



**EARTH OBSERVATION FOR
STATISTICS AT THE LOCAL LEVEL
A VIEW FROM EURISY**



Grazia M. Fiore
Head of Programmes, Eurisy

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Eurisy

- A European non-profit association
- Founded in 1989 by Hubert Curien, former French Minister of Science and Technology
- Based in Paris at ESA HQ
- Gathering Space Agencies and other organisations dealing with space affairs

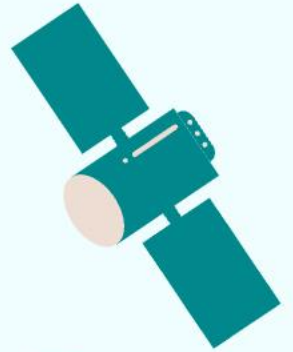
Members



Mission

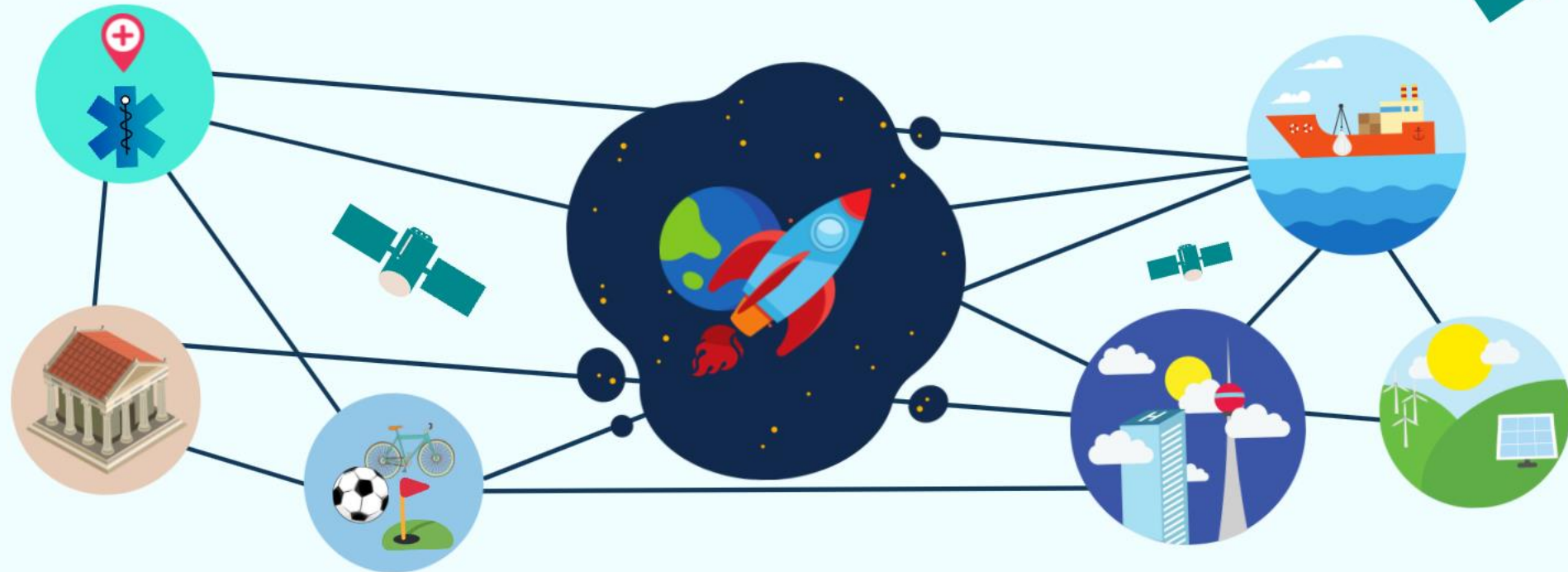


Create networks to bridge space and society



Our thematic areas:

- Space4Cities
- Space4Health
- Space4Rural
- Space4Culture
- Space4Maritime
- Space4Sports



Approach



Facilitator → EXPLORE

Raise awareness of satellite applications to help professional communities in many sectors: from transport to risk management, from habitat protection to energy, from climate change to the IoT.



Matchmaker → CONNECT

Support potential end users of satellite applications by leveraging its vast network among space and non-space communities; understanding patterns and links and/or creating them for mutual benefits.



