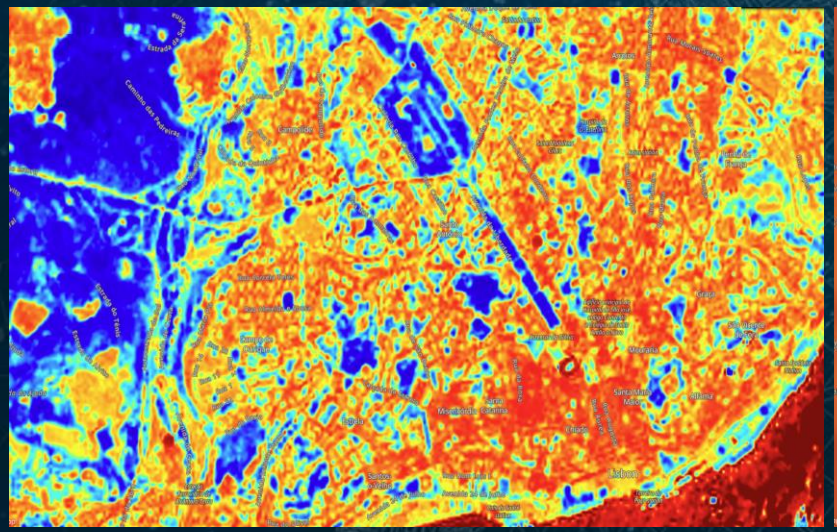
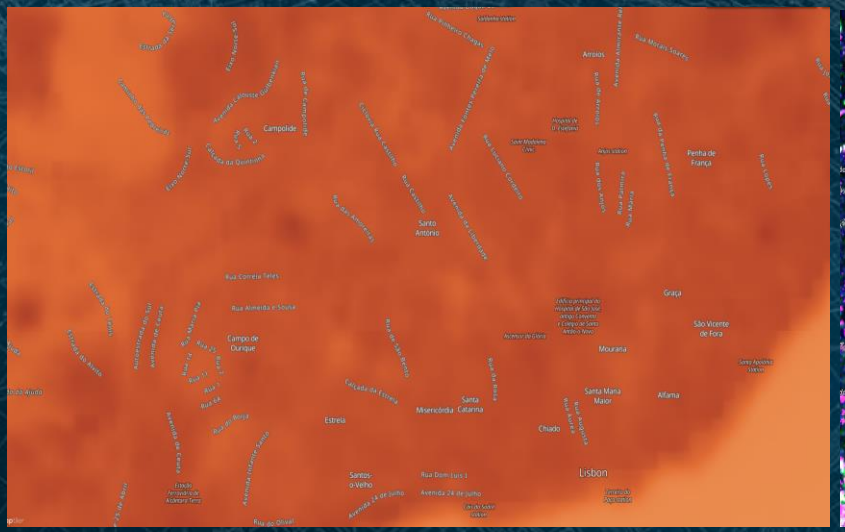
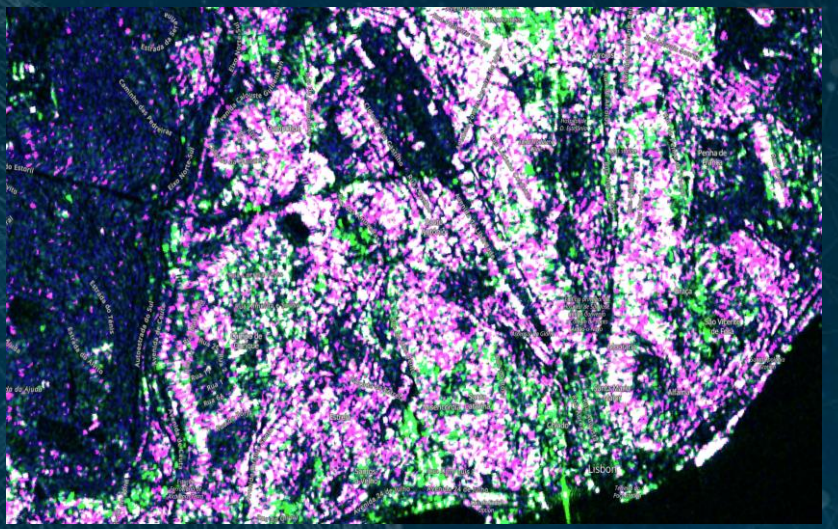




