











# DETAILED REPORT ON RESEARCH PROJECTS



## LIST OF FUNDED RESEARCH PROJECTS

Project Title	Role	Start year	Source of Funding	Total Budget (euros)	Web site
1 <a href="#">Impact of Biogenic versus Anthropogenic emissions on Clouds and Climate: towards a Holistic UnderStanding 'BACCHUS'</a>  <a href="#">ENV.2013.6.1-2: Atmospheric processes, eco-systems and climate change P7-ENV-2013-two-stage</a>	Partner	2013		8, 700, 000	-
2 <a href="#">Innovative Reuse of All Tyre Components in Concrete</a>  <a href="#">ENV.2013.6.1-1</a>  <a href="#">Collaborative Project</a>	Partner	2013		3,119, 000	-
3 <a href="#">DEVELOPMENT OF A MARITIME SPATIAL PLANNING</a>	Partner	2013		3, 500, 000	-
4 <a href="#">"ArchaeoLandscapes Europe" (ArcLand)</a>	Associate Partner	2011		-	<a href="http://www.archaeolandscapes.eu/">http://www.archaeolandscapes.eu/</a>
5 <a href="#">Dragon 3 Cooperation Project: Monitoring water quality features and prediction of potential fishing grounds by using multi-source and multi-scale remote sensing imageries- ID 10668</a>	Associate Partner	2012		-	
6 <a href="#">ACTRIS</a>	Associate Partner	2011		-	-
7 <a href="#">Integrated use of space, geophysical, and hyperspectral technologies intended for monitoring water leakages in water supply networks in Cyprus</a> <a href="#">ΑΕΙΦΟΡΙΑ/ΦΥΣΗ/0311(BIE)/21 'WaterLeaks'</a>	Project Coordinator	2012	Cyprus Research Promotion Foundation 	159,315	<a href="http://www.cyprusremotesensing.com/waterleaks/">http://www.cyprusremotesensing.com/waterleaks/</a>
8 <a href="#">Upgrade of the hydraulics laboratory for the modeling of water supply networks &amp; design and operation optimization study</a> <a href="#">ΑΝΑΒΑΘΜΙΣΗ/0609/34</a>	Project Coordinator	2012	Cyprus Research Promotion Foundation 	406, 060	<a href="http://www.cyprusremotesensing.com/hydrologis/">http://www.cyprusremotesensing.com/hydrologis/</a>
9 <a href="#">Catastrophic shifts in drylands: how can we prevent ecosystem degradation? 'CASCADE' FPT-ENV-2011</a>	Partner	2012		5,889,999.15	<a href="http://www.cascade-project.eu/">http://www.cascade-project.eu/</a>
10 <a href="#">Research Infrastructure for the Study of Corrosion in Concrete Steel</a>	Project Coordinator	2012	Cyprus Research Promotion Foundation	500, 000	<a href="https://www.cut.ac.cy/steeltc">https://www.cut.ac.cy/steeltc</a>

	<a href="#">Reinforcement and Improvement of the Structural Integrity of Cyprus Buildings (STEELCOR) NEA ΥΠΟΔΟΜΗ/ΝΕΚΥΠ/0311/29</a>			 Research Promotion Foundation		<a href="#">or/</a>
11	<a href="#">Managing Cultural Heritage Sites through Space and ground Technologies using Geographical Information Systems: A Pilot application at the archaeological sites of Paphos ΑΕΙΦΟΡΙΑ/ΚΟΙΑΦ/0311(BIE)/06</a>	Project Coordinator	2012	Cyprus Research Promotion Foundation 	119 565	
12	<a href="#">Development of a low altitude airborne remote sensing system for the processing of satellite data for archaeological investigations (ΠΡΟΣΕΛΚΥΣΗ/ΕΜΠΕΙΡΟΣ/0311/08)</a>	Project Coordinator	2012	Cyprus Research Promotion Foundation	49, 100	
13	<a href="#">Integrated use of remote sensing and lidar techniques for the study of air pollution and the optical properties of the atmosphere in Cyprus ΠΕΝΕΚ/0311 'LIDAR'</a>	Project Coordinator	2012	Cyprus Research Promotion Foundation 	87, 480	
14	<a href="#">Mediterranean Network for Custom Procedures and Simplification of Clearance in Ports 'MEDNET' Project 2S-MED11-14</a>	Partner	2012	MED PROGRAMME 	6454850.00	<a href="http://www.mednetproject.eu/">http://www.mednetproject.eu/</a>
15	<a href="#">Air Pollution Monitoring from space in Cyprus- The 'AIRSPACE' project</a>	Project Coordinator	2010	Cyprus Research Promotion Foundation 	127,000	<a href="http://blogs.cut.ac.cy/airspace/">http://blogs.cut.ac.cy/airspace/</a>
16	<a href="#">An integrated use of satellite remote sensing and hydraulic modeling for flood risk assessment at catchment scale in Cyprus: The SATFLOOD project</a>	Project Coordinator	2010	Cyprus Research Promotion Foundation 	179,780	<a href="http://blogs.cut.ac.cy/SATFLOOD/">http://blogs.cut.ac.cy/SATFLOOD/</a>
17	<a href="#">Web and 3G mobile phone based air quality management: particulates, public health, co-benefits. EUREKA project</a>	Project Coordinator	2011	EUREKA/ Cyprus Research Promotion Foundation 	800, 000	<a href="http://webair2.com/">http://webair2.com/</a>
18	<a href="#">Coastal Water quality using earth observation in Cyprus</a>	Project Coordinator	2011	Cyprus Research Promotion Foundation 	104, 680	
19	<a href="#">'PM3' (air pollution) (CUT: air pollution using earth observation) Funded by LIFE+</a>	Partner	2011	LIFE+ 	1, 294, 871	<a href="http://www.life-airquality.eu/">http://www.life-airquality.eu/</a>
20	<a href="#">Value Driven Procurement in Building and Real Estate (ValPro)</a>	Partner	2010	ERACOBUILD/ Cyprus Research Promotion Foundation	1, 200, 000	<a href="http://www.valpro.eu/">http://www.valpro.eu/</a>