Adviser → INFORM

Provide feedback to decision-makers on possible measures to overcome obstacles in diffusing space-derived innovation in society.

Activities

Events

Fora where pioneering public authorities, agencies and SMEs from around Europe can share their hands-on experience to teach, learn and innovate across sectors.



Projects

Eurisy answers to European calls taking part in international consortia for different projects.



Stories & reports

Based on its work with end users, Eurisy publishes articles, success stories and reports about the latest on satellite applications.



EARTH OBSERVATION FOR STATISTICS AT THE LOCAL LEVEL

Global data on wide areas



METADATA

Treating and stocking capacities

EARTH OBSERVATION APPLICATIONS AT THE LOCAL LEVEL

SAFE & RESILIENT CITY



DISASTERS & SECURITY

- Management of natural disasters
- Coordinated emergency and rescue services
- Critical infrastructure monitoring
- Oil spills detection and removal
- Monitoring of hazardous goods' transportation
- Analysis of crime incident patterns
- Infringements' reporting



SOIL & WATER

- Soil morphology and moisture
- Soil cover and use
- Inland and sea water quality and temperature
- Remote control of water reservoirs
- Hazardous materials management
- Sustainable urban agriculture

CLEAN CITY



AIR

- Air quality and temperature
- Traffic, industry and airport emissions
- Air quality modelling and management



ENERGY

- Solar energy systems' assessment
- Wind maps for wind power stations
- Remote monitoring of hydropower stations
- Synchronised power grid systems
- Remote detection of power outages



GREEN AREAS

- Urban forest and biosphere maps
- Balanced green and built-in spaces
- Vegetation cover monitoring and management



WASTE

- Optimised bin collection
- Detection of illegal dump sites
- Hazardous waste tracking

HEALTHY & INCLUSIVE CITY



HEALTH

- Coordinated emergency medical services
- Remote health check-ups
- Pollution peaks alerts
- First aid apps



ENGAGEMENT

- Apps enhancing civic e-participation
- City management based on mobile behavioural data
- Apps fostering sustainable lifestyles
- City open data



CULTURE

- Monitoring of historical buildings
- Augmented reality and historical city maps
- Tourism and city guides
- Geolocated outdoor serious games



URBAN PLANNING

- Land cover classification
- Land use monitoring and management
- Cadastral maps
- Urban sprawl monitoring
- Property tax evaluation
- Identification of illegal buildings
- Urban 3D planning



TRANSPORT & MOBILITY

- Real-time transport information
- Bike and car sharing
- Intermodal transport
- Urban traffic modelling and analysis
- Optimisation of public transport and traffic lights
- Mobility support for persons with impaired mobility
- Parking apps



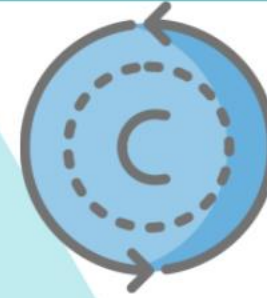
BUILDINGS & INFRASTRUCTURE

- Monitoring of pavements, buildings and critical infrastructure
- Planning of constructions and transport infrastructure
- Adapt construction materials to climate changes
- Road condition and traffic safety improvements
- Mapping of buried optic fibre, gas and electric lines
- Soil subsidence maps to prioritise maintenance works

EARTH OBSERVATION FOR STATISTICS AT THE LOCAL LEVEL



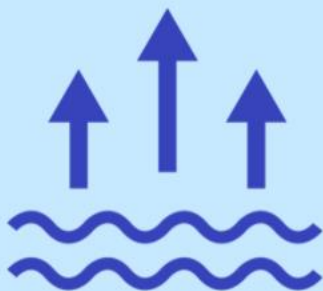
THE GLOBAL GOALS



EXAMPLES OF EO USE FOR STATISTICS

STATISTICS NETHERLANDS

Evapotranspiration Map (2014)



Agricultural statistics
and monitoring
Sentinel-2 (A&B) and
Landsat 8 time series



ESA SEN4STATS

EO products to support
agricultural statistics.
Can be integrated in
NSO environment



EXAMPLES OF EO USE FOR STATISTICS



emits

GAUSS "Generating Advanced Uptake of Earth Observation for Smart Statistics"

Oct 2021 Kickoff

3 EO entities (NOA, FMI and IGIK from Poland) + NSOs (ELSTAT, Statistics Finland, Statistics Poland).

Support development of information services for the national statistical offices.