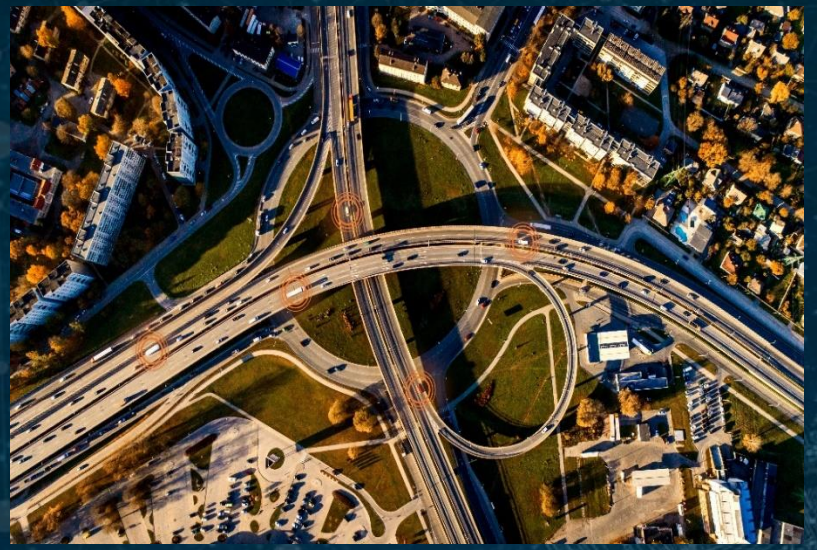


Same information in different location...



