

# SPACE RESEARCH

Let's  
**embrace  
space**

Space Research projects under  
**the 7<sup>th</sup> Framework Programme  
for Research**

GMES CORE SERVICES  
SUPPORTING SPACE FOUNDATIONS



**European Commission**  
Enterprise and Industry



## SPACE RESEARCH projects under the 7<sup>th</sup> Framework Programme for Research

### BUILDING GMES AND SPACE FOUNDATIONS

*Under the Seventh Framework Programme for Research (FP7), 2007 - 2013 the European Commission has made **EUR 1.4 billion** available in support of the establishment of Global Monitoring for Environment and Security (GMES) Services for Atmosphere, Emergency Response, Land, Ocean and Security, and support for **Space Foundations**.*

Europe has been active in the space sector for several decades. Yet with the adaptation of the European Space Policy, **space has gained a new momentum**. Acknowledged as a strategic asset for Europe, space now features strongly in FP7, which supports the building of GMES services, and research in Space Foundations.

This brochure provides an overview of projects supported under FP7 so far in the area of Space Research and Development.

**GMES** backs efforts to **monitor the pulse of the planet**, by anticipating environmental changes and creating a foundation for improved evidence-based policy making. In this respect, GMES helps in **dealing with the effects of climate change**, as it provides crucial information to allow decisions to be made. In emergency natural disasters such as flooding, forest fires or when earth-quakes strike, GMES helps European civil protection authorities to **assist people more effectively**.

**Space Foundations** represent the scientific and technological base for all space activities and embrace activities such as space science, space technologies and space transportation. This research area is also **essential for future space exploration missions** to the Moon and Mars. Within the context of the European Space Policy, Space Foundations also play an important role in **enhancing the competitiveness of European space industry**, and securing European strategic non-dependence for certain critical technologies.

Each of the initiatives presented in this brochure contributes to the progressive shaping of GMES and the successful implementation of the European Space Policy in the area of Space Foundations.

Learn more about these projects, and meet the people behind the scenes whose hard work every day brings Europe closer to achieving its ambitious space aspirations in the following pages.

Visit the European Space Research and Development website at: [http://ec.europa.eu/enterprise/space\\_research](http://ec.europa.eu/enterprise/space_research)



Valery Potapova © Fotolia

Listed below are projects co-financed by the European Commission under the 7<sup>th</sup> Framework Programme for Research in the areas of GMES, and Support for Space Foundations.

### TOWARDS GMES CORE SERVICES

- Something is in the air (MACC)
- The right knowledge can save lives (SAFER)
- Showing the situation on the ground (geoland2)
- Listen to ocean stories (MyOcean)
- Keeping Europe safe (G-MOSAIC)

### SUPPORTING SPACE FOUNDATIONS

- Fly me to the Moon (AEROFAST)
- Power amplification in a spacecraft (AGAPAC)
- Let's make spacecraft green (GRASP)
- Keeping people safe in space (HAMLET)
- Towards new frontiers in space (HiPER)
- Towards the next generation of spacecraft (HPH.com)
- Reinventing the rocket (ORPHEE)
- A closer look at Mars (PRoVisG)
- Towards a better space weather forecast (SOTERIA)
- Research at the International Space Station (ULISSE)

### COORDINATION AND SUPPORT ACTIONS

- GMES – because we need to know (SWIFT)
- Joining forces to better serve FP7 applicants (COSMOS)
- Uniting Europe in space (STAVE)

Further information is available at:

Space Research and Development website, presenting the FP7 space theme:  
[http://ec.europa.eu/enterprise/space\\_research](http://ec.europa.eu/enterprise/space_research)

GMES website  
<http://ec.europa.eu/gmes>

European Space Policy website  
<http://ec.europa.eu/enterprise/space>

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# MACC

## Monitoring Atmospheric Composition and Climate

### SOMETHING IS IN THE AIR

*Viewed from space, the atmosphere takes the form of a thin layer, a protective and sustaining mantle without which life on our planet would not be possible. Both essential to life and vulnerable to mankind's influence, the atmosphere is at the heart of climatic change. Helping Europe to understand and respond better to the consequences of an evolving climate, MACC is designed to be the pilot project for the future GMES Atmospheric Service.*



Leonid Nyshko © Fotolia

Atmospheric composition is an essential part of the Earth System, as gases and aerosols directly affect our well-being and interact with the radiation that drives our climate. Paving the way for the future GMES Atmospheric Service, MACC combines computer model simulations with world-wide observations to **monitor the composi-**

**tion of the Earth's atmosphere and predict regional air quality.** From 2009 to 2011, MACC will establish the pilot GMES Atmospheric Service.

