



# **IMAA-CNR research activities throughout Europe and at International level**

Report on Horizon 2020, Interreg MED, ESA,  
Copernicus, and Bilateral Agreements projects

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## ***Abstract***

The Institute of Methodologies for Environmental Analysis (IMAA) of the National Research Council (CNR) of Italy is actually involved in several programmes and initiatives at European and International level, where IMAA researchers have experienced scientific responsibility as well as played coordination roles.

In the framework of HORIZON 2020, IMAA has already recorded n.6 projects approved and funded with a European financial contribution to CNR-IMAA of about 2 Mil. Euro. IMAA played the role of partners as well as coordinator in international partnership constituted by academic, research and industrial partner. Even in COSME, the European programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises, IMAA has obtained a funding in a project addressed to create a European Strategic Cluster Partnership.

IMAA is going to play the role of Lead Partner of a project recently approved in the frame of the Interreg MED programme, where actions aimed at fostering low-carbon strategies and energy efficiency in specific MED territories will be implemented. A particular focus will be devoted to the projects promoted by the European Space Agency (ESA), where IMAA has reinforced its participation and to the Copernicus Climate Change Service (C3S) where IMAA is the Lead Contractor for the development of products related to the Access to Observations from Baseline and Reference Networks.

Moreover, IMAA is participating in two COST actions, reinforcing its presence on the strategic network for the transnational cooperation on key scientific themes, such as Earth System and Smart Cities.

IMAA has also promoted activities and bilateral projects of international cooperation with scientific institutions from European countries (e.g. Poland, Bulgaria, Czech Republic) and countries outside the EU (China, Azerbaijan, Argentina, Paraguay, Egypt, Lebanon) to favor the mobility of the personnel and the realization of joint research laboratories.

These successful data testify the effective ability of IMAA's researchers to be competitive at European level and the positive growth trend, both in terms of human resources and Research Infrastructures. IMAA is characterised by the highest concentration of researchers in a single "CNR Research Area" within the network of the Department of Science for Earth System and Environmental Technologies with a high percentage of young researchers. The IMAA headquarters is located in the Basilicata region. To-date, the permanent staff includes 88 people, whereas the non-permanent one includes more than

60 people. This result has been obtained by means of a continuous and effective research policy aimed at improving the attractiveness of top talents and young scientists in Earth Observation and Environmental Sciences.

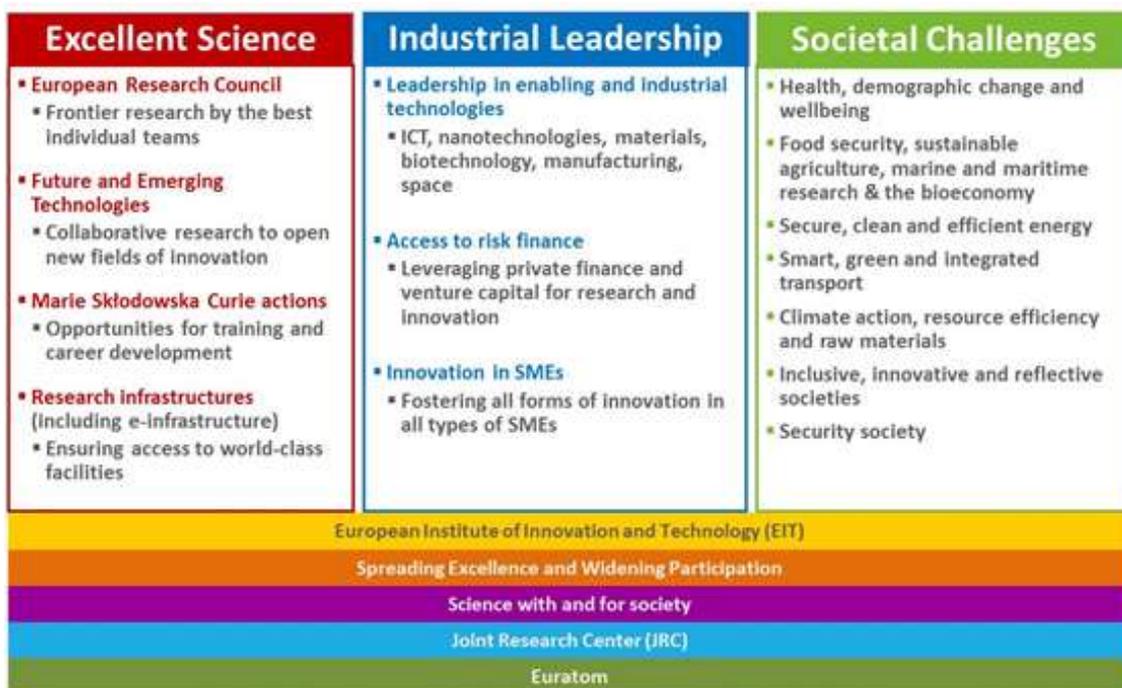
This report consists of six sections devoted to the single programmes. The first section is focused on HORIZON 2020, by reporting a general preface on the monitoring results and followed by a brief description of each project funded. The other five sections are respectively focused on the Interreg Med programme, European Space Agency project, Copernicus service, COST actions and finally on the Bilateral Agreements. All sections are organized in two parts: a general preface followed by the focus on the project/initiative funded in that specific programme.

# HORIZON 2020

## The programme and the monitoring of results

Horizon 2020 is the biggest EU Research and Innovation programme which has the challenging aim to contribute to reach a *smart, sustainable and inclusive growth in Europe* funding the most innovative and competitive ideas and projects. Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. Horizon 2020 aims to cover the full value chain, from frontier research, to technological development, demonstration, valorization of results and innovation. Compared to the previous Framework Programme, in Horizon the funding schemes have been substituted by the so called “actions”.

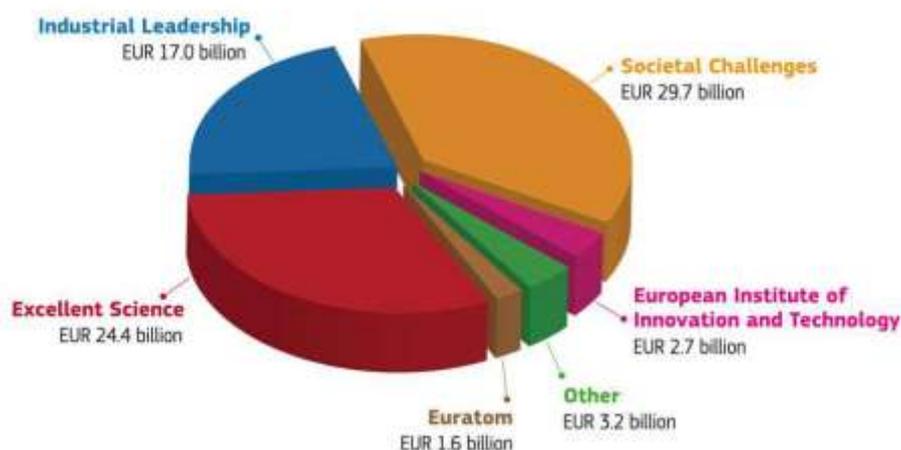
H2020 is structured in three main pillars: *Excellent Science, Industrial Leadership and Societal Challenges*, and integrated with 5 horizontal initiatives, which are Euratom, Joint Research Center, Science with and for Society, Spreading Excellence and Widening Participation and finally the European Institute of Innovation and Technology (EIT). The overall structure is reported in figure 1.



