

GEOSYSTEMS HELLAS S.A.

GEOSYSTEMS HELLAS S.A. (GSH) was established in November 2009 as GEOSYSTEMS EU GROUP Member (www.geosystems-group.eu).

Is a Greek SME with 12 qualified Engineers. Has three main activities:

1. acting commercially as Hexagon Geospatial and Hexagon Airborne Solutions partner and as consultant in Greece and Cyprus on complex subjects' integration on Earth Observation, IoT and 4/5G. Deeply involved in Remote Sensing and Photogrammetry projects working also with Big Data. GSH is focused on industrial projects covering added value services in the space market including Earth Observation and Navigation Applications, business development and Project Management support. Is participating in service projects, Enterprise Solutions /Smart M.Apps, Smart Cities /IoT Technology Trends and 2. participating in service projects e.g. coverage with airborne LiDAR E65 critical infrastructure after the 2020 flooding, archeological sites LiDAR use for monitoring and classification before excavations and 3. participating in R&D projects for land management focusing in the "built environment" and "critical infrastructure".

GEOSYSTEMS HELLAS S.A. is acting commercially in Greece and Cyprus:

- ❖ Offering software solutions as Hexagon Geospatial Sole Distributor (www.hexagongeospatial.com), UAV & aerial cameras as Hexagon Airborne Partner.
- ❖ Offering consultancy and technical support to projects in the field of geographic information systems, photogrammetry, remote sensing and Web applications.
- ❖ Participation at the development of smart solutions in space technology and in environmental projects (R&D projects).
- ❖ As Distributor of PLANET products and solutions (www.planet.com).

Geosystems Hellas S.A. participates as Project Partner at the H2020 **Integrated NBS-based Urban Planning Methodology for Enhancing the Health and Well-being of Citizens euPOLIS, (GA-869448)**, Official website: <https://eupolis-project.eu/>



New project under the initiative of Climate action, environment, resource efficiency and raw materials. To systematically implement an innovative NBS-based urban planning methodology, based on the Blue Green Solutions (BGS) paradigm, which is designed to create spatial and functional conditions that will enhance not only the PH and WB of citizens, but also the urban metabolism, the social cohesion and the resilience of cities to Climate Change (CC) and natural disasters.

Use of Earth Observation, Big Data and Data Fusion and machine learning/deep learning techniques and establishment of infrastructure for spatial information (Metadata, Data Specifications, Data and Service Sharing and Monitoring and Reporting). Operational requirements/scenarios definition in fields of data exchange/sharing in an interoperability manner. The solutions integrate sensors, software, domain knowledge and customer workflows into intelligent information ecosystems that deliver actionable information used in a broad range of vital industries. Strengths in image exploitation, processing, visualization and geospatial data management to meet a broader spectrum of customer needs in today's enterprise environment.

Geosystems Hellas S.A. participates as Project Partner at the H2020 **Development of a Support System for Improved Resilience and Sustainable Urban areas to cope with Climate Change and Extreme Events based on GEOSS and Advanced Modelling Tools (GA 101003517)**, Official website: **Harmonia (harmonia-project.eu)**

HARMONIA provides tools to predict Climate Change effects

[Learn More](#)



HARMONIA focuses on developing integrated solutions for urban environments, tailored to the European needs of security, health, prosperity and wellbeing, with regards to the detrimental impact of Climate Change (CC). ML, DL, on top of GEOSS, climate applications, Paris Agreement, Sendai Framework, Sustainable Urban Development, Societal Benefit Areas, Earth Observation, in-situ observing systems, DIAS, ESA TEP, Euro Data Cubes use.