But space can also be this…



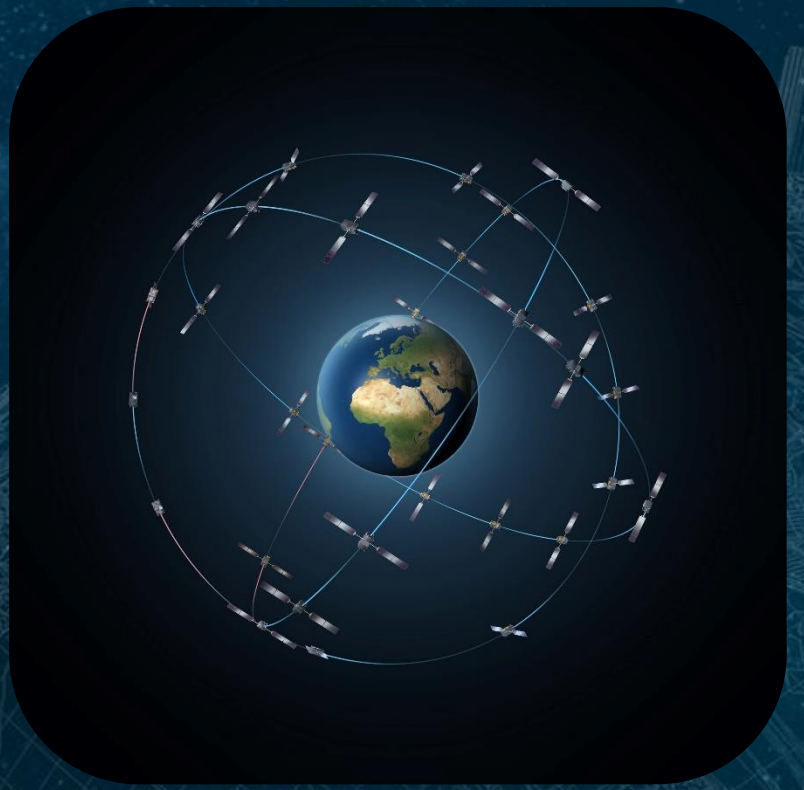
Where? What? How

Locating…Visualising…Connecting…

Satellite Navigation

Satellite Navigation

Satellites providing autonomous geo-spatial positioning



Location

Route Planning

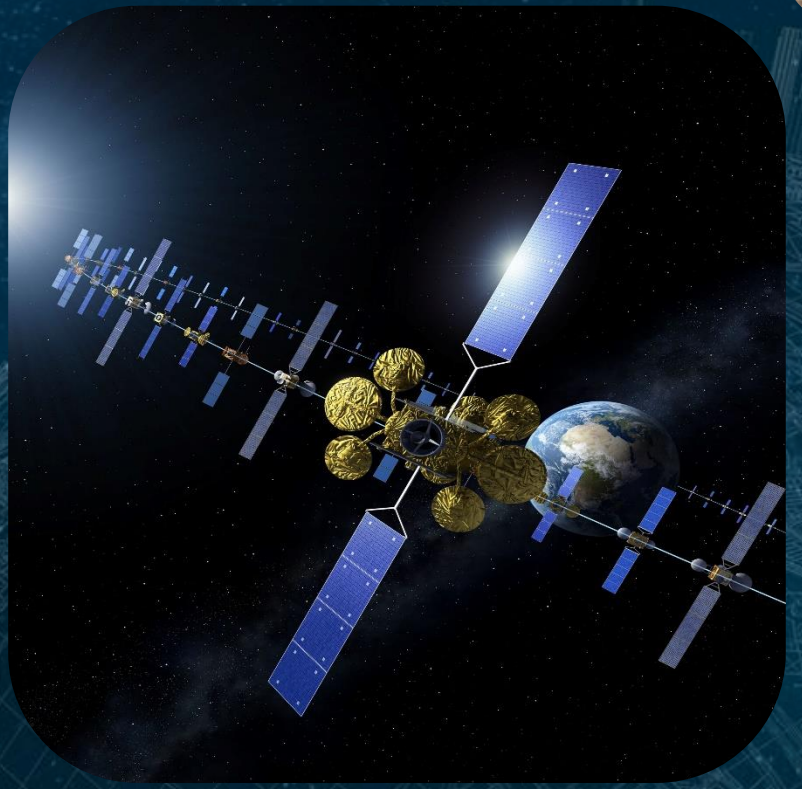
Parcel Tracking

Satellite Communication

Satellite Communication

Satellite Phones

Satellites relaying information across remote and large distances



Internet Services

Live Coverage

Integrated Space Applications for Smart and Green Cities

SatCom is essential to ensure communications whenever the terrestrial communications are absent or not reliable and to support digital solutions. Satellite IoT (including 5G based) to connect sensors for on field monitoring and connected vehicles.

Internet Services

Live Coverage

Virtual and Augmented Reality

GNSS enables ubiquitous high accuracy PNT technologies to support accurate and seamless positioning provided by GNSS, 5G and other complementary terrestrial and on-board systems.

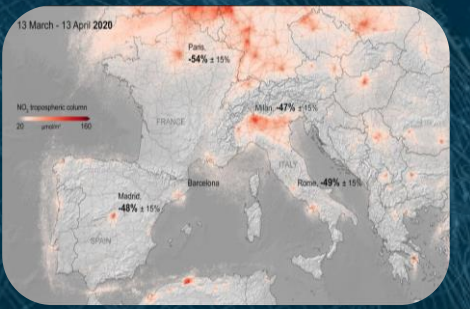
Location

Parcel Tracking

Artificial Intelligence

SatEO for mapping and monitoring environmental conditions such as urban sprawl, boundary/feature delineation and change detection, air quality measurements, heat signatures and fire detection. It can also support the development of Digital elevation/surface models and topography measurements

Urban Sprawl



Air Pollution

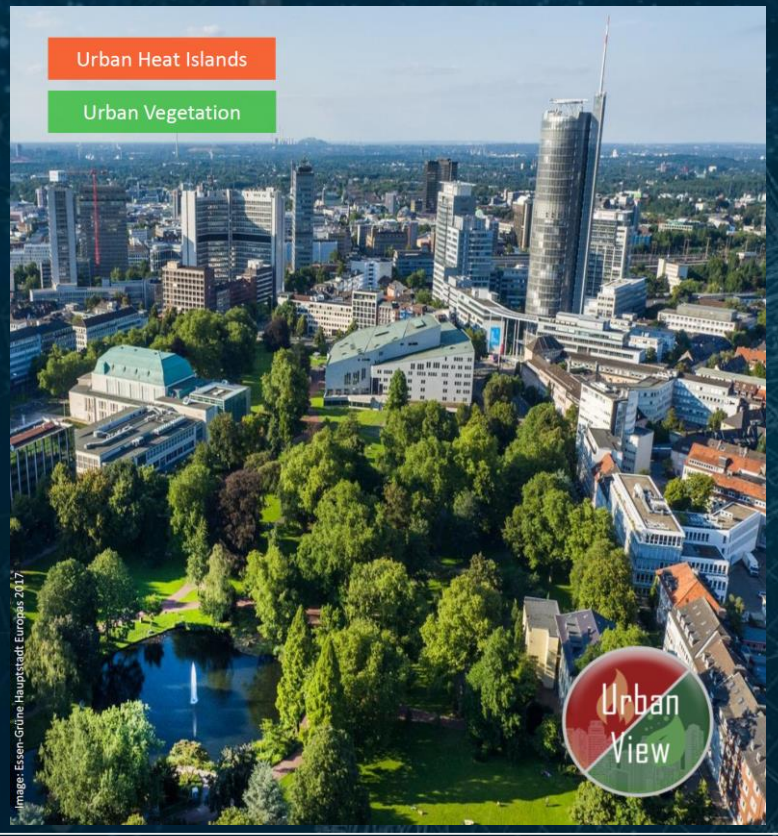
Digital Twins

Green Index - Urban Green View

Urban Green View **services support the integration of green spaces in a sustainable urban context .**

Key service features are:

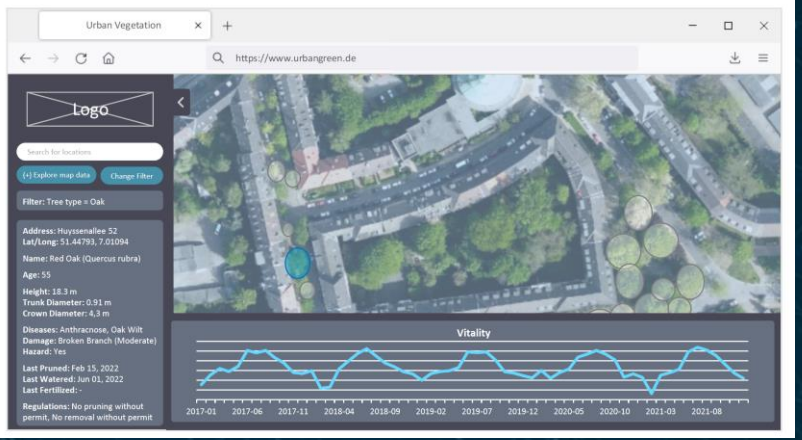
- Detection and Monitoring of the changes in urban vegetation
- Monitoring of heat zones and estimation of cold air corridors



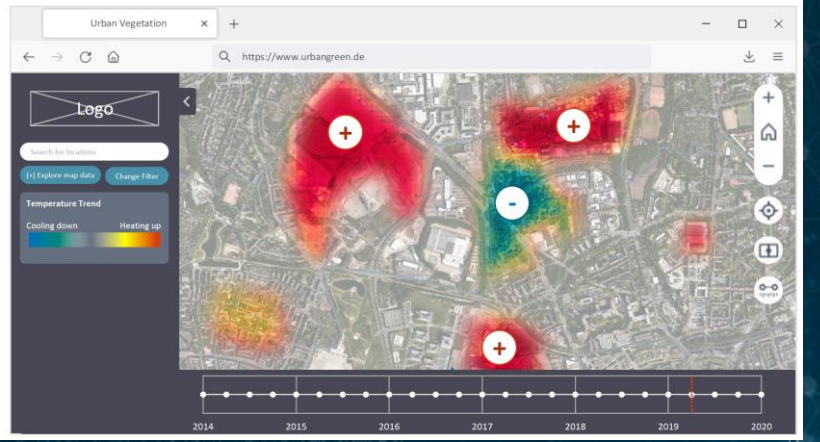
Pilot Test Users

The regional and state authorities such as the City of Essen, the regional planning authority of the Ruhr area (RVR) , the central cooperative for water management, and state forest enterprises.

URBAN VEGETATION – INDIVIDUAL TREES



URBAN HEAT – TREND ANALYSIS



Urban Energy- HeatScape Resolve: HSR

A service that allows municipalities and real-estate developers forecast the urban heat island effect and resulting local microclimate for future urban developments, to mitigate its effect on building energy use and outdoor comfort.

Urban development scenarios

HSR

HSR
HeatScape Resolve
mitigating urban heat islands from space

Results

Building energy use change

Outdoor comfort change

EO data and location independent heat island workflow ensure fast and reliable urban heat island intensity and microclimate forecasting in every city

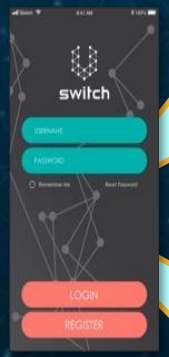
Targeted Users:

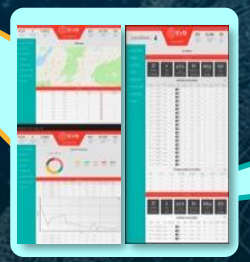
- Real-estate developers – building energy use / ESG reporting
- Municipalities – outdoor comfort improvement

Energy/Transport - Human Switch

Support drivers to SWITCH to electric based on driver's characteristics and provide LIVE asset management for energy market applications V2G

switch





Supported on smart phone and through an online portal

live

- **"Going Electric"** isn't just about buying a new vehicle. There are a number of considerations and opportunities for the owner.
- Live helps customers make and save money by embedding EVs into the energy system.

Uber

Novuna Vehicle Solutions

ALD Automotive

NatWest

NRMA

5000+
User Downloads

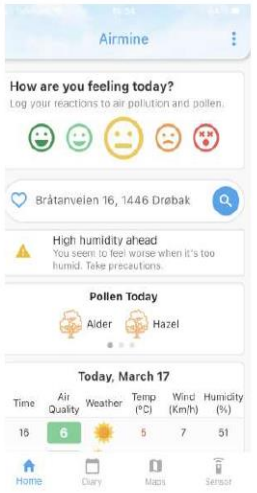
2.7m
Miles logged

£1.60
Customer Acquisition Cost

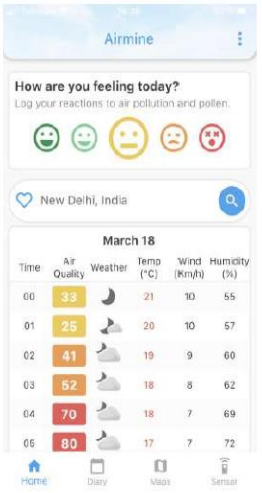
Air Quality - Mining air data for healthier, smarter decisions