				 Research Promotion Foundation 		
21	<a href="#">'REDSCALE'</a> <a href="#">Development of an automated system for monitoring red-scale population using image analysis, wireless networks and GIS technologies</a>	Partner	2010	Cyprus Research Promotion Foundation 	199,549	<a href="http://www.redscaletrap.com/">http://www.redscaletrap.com/</a>
22	<a href="#">Study of the urban heat island effect in Cyprus</a>	Partner	2008	Cyprus Research Promotion Foundation 	108, 909	<a href="http://www.urbanheat.com.cy/">http://www.urbanheat.com.cy/</a>
23	<a href="#">Estimation of Evapotranspiration in irrigated crops using satellite remote sensing and wireless sensors</a>	Project Coordinator	2009	Cyprus Research Promotion Foundation 	128, 000	<a href="http://www.cut.ac.cy/evapotranspiration/">http://www.cut.ac.cy/evapotranspiration/</a>
24	<a href="#">Development of an experimental System for Mapping of Lobesia Botrana Population in Cyprus using automated traps and wireless communication and Positioning Systems</a>	Partner	2008	Cyprus Research Promotion Foundation 	236, 020	<a href="http://www.vineflygis.com/">http://www.vineflygis.com/</a>
25	<a href="#">Integration of satellite remote sensing, GIS, modelling and wireless-sensor network for monitoring and determining irrigation demand in Cyprus</a>	Project Coordinator	2008	CUT-Research Committee 	128, 000	<a href="http://www.cut.ac.cy/irrigation/">http://www.cut.ac.cy/irrigation/</a>
26	<a href="#">Monitoring air pollution in Cyprus using satellite remote sensing and GIS and micro-sensor technology</a>	Project Coordinator	2008	CUT-Research Committee 	75 000	<a href="http://www.cut.ac.cy/pollution/">http://www.cut.ac.cy/pollution/</a>
27	<a href="#">ECOLANES FP6 Strep Project- Economical and sustainable pavement infrastructure for surface transport</a>	Partner	2007	FP6 /EC 	1, 700, 000	<a href="http://ecolanes.shef.ac.uk/">http://ecolanes.shef.ac.uk/</a>

# BRIEF DESCRIPTION OF EACH FUNDED PROJECT

## TITLE

# IMPACT OF BIOGENIC VERSUS ANTHROPOGENIC EMISSIONS ON CLOUDS AND CLIMATE: TOWARDS A HOLISTIC UNDERSTANDING

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### CONSORTIUM:

ETH ZURICH (COORDINATORS)  
UNIVERSITY OF HELSINKI  
PAUL SCHERRER INSTITUTE  
MAX PLANCK SOCIETY  
UNIVERSITY OF OXFORD  
UNIVERSITY OF OSLO  
FINNISH METEOROLOGICAL INSTITUTE  
UNIVERSITY OF LEEDS  
UNIVERSITY OF MANCHESTER  
LEIBNIZ INSTITUTE FOR TROPOSPHERIC RESEARCH  
J.-W. GOETHE UNIVERSITÄT FRANKFURT  
UNIVERSITY OF CRETE  
CONSIGLIO NAZIONALE DELLE RICERCHE -ISTITUTO DI SCIENZE DELL'ATMOSFERA E DEL CLIMA  
NATIONAL UNIVERSITY OF IRELAND GALWAY  
INSTITUTE FOR NUCLEAR RESEARCH AND NUCLEAR ENERGY  
THE HEBREW UNIVERSITY OF JERUSALEM  
CENTRE NATIONAL DE RECHERCHES MÉTÉOROLOGIQUES - MÉTÉO FRANCE  
KARLSRUHE INSTITUTE FOR TECHNOLOGY  
CYPRUS INSTITUTE  
CYPRUS UNIVERSITY TECHNOLOGY (Partner, PI: D.G.Hadjimitsis)

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**Summary:** The core idea of BACCHUS is to quantify key processes controlling clouds and climate and their feedbacks by i) contrasting the processes occurring in climate-relevant environments such as tropical areas and the Arctic and ii) by combining advanced measurements of cloud and aerosol properties with state-of-the-art numerical modelling. Specifically we aim to characterize the importance of biogenic versus anthropogenic emissions for cloud formation and climate in regions that are key regulators of climate (tropical rain forests) as well as in regions experiencing the most profound climatic changes, and which may be prone to irreversible transitions, e.g., the Arctic.

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## TITLE

### INNOVATIVE REUSE OF ALL TYRE COMPONENTS IN CONCRETE (ANAGENNISIS)

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#### CONSORTIUM:

UNIVERSITY OF SHEFFIELD (COORDINATORS)  
IMPERIAL COLLEGE  
Twincon Ltd (UK)  
Gumiimpex -GRP Ltd (CROATIA)  
Arkada Ltd (CROATIA)  
Gradmont Ltd (BOSNIA)  
Zebra General Constructions Ltd (CY)  
Adriatica Riciclaggio e Ambiente Abruzzo s.r.l.  
European Tyre Recycling Association  
University of Zagreb Faculty of Civil Engineering  
Technical University 'Gheorghe Asachi' of Iasi  
ZYP Ingeniería Geomática, S.L. (SPAIN)  
FhecorIngenierosConsultores, S.L (SPAIN)  
COMSA, S.A.U. (SPAIN)  
CYPRUS UNIVERSITY OF TECHNOLOGY (PI: D.G. HADJIMITSIS)

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**Summary:** The main aim of Anagennisis is to develop innovative solutions to reuse all tyre components in high value innovative concrete applications with reduced environmental impact. Thus, the project activities will comprise RTD as well as demonstration activities.

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## TITLE

### DEVELOPMENT OF A MARITIME SPATIAL PLANNING

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#### CONSORTIUM:

DEPARTMENT OF MERCHANT SHIPPING (Coordinators)  
DEPARTMENT OF LANDS AND SURVEYS  
UNIVERSITY OF THE AEGEAN  
MINISTRY OF MARINE AND AEGEAN  
CYPRUS UNIVERSITY TECHNOLOGY (PI: D.G.Hadjimitsis)  
OCEANOGRAPHY CENTRE OF THE UNIVERSITY OF CYPRUS

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**Summary:** The Integrated Maritime Policy of the European Union (EU), argues that the development of maritime economic activities, can be reconciled with the protection of the marine environment, provided that adequate tools and horizontal governance mechanisms. Maritime Spatial Planning is one of the main horizontal tools. Within this context, the European Commission adopted, in November 2008 , a roadmap for Maritime Spatial Planning, which defines 10 basic principles that should govern MSP of Member States (MS). In more recent announcement of the December 2010, the SC has updated this charter and announced further action on MSP. Therefore the SC in March 2013 presented a proposal for a directive on MSP and Integrated Coastal Zone Management (ICZM). This project aims to establish a framework for MSP and ICZM within which MS should develop. The main aim of the project is the joint development methodology, process and suitable implementation framework for Marine Spatial Planning. This methodology will be determined and then pilot projects in selected areas of both countries (Cyprus and Greece) will be selected. Remote Sensing and GIS will be used to manage and apply the proposed methodology.