HARMONIA will leverage existing tools, services and novel technologies to deliver an integrated resilience assessment platform working on top of GEOSS, seeing the current lack of a dedicated process of understanding and quantifying Climate Change (CC) effects on urban areas using Satellite and auxiliary data available on GEOSS, DIAS, urban TEP, GEP etc. platforms. HARMONIA will focus on a solution for climate applications supporting adaptation and mitigation measures of the Paris Agreement. HARMONIA will test modern Remote Sensing tools and 3D-4D monitoring, Machine Learning/Deep Learning techniques and develop a modular scalable data-driven multi-layer urban areas observation information knowledge base, using Satellite data time series, spatial information and auxiliary data, in-situ observing systems, which will integrate detailed information on local level of neighborhoods/building blocks. HARMONIA focuses on two pillars: a) Natural and manmade hazards intensified by CC: urban flooding, soil degradation and geo-hazards (landslides, earthquake, ground deformation) and b) Manmade hazards: heat islands, urban heat fluxes, Air Quality, Gas emissions. Sustainable reconstruction of urban areas and the health of humans and ecosystems, are top priorities. HARMONIA will take into account the local ecosystems of European urban areas, following an integrated and sustainable approach by incorporating the active communities' participation initiative, which will involve the use of a social platform. Paying extra attention to Sustainable Urban Development, one of the Societal Benefit Areas posits that use of EO is a crucial tool towards resilient cities and the assessment of urban footprints, to promote equity, welfare and shared prosperity for all, feed new indicators for the monitoring of progress towards the Sustainable Development Goals in an EU context.

Geosystems Hellas S.A. participates as Project Partner at the H2020 **HEALTHIER Cities through Blue-Green Regenerative Technologies: the HEART Approach (GA 945105)**, Official website: www.heart-project.eu

HEART's integrated approach aims to systematically improve urban health and reduce health disparities through an innovative Blue-Green-Solutions-based implementation mechanisms of urban planning that embraces and promotes the health and the wellbeing as a key-planning criterion. HEART aims to use medical evidence in clinical and non-clinical setting. For all clinical studies a sufficient ground of individuals will be selected to participate. Each case study will include approx. 800 individuals that will be selected by the medical and social experts of the consortium under the supervision of the local medical centers. Most of the recruited persons to participate in the demonstration phase will be equipped with the proposed wearable devices. HEART will follow a technical process that also includes a variety of information coming from medical data in non-clinical settings. The HEART project will make use also of additional sources coming from the existing environmental sensors (through the participating city/regional authorities and health institutes), satellite/remote-sensing data, as well as European services, such as Copernicus). All information will be processed in the data management tool that is using advanced Machine Learning (ML) and Artificial Intelligence (AI) techniques, modules and tools. This way, we aim to produce the evidence to prove the effects of various Blue-Green Solutions to public health and wellbeing in order to provide to the stakeholders (health/city/regional authorities) well-proven innovative urban planning methodologies as fundamental standards for future design of urban districts and regeneration of urban environments (especially deprived ones).



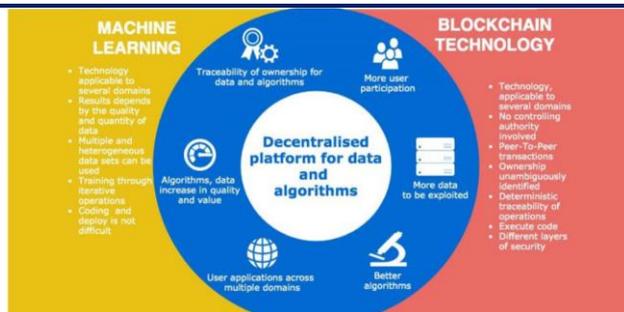
Geosystems Hellas S.A. participates as Project Partner at the H2020 **Next-generation Dynamic Digital EPCs for Enhanced Quality and User Awareness -D²EPC (GA-892984)**, Official website: www.d2epc.eu



Web and WebGIS infrastructure for spatial information (Metadata, Data Specifications, Data and Service Sharing and Monitoring and Reporting). Big Data, Data Fusion and Data Analytics techniques, Engineering and Analysis as well as System and Software Engineering.