Themes: air quality, snow/water statistics and well-being (through green indicators).



EXAMPLES OF EO USE FOR STATISTICS



Earth Observations Toolkit for
**SUSTAINABLE CITIES
AND HUMAN SETTLEMENTS**



**Links, guidance and uses cases for relevant
EO data sets and tools**



Earth Observations Toolkit for **SUSTAINABLE CITIES AND HUMAN SETTLEMENTS**



POLISH URBAN POLICY OBSERVATORY

11.3.1 Ratio of land consumption rate to the population growth rate

TARGETS 11.3, 11.6, 11.7

Warsaw, Krakow, Poznan,
Upper Silesia Coal Region

**CORINE Land Cover database, multi-temporal
Sentinel-2 data, in situ databases**



+ URBAN INDICES MAPS

POPULATION DENSITY DASYMETRIC MAPS



**DETAILED LAND USE MAPS, URBAN STATISTICAL DATA, AND POPULATION DENSITY DASYMETRIC MAPS
DENSITY OF POPULATION IN RELATION TO THE URBAN LAND USE CLASSES**



Earth Observations Toolkit for **SUSTAINABLE CITIES AND HUMAN SETTLEMENTS**



POLISH URBAN POLICY OBSERVATORY

11.6.2 Annual mean levels of fine particulate matter in cities

TARGETS 11.3, 11.6, 11.7

Warsaw, Krakow, Poznan,
Upper Silesia Coal Region

CORINE Land Cover map Level 6, Copernicus
data, statistical data and in situ databases

**ANALYTICAL DASYMETRIC MAPS OF
POLLUTION IN URBANIZED AREAS**

+ METEOROLOGICAL DATA =



**MAPS OF THE STATE OF POLLUTION AND AERATION
DASYMETRIC MAP OF THE CITY AERATION SYSTEM DEFICIT**



Earth Observations Toolkit for **SUSTAINABLE CITIES AND HUMAN SETTLEMENTS**



TARGETS 11.3, 11.6, 11.7

Warsaw, Krakow, Poznan,
Upper Silesia Coal Region

POLISH URBAN POLICY OBSERVATORY

11.7.1 & 11.7.2 Access to safe and inclusive green and public spaces

EO URBAN INDICES



STATISTICAL DATA



**HARMONIZED MAPS OF LAND ALLOCATED TO STREETS,
GREEN AREAS, ETC.**



MAPS OF NOISE, POLLUTION, TRAFFIC ACCIDENTS, AND CRIME

SAFE SPACES IN CITIES





Earth Observations Toolkit for **SUSTAINABLE CITIES AND HUMAN SETTLEMENTS**



POLISH URBAN POLICY OBSERVATORY

11.7.1 & 11.7.2 Access to safe and inclusive green and public spaces

TARGETS 11.3, 11.6, 11.7

Warsaw, Krakow, Poznan,
Upper Silesia Coal Region

CONSTRAINTS

Spatial resolution of Sentinel-2 data not sufficient for dense urban pattern of some cities. The Institute had to use satellite data of higher spatial resolution for almost 4.7% of the territory of Poland.

Additional expenses, which can be partially reduced by multispectral up-to-date high-resolution aerial orthophotomaps.



