



## **REGIONE BASILICATA**

**Overview of the involvement of local Research Organisations, Enterprises, Universities in national and international projects on Space applications and services.**

**( Earth Observation, Satellite Navigation and Telecommunication)**

**University of Basilicata**

## ORGANISATION PROFILE AND EXPERIENCE

### Section 1 - Contact details

<b>Organisation Name</b> (full name)	UNIVERSITY OF BASILICATA	<b>Contact person:</b>	
<b>Organisation acronym</b> (Abbreviation)	UNIBAS	<b>Title</b>	Rector's Delegate for International Relations and Research
<b>Address</b>	Via N. Sauro	<b>First Name</b>	Carmine
<b>Postal code</b>	85100	<b>Family Name</b>	Serio
<b>City</b>	Potenza	<b>Telephone</b>	+39 0971 205222
<b>Region</b>	Basilicata	<b>Fax</b>	
<b>Country</b>	Italy	<b>Skype</b>	
<b>www address</b>	<a href="http://www.unibas.it">www.unibas.it</a>	<b>E-mail</b>	<a href="mailto:serio@unibas.it">serio@unibas.it</a>

### Section 2 – Type of organisation

#### If you are an Enterprise

<b>Enterprise type</b>	<input type="checkbox"/> Private <input type="checkbox"/> Non profit	<b>Is your Company a Small-Medium sized Enterprise (SME)?</b>	<input type="checkbox"/> YES <input type="checkbox"/> NO
	<input type="checkbox"/> Public <input type="checkbox"/> Other		<b>if YES, Number of Employees</b>
			<input type="checkbox"/> < 10 <input type="checkbox"/> > 10 and < 50 <input type="checkbox"/> < 250
According to Article 2 of the annex of Commission Recommendation 2003/361/EC of 6 May 2003, which applies from 01 January 2005, an SME (Micro, Small or Medium-sized Enterprise) is an enterprise which:			
<ul style="list-style-type: none"> <li>• has fewer than 250 employees,</li> <li>• has an annual turnover not exceeding 50 million euro, and/or</li> <li>• an annual balance-sheet total not exceeding 43 million euro.</li> </ul>			
<b>Owned by a non SME:</b>		<input type="checkbox"/> YES <input type="checkbox"/> NO	
<b>Description of the organisation (max 1.000 characters):</b>			
<b>Staff information</b>			

#### If you are a Research Organisation

<b>Research Organisation type</b>	Research Organisation <input checked="" type="checkbox"/> Public)  University, Public  <input type="checkbox"/> Other, please specify:
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**Description of the organisation (max 1.000 characters):**

University of Basilicata is an Italian public University with eight Faculties and 12 Departments offering courses in science (chemistry, mathematics informatics, geology), engineering (civil, mechanics and information technology), agricultural science, economy, pharmacy, architecture, social and human science. The Department working on Space technology is the Department of Environmental Engineering and Physics ([www.difa.unibas.it](http://www.difa.unibas.it)). This is involved in scientific research activities aimed at investigating important aspects of natural and environmental processes affecting water, atmosphere and soil, and controlling anthropic influences on the environment, developing a deeper knowledge of the processes related to the production, delivery and use of the energy, designing and managing manufacturing systems in order to minimize their impact on the environment and optimize resource allocation/utilization. The Department has been conceived as a thematic department, characterized by a strong and interdisciplinary interaction between the scientific areas of thermodynamics, fluid mechanics, atmospheric physics, environmental chemistry, systems theory and the application fields of hydrology and hydraulic engineering, environmental engineering, energetic engineering, manufacturing systems and automation.

**Staff information**

Number of people specifically working on Space Technologies (EO, Sat navigation, Telecommunications):

Actual Staff profiles in ST (e.g. professors, researchers, technicians, administrative, PhDs, etc.):