New project under the initiative of Next-generation of Energy Performance Assessment & Certification focusing on the geolocation of the buildings and their energy consumption and the he BIM-oriented and digital twin enabled approaches, with the addition of multiple indicators, related to the smartness of the buildings (SRI), its environmental (LCA) and financial (LCC) performance, as well as to human comfort aspects.

Geosystems Hellas S.A. participates as Project Partner **BLENDED – ESA Contract**, <https://www.geosystems-hellas.gr/gsh-is-involved-in-the-esa-funded-project-synergetic-use-of-blockchain-and-deep-learning-for-space-data-blended/>



Synergetic use of Blockchain and Deep Learning for Space Data using NASA and ESA archives for urban cities expansion. BLENDED focuses upon Urban Expansion monitoring for three European Cities with the usage of time series Multispectral and SAR data in a three-decade lifespan. Deep Learning Networks are deployed for time series change detection analysis, while all platform data transfer and processes are implemented via a blockchain de-centralized manner.

Earth Observation products and space telescope observations are space data derived from satellites that can benefit from the application of machine learning to massively exploit the data by introducing other data from public and commercial sources. However, there are concerns that existing technologies used for infrastructure to support the exploitation offer insufficient protection with respect to the risk of data leakage, violation of privacy, unauthorized appropriation or corruption of algorithms. This is deterring users from using the full potential of space data and sharing their own data. European lawmakers are encouraging the adoption of new technologies to allow

the exploitation of machine learning without violating ownerships and copyright of the user's data. BLENDED, Topics that will be addressed include preservation of data/methods ownership, traceability of data use and exploitation, traceability and preservation of copyright, preservation of data privacy, and the ability to manage and process efficiently large volumes of data.

Geosystems Hellas S.A. participates as Member at the R&D Project METEORA, funded from the General Secretariat of Research and Technology (GSRT).



The objective of METEORA project is the creation of an easy-to-use digital platform for multiple applications and potential users, that will support an interactive Information System for a multi-dimensional documentation of Cultural Heritage sites. The innovations are: the introduction of innovative techniques for data collection, processing and multi-dimensional visualization of the spatial model and their correlation with appropriately structured databases (with various types of data) in order to create the optimum Information System (named "Meteora"); the automation of techniques combining spatial data that are collected from various sources in a unified adjustment, such as airborne LiDAR and images from UAV with direct georeferencing, laser scanning point clouds and terrestrial measurements. Also, at the processing stage, innovation refers to the development of software for the creation of an operational 4D model, using the scale as the 4th dimension of the model; that is, the creation of a unified 3D textured model whose scale of detail representation varies automatically as the user moves around the model. In addition, an augmented reality model will be developed, with the introduction of 3D structures of the past that no longer exist or 3D models of missing parts of the cultural monument into the reality 3D/4D model.

Official website: www.meteora.net.gr

Geosystems Hellas S.A. participates as Coordinator at the R&D Project ARTEMIS, funded from the General Secretariat of Research and Technology (GSRT).



ARTEMIS
"Ανάπτυξη Πρακτικών και δημιουργία Υποπονημένης υπηρεσίας παρακολούθησης των οικονομικών δασών"

The ARTEMIS project aims at creating a multi-parameter service for the processing and diffusion of satellite and other data on an online platform related to the quality, health and sustainable development of economic forests and specific chestnut forests. This product will help monitor and improve chestnut production and protect biodiversity against climate change. As a region of interest, we place the forests of Thessaly and specifically the area of the Municipality of Mouzaki.

Official website: www.artemis2018.eu

Geosystems Hellas S.A. participates as Project Coordinator at the **ExPert Integrated suPport systEm for coastal mixed urbAn – industrial – critical infrastructure monitoring using Combined technologies –EPIPELAGIC**, Official website: <http://epipelagicproject.com/>



EPIPELAGIC project focuses on coastal area monitoring and addresses RIS3 priority for "Centers of excellence for environmental Studies-Environment & Sustainable Growth because of the Climate Change". The main objective is to contribute to "mitigation and adaptation to climate change and natural disasters" by providing methodologies and tools using time series of Chinese Satellites (optical, SAR, Geodetical/ GPS-GNSS) in combination with European Satellite data and auxiliary data.