MACC will monitor the distributions and long-range transport of greenhouse gases such as carbon dioxide and methane, aerosols that result from both natural processes and human activities, and reactive gases such as tropospheric ozone and nitrogen dioxide.

**MACC's products and services will provide information that will support development and implementation of European environmental policy and wider international programmes.** They will provide data that are critical to the understanding of climate and to the improvement and validation of the computer models that are used to predict climate

change. They will provide information important for the protection of health and for the efficient exploitation of sources of renewable energy. They will provide data that can be used in future downstream services that provide information targeted locally and at specific sectors of the user community. Development and operation of these services will provide opportunities and benefits to both public institutions and private companies.



**ADRIAN SIMMONS**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

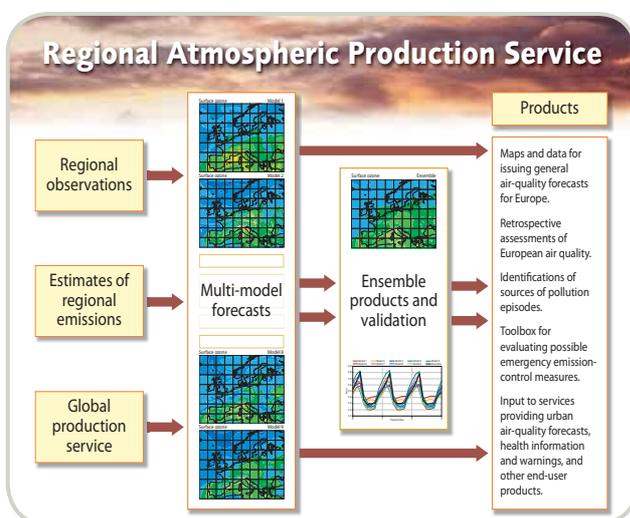
We aim for sustained operation and refinement of data analysis and modelling systems that monitor variations in atmospheric constituents important for climate, assess and predict air quality, UV radiation and solar-energy resources, and thereby meet the needs of Europe's community of users.

#### Why is this GMES service important for Europe?

MACC and the ensuing operational service will provide Europe with the vital information needed to formulate, implement and evaluate its policy responses to the effects of climate change and poor air quality, and will strengthen the foundation of Europe's global advocacy on such issues.

#### How does your work benefit European citizens?

Citizens will benefit in the longer term from the policy improvements that MACC will support, and in the shorter term from better advisory and warning services, many delivered by specialist intermediate service providers, in areas such as health, transport and leisure activities.



Example of regional product supply chain.