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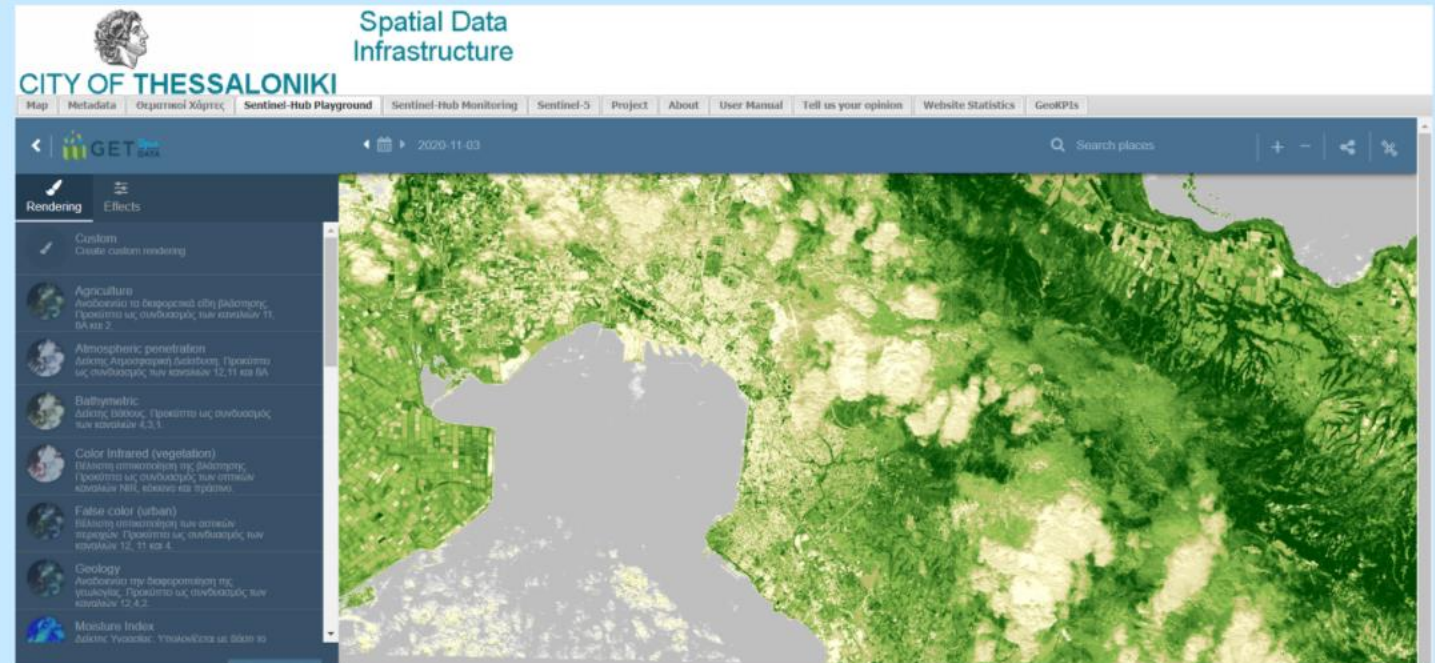


THESSALONIKI URBAN RESILIENCE OBSERVATORY

CITY OF **THESSALONIKI**

MONITOR AIR POLLUTION

**Copernicus DATA to upgrade the
spatial data infrastructure
through standardised web
services**



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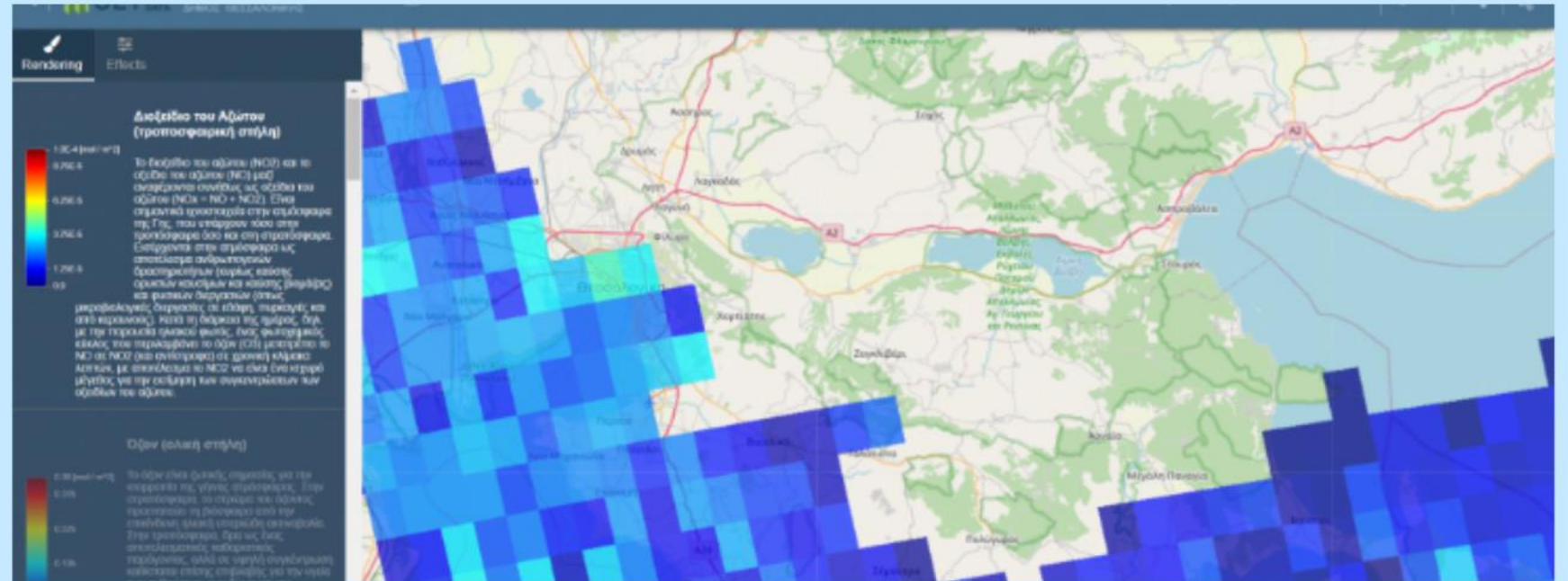
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THESSALONIKI URBAN RESILIENCE OBSERVATORY