**Figure 1: Structure of Horizon 2020**

The total budget of Horizon 2020 (including the Euratom nuclear research programme) in current prices is nearly €80 billion and in constant prices €70.2 billion for 7 years.

The repartition of the budget on each programme is shown in the figure 2.



**Figure 2: Budget for each programme**

The second phase of HORIZON 2020 is going to be concluded with the launch of the final calls of the biannual work-programme 2016-2017 and the first phase was concluded with the closure of all calls planned in the work-programme 2014-2015.

On the basis of the monitoring report, published by the European Commission in 2016<sup>1</sup>, the number of proposals received in total was 76.427, out of which 9.087 proposals were the overall signed grants; therefore, the overall **success rate** of eligible full proposals is around **11.8%** in terms of number of eligible proposals in the reference years. The number of eligible applications per European Member States testifies how much some European contraries are active and how more recent member states are coping with this new research and innovation programme (Fig.3).

<sup>1</sup> “Horizon 2020 – Monitoring report 2015” - European Commission, 2016  
<https://ec.europa.eu/programmes/horizon2020/en/news/horizon-2020-monitoring-report-2015>



**Figure 3 – Number of eligible applications to Horizon 2020 per EU Member States (from “Horizon 2020 – Monitoring report 2015”)**

Italy falls among the first Member States as number of eligible applications anyway the success rate is still below the average, being of 10.4%, with a maximum value in Societal Challenges (13% in 2014) and a minimum value in Excellent Science (8% in 2015).

### **CNR-IMAA in HORIZON 2020: the projects approved and funded**

The IMAA inclusion in international programmes furtherly increased in 2016 thanks to the successful participation in Horizon 2020 calls where IMAA researchers have experienced scientific responsibility as well as played coordination roles. Up to now, IMAA has participated in n.6 projects funded in Horizon and has finalized the FP7 projects.

Besides those projects, one project was granted to funding under the programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME). COSME programme is improving access to finance for SMEs through two financial instruments that have been available since August 2014: the Loan Guarantee Facility and the Equity Facility for Growth. COSME has a budget of over EUR 1.3 billion to fund these financial instruments that facilitate access to loans and equity finance for SMEs where market gaps have been identified.

As regards the projects granted to funding in H2020, there are two falling in Excellent Science (INFRA theme), one in Industrial Leadership (Earth Observation theme), one in Societal Challenge (Smart, green and integrated transport) and two in Spreading excellence and widening participation (Twinning theme).

IMAA plays the role of Coordinator for n.1 project out of 5. It is worth noting that the project coordinated by IMAA is ACTRIS “Aerosols, Clouds, and Trace gases Research Infrastructure Network”, an infrastructural project financed within the FP7 and Horizon 2020, which includes 21 Countries for 31 partners and integrates the most important European infrastructures for the study of aerosols and clouds. ACTRIS has been selected to the European Strategy Forum on Research Infrastructures (ESFRI) roadmap in 2016.

The list of all funded projects is reported in the table below, where the status of the project as well as the role of CNR-IMAA are present.

**Table 1- List of the projects granted to funding in HORIZON 2020 and in COSME**

Programme	Project Acronym	Project Title	Role of CNR-IMAA	Status
<b>HORIZON 2020</b>	<b>GAIA-CLIM</b>	Gap Analysis for Integrated Atmospheric ECV CLimate Monitoring	Partner	Ongoing
	<b>ACTRIS-2</b>	Aerosols, Clouds, and Trace Gases Research InfraStructure	Coordinator	Ongoing
	<b>ENVRPLUS</b>	Environmental Research Infrastructures providing shared solutions for science and society	Partner	Ongoing
	<b>ATHENA</b>	Remote Sensing Science Center for Cultural Heritage	Partner	Ongoing
	<b>ECARS</b>	East European Centre for Atmospheric Remote Sensing	Partner	Ongoing
	<b>EUNADICS-AV</b>	European Natural Airborne Disaster Information and Coordination System for Aviation	Partner	Ongoing
<b>COSME</b>	<b>SPACE2ID</b>	Space Clusters International Industrial Diversification	Partner	Ongoing

In the following section, a brief description of each project is provided. General information including the reference call, the type of action, the duration, the actual status of the project,

the project cost, the content and the reference contact of the project are reported. Besides this general information, data about the participation in each call are reported on the basis of the “Flash call info” document. This document is available for each call closed for which the evaluation process has been finalized. It provides details on the number of proposals evaluated above the threshold and number of proposals submitted for each call.

# List of CNR-IMAA projects funded under Horizon 2020



## GAIA-CLIM

### Gap Analysis for Integrated Atmospheric ECV CLimate Monitoring

First successful results about the participation of CNR-IMAA in Horizon 2020 have been recorded at the beginning of 2015 with the submission and the approval of GAIA-CLIM project under the call ““Earth Observation-2014”. It was submitted under the call EO-3-2014 “Observation capacity mapping in the context of Atmospheric and Climate change monitoring” under “Earth Observation-2014” where n.3 proposals out of n.3 proposals submitted have received an evaluation score above the applicable threshold.

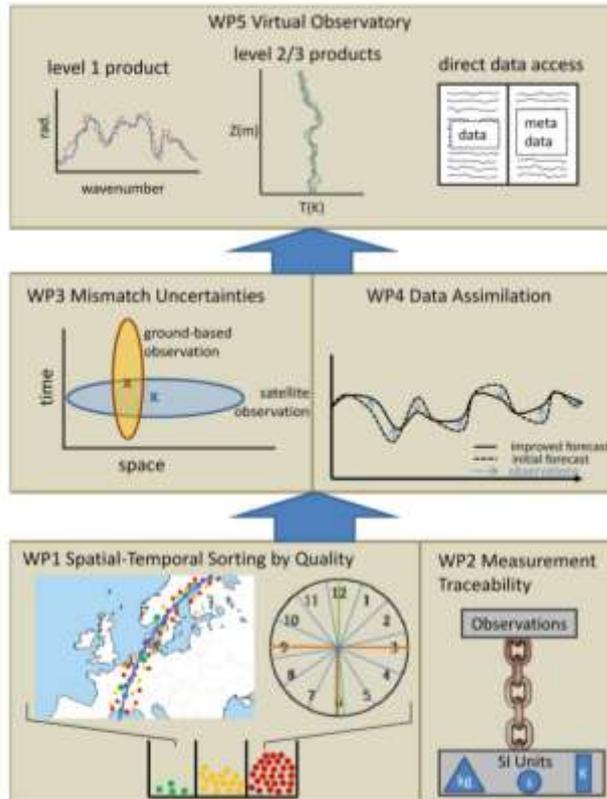
#### *General information*

HORIZON 2020	
<b>Title</b>	Gap Analysis for Integrated Atmospheric ECV CLimate Monitoring
<b>Project Acronym</b>	GAIA-CLIM
<b>Reference call</b>	EO-3-2014 'Observation capacity mapping in the context of Atmospheric and Climate change monitoring'
<b>Type of action</b>	Research and Innovation Action
<b>Duration</b>	36 months
<b>Starting date</b>	1 <sup>st</sup> March 2015
<b>Status</b>	ongoing
<b>Project cost</b>	5.999.726,25 Euro
<b>IMAA's budget</b>	426.250,00 Euro
<b>Role of CNR-IMAA</b>	Partner
<b>Responsible for CNR-IMAA</b>	Fabio Madonna
<b>Website</b>	<a href="http://www.gaia-clim.eu/">http://www.gaia-clim.eu/</a>

#### **CONTENT**

The GAIA-CLIM (Gap Analysis for Integrated Atmospheric ECV CLimate Monitoring) project has been funded in the frame of the call EO-3-2014 'Observation capacity mapping in the context of Atmospheric and Climate change monitoring' of EU framework program for Research and innovation Horizon 2020. The project sees 21 partners involved, including European institutions, met service and US partners, such as ECMWF, MetOffice, NOAA, under the coordination of NERSC (Nansen Environmental and Remote Sensing Center).