© MACC

# MACC

## Monitoring Atmospheric Composition and Climate



### LIST OF PARTNERS

- European Centre for Medium-Range Weather Forecasts (ECMWF), United Kingdom
- Met Office, United Kingdom
- Centre national de la recherche scientifique (CNRS), France
- Commissariat à l'Énergie Atomique (CEA), France
- Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany
- Max-Planck-Gesellschaft zur Förderung der Wissenschaften (MPG), Germany
- Koninklijk Nederlands Meteorologisch Instituut (KNMI), The Netherlands
- Institut d'Aéronomie Spatiale de Belgique (BIRA-IASB), Belgium
- Ilmatieteen laitos (FMI), Finland
- Danmarks Meteorologiske Institut (DMI), Denmark
- Deutscher Wetterdienst (DWD), Germany
- Universität Bremen (IUP-UB), Germany
- Université Pierre et Marie Curie - Paris 6 (UPMC), France
- Ethniko kai kapodistriako panepistimio athinon (NKUA), Greece
- Météo-France (MF-CNRM), France
- National University of Ireland (NUIG), Ireland
- Sveriges meteorologiska och hydrologiska institut (SMHI), Sweden
- Agenzia Regionale Prevenzione e Ambiente dell'Emilia Romagna (ARPA-ER), Italy
- Agencia Estatal de Meteorología (AEMET), Spain
- Meteorologisk institutt (MET.NO), Norway
- Förderverein des Rheinischen Institutes für Umweltforschung an der Universität zu Köln (FRIUUK), Germany
- Commission of the European Communities - Directorate General Joint Research Centre ( DG JRC)
- Institut National de l'Environnement Industriel et des Risques (INERIS), France
- Český hydrometeorologický ústav (CHMI), Czech Republic
- Administrația Națională de Meteorologie r.a. (NMA), Romania
- Instytut Ochrony Srodowiska (PIEP), Poland
- Imperial College of Science, Technology and Medicine (IMPERIAL), United Kingdom
- Forschungszentrum Jülich GmbH (FZJ), Germany
- Environmental Agency of the Republic of Slovenia (ARSO), Slovenia
- Association pour la Recherche et le Développement des Méthodes et Processus Industriels (ARMINES), France
- Nederlandse Organisatie voor Wetenschappelijk Onderzoek (SRON), The Netherlands
- University of Leeds, United Kingdom
- King's College London (KCL), United Kingdom
- Vereniging voor christelijk hoger onderwijs, wetenschappelijk onderzoek en patiëntenzorg (VUA), The Netherlands
- Umweltbundesamt GmbH (UBA), Austria
- Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek (TNO), The Netherlands
- Cambridge Environmental Research Consultants Ltd. (CERC), United Kingdom
- Carlo Gavazzi Space SpA (CGS), Italy
- Flyby s.r.l., Italy
- Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique (CERFACS), France
- Centre National d'Etudes Spatiales (CNES), France
- Norsk institutt for luftforskning (NILU), Norway
- Consiglio Nazionale delle Ricerche (CNR), Italy
- The National Environmental Protection Agency (NEPA), Romania
- University of the West of Scotland (UWS), United Kingdom

### COORDINATOR

**European Centre for Medium-Range Weather Forecasts (ECMWF), United Kingdom**

### CONTACT

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### PROJECT INFORMATION

MACC: Monitoring Atmospheric Composition and Climate  
Contract no: 218793

Starting date: 01/06/2009

Duration: 29 months

Estimated total cost: € 16.000.000

<http://macc.ecmwf.int>



# SAFER

## Services and Applications For Emergency Response

### THE RIGHT KNOWLEDGE CAN SAVE LIVES

Every year in the world, fires, floods, earthquakes and volcanic eruptions, landslides and other humanitarian crises claim the lives of thousands of citizens. With climate change, such emergencies may increase in frequency. The project SAFER is implementing and validating a preoperational version of the **GMES Emergency Response Core Service (ERCS)**, reinforcing the European capacity to respond to such disasters.

European Civil Protection Authorities as well as humanitarian relief organizations such as United Nations agencies or NGOs need **fast and accurate information** when responding to an emergency situation. Such information often takes the form of detailed maps of an area that is affected by an emergency.

Implementing a pre-operational version of the GMES Emergency Response Core Service, SAFER's main goal is to provide a **rapid mapping capacity** in response to disastrous events. Such information is based on satellite images of the affected area and on reference maps, which SAFER prepares in advance for areas faced with an elevated risk of emergencies. Such risk areas may be mountain valleys with a history of flooding or landslides, dry lands vulnerable to forest fires or the neighbourhood of a volcano.

From 2008, SAFER delivers services at full scale in response to real events as well as during specific exercises. **The project's main performance criterion is the**

**response time:** with SAFER, reference mapping will be made available to users within just six hours after an emergency situation arises. **Assessment maps of the disaster area will be available within 24 hours.**

Moreover, SAFER aims at extending the use of its products to before the crisis situation (for early warning) and after the crisis situation (for reconstruction). The project seeks to further develop the foundation for the future GMES Emergency Service through provision of specific thematic products, in particular in the areas of meteorological and geophysical risks.

The SAFER consortium includes European users such as civil protection authorities as well as non-European users such as UN agencies and is built around a core team of European industry and research institutes that have gained experience in this area within the framework of the Sixth Framework Programme for Research or ESA programs. A wide network of scientific partners and service providers extend SAFER's European dimension, in particular to the new EU Member States.



**DAVID HELLO**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

SAFER aims at implementing and validating preoperational versions of the Emergency Response Core Service. In first priority we want to validate an information service focussing on rapid mapping during the response phase and then to enrich this service with a wider set of thematic products.

#### Why is this GMES service important for Europe?

The global climate change increases the need for a better European emergency response capacity. SAFER will guarantee in the long term that Europe can provide adequate information capabilities to support early warning, relief operations and reconstruction activities.