5 Researchers

3 Professors

2 Technicians

8 PhD students

4 Post Doc students

### Section 3 - Description of your main expertise and activities in the field of Space Technologies

<b>Areas of expertise</b> (max 2.000 characters)	<b>The areas of expertise include</b> <ul style="list-style-type: none"> <li>➤ IR and Far IR spectroscopy and atmospheric radiative transfer (RT) in presence of gaseous components</li> <li>➤ Properties of atmospheric particulate components (clouds, aerosols) and RT with multiple scattering</li> <li>➤ Scientific support to instrument development, radiometers, spectrometers and FTS spectrometers</li> <li>➤ Use of operational and future remote sounding instrumentation from satellite in Meteorology and Climatology</li> <li>➤ Laser technology and applications to earth observations</li> <li>➤ Satellite applications to risk assessment and natural hazards</li> <li>➤ Characterization and development of new Satellite Sensors</li> <li>➤ Development of new satellite data analysis algorithms</li> <li>➤ Remote sensing of surface properties</li> <li>➤ Remote sensing of atmospheric parameters including minor and trace gases</li> <li>➤ Robotics and automation technology for on-orbit space servicing and planetary exploration</li> <li>➤ Validation of remote sensed measurements at the surface</li> <li>➤ Assimilation in hydrological modelling of remote sensed data</li> </ul>
<b>Keywords describing the activities performed by the organisation</b> (if needed more than one)	<ol style="list-style-type: none"> <li>1. <b>Visible and Infrared satellite remote sensing</b></li> <li>2. <b>Fourier Spectroscopy</b></li> <li>3. <b>Lidar Systems</b></li> <li>4. <b>Development of Algorithms</b></li> <li>5. <b>Robotics</b></li> </ol>

## Section 4 – List of Projects implemented in the last 5 years

<b>Project</b>	<b>GMOSS Network of Excellence</b>
<b>Title</b>	<b>Global Monitoring for Security and Stability</b>
<b>Project Acronym</b>	<b>GMOSS</b>
<b>Source of funding / Programme</b>	FP6
<b>Status</b>	Completed
<b>Role of the organisation</b>	Partner
<b>Responsible</b>	Valerio Tramutoli ( <a href="mailto:valerio.tramutoli@unibas.it">valerio.tramutoli@unibas.it</a> )
<b>Duration</b>	April 2004 – March 2008
<b>Content</b>	The aim of the GMOSS Network of Excellence is to integrate Europe's civil security research so as to acquire and nourish the autonomous knowledge and expertise base Europe needs if it is to develop and maintain an effective capacity for global monitoring using satellite earth observation. The joint programme of research will aim to meet the priorities of users from the civil security sector.
<b>Website</b>	<a href="http://gmooss.jrc.it/web/guest/gmooss">http://gmooss.jrc.it/web/guest/gmooss</a>

<b>Project</b>	<b>GRIDCC</b>
<b>Title</b>	<b>GRID enabled remote instrumentation with distributed Control and Computation) Global Monitoring for Security and Stability</b>
<b>Project Acronym</b>	<b>GRIDCC</b>
<b>Source of funding / Programme</b>	FP6
<b>Status</b>	Completed
<b>Role of the organisation</b>	Coordinating the participation of IMAA-CNR team to the project
<b>Responsible</b>	Valerio Tramutoli ( <a href="mailto:valerio.tramutoli@unibas.it">valerio.tramutoli@unibas.it</a> )
<b>Duration</b>	September 2004 – August 2007
<b>Content</b>	GRIDCC was aimed to provide access to, and control of, distributed complex instrumentation. The goal of GRIDCC was to exploit grid opportunities for the secure and collaborative work of distributed teams, in order to remotely operate and monitor scientific equipment using the grid's massive memory and computing resources for storing and processing data generated by this kind of equipment.
<b>Website</b>	<a href="http://www.ask.com/wiki/GridCC">http://www.ask.com/wiki/GridCC</a>

<b>Project</b>	<b>MOMET</b>
<b>Title</b>	<b>Monitoring short term fluctuations in mud volcanoes methane emissions</b>
<b>Project Acronym</b>	<b>MOMET</b>
<b>Source of funding / Programme</b>	NATO-Security through Science
<b>Status</b>	Completed
<b>Role of the organisation</b>	Partner and Coordinator of European partnership
<b>Responsible</b>	Valerio Tramutoli ( <a href="mailto:valerio.tramutoli@unibas.it">valerio.tramutoli@unibas.it</a> )
<b>Duration</b>	January 2006 – December 2007
<b>Content</b>	The project with the participation of IMAA-CNR and the Universities of Baku (Azerbaijan), Siena and Basilicata was devoted to the study of the emissions of mud volcanoes in Azerbaijan in relation to the occurrence of strong earthquakes and possible precursory phenomena observable from the ground

	and by satellite.
<b>Website</b>	<a href="http://www.geohazard.caucasus.net/index.html">http://www.geohazard.caucasus.net/index.html</a>