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## TITLE

### ARCHAEOLANDSCAPES EUROPE

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#### CONSORTIUM:

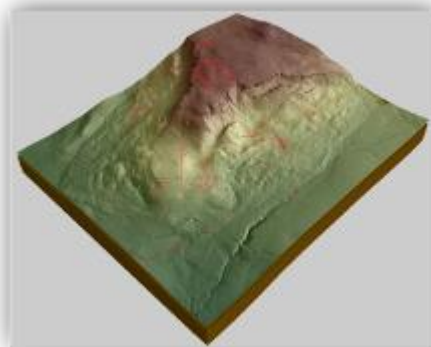
ROMAN-GERMANIC COMMISSION OF THE GERMAN ARCHAEOLOGICAL INSTITUTE  
MORE THAN 65 PARTNERS  
CYPRUS UNIVERSITY TECHNOLOGY (Associate Partner, PI: D.G.Hadjimitsis)

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**Summary:** The target of the ArchaeoLandscapes project is to address existing imbalances in the use of modern surveying and remote sensing techniques and to create conditions for the regular use of these strikingly successful techniques across the Continent as a whole. It aims to create a self-sustaining network to support the use throughout Europe of aerial survey and 'remote sensing' to promote understanding, conservation and public enjoyment of the shared landscape and archaeological heritage of the countries of the European Union.

The project represents the culmination of a growing European cooperation from the mid-1990s onwards. Now federating 68 prestigious institutions in the field of archaeology and heritage protection (1 Coordinator, 26 Co-organisers and more than 30 Associated Partners) from 26 separate countries, it will bring that process to a sustainable and self-supporting future as the long-term legacy of this and earlier EU-assisted initiatives.

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## TITLE

# DETECTION OF LANDUSE CHANGE AND ITS RELATIONSHIP TO WATER QUALITY FEATURES AND POTENTIAL FISHING GROUNDS BY USING MULTI-SOURCE AND MULTI-SCALE REMOTE SENSING IMAGERIES

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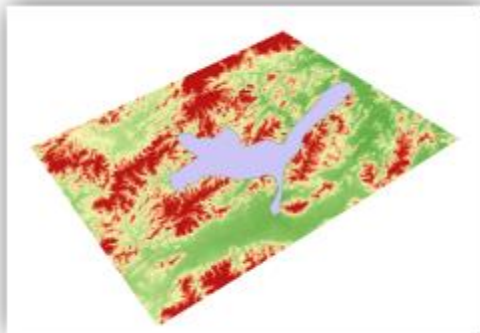
### CONSORTIUM:

CHINESE ACADEMY OF SCIENCES  
INSTITUTE FOR MEDITERRANEAN STUDIES – FOUNDATION OF RESEARCH & TECHNOLOGY  
SHANGHAI OCEAN UNIVERSITY  
UNIVERSITY COLLEGE LONDON  
SHANGHAI JIAO TONG UNIVERSITY  
CRANFIELD UNIVERSITY  
SHANGHAI JIAO TONG UNIVERSITY  
ZHEJIANG CAS APPLICATION CENTER FOR GEOINFORMATICS  
CYPRUS UNIVERSITY OF TECHNOLOGY (Partner from Europe, PI: D.G.Hadjimitsis)

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**Summary:** There are approximately 20,000 natural lakes across China, 2,800 of which measure at least one square kilometer. Most of these Lakes are undergoing eutrophication or other severe environmental nuisances owing to natural and/or anthropogenic processes. In order to prevent or to minimize such damaging impacts, and to ascertain a proper quality management of the lake water and the associated fish resources, it is required to have access to up-to-date, accurate, and relevant data and information on the aquatic ecosystem in a timely manner. To date, a number of technological tools can be used to acquire data in a timely and cost effective way, including multi-source remote sensing data, ground truth data collected real time by means of wireless sensor network, and other supporting data. The proposed project focusing on Xin'an river watershed and Qiandao Lake as well as on important wetlands and aquatic ecosystems on Chongming Island investigates the impact of water quality and land cover/use change on the spatio-temporal distribution of the fishing grounds in Qiandao Lake.

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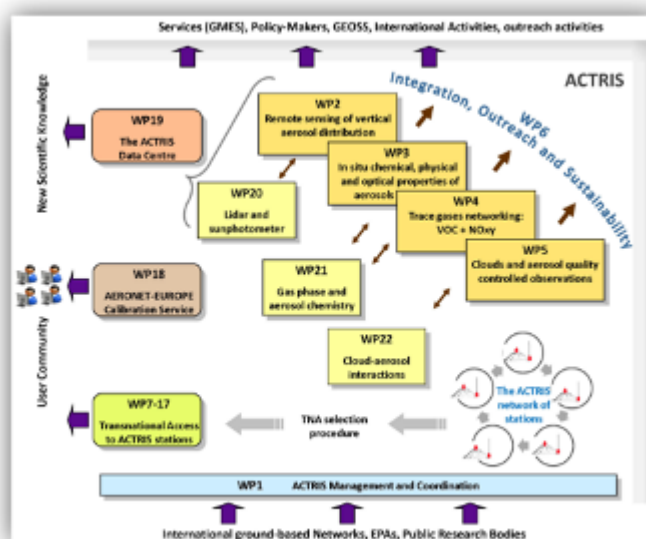
## TITLE

# AEROSOLS, CLOUDS, AND TRACE GASES RESEARCH INFRASTRUCTURE NETWORK

### CONSORTIUM:

CONSIGLIO NAZIONALE DELLE RICERCHE  
MORE THAN 25 PARTNERS  
CYPRUS UNIVERSITY TECHNOLOGY (Associate Partner, PI: D.G.Hadjimitsis)

**Summary:** ACTRIS (Aerosols, Clouds, and Trace gases Research InfraStructure Network) is a European Project aiming at integrating European ground-based stations equipped with advanced atmospheric probing instrumentation for aerosols, clouds, and short-lived gas-phase species. ACTRIS will have the essential role to support building of new knowledge as well as policy issues on climate change, air quality, and long-range transport of pollutants. As part of the transnational access (TNA) activity, ACTRIS offers opportunities to researchers or research teams to access research facilities with an excellent combination of advanced instruments and expertise, using state-of-the-art equipment for measurement campaigns and instrument testing. ACTRIS supports training of new scientists in order to conduct high-quality research and contributes the scientific community to exchange knowledge and experience and to work towards future common projects and objectives.



## TITLE

# INTEGRATED USE OF SPACE, GEOPHYSICAL AND HYPERSPECTRAL TECHNOLOGIES INTENDED FOR MONITORING WATER LEAKAGES IN WATER SUPPLY NETWORKS IN CYPRUS

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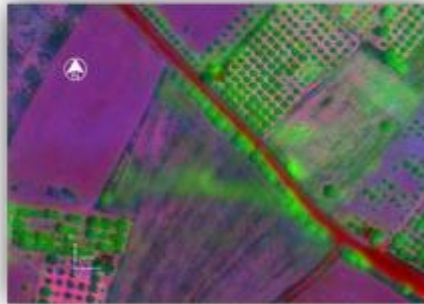
## CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
WATER DEVELOPMENT DEPARTMENT  
FOUNDATION FOR RESEARCH & TECHNOLOGY (FORTH), HELLAS  
FREDERICK RESEARCH CENTRE  
SOUTHAMPTON UNIVERSITY

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**Summary:** Estimates of water leakages in distribution systems in Cyprus are very high and in some towns such as Paphos, they are estimated to be more than 40% of the total water consumption of the town. This amount of water loss is crucial in times of low rainfall in the island. This project aims to use combined new technologies for the detection and monitoring of water leakages which are negatively affecting the national water reserves. This research proposal concentrates in rural and semi-rural areas, where main water pipe networks connect different areas between them. The innovative aspect of the Project is that for the first time, state-of-the-art technologies will be combined for monitoring water networks through the use of Global Positioning System, Radar Scanners, Satellite Remote Sensing and Geophysics. The data will be entered into a Geographic Information System (GIS), for the further spatial analysis. Multispectral analysis and vegetation indices using remote sensing satellite images will be used as they can be associated with water pipe leakage detection. Moreover ground geophysical surveys can provide high resolution subsurface images mapping areas of possible water leakages. The use of satellite remote sensing is ideal in Cyprus, due to the high number of cloud-free images all over the year.