#### How does your work benefit European citizens?

Natural and man-made disasters take a very high toll in economic and human terms. In the long term, ERCS will provide tangible benefits for all citizens, in Europe and worldwide, in terms of a better quality of life, better health, and increased safety.



Aerial view of fire.  
MyShotz.com © Fotolia

# SAFER

## Services and Applications For Emergency Response



### LIST OF PARTNERS

- Infoterra France, France
- Infoterra Limited (ITUK), United Kingdom
- Infoterra GmbH (ITD), Germany
- Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany
- Telespazio S.p.A. (TPZ), Italy
- Centre National d'Etudes Spatiales (CNES), France
- Ministère de l'intérieur, de l'outre-mer et des collectivités territoriales, France
- Presidenza del Consiglio dei Ministri – Dipartimento della Protezione Civile (DPC), Italy
- European Union Satellite Centre (EUSC)
- Istituto Nazionale di Geofisica e Vulcanologia (INGV), Italy
- INSA Ingeniería y Servicios Aeroespaciales S.A., Spain
- Commission of the European Communities - Directorate General Joint Research Centre (JRC)
- Météo-France (MF-CNRM), France
- Università degli Studi di Firenze (UNIFI), Italy
- ALTAMIRA INFORMATION SL, Spain
- Bundesamt für Bevölkerungsschutz und Katastrophenhilfe, Germany
- Critical Software S.A., Portugal
- Elsig Datamat spa., Italy
- European Centre for Medium-Range Weather Forecasts (ECMWF), United Kingdom
- EDISOFT S. A., Portugal
- Ecole normale supérieure (ENS), France
- Centro Europeo di Formazione e Ricerca in Ingegneria Sismica, Italy
- Accademia Europea per la ricerca applicata ed il perfezionamento professionale – Bolzano (EUREC), Italy
- Eurosense-Belfotop NV, Belgium
- EUROSENSE ROMANIA SRL, Romania
- GAMMA Remote Sensing and Consulting AG (GAMMA), Switzerland
- GeoID bvba, Belgium
- geomer GmbH, Germany
- GISAT s.r.o., Czech Republic
- GMV Aerospace and Defence S.A., Spain
- Institute of Geodynamics of the Romanian Academy (IGAR), Romania
- Consiglio Nazionale delle Ricerche (CNR), Italy
- INDRA Espacio SA, Spain
- JOANNEUM RESEARCH Forschungsgesellschaft mbH, Austria
- Keyobs S.A., Belgium
- Universidad de Valladolid (LATUV), Spain
- MapAction, United Kingdom
- The National Land Survey of Sweden (METRIA), Sweden
- Norsk institutt for luftforskning (NILU), Norway
- Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences (INRNE), Bulgaria
- National Observatory of Athens, Greece
- Planetek Hellas (PKH), Greece
- Universität Salzburg, Austria
- Remote Sensing Application Center (ReSAC), Bulgaria
- Romanian Space Agency (ROSA), Romania
- Skysoft Portugal, Software e Tecnologias de Informação S.A., Portugal
- Sogreah Consultants SAS, France
- Tele-Rilevamento Europa T.R.E. s.r.l., Italy
- Universidad de Alcalá de Henares, Spain
- Université Louis Pasteur (ULP), France
- Univerzita Komenského v Bratislave, Slovakia
- United Nations Institute for Training and Research (UNOSAT)
- Sas Magellium, France
- World Food Programme (WFP)
- United Nations Office for Project Services (UNOPS)

### COORDINATOR

**Infoterra France, France**

### CONTACT

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### PROJECT INFORMATION

Services and Applications For Emergency Response (SAFER)

Contract no: 218802

Starting date: 01/01/2009

Duration: 36 months

EU Contribution: € 26.912.700

Estimated total cost: € 39.312.720

[www.emergencyresponse.eu](http://www.emergencyresponse.eu)



# geoland2

## SHOWING THE SITUATION ON THE GROUND

*With climate change an increasing threat, pressure on nature is growing, reducing biodiversity and deteriorating our own living conditions. To mitigate these threats by effective countermeasures and adaptation strategies, monitoring the condition of our natural environment and its changes over time is essential. The project geoland2 constitutes a major step forward towards the implementation of the **GMES Land Services**, operationally providing reliable and affordable geo-information products on the basis of satellite Earth observation data.*