<b>Project</b>	<b>STREGEOS</b>
<b>Title</b>	<b>STress Related GEOhazards in South-caucasus</b>
<b>Project Acronym</b>	<b>STREGEOS</b>
<b>Source of funding / Programme</b>	EC-FP6/INTAS
<b>Status</b>	Completed
<b>Role of the organisation</b>	Partner
<b>Responsible</b>	Valerio Tramutoli ( <a href="mailto:valerio.tramutoli@unibas.it">valerio.tramutoli@unibas.it</a> )
<b>Duration</b>	January 2007 – January 2008
<b>Content</b>	The project combines the analysis of the contemporary tectonic stress, seismicity, pore pressure and geology to assess stress related geological hazards in the South Caucasus region. The South Caucasus and Caspian area is highly vulnerable to stress-related geological hazards, the most dangerous and devastating of which are strong earthquakes but also environmental geohazards including landslides, soil liquefaction, natural oil slicks and, in particular, violent eruptions of the regions mud volcanoes. Pipelines, roads, railroads, factories, tunnels, refineries, oil platforms and homes are at risk of damage and destruction in the Caucasus area which is still a main gateway between Asia and Europe. The protection of this infrastructure is critical to ensure the economic development and the cultural and social prosperity of Armenia, Azerbaijan and Georgia. Furthermore, the political and economical stability of this region is important for guaranteeing the efficiency and independence of the energy supply for Western Europe.
<b>Website</b>	<a href="http://www.geohazard.caucasus.net/index.html">http://www.geohazard.caucasus.net/index.html</a>

<b>Project</b>	<b>G-MOSAIC</b>
<b>Title</b>	<b>GMES services for Management of Operations, Situation Awareness and Intelligence for regional Crises</b>
<b>Project Acronym</b>	
<b>Source of funding / Programme</b>	EC-FP7/GMES-ESA
<b>Status</b>	In progress
<b>Role of the organisation</b>	Partner
<b>Responsible</b>	Valerio Tramutoli ( <a href="mailto:valerio.tramutoli@unibas.it">valerio.tramutoli@unibas.it</a> )
<b>Duration</b>	January 2008 – December 2011
<b>Content</b>	Peacekeeping, nuclear proliferation, piracy at sea, illegal immigration, drug trafficking, protection of vital infrastructure such as pipelines, and assistance to European residents in crisis areas, are but some of the areas where GMES can provide Europe with an autonomous source of information and with products and services that will deliver timely and reliable information to European decision-makers. The G-MOSAIC Collaborative Project will provide the European Union with intelligence data that can be applied to early warning and crisis prevention as well as to crisis management and rapid interventions in hot spots around the world. It aims at identifying and developing products, methodologies and pilot services for the provision of geo-spatial information in support to EU external relations policies and at contributing to define and demonstrate the sustainability of GMES global security services.
<b>Website</b>	<a href="http://www.gmes-gmosaic.eu/home.html">http://www.gmes-gmosaic.eu/home.html</a>

<b>Project</b>	<b>PRE-EARTHQUAKES</b>
<b>Title</b>	<b>Processing Russian and European EARTH observations for earthQUAKE precursors Studies</b>
<b>Project Acronym</b>	<b>PRE-EARTHQUAKES</b>
<b>Source of funding / Programme</b>	EC-FP7/GMES
<b>Status</b>	Negotiation finalized – contract signature foreseen in December 2010
<b>Role of the organisation</b>	Project Coordinator
<b>Responsible</b>	Valerio Tramutoli ( <a href="mailto:valerio.tramutoli@unibas.it">valerio.tramutoli@unibas.it</a> )
<b>Duration</b>	March 2011-February 2013
<b>Content</b>	<p>PRE-EARTHQUAKES intends to commit EU and Russian researchers to integrate different observational data (including ESA and ROSKOSMOS satellite data) and to improve, by cross-validating, their methodologies, in order:</p> <ul style="list-style-type: none"> <li>• to substantially improve our knowledge of preparatory phases of earthquakes and their possible precursors;</li> <li>• to promote a worldwide Earthquake Observation System (EQuOS) as a dedicated component of GEOSS (Global Earth Observation System of Systems);</li> <li>• to develop and offer to the international scientific community an integration platform where independent observations and new data analysis methodologies devoted to the research on/of earthquake precursors can be collected and cross-validated;</li> </ul> <p>Different ground and satellite based observations, different data analysis methods, different measured parameters will be compared and integrated in order to move the research in this field behind its present frontiers.</p>
<b>Website</b>	<a href="http://www.difa.unibas.it/index.jsp">http://www.difa.unibas.it/index.jsp</a>