EPIPELAGIC structure meets three critical priorities in the Greek Chinese Collaboration: a) Clear and effective roles and tasks allocated per partner, b) High quality outputs within available resources and time frame and c) Well-structured control system, encompassing constant coordination and risk mitigation by flexible adaptations to project action plan. The planning and implementation of the combined use of technologies and methodologies offered from the Copernicus Sentinels and

collaborative missions, Galileo/EGNOS satellite systems, GaoFen-1/2/3 and Beidou, as well as accurate results by big data fusion, web process services and decision support systems are the main goals of EPIPELAGIC. The project will monitor soil subsidence, erosion and degradation in coastal urban/suburban and heavily industrial areas (with gas and oil infrastructures among other industries) with mixed land use and population of all ages and professions, thus contributing to risk mitigation and new planning policies vs the climate change.

Geosystems Hellas S.A. participates as Project Coordinator at **The CompOlive, Official website: www.compolive.eu**



The CompOlive project aims at developing an integrated technological product – management system and application that includes software development, logistics infrastructure and services. CompOlive using advanced remote sensing products, innovative digital technologies and know-how in the field of composting, will contribute and allow the efficient treatment and utilization of waste oil production materials in the field (on-farm). The philosophy of the project is simple and essentially aims at achieving a circular economy in the agri-food sector, with emphasis on olive production, while making composting in the field as a service (composting on-farm as a service) economically viable and viable.

Geosystems Hellas S.A. participates as Member at the R&D Project **PEARLS (H2020 RISE): PLANNING AND ENGAGEMENT ARENAS FOR RENEWABLE ENERGY LANDSCAPES**



UNDERSTANDING REGIONAL DIVERSITY FOR FURTHER ADVANCEMENTS ON LOW CARBON ECONOMY

Official website: <http://pearlsproject.org>.

Geosystems Hellas S.A. participates as Member at the R&D Project **STABLE (H2020 RISE): S**tructural stABiLity risk assEssment-STABLE addresses the design and development of a Thematic Platform, combining structural stability models, damage assessment simulation tools, advanced remote sensing, in-situ monitoring technologies, geotechnics and cadastral data sets with WebGIS application for mapping and long term monitoring of CH. This will enable effective monitoring and management of the CH to prevent, or at least reduce, catastrophic damages.

Official website: <https://www.stable-project.eu/>

Geosystems Hellas S.A. participates as Member at the R&D Project **RESEARCH (H2020 RISE): R**emote SEnsing techniques for ARCHaeology- RESEARCH addresses the design and development of a multi-task platform, combining advanced remote sensing technologies with GIS application for mapping and long term monitoring of archaeological CH in order to identify changes due to climate changes and anthropic pressures. The EO processing chain will address the major risks affecting CH including the degradation due to soil erosion, land movement and vegetation as well as risks due to anthropic pressure.

Official website: <https://www.re-se-arch.eu/>

Geosystems Hellas S.A. participates as Member at the R&D Project H2020-MSCA-RISE-2020 **Economy bY spacE, EYE (GA 101007638)**

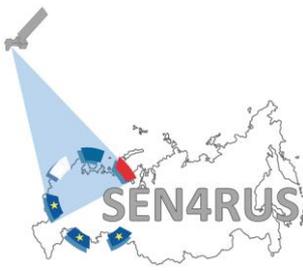
Geosystems Hellas S.A. participates as Member at the R&D Project H2020-MSCA-RISE-2020 **Development of Utilities Management Platform for the case of Quarantine and Lockdown, eUMaP (GA**