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## TITLE

# UPGRADE OF THE HYDRAULICS LABORATORY FOR THE MODELING OF WATER SUPPLY NETWORKS & DESIGN AND OPERATION OPTIMIZATION STUDY (INFRASTUCURE)

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## CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
WATER DEVELOPMENT DEPARTMENT LTD  
NATIONAL TECHNOLOGICAL UNIVERSITY OF ATHENS  
ISOTHERM LTD  
PAPHOS MUNICIPALITY

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**Summary:** In the context of this proposal for upgrading existing laboratory/technological equipment, the Cyprus University of Technology together with a strong Research Consortium propose the development of a State of the Art Laboratory for Hydrodynamics/Hydraulics Applications which is a prerequisite for the execution of the proposed Research Project on the optimization study for the design and operation - through computational and experimental simulation - of water supply networks. The Project aims to satisfy the dire need for authorities to solve the extremely serious problem of water supply as a result of continued water shortage. The grave and chronic problems of water losses in the water supply network pipes, the uncontrolled and non-optimum operation of pumping stations, the often wrong design of the networks because of various interventions (e.g. town planning, wrong mapping of existing networks), are some of the most important problems which need to be tackled in order to optimize the performance of the networks and, consequently, save on this precious resource, as well as, on the energy consumed.

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## TITLE

# CATASTROPHIC SHIFTS IN DRYLANDS: HOW CAN WE PREVENT ECOSYSTEM DEGRADATION?

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## CONSORTIUM

STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK  
TECHNICAL UNIVERSITY OF CRETE  
UNIVERSITA DEGLI STUDI DELLA BASILICATA  
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE  
UNIVERSIDAD DE ALICANTE  
UNIVERSITY OF AVEIRO  
FONDAZIONE PER LO SVILUPPO SOSTENIBILE DEL MEDITERRANEO  
UNIVERSITY OF LEEDS  
UNIVERSITÄT BERN  
UNIVERSITEIT UTRECHT  
JOINT RESEARCH CENTRE  
CYPRUS UNIVERSITY OF TECHNOLOGY (Partner, PI: D.G.Hadjimitsis)  
WAGENINGEN UNIVERSITY  
FUNDACION CENTRO DE ESTUDIOS AMBIENTALES DEL MEDITERRANEO

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**Summary:** The aims and objectives of CASCADE are to obtain a better understanding of sudden shifts in drylands that may lead to major losses in biodiversity and concomitant ecosystem services. By focusing on vulnerable drylands as our target ecosystems, we build further on existing knowledge regarding shifts in these ecosystems. CASCADE will improve our understanding of the biogeochemical mechanisms underlying sudden and catastrophic shifts, and of the key biotic and abiotic factors influencing these processes. Based on these analyses, CASCADE will develop ways to predict the proximity of the CASCADE's dryland ecosystems to thresholds in such a way that these predictions can be used by policymakers and land users for more sustainable management of drylands worldwide.

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## TITLE

# RESEARCH INFRASTRUCTURE FOR THE STUDY OF CORROSION IN CONCRETE STEEL REINFORCEMENT AND IMPROVEMENT OF THE STRUCTURAL INTEGRITY OF CYPRUS BUILDINGS

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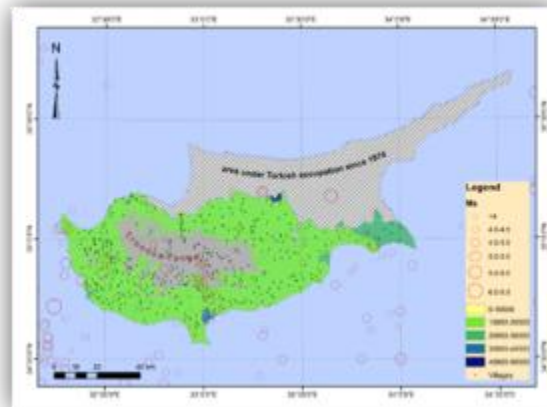
## CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
NATIONAL TECHNICAL UNIVERSITY OF ATHENS  
CYPRUS SCIENTIFIC AND TECHNICAL CHAMBER

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**Summary:** The STEELCOR project aims to develop a new multi-beneficiary Research Infrastructure for the Corrosion of Concrete Steel Reinforcement and to put forward a systematic scientific research on Concrete Steel Reinforcement for the improvement of the Structural Integrity of Buildings and Structures in Cyprus. The project also aims to develop risk analysis, life cycle costing and digital mapping tools of Cyprus identifying the risk areas due to high corrosion of concrete steel reinforcement. The mains aims of the STEELCOR project will be achieved through the following scientific and technological objectives: to evaluate the mechanical properties of different types of steel reinforcement, introduced in Cyprus over the past; to perform accelerated corrosion tests on bare steel reinforcement and concrete cast steel reinforcement; to perform fatigue testing on corroded and non-corroded steel reinforcement; to study the fractured surfaces of corroded samples; to undertake non-destructive testing of steel reinforcement and to perform static analysis on typical structures and buildings in Cyprus.

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## TITLE

# MANAGING CULTURAL HERITAGE SITES THROUGH SPACE AND GROUND TECHNOLOGIES USING GEOGRAPHICAL INFORMATION SYSTEMS: A PILOT APPLICATION AT THE ARCHAEOLOGICAL SITES OF PAPHOS

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### CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
FOUNDATION FOR RESEARCH & TECHNOLOGY, HELLAS  
KYKKOS MUSEUM  
PAPHOS MUNICIPALITY

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**Summary:** Cultural heritage is endangered by different environmental and human hazards such as uncontrolled urban activities, fire, earthquakes, air pollution agents, erosion, landslide, flood processes e.t.c. On site observation is the most common way of monitoring Cultural Heritage (CH) Sites and Monuments in Cyprus. However, this procedure which includes data collection, periodical observations, and multivariate risk assessment analysis, is difficult to be accomplished with the traditional practices and methods since it is time consuming and expensive. Furthermore, many archaeological sites and monuments are located at inaccessible areas, far away from the main road network and urban areas. The local legislation regarding the protection of CH sites needs to be further expanded and revised in order to overcome these problems and to be easily applicable with low cost by the local authorities and public departments of Cyprus. The general objective of this project includes the development of a new methodology and framework for monitoring Cultural Heritage Sites and Monuments of a wider area than in the case of site observation, in which the coverage is limited using new innovative technologies (satellite images, LIDAR sensor, GIS, sun-photometers etc). Such methodology can be integrated into the Department of Antiquities, municipalities' etc decision-making process, so that preventative measures could be taken to reduce risk. Furthermore the proposal promotes sustainable development and protects CH.