The project will develop appropriate methods to map reference quality comparators onto EO measurements. It will document gaps in the current observing system and all aspects of measurement uncertainty mapping, and propose strategies to address these including



recommendations regarding future funding of surface and sub-orbital observing capabilities to meet long term EO comparator needs. Finally, it will develop tools to aid end users through a 'virtual observatory'. The project will significantly increase the quality and use of ground based data for validation of satellite sensors and climatological models, with relapses of considerable interest for several sectors (climate, ocean monitoring and extreme events, land conservation, ...) and end users (meteorological services, civil protection, space agencies, environmental agencies, ...).

# ACTRIS-2

## Aerosols, Clouds, and Trace Gases Research InfraStructure

The project ACTRIS-2 was one of the 18 projects funded under the call INFRAIA-2014-2015 “Integrating and Opening Research Infrastructures of European Interest”, where 60 proposals were submitted and 47 out of these were evaluated with a score above the threshold. The project is coordinated by IMAA and involves 31 partners belonging to Universities and Research Centres from all 21 European countries. The project is a successful follow-up of ACTRIS “Aerosols, Clouds, and Trace gases Research Infrastructure Network” project, funded under the Seventh Framework Programme, on the call INFRA-2010-1-1.1.16: Research Infrastructures for Atmospheric Research.

ACTRIS has been selected to the European Strategy Forum on Research Infrastructures (ESFRI) roadmap in 2016. In the project consortium the CNR Department of Earth System Science and Environmental Technologies is involved with two institutes: IMAA and ISAC “Institute of Atmospheric Sciences and Climate”. ACTRIS has been selected to the European Strategy Forum on Research Infrastructures (ESFRI) roadmap in 2016.

### *General information*

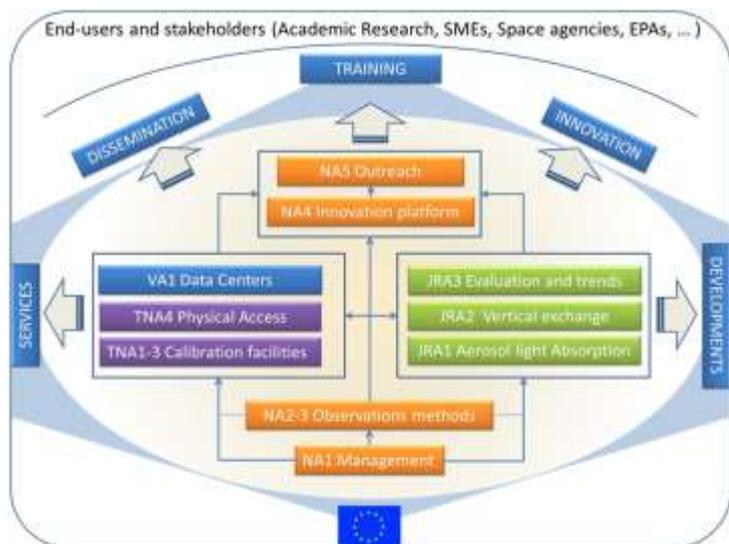
<b>HORIZON 2020</b>	
<b>Title</b>	Aerosols, Clouds, and Trace Gases Research InfraStructure
<b>Project Acronym</b>	ACTRIS-2
<b>Reference call</b>	INFRAIA-2014-2015 “Integrating and Opening Research Infrastructures of European Interest
<b>Type of action</b>	Research and Innovation Action
<b>Duration</b>	48 months
<b>Starting date</b>	1 <sup>st</sup> May 2015
<b>Status</b>	Ongoing
<b>Project cost</b>	10.126.484,54 Euro
<b>IMAA’s budget</b>	911.846,00 Euro
<b>Role of CNR-IMAA</b>	Coordinator
<b>Responsible for CNR-IMAA</b>	Gelsomina Pappalardo
<b>Website</b>	<a href="http://actris2.nilu.no/Projects/ACTRIS2IAinH2020(20152019).aspx">http://actris2.nilu.no/Projects/ACTRIS2IAinH2020(20152019).aspx</a>

### **CONTENT**

ACTRIS-2 is the pan-European initiative for coordinating long-term observations of aerosols, clouds, and short lived gases from the ground.

The objective of ACTRIS-2 is to consolidate the construction of a unique user-oriented Research Infrastructure initiated more than 15 years ago for providing 4-D integrated high-quality data from near-surface to high altitude (vertical profiles and total-column), relevant to climate and air-quality research. ACTRIS-2 is a European contribution to the Global Atmosphere Watch program of the World Meteorological Organisation (WMO-GAW) and the research component of the European Monitoring and Evaluation Programme (EMEP). It supports European activities of the AErosol RObotic NETwork (AERONET). ACTRIS-2 activities also support the strategic priorities of the intergovernmental Group on Earth Observations (GEO) and develop synergies with national initiatives.

The distributed observation platforms of ACTRIS-2 are located both in Europe and outside and will improve systematic and timely collection, processing and distribution of data and results for use in modeling, in particular towards implementation of atmospheric and climate services. ACTRIS-2 pursues the following targets:



- Maintaining and increasing the availability of long-term observational data relevant to climate and air-quality research on the regional scale
- Continuing to develop and disseminate integration tools to fully exploit the use of multiple atmospheric techniques at ground-based stations, for the calibration/validation/integration of satellite sensors and for the improvement of the parameterizations used in global and regional-scale climate and air-quality models
- Opening calibration facilities and advanced observing platforms to Trans-National Access for the benefit of a large user community including SMEs, and further facilitating virtual access to high-quality information, products and services enhancing the ACTRIS Data Centre
- Maintaining and enhancing the capacity of training in the field of atmospheric observations particularly directed to young scientists and researchers from non-EU developing countries
- Promoting innovation potential and technological standardization with European SMEs for transfer of observation technologies and methods
- Developing a sustainable strategy for maintaining ACTRIS-services in the long term.