CITY OF **THESSALONIKI**

Atmospheric concentrations of pollutants, e.g. nitrogen dioxide, ozone, carbon monoxide, sulfur dioxide, formaldehyde and methane particles



Sentinel 5 Tropospheric NO2 Column - 2020-06-16



Earth Observations Toolkit for **SUSTAINABLE CITIES AND HUMAN SETTLEMENTS**



CITY OF **THESSALONIKI**

TRACKING OPEN SPACE FOR PUBLIC USE





Earth Observations Toolkit for SUSTAINABLE CITIES AND HUMAN SETTLEMENTS



CITY OF THESSALONIKI

TRACKING OPEN SPACE FOR PUBLIC USE

gis.thessaloniki.gr/greenobservatory/?lang=en_GB

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ΔΗΜΟΣ ΘΕΣΣΑΛΟΝΙΚΗΣ

Powered by GET making smarter weather

About

OpenStreetMap

- Thessaloniki Buildings (Vegetation Sufficiency)
 - critical deficit
 - deficit
 - sufficient
 - good
 - optimal
- Municipal Sectors
- SENTINEL 2, TRUE COLOR L2A
- SENTINEL 2, NDVI
- SENTINEL 2, GREEN CITY
- SENTINEL 2, FALSE COLOR INFRARED
- PLEIADES, NDVI PAN-SHARPENED
- PLEIADES, TRUE COLOR PAN
- PLEIADES, NDVI
- PLEIADES, False Color
- Trees
- Trees (Triandria)

Index – level of green adequacy around buildings

The urban green space has multiple effects on human health and well-being, combined with the positive effects on the urban environment. These positive effects include, the reduction of air pollution, noise levels, weather conditions retention and especially the reduction of temperature retention. The latter one has a huge impact on the urban heat islands phenomenon (UHI) that prevails in large urbanized areas. Trees function as the cooling points on roads, the grass plots allow water penetration and this water is then used for the evapotranspiration from vegetation, positively affecting the microclimate. These functions are even more important in the framework of climate change.

For the calculation of the adequacy index we use

Index – level of green adequacy around buildings

Individual trees of the city

Forecasting System of urban heat island

Adequacy of greenery per municipal district and neighborhoods

Completion of buildings in the area of Triandria with BIM techniques



Earth Observations Toolkit for
**SUSTAINABLE CITIES
AND HUMAN SETTLEMENTS**



EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT

The Earth Observations Toolkit for Sustainable Cities and Human Settlements

ONLINE WORKSHOP, DECEMBER 2021

EARTH OBSERVATION FOR STATISTICS AT THE LOCAL LEVEL

Advantages

- Cover large areas repetitively with various spectral bands and spatial resolutions
- Provide more timely statistical outputs
- Reduce the frequency of surveys
- Provide disaggregated data for informed decision making
- Support the monitoring of SDGs



EARTH OBSERVATION FOR STATISTICS AT THE LOCAL LEVEL



Limits

- EO data use requires funds and engagement from statistical institutions
- These can lack knowledge to analyse and use EO data
- These could overtrust EO



Solutions

- Collaborate
- Share
- Focus

eurisy
ACTING COLLECTIVELY TO
BRIDGE SPACE AND SOCIETY

Find us:



www.eurisy.eu

grazia.fiore@eurisy.eu