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## TITLE

# DEVELOPMENT OF A LOW ALTITUDE AIRBORNE REMOTE SENSING SYSTEM FOR THE PROCESSING OF SATELLITE DATA FOR ARCHAEOLOGICAL INVESTIGATIONS (ICAROS)

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## CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
NATIONAL TECHNOLOGICAL UNIVERSITY OF ATHENS

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**Summary:** The scope of this research project is the development and implementation of a low-altitude remote sensing system for its exploitation to archaeological applications. In addition the system can be used in other remote sensing applications. The ICAROS program has enabled the development of an autonomous remote sensing system which can now be used in many remote sensing applications.

Earth observation techniques intended for archaeological research, such as satellite images and ground geophysical surveys are well established in the literature. In contrast, low altitude airborne systems for supporting archaeological research are still very limited. The ICAROS project, , aims to develop an airborne system for archaeological investigations. The system will incorporate both a GER 1500 field spectroradiometer and NIR camera in a balloon system operated from the ground. The GER 1500 field spectroradiometer has the capability to record reflectance values from 400 nm up to 1050 nm (blue/green/red and NIR band). The Field of View (FOV) of the instrument is 40 while a calibrated spectralon panel will be used in order to minimize illumination errors during the data collection. Existing atmospheric conditions will be monitored using sun-photometer and meteorological station

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## TITLE

# INTEGRATED USE OF REMOTE SENSING AND LIDAR TECHNIQUES FOR THE STUDY OF AIR POLLUTION AND THE OPTICAL PROPERTIES OF THE ATMOSPHERE IN CYPRUS

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## CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
NATIONAL AND KAPODISRTIAN UNIVERSITY OF ATHENS  
NATIONAL OBSERVATORY OF ATHENS  
NATIONAL TECHNICAL UNIVERSITY OF ATHENS  
CYPRUS METEOROLOGICAL SERVICE

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**Summary:** Atmospheric aerosols consist one of the major source of uncertainty in climate change modelling, responsible for direct, by scattering and absorbing the solar and terrestrial radiation, and indirect radiative forcing, by acting as cloud condensation nuclei. The main objective of this proposal is the development of a new integrated algorithm/tool for continuously monitoring the levels of particulate air pollution and for the retrieval of various atmospheric parameters. These parameters will be used for the atmospheric correction of satellite imagery, but also can be used for operational purposes (e.g. monitoring of the movement of large aerosol loads affecting aviation, human health, climate, monitoring the Planetary Boundary Layer (PBL) height to estimate the accumulation of air pollution, etc.).

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## TITLE

### MEDITERRANEAN NETWORK FOR CUSTOM PROCEDURES AND SIMPLIFICATION OF CLEARANCE IN PORTS (MEDNET)

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#### CONSORTIUM:

RETE AUTOSTRADA MEDITERRANEE  
NATIONAL TECHNICAL UNIVERSITY OF ATHENS  
IGOUMENITSA PORT AUTHORITY S.A.  
PATRAS PORT AUTHORITY S.A.  
ANCONA PORT AUTHORITY S.A.  
TARANTO PORT AUTHORITY  
CENTER FOR INNOVATION IN TRANSPORT, SPAIN  
VALENCIAPORT FOUNDATION  
JUNCTION  
CYPRUS UNIVERSITY OF TECHNOLOGY (Partner, PI: D.G.Hadjimitsis)  
MARITIME INSTITUTE OF EASTERN MEDITERRANEAN  
CHAMBER OF COMMERCE & INDUSTRY OF MARSEILLE PROVENCE  
INSTITUTE OF TRAFFIC AND TRANSPORT LJUBLJANA L.L.C.  
CONSULTORES EM TRANSPORTES INOVAÇÃO E SISTEMAS  
INTERMODAL TRANSPORT CLUSTER  
ALBANIAN INSTITUTE OF TRANSPORT  
PORT OF RIJEKA AUTHORITY  
ZADAR PORT AUTHORITY

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**Summary:** The proposed project aims to establish and operate a network of port authorities and transport experts in the Mediterranean region, focusing on the exchange of knowledge and expertise with regard to port and custom procedures and simplification of clearance for vessels and cargoes. This is expected to enhance the common understanding and promote the introduction of information systems to ports operation and potentially to other intermodal modes. The MEDNET project intends to make a significant contribution towards customs procedures and simplification of clearance for vessels and cargoes in Mediterranean area through a series of activities. Initially, a state of the art analysis will record the past and current customs practices and related legislation and create a “Port Operations Observatory in the Mediterranean”, whose purpose is the transparent sharing of best practice solutions with all stakeholders, extending, thus, the knowledge dissemination among European countries and along the port community. Subsequently, the bottlenecks that hinder the efficient flow of information will be identified and current administrative, regulatory and technical barriers will be analyzed. In addition, the project will identify windows of opportunity in view of simplifying and speeding up procedures

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## TITLE

### AIR POLLUTION MONITORING FROM SPACE IN CYPRUS (AIRSPACE)

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#### CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
CYPRUS METEOROLOGICAL SERVICE  
NATIONAL OBSERVATORY OF ATHENS  
THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE (USA)  
FREDERICK RESEARCH CENTRE

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**Summary:** Air quality has traditionally been monitored at the surface through ground-based monitors. These monitors are used to characterize air quality and to determine compliance with ambient air quality standards. Research has been focused recently on the study of regional and intercontinental transport of air pollutants, such as particulate matter (PM<sub>10</sub>, PM<sub>2.5</sub>). However, it was proved that there is need for additional data sources to monitor air pollution as it moves in multiple dimensions, both spatially and temporally. On the latter, satellite data (in terms of aerosol optical thickness) provide synoptic information and visualization to ground-based air quality data modelling. This proposal aims at developing a novel methodology based on in-situ experimental observations in order to use satellite retrievals as a tool for monitoring air particulate pollution. This methodology is applied in Cyprus, which is one of the most polluted zones over Europe, enclosing both urban and industrial sites. Within this project, observations from Lidar, sun-photometer, satellite AOT retrievals and PM<sub>10</sub>, PM<sub>2.5</sub> concentrations at site located as well close to as far from pollution sources (both urban and industrial) will be considered.