# ENVRIPLUS

## Environmental Research Infrastructures providing shared solutions for science and society

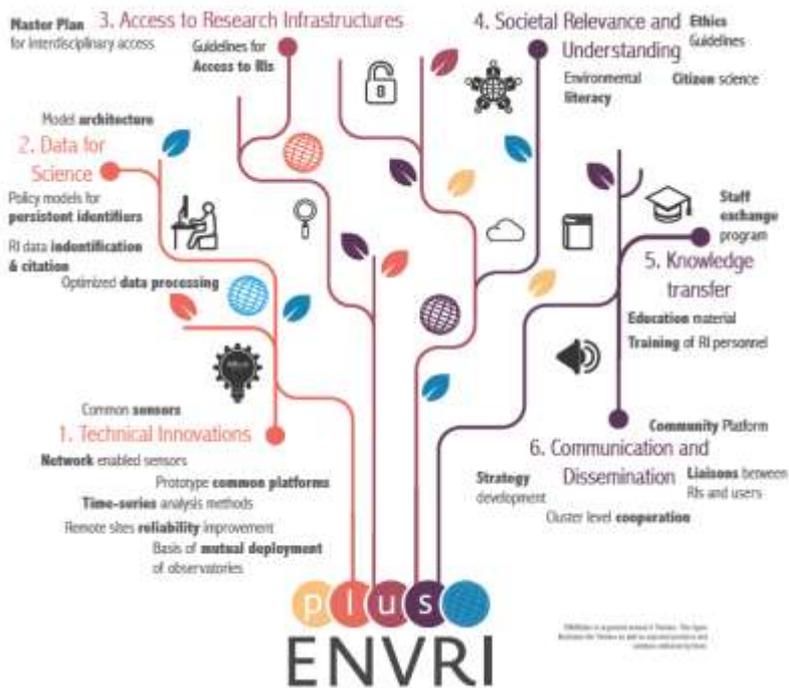
The project ENVRIPLUS was one out of 12 proposals submitted to the call INFRADEV4-2014-2015 and among the 8 projects funded under the call INFRADEV4-2014-2015 “Implementation and operation of cross-cutting services and solutions for clusters of ESFRI and other relevant research infrastructure initiatives” in “Research Infrastructures – INFRA” programme. CNR-IMAA is participating in ENVRIPLUS as partner together with the Institute of Atmospheric Sciences and Climate (CNR-ISAC), the Institute of Biometeorology (IBIMET-CNR) and the Institute of Information Science and Technologies “A. Faedo” (CNR-ISTI).

### General information

<b>HORIZON 2020</b>	
<b>Title</b>	Environmental Research Infrastructures providing shared solutions for science and society
<b>Project Acronym</b>	ENVRIPLUS
<b>Reference call</b>	INFRADEV4-2014-2015 Implementation and operation of cross-cutting services and solutions for clusters of ESFRI and other relevant research infrastructure initiatives
<b>Type of action</b>	Research and Innovation Action
<b>Duration</b>	48 months
<b>Starting date</b>	1 <sup>st</sup> May 2015
<b>Status</b>	Ongoing
<b>Project cost</b>	14.998.034,25 Euro
<b>EU contribution</b>	14.683.534,25 Euro
<b>IMAA’s budget</b>	332.750,42 Euro
<b>Role of CNR-IMAA</b>	Partner
<b>Responsible for CNR-IMAA</b>	Gelsomina Pappalardo
<b>Website</b>	<a href="http://www.envriplus.eu/">http://www.envriplus.eu/</a>

### CONTENT

ENVRIPLUS is a cluster of research infrastructures (RIs) for Environmental and Earth System sciences, built around ESFRI roadmap and associating leading e-infrastructures and Integrating Activities together with technical specialist partners. ENVRIPLUS is driven by 3 overarching goals:



1) favoring cross-fertilization between infrastructures, 2) implementing innovative concepts and devices across RIs, and 3) facilitating research and innovation in the field of environment to an increasing number of users outside the RIs. ENVRIPLUS organizes its activities along a main strategic plan where sharing multi-disciplinary

expertise will be most effective. It aims to improve Earth observation monitoring systems and strategies, including actions towards harmonization and innovation, to generate common solutions to many shared information technology and data related challenges, to harmonize policies for access and provide strategies for knowledge transfer amongst RIs. ENVRIPLUS develops guidelines to enhance trans-disciplinary use of data and data-products supported by applied use-cases involving RIs from different domains. ENVRIPLUS coordinates actions to improve communication and cooperation, addressing Environmental RIs at all levels, from management to end-users, implementing RI-staff exchange programs, generating material for RI personnel, and proposing common strategic developments and actions for enhancing services to users and evaluating the socio-economic impacts. ENVRIPLUS is expected to facilitate structuration and improve quality of services offered both within single RIs and at pan-RI level. It promotes efficient and multi-disciplinary research offering new opportunities to users, new tools to RI managers and new communication strategies for environmental RI communities. The produced solutions, services and other project results are made available to all environmental RI initiatives, thus contributing to the development of a consistent European RI ecosystem.

# ATHENA

## Remote Sensing Science Center for Cultural Heritage

ATHENA was funded under the call for Twinning 2015 where 321 out of 552 proposals have been evaluated above the threshold. The project ATHENA started in December 2015 within the programme Spreading excellence and widening participation. CNR-IMAA participated in the project together with the Institute of Archaeological and Architectural Heritage of the National Research Council of Italy (CNR-IBAM)

### *General information*

HORIZON 2020	
<b>Title</b>	Remote Sensing Science Center for Cultural Heritage
<b>Project Acronym</b>	ATHENA
<b>Reference call</b>	CALL FOR TWINNING - H2020-TWINN-2015
<b>Type of action</b>	Coordination and Support Action (CSA)
<b>Duration</b>	36 months
<b>Starting date</b>	1 <sup>st</sup> December 2015
<b>Status</b>	Ongoing
<b>Project cost</b>	972.841,25 Euro
<b>CNR's budget</b>	176.250,00 Euro
<b>IMAA's budget</b>	88.125,00 Euro
<b>Role of CNR-IMAA</b>	Partner
<b>Responsible for CNR-IMAA</b>	Rosa Lasaponara

### **CONTENT**

The "ATHENA" proposal aims to establish a Center of Excellence in the field of Remote Sensing for Cultural Heritage in the areas of Archaeology and Cultural Heritage through the development of an enhanced knowledge base and innovative methods. This center will be established by twinning the existing Remote Sensing and Geo-environment Research Laboratory at the Cyprus University of Technology (CUT) with internationally-leading counterparts from other Member States of the EU, such as the Institute of Methodologies for Environmental Analysis (CNR-IMAA) and the Institute of Archaeological and Architectural Heritage (CNR-IBAM) of the National Research Council of Italy, and the German Aerospace Centre (DLR). The goals of the Center will be aligned with the Smart Specialization Strategy of Cyprus. The close collaboration between CUT and other experts in the field of Remote Sensing for Cultural Heritage in the EU will form a synergic network that will permit the transfer of knowledge and training of the existing personnel of CUT. As a

result, the ATHENA project will have both direct and indirect social, scientific, and economic outcomes. In addition, the implementation of the project will facilitate future collaborations with experts of the Archaeology and Cultural Heritage sector in an EU level, increase the Centers' research capabilities, as well as enhance the research and academic profile of all participants. It is noteworthy to underline the importance of the geographical position of the Center in the region of eastern Mediterranean, a region inhabited thousands of years before and therefore abound in archaeological residues.

# ECARS

## East European Centre for Atmospheric Remote Sensing

ECARS falls among the projects funded under the call for Twinning 2015 where 321 out of 552 proposals have been evaluated above the threshold. The project has just started within the programme Spreading excellence and widening participation.