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Space technology connected with Artificial Intelligence and machine learning techniques is one of the most rapidly developing field of science and also play a key role to control disaster by space like Covid-19 outbreak. While space technologies have been successfully applied to a small number of macroeconomy and health care related matters over the last decade, there is neither a significant utilization of space elements nor a systematic analysis of needs for space assets in this sector yet. There are a significant number of indirect parameters observable from space that can be correlated to the impact on the economy of natural, health (including epidemic) and man-made disasters. Classical environment parameters (geographical, climatological and hydrogeological) and man induced impact on the environment (pollution, heat) can be combined with economic parameters of human activities impacted by the epidemic including transportation, industry, and commerce. Specific human activities can be directly correlated with the progression of the diseases i.e. increase of heat delivered by crematorium in the affected areas as well as in the dwelling areas due to lock-down restrictions. All these "observed parameters" need to be correlated to macro parameters related to the progress of the epidemic and its impact of the of the infection to the economy at different scales. At medium- and long-term time scale, this methodology enables the near real-time monitoring of macroeconomic parameters during the recovery phase following the end of the emergency outbreak. The project EYE intends to propose a prototype service based on Copernicus data, automatic image processing supported by artificial intelligence integrated with modelling and statistic and geospatial data into an IT platform able to provide econometric and epidemiologic now casting and forecasting data.

In 2020 Europe went through a very significant economic and social crisis, namely the response to the disease of Coronavirus. Over 200 million European citizens were obliged to observe restrictive measures, in some cases lock down measures, in order for governments and local authorities of the Member States of the European Union to address and limit the problem of the spread of the virus. Through this situation a number of problems emerged, one of which relates to the management of building utilities under such conditions. Specifically, in a very few days most of the activity of the European Economy shifted from the office environment to homes, leading to several problems in relation to with the completeness and integrity of utilities such as power outages, water shortage and insufficient internet connection. The initiative entitled Development of Utilities Management Platform for the case of Quarantine and Lockdown - eUMaP aims to implement all those activities that will lead to the development of an open platform through which local authorities will be able to plan and manage the demand and supply of building utilities in case of quarantine or lock down. The platform will be developed through a Research and Innovation Staff Exchange (RISE) program. eUMaP platform will be based on the rational of earth observation, and the recording of the required network information in open BIM platforms of five European capital cities (Rome, Berlin, Athens, Vilnius, Nicosia). The platform will be piloted in study areas with the aim of optimizing it and delivering it as an open platform upon completion of the program.

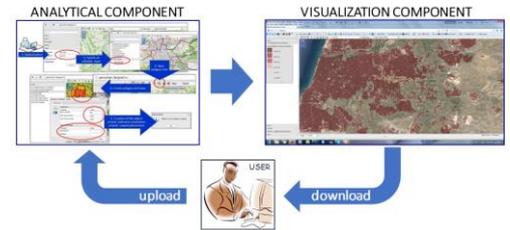
Geosystems Hellas S.A. successfully concluded as Project Partner at the R&D Project **SEN4RUS** funded by ERA.Net-RUS Plus (Project Coordinator: **FORTH**). **Official website:**www.sen4rus.eu



SEN4RUS main objective is to account for the **specific requirements** of spatial and urban planning in Russia to **develop** urban planning **indicators**. SEN4RUS will effectively and efficiently exploit the information content provided by **Sentinels** mass data streams in support of city and regional planning. A **Web-based Information System (WIS)** will be developed to on-line evaluate these indicators and to provide them in a form that allows **direct implementation** into urban planning procedures.

The SEN4RUS WIS

SEN4RUS will develop **robust techniques** for information extraction and derivation of **geo-information products** from Sentinels data in combination with an improved **WIS** that is adapted to and optimized for the Russian urban and regional **planning** system and can be easily understood and controlled by **non-experts**.



- SEN4RUS will develop EO-based methods for evaluating environmental indicators, enabling its integration into operational services for **urban planning in Russia**, by providing indicators for both **urban** and **peri-urban** areas.
- This will lead to more efficient **routine** urban planning, as well as to more efficient climate change **mitigation** and **adaptation**, at local scale.
- A **new business model** will be developed, based on the exploitation of the new generation of **European satellites** (i.e., Copernicus Sentinels) by an international consortium (**public-private partnership**), to develop **EO-based services** for urban planners and applications **in Russian cities**.