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## TITLE

# INTEGRATED USE OF SATELLITE REMOTE SENSING AND HYDRAULIC MODELING FOR THE FLOOD RISK ASSESSMENT AT A CATCHMENT SCALE IN CYPRUS

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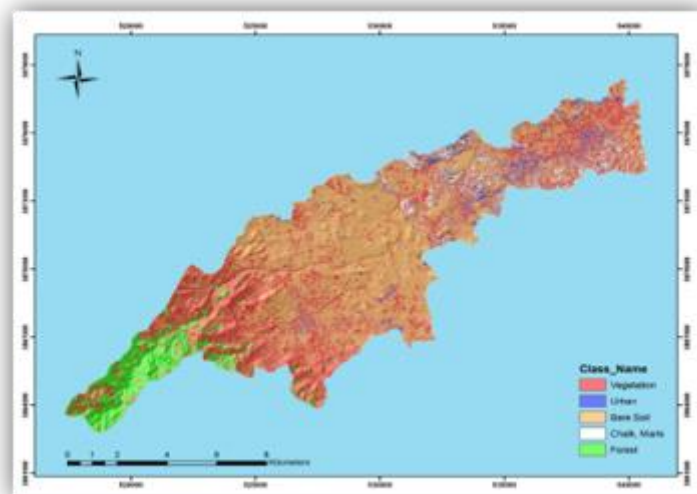
### CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
CYPRUS METEOROLOGICAL SERVICE  
WATER DEVELOPMENT DEPARTMENT LTD  
NATIONAL OBSERVATORY OF ATHENS  
TECHNICAL UNIVERSITY OF CRETE

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**Summary:** The increase of flood inundation occurring in different regions all over the world have enhanced the need for effective flood risk management. As floods frequency is increasing with a steady rate due to ever increasing human activities on physical floodplains there is a respectively increasing of financial destructive impact of floods. A flood can be determined as a mass of water that produces runoff on land that is not normally covered by water. However, earth observation techniques such as satellite remote sensing can contribute toward a more efficient flood risk mapping according to EU Directives of 2007/60. This study strives to highlight the need of digital mapping of urban sprawl in a catchment area in Cyprus and the assessment of its contribution to flood risk. In addition the project aims to map potential areas with high risk from floods.

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## TITLE

### WEB AND 3G MOBILE PHONE BASED AIR QUALITY MANAGEMENT: PARTICULATES, PUBLIC HEALTH, CO-BENEFITS (WEBAIR-2)

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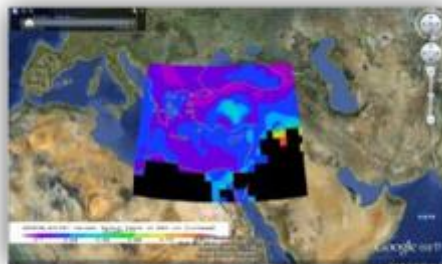
#### CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
ATLANTIS CONSULTING CYPRUS LTD  
ENVIRONMENTAL SOFTWARE & SERVICES GMBH  
OIKON LTD. - INSTITUTE FOR APPLIED ECOLOGY

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**Summary:** WEBAIR-2 will follow-up on E!3266 WEBAIR for urban and industrial air quality management, by extending the application scope and IT technologies employed to: (1) Particulates (PM10/2.5) emission modelling and public health, with emphasis on the political controversial concepts of local traffic reductions by various regulatory and economic instruments; (2) CO2/GHG emissions, energy efficiency and the co-benefits between Kyoto targets (and the emerging follow-up commitments from Copenhagen) and "classical" air pollution, as regulated, for example, in 2008/50/EC, based on a distributed, bottom-up approach to emission control using the directly measurable air pollutants as a direct validation instrument, and (3) Use of 3G mobile phone technology for personalized health related information, warnings and exposure reports e.g., for Asthma patients. A key objective of the proposal is to add elements of sustainable development and explicit environmental criteria to the overall objectives of the Lisbon Strategy.

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## TITLE

# COASTAL WATER QUALITY USING EARTH OBSERVATION IN CYPRUS (SATCOAST)

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### CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
NATIONAL OBSERVATORY OF ATHENS  
NTUA  
DEPARTMENT OF FISHERIES & MARINE RESEARCH (CY)

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**Summary:** The main objective of this project is the monitoring of coastal waters with emphasis on areas where desalination plants, ports and other point sources of pollution using Remote Sensing Techniques (Satellite Remote Sensing). Furthermore a sampling station network will be designed for the areas where water samples will be collected in order to correlate some of the water quality parameters mentioned below with corresponding reflectance values acquired both by satellite and ground-based means. In situ physicochemical measurements of water quality parameters (water temperature, turbidity, dissolved oxygen, pH, salinity, electrical conductivity) and laboratory analysis of qualitative parameters - nutrients (total phosphorus, dissolved reactive phosphorus, total nitrogen, nitrate and nitrite, ammonia, chlorophyll-a, BOD, COD) will be carried out as defined by the Directive 2000/60/EC. The combination of field campaign measurements provides accurate measurement of the required parameters. The correlation of satellite observations and ground-truth measurements will focus only on the parameters of temperature, turbidity, suspended particulate matter and chlorophyll-a.

It is therefore imperative to design and implement a new integrated system of synoptic coverage and continuous monitoring of coastal waters to detect at any time any pollution event achieving in the immediate and sustainable management of water resources in Cyprus. Final goal is to cover both the current water needs, ours and the environment, and to ensure the existence of adequate "good status" water quantities for future generations.

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## TITLE

### PARTICULATES MONITORING, MODELLING AND MANAGEMENT (PM3)

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#### CONSORTIUM:

DEPARTMENT OF LABOUR INSPECTION, MINISTRY OF LABOUR AND SOCIAL INSURANCE  
ATLANTIS CONSULTING CYPRUS LTD  
CYPRUS UNIVERSITY OF TECHNOLOGY (Partner, PI: D.G.Hadjimitsis)  
ARISTOTELEIO PANEPISTIMIO THESSALONIKIS  
ENVIRONMENTAL SOFTWARE AND SERVICES GMBH (AUSTRIA)

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**Summary:** The Competent Authorities have and are undertaking significant dust monitoring and management efforts as well as several projects to support air quality management and data collection. Due to the large spatial and temporal variability of measured PM10 concentrations, as well as potentially significant PM inputs from trans-boundary movements, however, added efforts as well as innovative data collection and modeling tools are required in order to facilitate the preparation of effective and efficient dust management plans. The project's overall objective is to support the Competent Authorities in preparing cost effective and efficient particulate matter management. For this purpose, state of the art now casting, forecasting and scenario analysis software will be applied. New and innovative data collection and processing methods as well as a robust stakeholder participation process will be introduced in order to support the application of the models. The present data collection activities will be supported through the project by remote sensing techniques. These will be developed, calibrated and applied and will provide data for a potentially much denser grid than possible with ground stations. Further, this method can produce data at various elevations thus greatly enhancing source apportionment and air quality modeling.