### *General information*

<b>HORIZON 2020</b>	
<b>Title</b>	East European Centre for Atmospheric Remote Sensing
<b>Project Acronym</b>	ECARS
<b>Reference call</b>	CALL FOR TWINNING - H2020-TWINN-2015
<b>Type of action</b>	Coordination and Support Action (CSA)
<b>Duration</b>	36 months
<b>Starting date</b>	1 <sup>st</sup> January 2016
<b>Status</b>	Ongoing
<b>Project cost</b>	1.000.000 Euro
<b>IMAA's budget</b>	160.000 Euro
<b>Role of CNR-IMAA</b>	Partner
<b>Responsible for CNR-IMAA</b>	Gelsomina Pappalardo
<b>Website</b>	<a href="http://ecars.inoe.ro/index.php/project/">http://ecars.inoe.ro/index.php/project/</a>

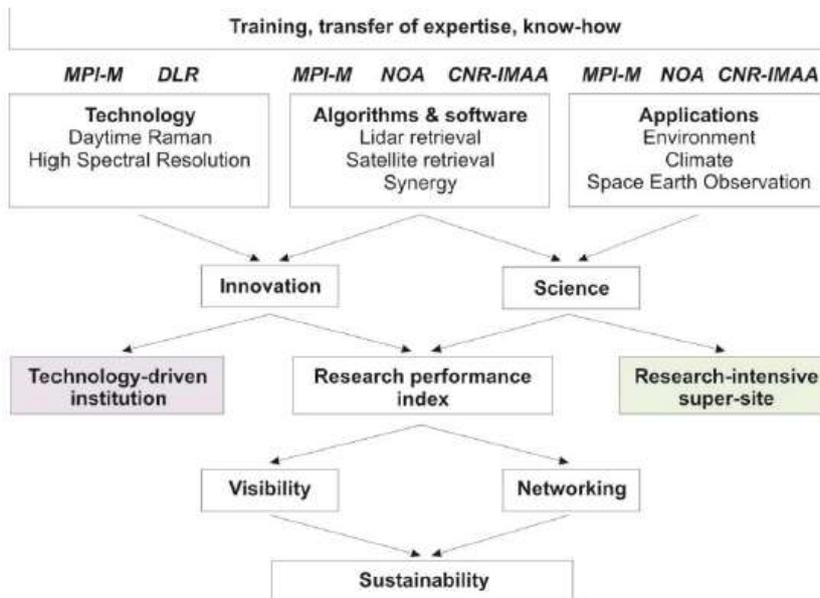
### **CONTENT**

ECARS addresses the challenges of the Twinning programme by tackling deficiencies and networking gaps between INOE, a very dynamic research institution in Romania, and internationally-leading counterparts at EU level. The activity will strengthen the excellence of INOE Center for atmospheric remote sensing and will stimulate high-level environmental and climate research, conform to Romanian Smart Specialization Strategy. This will be achieved by consolidating INOE's links with four highly esteemed research institutions, each one having high-level expertise in specific areas: MPI-M (ground-based remote sensing), DLR (airborne remote sensing), NOA (satellite remote sensing) and CNR-IMAA (data exploitation).

The coordination and support actions address specific areas of atmospheric remote sensing where the expertise of INOE will be strengthened, increasing its innovation capacity and research profile. The focus is on cutting edge passive and active remote sensing technologies, good practices and data synergy, leading to better data exploitation for environmental and climate research. Transfer of know-how is performed in a larger context

of training through research, with ECARS complementing ongoing projects in HORIZON2020 and ESA Earth Observation programs. ECARS' goal is to create a collaborative framework around INOE for sharing specialized knowledge, brainstorming for new ideas and elaborating scientific publications. Measures to maximize the impact involve short-term staff exchanges and on-site training, expert visits, virtual training, technical workshops, summer schools, webinars and outreach activities.

ECARS is envisaged to increase by 50% the annual number of scientific papers published by INOE, and the impact factor by 25%. Knowledge will be further spread through national Master and PhD programs, reinforcing the atmospheric remote sensing activities in Romania and enhancing the related S&T capacities.



# EUNADICS-AV

## European Natural Airborne Disaster Information and Coordination System for Aviation

### *General information*

<b>HORIZON 2020</b>	
<b>Title</b>	European Natural Airborne Disaster Information and Coordination System for Aviation
<b>Project Acronym</b>	EUNADICS-AV
<b>Reference call</b>	H2020-MG-2016-SingleStage-INEA
<b>Type of action</b>	RIA - Research and Innovation action
<b>Duration</b>	36 months
<b>Starting date</b>	1 <sup>st</sup> October 2016
<b>Status</b>	Ongoing
<b>Project cost</b>	7.509.318,75
<b>IMAA's budget</b>	556.250,00
<b>Role of CNR-IMAA</b>	Partner
<b>Responsible for CNR-IMAA</b>	Gelsomina Pappalardo

### **CONTENT**

Aviation is one of the most critical infrastructures of the 21st century. Even comparably short interruptions can cause economic damage summing up to the Billion-Euro range. As evident from the past, aviation shows certain vulnerability with regard to natural hazards. The proposal EUNADICS-AV addresses airborne hazards (environmental emergency scenarios), including volcano eruptions, nuclear accidents and emergencies and other scenarios where aerosols and certain trace gases are injected into the atmosphere. Such events are considered rare, but may have an extremely high impact, as demonstrated during the European Volcanic Ash Crisis in 2010. Before the 1990s, insufficient monitoring as well as limited data analysis capabilities made it difficult to react to and to prepare for certain rare, high-impact events. Meanwhile, there are many data available during crisis situations, and the data analysis technology has improved significantly. However, there is still a significant gap in the Europe-wide availability of real time hazard measurement and monitoring information for airborne hazards describing “what, where, how much” in 3 dimensions, combined with a near-real-time European data analysis and assimilation system. The main objective of EUNADICS-AV is to close this gap in data and information availability, enabling all stakeholders in the aviation system to obtain fast, coherent and consistent information. This would allow a seamless response on a European scale,

including ATM, ATC, airline flight dispatching and individual flight planning. In the SESAR 2020 Programme Execution Framework, EUNADICS-AV is a SESAR Enabling project (project delivering SESAR Technological Solutions). The project aims at passing a SESAR maturity level V2, which includes respective service validation activities, including validation exercises. Work will be also done to prepare a full V3 validation.

# SPACE2ID

## Space Clusters International Industrial Diversification

SPACE2ID project was submitted and approved under the call “Cluster Go International” COS-CLUSTER-2014-3-03 within the COSME programme. The main objective of this action is to intensify cluster and business network collaboration across borders and sectoral boundaries and to support the establishment of European Strategic Cluster Partnership (ESCP) to lead international cluster cooperation in fields of strategic interest – notably in support of the development of emerging industries. CNR-IMAA is involved in the project through TeRN Consortium, a public-private consortium operating in technologies for Earth Observation and Natural Risks.