Service to measure air quality and detect presence of vegetation pollen in the air. The service provides also forecasting and therefore generates warning for people suffering with asthmas or pollen allergies

App: Flutter, Firebase and Azure

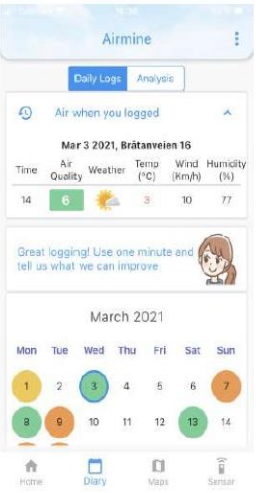


Global air quality forecasts: machine learning, ground stations and satellite data



European pollen forecasts: NDVI (Sentinel 2) and ground stations

Diagnostics: User logs and machine learning



Example of Current Customers: Almost 30 paying customers - Sensors deployed all around the world e.g. Norway, Poland, Indonesia, Australia

Further Info: https://business.esa.int/projects/mining-air-data-for-healthier-smarter-decisions

Airmine App
available on google play and app store

Sensor developed to measure (locally) air quality and pollen to improve model output

EO data for air quality modelling, vegetation density and plant species classification. GNSS services to collect local measurements.

Climate Adaptation - HYDRONET HydroLogic

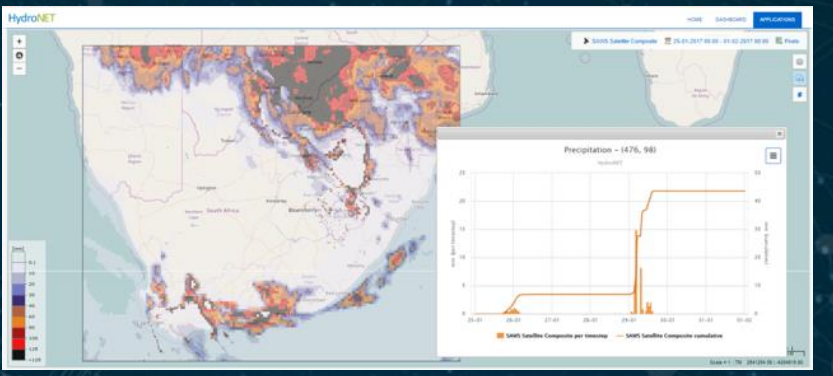
HydroNET is an online portal for accurate and up-to-date information on flooding and precipitation levels.
It provides flood warning and alerting.
It automatically generates reports for specific flood or rainfall events

ESA supports the SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD
United Nations

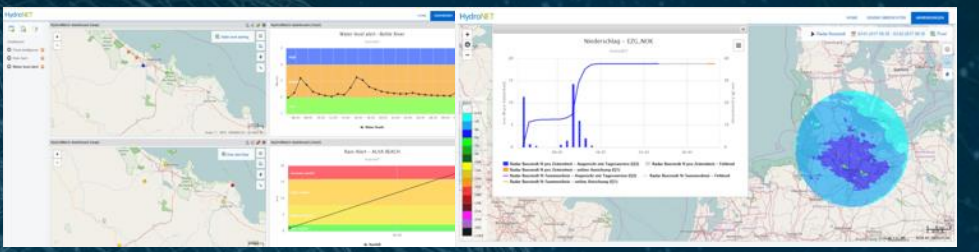
SDG1 No poverty | Prosperity
SDG11 Sustainable cities and communities | Planet
SDG13 Climate action

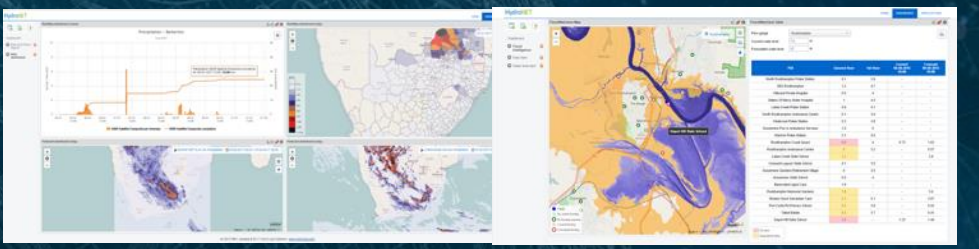
Situational information, configured in minutes