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#### PARTICULATES MONITORING, MODELING AND MANAGEMENT



We monitor,  
we model,  
we manage,  
so we improve

## TITLE

### VALUE DRIVEN PROCUREMENT IN BUILDING & REAL ESTATE

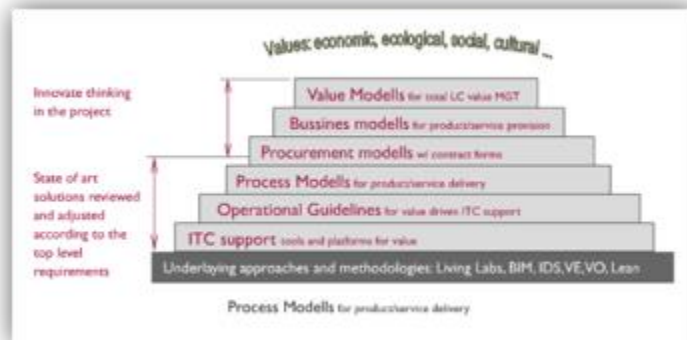
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#### CONSORTIUM:

VTT TECHNICAL RESEARCH CENTRE OF FINLAND  
CENTRE SCIENTIFIQUE ET TECHNIQUE DU BÂTIMENT  
CNE TECHNOLOGY LTD  
COPENHAGEN BUSINESS SCHOOL  
CYPRUS UNIVERSITY OF TECHNOLOGY (Partner, Contact Person: D.G.Hadjimitsis)  
JÖNKÖPING UNIVERSITY  
SINTEF BUILDING AND INFRASTRUCTURE  
RAMBØLL  
CATENDA  
IOSIS

**Summary:** While trimming production costs already may be reasonably supported by methods and tools (such as integrated design & production systems, industrial production, lean thinking etc.) and is not hampered by current contract forms, life cycle to product / service provision (to performance based specifications) still lacks sufficient tool support (e.g. service configuration and performance monitoring) and is not likely to become major business model under contractual frameworks that do not provide incentive for (or even prevent) continuous improvement and innovation. Currently, there exists no tool, nor any holistic model or method for the evaluation of different value propositions considering all aspects of life cycle costs and values (economic, ecological, social, cultural, etc.). Creating additional value is still a rather new concept in the building industry and as such it is not yet driving business models or being enabled by contract forms. As a result, value driven processes and supporting models, methods and tools are not implemented in practice even if they exist.. This proposal brings together leading research institutions and key industry partners, creating a framework for interdisciplinary research to tackle the problem described above; a novel solution that can boost economic and social growth in the value-added direction.

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## TITLE

# DEVELOPMENT OF AN AUTOMATED SYSTEM FOR MONITORING REDSCALE POPULATION USING IMAGE ANALYSIS, WIRELESS NETWORKS AND GIS TECHNOLOGIES

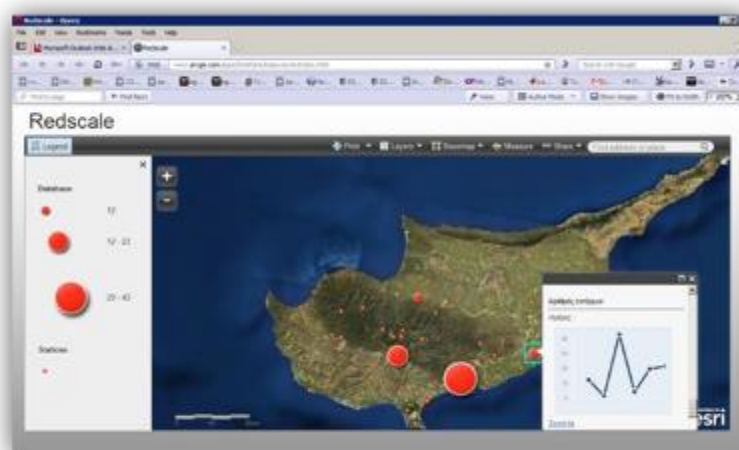
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## CONSORTIUM:

CYPROFRESH  
CNE TECHNOLOGY CENTER  
CYPRUS UNIVERSITY OF TECHNOLOGY (Partner, Contact Person: D.G.Hadjimitsis)  
AGRICULTURAL RESEARCH INSTITUTE

**Summary:** The aim of the "RedScale ID" research program is to develop an automated, energy-independent trap for continuous monitoring / identification of the RedScale population and in addition to record other relevant parameters related to the population. Such kind of parameter is temperature which is related to day-degrees growth calculation for estimating RedScale population. For this purpose satellite image data were used in order to estimate LST and then to correlate with air temperature. The use of satellite data has many advantages against traditional techniques such as local meteorological stations places in agricultural areas, since they can provide a synoptic coverage on a systematic daily basis.

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## TITLE

### STUDY OF THE URBAN HEAT ISLAND EFFECT IN CYPRUS

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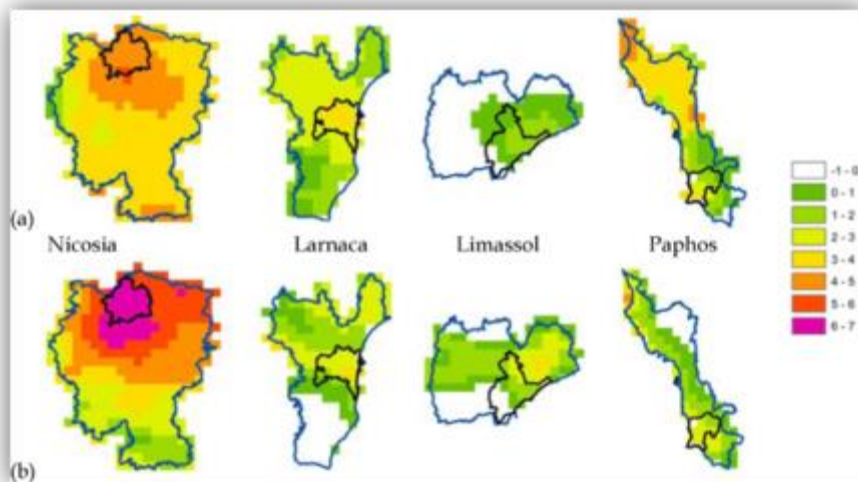
#### CONSORTIUM:

CYPRUS METEOROLOGICAL SERVICE  
NATIONAL OBSERVATORY OF ATHENS  
CYPRUS UNIVERSITY OF TECHNOLOGY (Partner, PI: D.G.Hadjimitsis)

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**Summary:** This project aims to study the urban heat island effect in Cyprus based on both multi-temporal satellite and meteorological data. The necessary heat waves and the analysis of the synoptic conditions favouring the development of heat waves have been studied and analyzed. The development of a Neural Network for the correlation of satellite derived land surface temperature (LST) with ground based air surface temperature is also examined. The analysis of satellite derived LST for studying the temporal evolution of LST and the deviation of LST (anomaly) from the mean values during a heat wave event has been evaluated while the calculation of the mean monthly magnitude of urban heat island (UHI) for the period 2002-2008 and for other selected heat wave events has been also considered.