Geosystems Hellas S.A. successfully concluded as Coordinator at the R&D Projects **5DMuPLIS** and **INDES MUSA** which are funded from the General Secretariat of Research and Technology (GSRT) and they are implemented under the framework «Greece - Israel Bilateral R&TD Cooperation» and «Greece - China Bilateral R&TD Cooperation».



This project aims at the development of an advanced **5D Multi-Purpose LIS** (Land information System), based on existing 3d packages (traded by the two participating enterprises) for integrating and managing various types of information (financial, architectural, topographical, cadastral, valuation, engineering, ownership, etc.) from governmental, regional and local databases at 3d spatial dimensions + time + scale. The technical tool will serve urban land management purposes, land policies & reforms (property registration in 4d, property valuation, planning & land readjustment, affordable housing, etc) with transparency and will serve both public & private sectors (state authorities, municipalities, professionals, etc). The proposed innovative system focuses on creating add-ons for desktop application, which can be easily improved or modified according to the needs.

Official website: www.5dmuplis.gr



Integrated monitoring solutions constitute a prerequisite towards risk mitigation and urban planning policies against soil subsidence and seismic motion, providing valuable knowledge and data for investigating the corresponding physical mechanisms. The above concept lies between the main framework of actions of **INDES-MUSA** project aiming at the deployment of an innovative multi-sensor system for monitoring in a complementary manner ground deformation and seismic motion in subsidence-prone urban areas. The integrated nature of the proposed monitoring scheme is provided by a combination of Airborne Lidar missions, mobile GNSS stations, a tide gauge and water level sensors for ground subsidence measurements complemented by permanent accelerographic and GNSS stations for monitoring seismic motion. The test site is the region of Kalochori close to Thessaloniki in North Greece.

Official website: www.indes-musa.gr

Geosystems Hellas S.A. as a funded member of **SI-CLUSTER** (Hellenic Space Technologies and Applications Cluster) has participated at the collaborative projects **NFOFRAS** and **ACRITAS**.



The **NFOFRAS** project aims at the design and development of the National Forest Fire Risk Assessment System (NFOFRAS system) through the development of algorithms for

the extraction of Fire Risk Indices at forest level, based on high resolution satellite measurements of parameters that are being used as input for fire and fuel modelling. The database of NFOFRAS will consist of three categories of data:

- a. Values of selected climatic variables from the meteorological system GCOS.
- b. Climatological processed satellite products from satellite Earth observation systems of ESA and NASA which will be produced with modern methods of dynamic reduced spatial scale observation (Dynamic Downscaling) with priority to snow cover parameters and soil moisture.
- c. Surface sampling measurements of the snow water equivalent and dryness of forest biomass.

GEOSYSTEMS HELLAS is responsible for:

- ✓ the definition and calculation of satellite earth core variables and indicators which are used in the NFOFRAS system
- ✓ the integration of strategies satellites climatic variables for the NFOFRAS system
- ✓ the dissemination activities and business models.



ACRITAS project (Space Technologies for Surveillance and Monitoring Integrated Applications) aims at the research, design, development and

validation of space-based integrated applications for surveillance and monitoring through advanced multi-sensor data fusion technologies. GEOSYSTEMS HELLAS is focusing on Flood Monitoring with use of satellite imagery along with meteorological, hydrological and in situ sensor data for Land Border Surveillance and Disaster Management in the Greek North-East borders area of Evros river and Flood Monitoring for Agriculture Management.

Remote sensing techniques for mapping flood extent and assessing flood damages have been developed in order to guide the disaster management authorities to contribute significantly towards flood events and improve the efficiency of flood disaster monitoring and management for the areas of interest.

The processed geospatial data are available through a fully interoperable Web GIS platform so as authorities can access the information they want from anywhere and anytime, and overlay the right information with additional data timely.

Member Of