### General information

<b>COSME</b>	
<b>Title</b>	Space Clusters International Industrial Diversification
<b>Project Acronym</b>	SPACE2ID
<b>Reference call</b>	COSME-2014-3.1 Cluster Go International: Strand 1: Supporting preparatory actions for establishment and shaping of new European Strategic Cluster Partnerships
<b>Type of action</b>	COSME-GA Grant agreement
<b>Duration</b>	14 months
<b>Starting date</b>	01 January 2016
<b>Status</b>	Ongoing
<b>Project cost</b>	187.469,25 Euro
<b>TeRN's budget</b>	29.291,00 Euro
<b>Role of CNR-IMAA</b>	Scientific Responsibility
<b>Responsible for CNR-IMAA</b>	Carmela Cornacchia
<b>Website</b>	<a href="http://www.space2id.eu/about/">http://www.space2id.eu/about/</a>

### CONTENT

Due to their intrinsic capacity to apply to several industrial and business sectors, space technologies (both Global Navigation Satellite Systems and Earth Observation technologies) are expected to know an important growth and new business value chain should be developed in the coming years related to this use of space technologies in various economic sectors, at the international scale. The SPACE2ID proposal (Space Clusters International Industrial Diversification) main objective is to create an ESCP

between European space Clusters and several other European clusters, namely MELCA clusters (MELCA stemming for Mobility, Energy, Logistics, Creative industries and Agriculture). It proposes to pave the way to the international business development of space technologies providers in the following applicative sectors:

- Mobility (i.e. transports of people)
- Energy
- Logistics (i.e transport of goods)
- Creative Industries (i.e., design, games and music)
- Agriculture

The commercial products that should stem from this international diversification process are particularly adapted to countries in which space ground infrastructures are not developed enough to allow these services to be provided by traditional ways. Therefore, the capability for space companies to grow is only based on their own capabilities to export their services. However, in these relatively new domains, these companies are generally too small to be able to have commercial actions abroad. Cluster may thus play an important role in this internationalization by organizing, on a long-term basis, commercial actions in several identified countries, commonly chosen for the five diversification sectors.

# ***The European Territorial Cooperation Programmes: The Interreg MED***

“Interreg MED” means European Territorial Cooperation for the Mediterranean area. It is a transnational programme where the Partner States from 13 countries are involved and work together to tackle challenges beyond national borders. Accordingly to the Interreg MED Programme Programme, the main objective is to “promote sustainable growth in the Mediterranean area by fostering innovative concepts and practices and a reasonable use of resources and by supporting social integration through an integrated and territorially based cooperation approach”. The rise of low carbon economy, the protection of natural and cultural resources and the strengthening of innovation are the main challenges setup by the Programme. In September 2015 the first call for Modular projects was published and opened to the following priority axis:

- Priority Axis 1: Promoting Mediterranean innovation capacities to develop smart and sustainable growth
- Priority Axis 2: Fostering low-carbon strategies and energy efficiency in specific MED territories: cities, islands and rural areas
- Priority Axis 3: Protecting and promoting Mediterranean natural and cultural resources

The indicative ERDF allocation for the call was 75M€ (25M€ for each priority axis) and 3M€ (1M€ for each priority axis) as indicative IPA allocation. After the evaluation of the proposals, the Steering Committee approved 61 Modular Projects in total.

## PrioritEE

### Prioritise energy efficiency (EE) measures in public buildings: a decision support tool for regional and local public authorities

#### General information

<b>INTERREG MED</b>	
<b>Title</b>	Prioritise energy efficiency (EE) measures in public buildings: a decision support tool for regional and local public authorities
<b>Project Acronym</b>	PrioritEE
<b>Reference call</b>	1 <sup>st</sup> Call for Modular projects
<b>Priority Axis</b>	2 - Fostering low-carbon strategies and energy efficiency in specific MED territories: cities, islands and remote areas
<b>Specific objective</b>	2.1 - To raise capacity for better management of energy in public buildings at transnational level
<b>Duration</b>	30 months
<b>Starting date</b>	1 <sup>st</sup> February 2017
<b>Status</b>	Ongoing
<b>Project cost</b>	2.234.295,85
<b>IMAA's budget</b>	396.801,00
<b>Role of CNR-IMAA</b>	LEAD PARTNER
<b>Responsible for CNR-IMAA</b>	Monica Salvia

#### CONTENT

PrioritEE project, was one of 61 Modular projects funded under the first call of the Interreg MED Programme. in the Priority Axis 2: Fostering low-carbon strategies and energy efficiency in specific MED territories: cities, islands and remote areas - Specific objective 2.1: To raise capacity for better management of energy in public buildings at transnational level.

PrioritEE has the purpose of prioritizing European investments in Public Buildings in the MED area, by reinforcing the capacities of public administrations in selecting and implementing eco-friendly and cost-effective energy planning measures. It will be focused on three main pillars (Capacity building, Development of decision-making support tools, Communication and knowledge transfer) to reduce energy consumption and prioritize EE investments in Municipal Public Buildings.

The project partnership coordinated by CNR-IMAA is composed by 5 professional institutions (Consiglio Nazionale delle Ricerche, New University of Lisbon/Faculty of Science and Technology, Centre for Renewable Energy Sources and Saving, North-West Croatia Regional Energy Agency, University of Zaragoza) and 5 Local public authorities (Società Energetica Lucana, Regional Development Agency of Western Macedonia S.A., Lezíria do Tejo Intermunicipal Community, City of Karlovac and Provincial Government of Teruel ) from 5 MED countries (IT, PT, ES, EL and HR).

It started on 1<sup>st</sup> February 2017 and has the duration of 30 months.

# ***European Space Agency***

## ***Advanced Research in Telecommunications Systems***

ESA's Advanced Research in Telecommunications Systems (ARTES) programme transforms research and development activities into operational, profitable and self-sustaining products and services. The success of ARTES is the result of consolidating public-private partnerships between the decision-makers from space industry, service providers, organisations and user communities within participating Member States.

The ARTES Applications programmes are dedicated to funding and promoting the development of space-based applications, services and solutions for the needs of European citizens and society at large.

### **ARTES INTEGRATED APPLICATIONS PROMOTION (IAP)**

The ARTES IAP programme is dedicated to the development, implementation and pilot operations of Integrated Applications. These are applications that combine (or 'integrate') data from at least two existing and different space assets, such as Satellite Communication, Earth Observation, Satellite Navigation, Human Spaceflight technologies and others.

ARTES IAP projects cover Feasibility Studies and Demonstration Projects.

The following objectives have been defined for ARTES IAP activities:

- Promotion of space applications to a wider range of users, especially those who are not aware of the benefits that space technologies can bring to them
- Development of new operational services for these users, involving a broader participation by actors on both the demand and supply sides
- Utilisation of one or more existing space-assets such as
  - Satellite Communications
  - Earth Observation
  - Satellite Navigation
  - Human Spaceflight technologies
  - and others

leading to a better exploitation of existing space capacity and know-how together with a better understanding of how they should evolve to meet user requirements

- Cross-fertilisation across disciplines (e.g. impact of Climate on Health, on Energy, on Transport, etc...) together with the development of a consistent approach across Integrated Applications initiatives, to maximise their efficient and cost-effective implementation

# ArTeK

## Satellite enabled Services for Preservation and Valorisation of Cultural Heritage

### General information

<b>ESA</b>	
<b>Title</b>	Satellite enabled Services for Preservation and Valorisation of Cultural Heritage
<b>Project Acronym</b>	ArTeK
<b>Reference call</b>	ARTES 20IAP programme
<b>Duration</b>	24 months
<b>Starting date</b>	2 <sup>nd</sup> November 2016
<b>Status</b>	Ongoing
<b>Project cost</b>	4.400.000
<b>IMAA's budget</b>	399.960
<b>Role of CNR-IMAA</b>	Partner
<b>Responsible for CNR-IMAA</b>	Rosa Lasaponara
<b>Website</b>	<a href="http://www.nais-solutions.it/?page_id=702">http://www.nais-solutions.it/?page_id=702</a>

### CONTENT

ArTeK is a project successfully evaluated in the frame of ARTES 20 IAP programme of the European Space Agency (ESA), supported by the Italian Space Agency (ASI).