<b>Project</b>	<b>ESA-EUMETSAT MTG project</b>
<b>Title</b>	<b>Consolidation of Scientific baseline for MTG-IRS L2 Processing: Role of OE with background state and associated error from Climatology</b>
<b>Project Acronym</b>	
<b>Source of funding / Programme</b>	EUMETSAT/ESA-EUMETSAT MTG programme
<b>Status</b>	In progress
<b>Role of the organisation</b>	Project Leader
<b>Responsible</b>	Carmine Serio ( <a href="mailto:serio@unibas.it">serio@unibas.it</a> )
<b>Duration</b>	July 2009 – March 2011
<b>Content</b>	The project has been undertaken within the activities of the Meteosat Third Generation Infrared Sounder mission. The main objective is to develop a L2 prototype processor for the infrared sounder. The DIFA team is involved in the project because of its belonging to the MTG-IRS Science Team (MIST) issued by EUMETSAT.
<b>Website</b>	<a href="http://www.difa.unibas.it/jFM/dlf/Laboratori/AppSpec/as/home.html">http://www.difa.unibas.it/jFM/dlf/Laboratori/AppSpec/as/home.html</a>

<b>Project</b>	<b>ESA-EUMETSAT MTG project</b>
<b>Title</b>	<b>Assessing the 3-D correlation structure of atmospheric humidity fields and evaluation of the MTG Infrared Sounding Mission to resolve it</b>
<b>Project Acronym</b>	<b>MTG/3D</b>
<b>Source of funding / Programme</b>	EUMETSAT/ESA-EUMETSAT MTG programme
<b>Status</b>	Completed

<b>Role of the organisation</b>	Project Leader
<b>Responsible</b>	Carmine Serio ( <a href="mailto:serio@unibas.it">serio@unibas.it</a> )
<b>Duration</b>	June 2007 – June 2008
<b>Content</b>	The study has been performed by DIFA because of its belonging to the MTG science team, issued by ESA and EUMETSAT. The MTG (Meteosat Third Generation) infrared sounding (IRS) mission is being to be designed to reach a breakthrough and an essential improvement in both the horizontal and vertical spatial sampling and resolution. The horizontal spatial resolution (3 to 6 km) has been specified to detect small scale variability in the water vapour. A similar stringent requirement is also asked for the vertical spatial resolution in order to gain to MTG IRS mission the capability to resolve 3-D water vapour structure on a scale of 3 to 6 km in the horizontal and 1-2 km in the vertical, at least in the lower troposphere. The study has provided a comprehensive assessment of the MTG IRS water vapour performance in terms of vertical resolution and accuracy.
<b>Website</b>	<a href="http://www.difa.unibas.it/jFM/df/Laboratori/ApplSpec/as/home.html">http://www.difa.unibas.it/jFM/df/Laboratori/ApplSpec/as/home.html</a>

<b>Project</b>	<b>EUMETSAT/ESA MTG project</b>
<b>Title</b>	<b>Assessment of the Temperature and water vapour retrieval capability and performance of the MTG Infrared Sounding Mission under different noise and spectral coverage scenarios.</b>
<b>Project Acronym</b>	<b>(MTG_T_q_assessment)</b>
<b>Source of funding / Programme</b>	EUMETSAT/ESA-EUMETSAT MTG programme
<b>Status</b>	Completed
<b>Role of the organisation</b>	Project Leader
<b>Responsible</b>	Carmine Serio ( <a href="mailto:serio@unibas.it">serio@unibas.it</a> )
<b>Duration</b>	November 2005-November 2006
<b>Content</b>	The study was carried out by DIFA as part of the MTG science team. At the end of the pre phase A, technological constraints arose, which could well demand for a simplification in the instrument concept and design. The simplification could have consisted either of cutting the spectral coverage at about 12 $\mu\text{m}$ ( $830\text{ cm}^{-1}$ ) in the long wave part and around 4.7 $\mu\text{m}$ ( $2100\text{ cm}^{-1}$ ) in the shortwave side, or of relaxing the noise specifications in the long wave side of the spectrum. A compromise between the two could had to be considered, which made a trade-off study high desirable. DIFA provided such a trade-off study
<b>Website</b>	<a href="http://www.difa.unibas.it/jFM/df/Laboratori/ApplSpec/as/home.html">http://www.difa.unibas.it/jFM/df/Laboratori/ApplSpec/as/home.html</a>