FLOOD WATCH

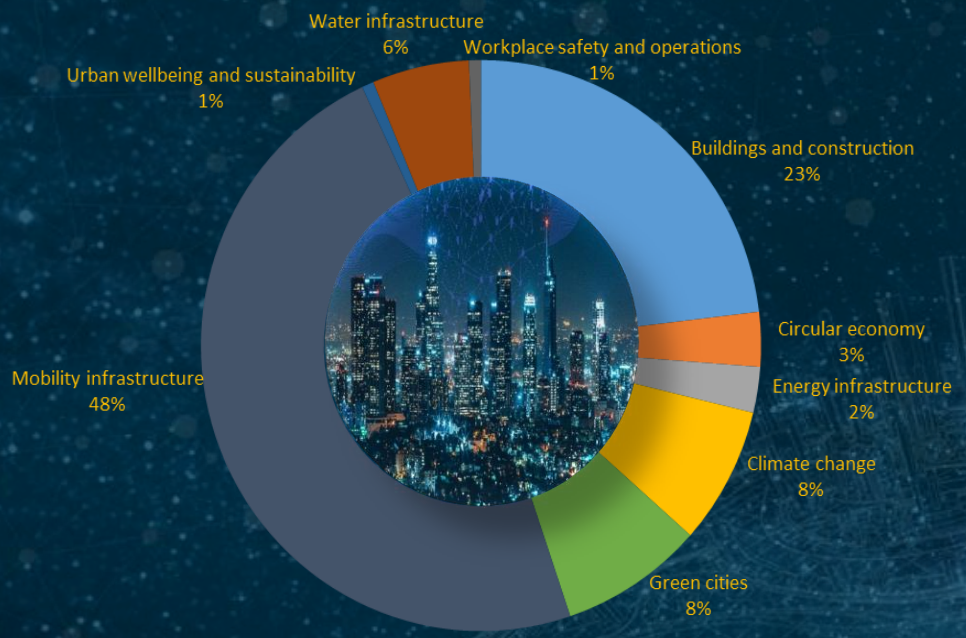


RAIN WATCH





BASS Smart Cities Initiatives - Portfolio



Market demand from smart cities for green solutions, new regulations, space opportunities awareness and cross-sector collaboration will support future growth in green and sustainable investment