ArTeK is intended as an advanced instrument, missing today, aimed at supporting institutions responsible for Cultural Heritage (CH) in terms of:

- Safeguard, through a constant multi-modal site monitoring, for those sites that need special controls because threatened by environmental factors (both natural and anthropic);
- Valorisation, through advanced fruition mechanisms;
- Management, through site control mechanisms.

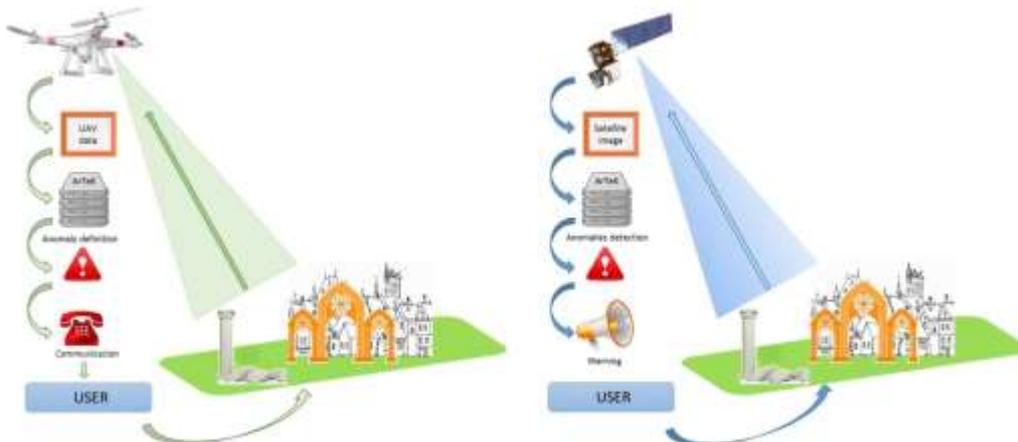


Image extracted from <http://www.nais-solutions.it/>

ArTeK is aimed at the development and demonstration of an innovative, effective and sustainable service to supply a complete and systematically updated view about the cultural assets condition and support their management/fruiton.

ArTeK enabling technologies encompass:

- Satellite Earth Observation (optical and SAR) used for (i) identification and evaluation of environmental risks that could have a potential negative impact over cultural assets, (ii) identification of changes, (iii) conditions evaluation, (iv) sites and artifacts mapping;
- Satellite Telecommunication enabling data transmission from sensors network located inside remote sites to the ArTeK service centre;
- Satellite Navigation, at the base of visitor's flow monitoring inside the visited area. Moreover, precise positioning data, coming from ad-hoc or permanent GNSS networks, will be exploited for improving SAR data elaboration;
- Airborne Remote Sensing from UAVs equipped with sensors selected on the base of mission specificities, used when requested by the situation (e.g. when spatial resolution offered by satellite sensors is not sufficient);
- On site sensors located inside sites of interest used in case of identifications of criticalities that require a continuous monitoring (e.g. daily measurements) or to compensate the absence of spatial or aerial sensors. CNR-IMAA is involved a partnership led by NAIS and composed by 8 international partners.

Pilot sites selected for the demonstration of ArTeK, each one with their specific critical situation, are:

- Villa Adriana (UNESCO site since 1999) and the historic centre of Tivoli (Rome);
- Civita di Bagnoregio (VT, Italy);
- Matera (UNESCO site since 1993) (MT, Italy);
- Baia (NA, Italy);
- Gianola (LT, Italy).

It started on 2<sup>nd</sup> November 2016 and has the duration of 24 months.

# **Copernicus**

The European Earth observation programme Copernicus, previously known as GMES (Global Monitoring for Environment and Security), is a European system for monitoring the Earth. It consists of a complex set of systems which collect data from multiple sources: earth observation satellites and in situ sensors such as ground stations, airborne and sea-borne sensors. It processes these data and provides users with reliable and up-to-date information through a set of services related to environmental and security issues.

The services address six thematic areas: land, marine, atmosphere, climate change, emergency management and security. They support a wide range of applications, including environment protection, management of urban areas, regional and local planning, agriculture, forestry, fisheries, health, transport, climate change, sustainable development, civil protection and tourism.

The Copernicus Climate Change Service (C3S), still in its development phase, will combine observations of the climate system with the latest science to develop authoritative, quality-assured information about the past, current and future states of the climate in Europe and worldwide.

ECMWF operates the Copernicus Climate Change Service on behalf of the European Union and will bring together expertise from across Europe to deliver the service.

C3S will provide key indicators on climate change drivers such as carbon dioxide and impacts, for example, reducing glaciers. The aim of these indicators will be to support European adaptation and mitigation policies in a number of sectors.

In the context of the Copernicus Service and In-situ activities, several contract opportunities are opened.

In April 2016, a tender in the frame of C3S was opened: the C3S\_311a Collection and Processing of In Situ Observations. This is divided into four Lots:

- Lot 1: Coordination of data rescue activities
- Lot 2: Access to observations from global climate data archives
- Lot 3: Access to observations from baseline and reference networks
- Lot 4: Climate monitoring products for Europe based on in situ observations

# BARON

## Baseline And Reference Observation Networks

### General information

<b>Copernicus</b>	
<b>Title</b>	C3S-Baseline And Reference Observation Networks
<b>Project Acronym</b>	C3S-BARON
<b>Reference tender</b>	C3S_311a_Lot3: Access to Observations from Baseline and Reference Networks
<b>Duration</b>	48 months (divided in two service contract of 22 and 26 months respectively)
<b>Starting date</b>	1 <sup>st</sup> March 2017
<b>Status</b>	Ongoing
<b>Project cost</b>	2.085.247,51
<b>IMAA's budget</b>	648.355,21
<b>Role of CNR-IMAA</b>	Lead Contractor
<b>Responsible for CNR-IMAA</b>	Fabio Madonna (Technical/Service Manager)

### CONTENT

The proposal C3S-BARON (*C3S-Baseline And Reference Observation Networks*) has the main objective to rationalise, harmonise and improve access to open and free observational records and data streams from selected in-situ GCOS-relevant Baseline and Reference observing networks facilitating climate monitoring, estimation of ECVs and uncertainty assessments, and maximizing the number of users of the existing high-quality in-situ observing capabilities.

The C3S-BARON proposal is focussed upon access to and redistribution of harmonized data products from atmospheric in-situ observations networks measuring a subset of ECVs which includes surface temperature, atmospheric temperature and humidity (vertical profiles), ozone (column and profiling concentration), wind profiles (from radiosoundings), CO, CO<sub>2</sub> and CH<sub>4</sub> (column concentrations), and water vapour content (columnar from GPS/GNSS only). For these ECVs demonstrable Baseline and Reference quality measurement networks are assured.

The successful implementation of the proposal will allow the development of consistent quality control algorithms for in situ climate data arising from Baseline and Reference networks at various time scales (hourly, daily, monthly, annually). Methods will be developed and implemented to detect and adjust for inhomogeneities due to issues such as instrumentation changes, calibration drifts or observing station relocations and to quantify uncertainty in a consistent and metrologically rigorous manner.