<b>Project</b>	<b>ROSED</b>
<b>Title</b>	<b>REALIZZAZIONE DI UN'INSTALLAZIONE SPERIMENTALE PER LA ROBOTICA COOPERANTE BASATA SU ROSED</b>
<b>Project Acronym</b>	<b>ROSED</b>
<b>Source of funding / Programme</b>	Italian Space Agency
<b>Status</b>	Completed
<b>Role of the organisation</b>	Project Leader
<b>Responsible</b>	Fabrizio Caccavale
<b>Duration</b>	November 2007 July 2009
<b>Content</b>	The project is aimed at redesigning the ROSED (RObotic Servicing Demonstrator) cooperative robotic set-up. The main

	goal is to control and coordinate the two robotic arms by using a single PC-based controller. To this aim, a real-time software environment (Replics for ROSED) has been developed and successfully tested on a series of robotic tasks requiring motion coordination between the two arms.
<b>Website</b>	<a href="http://www.difa.unibas.it">www.difa.unibas.it</a> - <a href="mailto:fabrizio.caccavale@unibas.it">fabrizio.caccavale@unibas.it</a>

<b>Project</b>	<b>ARCAS</b>
<b>Title</b>	<b>Aerial Robotics Cooperative Assembly System</b>
<b>Project Acronym</b>	<b>ARCAS</b>
<b>Source of funding / Programme</b>	EC-FP7-ICT
<b>Status</b>	Large-scale integrating project (IP) proposal to be submitted to the Call FP7-ICT-2011-7
<b>Role of the organisation</b>	Partner
<b>Responsible</b>	Fabrizio Caccavale
<b>Duration</b>	4 years
<b>Content</b>	The project is aimed at designing and developing the first free-flying robot system for cooperative assembly. The project will pave the way for a large number of applications including the building of platforms for the evacuation of people in rescue operations, the installation of platforms in uneven terrains for landing of manned and unmanned VTOL aircrafts, the cooperative inspection and maintenance as well as on-orbit servicing including the construction of space structures. The consortium will be composed by 9 partners, including the German Aerospace Center (DLR) and EADS-Astrium.
<b>Website</b>	<a href="mailto:fabrizio.caccavale@unibas.it">fabrizio.caccavale@unibas.it</a>

<b>Project</b>	<b>COBRA-ECOWAR</b>
<b>Title</b>	Spectrally resolved observations of Earth's emission spectrum in the water vapour rotational band (17-50 micron) to test models of atmospheric radiative transfer
<b>Project Acronym</b>	<b>COBRA-ECOWAR</b>
<b>Source of funding / Programme</b>	Italian Ministry of University/PRIN 2005
<b>Status</b>	Completed
<b>Role of the organisation</b>	Project Leader
<b>Responsible</b>	<a href="mailto:serio@unibas.it">serio@unibas.it</a>
<b>Duration</b>	January 2006- March 2008
<b>Content</b>	A two years project covering basic science issues concerned with the water vapour rotational band, such as its spectroscopy, its influence on the natural green-house effect, the capability of new detectors technology to provide a concept simplification of a future satellite mission to remotely sense the earth emission with the rotation H <sub>2</sub> O band, an emission which is until now overlooked despite its important role in governing the cooling/heating of the atmosphere.
<b>Website</b>	<a href="https://www.difa.unibas.it/jFM/df/Progetti/cobra/index.htm">https://www.difa.unibas.it/jFM/df/Progetti/cobra/index.htm</a>



<b>Project</b>	<b>CUBIST</b>
<b>Title</b>	Relationship between hydrological processes and physical and climatic characteristics of the territory at regional and basin scale
<b>Project Acronym</b>	<b>CUBIST</b>
<b>Source of funding / Programme</b>	PRIN 2007
<b>Status</b>	Completed
<b>Role of the organisation</b>	Partner
<b>Responsible</b>	Mauro Fiorentino ( <a href="mailto:fiorentino@unibas.it">fiorentino@unibas.it</a> )
<b>Duration</b>	January 2008- March 2010
<b>Content</b>	The aim of the project was the implementation of a hydrological model physically based able to integrate ground measurements with remote sensed data for the description on vegetation state (LAI, vegetation stress) and relative soil moisture.
<b>Website</b>	<a href="http://www.cubist.polito.it/">http://www.cubist.polito.it/</a>