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## TITLE

# ESTIMATION OF EVAPOTRANSPIRATION IN IRRIGATED CROPS USING SATELLITE REMOTE SENSING AND WIRELESS SENSORS

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### CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
AGRICULTURAL RESEARCH INSTITUTE  
NATIONAL AGRICULTURAL RESEARCH FOUNDATION

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**Summary:** The need for an efficient irrigation water management is of vital importance in Cyprus. Estimating crop evapotranspiration (ET<sub>c</sub>) from remotely sensed data could be a very helpful tool for Policy makers. The project aims to estimate ET<sub>c</sub> using remotely sensed data and in situ field data, such as field spectroradiometric data, Leaf Area Index (LAI) and crop height (CH). Remotely sensed data were correlated to field data in order to avoid direct measurements of crop canopy factors, in the future. These empirical equations have been used to provide the final ET<sub>c</sub> maps using the Surface Energy Balance Algorithm for Land (SEBAL) methodology. Finally an economic assessment of the irrigation costs using old and the new data regarding irrigation was made to test if remote sensing can play an important role in the irrigation management.

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## TITLE

# DEVELOPMENT OF AN EXPERIMENTAL SYSTEM FOR MAPPING OF LOBESIA BOTRANA POPULATION IN CYPRUS USING AUTOMATED TRAPS AND WIRELESS COMMUNICATION AND POSITIONING SYSTEMS

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## CONSORTIUM:

NOVATEX SOLUTIONS LTD  
CNE TECHNOLOGY CENTRE  
CYPRUS UNIVERSITY OF TECHNOLOGY (Partner, Contact Person: D.G.Hadjimitsis)  
AGRICULTURAL RESEARCH INSTITUTE

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**Summary:** The Vineflygis Project aims to increase agricultural production by helping the farmers control the use of pesticides at the right time with the right amount. These are achieved by means of advanced technological systems. The main aim of this project is to collect statistical data by capturing specific types of pests by number of traps which contain pheromones that attract the type of pests in investigation and send the count by wireless technology to a database where all these records are stored and compared. Based on these data, a graphical chart is generated showing this information. This whole process works fully automated and does not need constant interaction by humans. The locations are carefully examined and selected by satellite images. Each location will include number of traps, called DELTA Traps (image on the right) with a central main unit

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## TITLE

# INTEGRATION OF SATELLITE REMOTE SENSING, GIS, MODELLING AND WIRELESS-SENSOR NETWORK FOR MONITORING AND DETERMINING IRRIGATION DEMAND IN CYPRUS

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## CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
NAGREF  
CYPRUS METEOROLOGICAL OFFICE

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**Summary:** Remote sensing techniques have a sound role now days in the field of agriculture, and more specifically in hydrology. Estimating evapotranspiration through satellites has been a trend the last years. Spectral signatures profiles of different crops are necessary for post-processing of satellite imagery such as ‘classification’ in order to verify the crop type and therefore estimate evapotranspiration. Moreover ground “truth” data collected during satellite overpass can verify the at-satellite results. Indeed, for this project study spectral signatures were collected during the whole phenological cycle of some agricultural crops in Cyprus using the GER-1500 field spectroradiometer with a spectral range from 350nm to 1050 nm. Furthermore an Entity – Relationship Database was design and developed in order to manage, search and store thousands of spectral signatures in a systematic way. The database was build in the Microsoft Access environment while the geo-location of each measurement is recorded based on coordinates. The database may be connected to a Geographical Information System. The primary entities of the database were set as the “spectral signature” and “crop type”.

As the results have shown of daily ET<sub>c</sub> over specific crops in Mandria village (Paphos District), SW Cyprus, using remote sensing data was much closed compared to FAO 56 method. According to results, spectro-radiometric measurements are of vital importance when estimating ET<sub>c</sub>. The use of such tools in research regarding irrigation demand help in validating the research results and have increased accuracy. Monthly water demands of different crops were estimated and therefore future irrigation scheduling can be performed for similar crops.

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## TITLE

# MONITORING AIR POLLUTION IN CYPRUS USING SATELLITE REMOTE SENSING AND GIS AND MICRO-SENSOR TECHNOLOGY

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### CONSORTIUM:

CYPRUS UNIVERSITY OF TECHNOLOGY (Coordinator: D.G.Hadjimitsis)  
SIGNALGENERIX LTD

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**Summary:** This research project aims to support the efforts of local authorities and relevant state agencies to create a comprehensive system for the management, monitoring and measurement of air pollution in Cyprus with the combined use of satellite remote sensing and ground sensors. The main objective is to apply the methods available for determining the atmospheric effects on satellite images and to study their effectiveness for the calculation of air pollution by using satellite remote sensing techniques. The use of satellite images is an essential tool for easy and rapid identification of air pollution. The satellite images used for this application in this study were obtained from the Landsat-5 TM and Landsat-7 ETM + with a resolution of 30x30m, the MODIS Terra with a resolution 1x1km and ASTER with a resolution of 30x30m. These sensors cover a very large percentage of the area of Cyprus.

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## TITLE

# ECONOMICAL AND SUSTAINABLE PAVEMENT INFRASTRUCTURE FOR SURFACE TRANSPORT (ECOLANES)

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### CONSORTIUM:

THE UNIVERSITY OF SHEFFIELD (COORDINATORS)  
UNIVERSITY OF AKDENIZ  
TECHNICAL UNIVERSITY OF IASI  
EUROPEAN TYRE RECYCLING ASSOCIATION  
AGGREGATE INDUSTRIES UK LTD  
ANTALYA MUNICIPALITY  
COMPANIA NATIONALA DE DRUMURI NATIONALE DIN ROMANIA  
ADRIATICA RICICLAGGIO E AMBIENTE S.R.L.  
PUBLIC WORKS DEPARTMENT  
CYPRUS UNIVERSITY OF TECHNOLOGY (Partner, PI: D.G.Hadjimitsis)  
SCOTT WILSON GROUP PLC

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**Summary:** EcoLanes was a three year FP6 project funded under the priority thematic area of Sustainable Surface Transport, FP6-2005-Transport-4 call 3B. The key area and activity code associated with EcoLanes was SUSTDEV 2.6: design and manufacture of new construction concepts for road, rail, waterborne and inter-modal infrastructures. The project main aims were to develop infrastructure for surface transport using slip forming and roller compaction techniques based on existing asphalt laying equipment and steel fibre reinforced concrete. The benefits of the new construction concept will be manifold, such as to reduce construction costs by 10-20%, reduce construction time by 15%, reduce the energy consumption in road construction by 40%, minimise maintenance, use waste materials in road construction and make tyre recycling more economically attractive. To achieve its objectives, the project drew expertise from six countries and had to overcome serious scientific and technological barriers in fibre processing, concrete manufacture and road design. The project delivered new processes, design guidelines and full-scale demonstration projects in four diverse European climates and economies.

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