Activities across

>10 countries

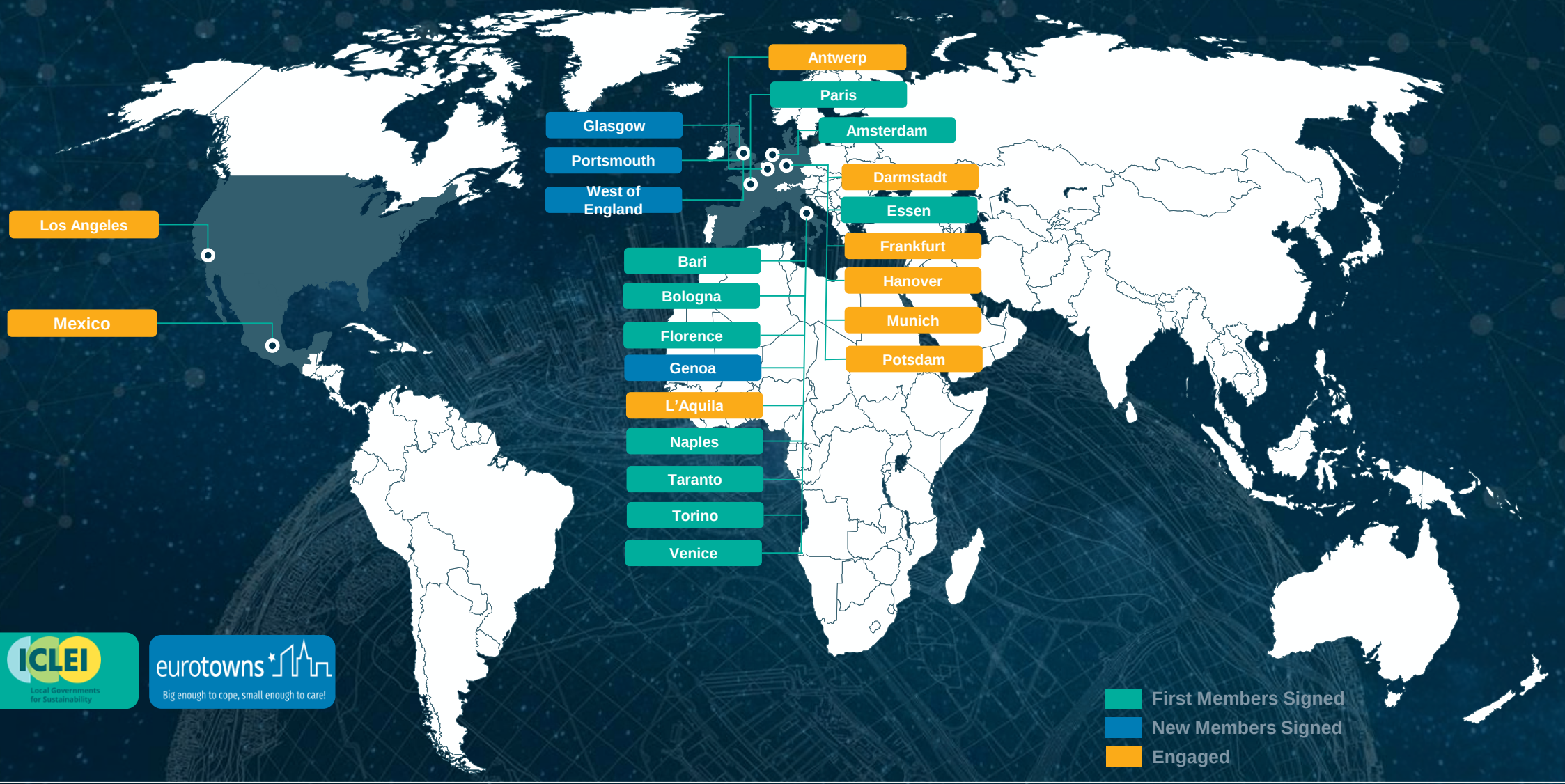
15M€

invested over 10 years

61

projects and studies

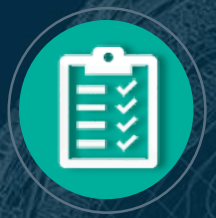
Space for Smart and Green Cities - Task Force – Members



Space for Smart and Green Cities - Task Force – Approach

- The Task Force has a strong implementative focus, aiming to develop and deliver innovative projects, trials of technologies and user driven solutions in the smart cities highlighting the socio, economic and environmental advantages for users and the involved industry.

- The Task Force is expected to :
  - Maintain an up-to-date overview of current green smart cities related policies and activities
  - Identify and agree on short- and long-term priorities and its potential space added value
  - Implement initiatives in the selected thematic areas to be undertaken with partners of the Task Force



Use Cases

Funding Calls

Pilot Projects

Space for Smart and Green Cities - Task Force – Priority Areas

Urban Development

- Digitalisation – Digital Infrastructure, Digital Twin, Cultural Change, 5G
- Robotics – Assistance, monitoring, maintenance
- Nature-based solutions (NBS) for urban resilience
- Environment - Air Quality, Urban Heat Island, Green Space
- 15 Min City
- Circular Economy

Sustainable Mobility

- Electromobility and Infrastructure
- Mobility As A Service
- Smart Traffic Management
- Connected Autonomous Vehicle
- Alternative fuel - Hydrogen

Energy

- Energy efficiency
- Smart Grid
- Smart Utilities
- Street Lighting Management

Well-being and Inclusiveness

- Healthy cities
- Social inclusion and well being
- Safety
- Smart home office – Home automation

Space for Smart and Green Cities – Task Force – Roadmap

Nov 2022
1st High-level discussions with German cities

Jan 2023
2nd High-level discussions with German cities

May 2023
1st High-level discussions with all cities

Jun 2023
2nd High-level discussions with all cities

Sept 2023
Launch of Space for Smart and Green Cities Task Force

Jun/Aug 2023
Follow-up One to one

Nov 2023
1st Advisory Board Meeting

Dec 2023
1st Working Groups Meeting
- Urban Development
- Sustainable Mobility

Mar 2024
2nd Working Groups Meeting
- Urban Development
- Sustainable Mobility

Sept 2024
2nd Advisory Board Meeting

Sept/Oct 2024
3rd Working Groups Meeting
- Urban Development
- Sustainable Mobility

Jan – Sep 2024
Funding calls published with challenges from Task Force members


Commercial Applications of Space-enabled Robotics: Transport and Logistics


Space For Sport, Culture and Education Infrastructure


Commercial Applications of Space-enabled Robotics: Smart Cities and Infrastructure


Space for Electromobility

Apr – Aug 2024
Discussions with Task Force members on future funding topics


Space for Sustainable, Connected and Liveable Cities


Space for Intermodal Transport

Let’s work together!