Technical solutions shall build upon the considerable heritage of pre-existing expertise and tools developed under the ongoing H2020 projects GAIA-CLIM ([www.gaia-clim.eu](http://www.gaia-clim.eu)), QA4ECV ([www.qa4ecv.eu](http://www.qa4ecv.eu)), and ACTRIS ([www.actris.eu](http://www.actris.eu)), to which the Lead Contractor and sub-contractors are active participants. They will be implemented in coordination with

the different solutions provided under remaining awardees for Lot1, Lot2, and Lot3 of this ITT upon discussion with ECMWF. A Data Management Facility will be operated on a continuous basis to process the Baseline and Reference quality data and to make all the output available to C3S users via the CDS by directly uploading data and products to a designated server using ODB (Observation DataBase) as the basis for a Common Data Model.

# **COST ACTION**

COST is the longest-running European framework supporting trans-national cooperation among researchers, engineers and scholars across Europe.

IMAA-CNR participates in the following COST projects focused on Earth System and Smart Cities macro themes.

**COST Action ES1303:** Earth System Science and Environmental Management - Towards operational ground based profiling with ceilometers, doppler lidars and microwave radiometers for improving weather forecasts (TOPROF)

Period of the Action: 22 October 2013 - 21 October 2017

Action Chair: Prof. Anthony Illingworth

Responsible for CNR-IMAA: Domenico Cimini, Management Committee member & Grant Holder Scientific Representative)

Website: [www.toprof.eu](http://www.toprof.eu)

The new generation of high-resolution (1km) weather forecast models now operational over Europe promises to revolutionise predictions of severe weather and poor air quality. To realise this promise, a dense observing network is required, focusing especially on the lowest few km of the atmosphere, so that forecast models have the most realistic state of the atmosphere for initialisation, continuous assimilation and verification. TOPROF aims at developing tools for making data from three observing networks available throughout Europe: i) ceilometers, ii) Doppler wind lidars, and iii) microwave radiometer profilers. These instruments are relatively inexpensive and have proven suitable for unmanned network operations. In collaboration with Numerical Weather Prediction centres, the action will lead towards operational networking of these existing but so far under-exploited, instruments.

**COST Action TU1204: People Friendly Cities in a Data Rich World**

Period of the Action: 11/04/2013 - 10/04/2017

Chair of Action: Professor Mark Dyer, Trinity College Dublin, Ireland

Responsible for CNR-IMAA: Filomena Pietrapertosa (Management Committee Substitute member)

Website: [http://www.cost.eu/COST\\_Actions/tud/TU1204](http://www.cost.eu/COST_Actions/tud/TU1204)

Cities are the future. In 2008, the percentage of people living in urban areas surpassed those living rural communities. The United Nations estimates that over 70% of the world's population will be living in towns and cities by 2050. Not surprisingly cities elicit ever greater attention from government, researchers, and industry. Many of the initiatives focus upon the efficient use of resources and carbon reduction in response to climate change. Likewise the "Smart City" concept offers a similar if somewhat broader vision of a more efficient city. The focus upon smarter and more efficient cities is important, but incomplete. It is important that cities be sustainable and pleasant to live within. Against this background, the Action builds on an ESF exploratory workshop on the emerging theme of "smart and liveable cities". Supported by a European network of candidate cities, the Action co-ordinates a trans-disciplinary network of experts and non-experts that investigate the alignment of the "hardware" and "software" of a city with user needs to promote well being, good health, and a sustainable use of resources, within an evolving people-centred consultation framework for economic, cultural, and political development.

## ***Bilateral agreements of Scientific and Technological Cooperation***

The Bilateral Agreements of Scientific and Technological Cooperation are promoted by the National Research Council to reinforce and encourage the sharing and exchange of the research activities among CNR and foreign homologous Research Councils (<http://www.cnr.it/sitocnr/Englishversion/CNR/Activities/IntActivity/BilateralAgr.html>). These agreements are implemented for the joined financing of:

- Joint research projects (of biennial or triennial duration, carried out by joint Italian and foreign research teams)
- Individual free exchange programme
- bilateral seminars

The Agreements embrace, as a rule, all disciplines and fields of research except in cases of restricted specific competences of the foreign Council concerned.

In the framework of the this kind of bilateral agreements, since 2013 IMAA-CNR has successfully obtained funding for n.8 projects and actually the evaluation for other n.3 requests for funding is going to be received, as listed in the table below.

<b>List of Bilateral led by IMAA</b>	<b>Year of publication of the call</b>	<b>Responsible person</b>	<b>Status of the request for funding</b>	<b>Reference year for the Implementation</b>
CNR/CAS - CINA	2013	Pignatti	Funded	2014-2016
CNR-CAS (ex AVCR) - REPUBBLICA CECA	2015	Gallipoli	Funded	2016-2018
CNR-ANAS - AZERBAIJAN	2015	Telesca	Funded	2016-2017
CNR-ASRT - EGITTO	2015	Lapenna	Funded	2016-2017
		Rizzo	Funded	2016-2017
CNR-CONICET - ARGENTINA	2016	Telesca	Validated	-
		Mona	Validated	-
CNR-CAS - CINA	2016	Pignatti	Funded	2017-2019
CNR/CONACYT - PARAGUAY	2016	Telesca	Funded	2017-2018
CNR- CNRS (Libano) - LIBANO	2016	Lapenna	Funded	2017-2018
CNR-PAN - POLONIA	2016	Rizzo	Validated	-

## **Reference Documents**

- Horizon 2020 – Monitoring report 2015 - European Commission, 2016, doi: 10.2777/545931, ISBN 978-92-79-63542-7, <https://ec.europa.eu/programmes/horizon2020/en/news/horizon-2020-monitoring-report-2015>
- “Horizon 2020 – First Results” – European Commission, doi:10.2777/718503, [https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/horizon\\_2020\\_first\\_results.pdf](https://ec.europa.eu/programmes/horizon2020/sites/horizon2020/files/horizon_2020_first_results.pdf).
- Flash call info «EO-3-2014»:  
[https://ec.europa.eu/research/participants/portal/doc/call/h2020/eo-3-2014/1620132-h2020-eo-2014\\_flash\\_call\\_info\\_en.pdf](https://ec.europa.eu/research/participants/portal/doc/call/h2020/eo-3-2014/1620132-h2020-eo-2014_flash_call_info_en.pdf)
- Flash call info «INFRAIA-2014-2015»:  
[https://ec.europa.eu/research/participants/portal/doc/call/h2020/infraia-1-2014-2015/1637636-infraia-2014-2015\\_flash\\_call\\_info\\_en.pdf](https://ec.europa.eu/research/participants/portal/doc/call/h2020/infraia-1-2014-2015/1637636-infraia-2014-2015_flash_call_info_en.pdf)
- Flash call info «H2020-TWINN-2015»:  
[https://ec.europa.eu/research/participants/portal/doc/call/h2020/h2020-twinn-2015/1665142-h2020\\_twinn\\_2015\\_flash\\_call\\_info\\_\(call\\_results\)\\_en.pdf](https://ec.europa.eu/research/participants/portal/doc/call/h2020/h2020-twinn-2015/1665142-h2020_twinn_2015_flash_call_info_(call_results)_en.pdf)
- Interreg MED Programme - List of Modular projects approved in December 2016  
<http://interreg-med.eu/en/results-of-the-1st-call-for-proposals-corrected-modular/>



### **Contact details**

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