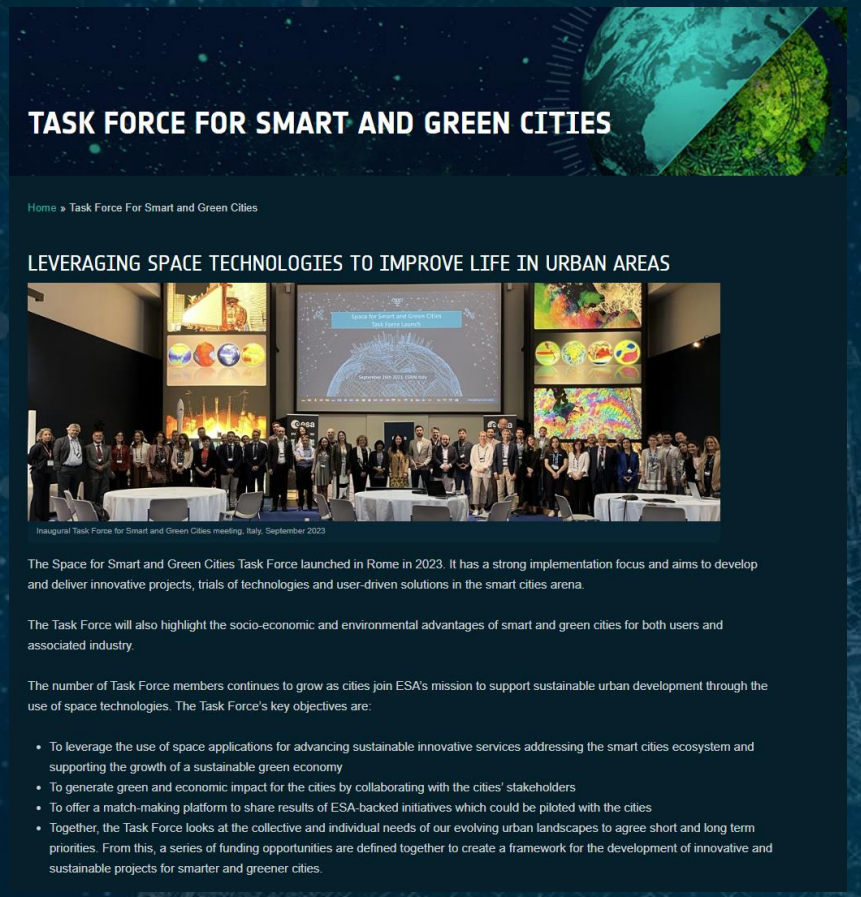
Leveraging the use of space applications is crucial for transition to smart sustainable cities

Several initiatives already planned to support the challenges faced by cities by using space assets and data

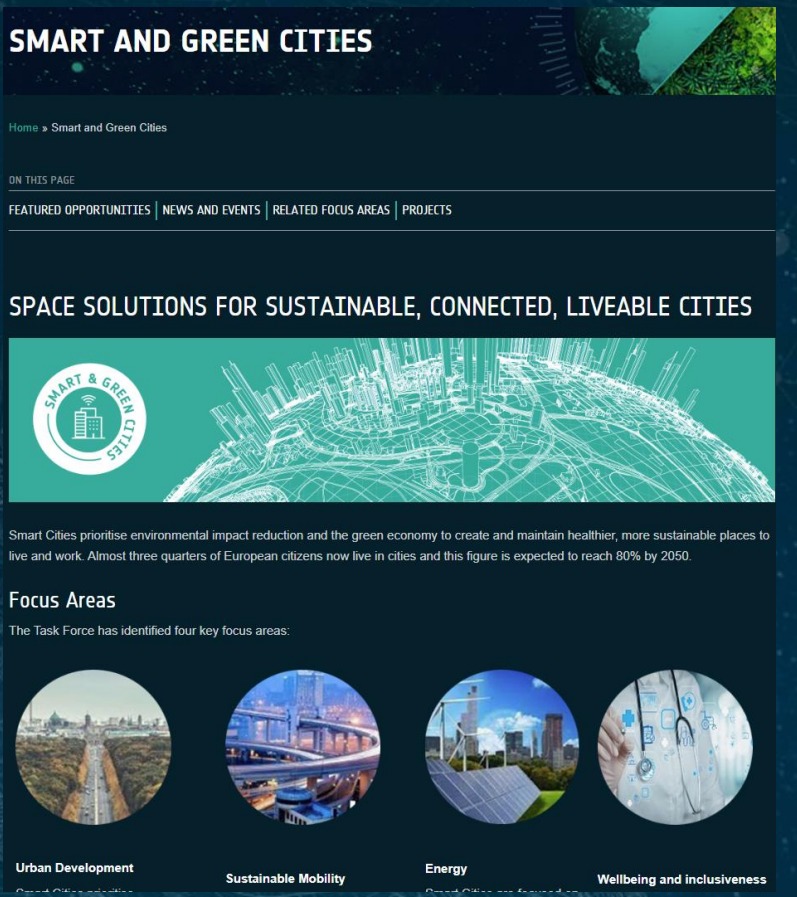
It is essential to facilitate match-making between solution providers and cities authorities

ESA is ready to support de-risking of space services development and validation through pilot projects in the interested city(ies)

Where to find the information?



https://business.esa.int/task-force-for-smart-and-green-cities



https://business.esa.int/smart-and-green-cities

To find out more about joining our Task Force please email business@esa.int.

SIGN UP FOR OUR SMART CITIES BULLETIN

Upcoming Event

ESA Space Solutions

Thank You!

For more information:(https://business.esa.int/)