To respond effectively to the effects of climate change, decision makers need to be informed about the current conditions of our natural environment and predictable trends. The GMES Land Services provide such area-extended, geo-located and cross-boarder harmonized geo-information at global, European, and regional scales. The project geoland2 aims to prepare the operational application capabilities of these GMES Land Services, consisting of Core Mapping Services (CMS) and Core Information Services (CIS), to **support decision makers with the most accurate and up to date information available.**

The Core Mapping Services produce basic **geo-information on land cover and land use** and its annual and seasonal changes as well as a variety of additional biophysical parameters describing the continental vegetation state, the radiation budget at the surface and the water cycle on the basis of satellite Earth observation data. They cover local to global scales with updating frequencies from one day to several years.



geoland2 aims to implement the operational production capabilities of the GMES Land Monitoring Services. These services support the sustainable use of our land resources threatened by manmade pressure and climate variability.

© geoland2

The CMS mapping products are of broad generic use: besides being a valuable information source in its basic form, they are the basis for more elaborated geo-information services. These focused Core Information Services (CIS) address a wide variety of thematic fields of application, like water quality, forest managing, spatial planning, agri-environmental issues, the carbon cycle, and food security.

These Core Information Services offer **specific information for European Environmental Policies and international treaties and strategies on climate change**, food security and the sustainable development of Africa. Thereby they effectively support responsible public authorities and decision makers on the regional to continental level in the implementation of European policies and international conventions.

The goal of geoland2 is to prepare, validate and demonstrate pre-operational production capabilities of the GMES Land Services. geoland2 deliverables consist of the organisation of a qualified production network, the building of operational processing lines, demonstration of these services and products on large scales, and the setting up of a product quality assurance process driven by the users, to guarantee that the products meet the real user's needs.

The project's efforts will build up on the achievements of previous or ongoing projects funded under the Sixth Framework Programme, such as geoland and BOSS4GMES, as well as the GMES Service Elements (GSE) funded by the European Space Agency (ESA) in the field of "Land" and "Forest Monitoring".



**ALEXANDER KAPTEIN**  
IS PROJECT COORDINATOR

## QUESTIONS & ANSWERS

### What do you want to achieve with this project?

geoland2 is the GMES "Land Monitoring Core Service" implementation project. The aim is to implement operational production capacities and to demonstrate the service dealing with monitoring of land cover / land use and their temporal changes as well as bio-geophysical parameters.

### Why is this GMES service important for Europe?

The service supports public authorities on local to international level in the efficient implementation of European directives and policies towards adaptation to climate change as well as in their efforts towards sustainable development and food security for Africa.

### How does your work benefit European citizens?

The service supports the sustainable use of land resources threatened by man-made pressure and climate variability (e.g. water quality) and efforts towards global food security. Thereby it helps to improve the quality of life of European citizens and people all over the globe.



## LIST OF PARTNERS

- Astrium GmbH, Germany
- UAB Aerogeodezijos institutas, Lithuania
- ALTERRA B.V., The Netherlands
- Austrian Research Centers GmbH (ARC), Austria
- Aristotelio Panepistimio Thessalonikis, Greece
- Commissariat à l'Énergie Atomique (CEA), France
- Consiglio Nazionale delle Ricerche (CNR), Italy
- European Association of Remote Sensing Laboratories (EARSeL), Germany
- European Centre for Medium-Range Weather Forecasts (ECMWF), United Kingdom
- European Forest Institute, Finland
- EOLAB-Spain, S.L., Spain
- Universitat Autònoma de Barcelona (ETC-LUSI), Spain
- Eurosense-Belfotop Nv, Belgium
- GAF AG, Germany
- GEOAPIKONISIS Ltd., Greece
- Geosat Technology SARL, France
- GeoVille Information Systems, Austria
- GISAT s.r.o., Czech Republic
- Instytut Geodezji i Kartografii, Poland
- Instituto de Meteorologia (IM), Portugal
- Indra Espacio S.A., Spain
- Institut national de la recherche agronomique (INRA), France
- Infoterra GmbH, Germany
- Infoterra France SAS, France
- Infoterra Limited, United Kingdom
- JOANNEUM RESEARCH Forschungsgesellschaft mbH, Austria
- Commission of the European Communities - Directorate General Joint Research Centre - JRC ( DG JRC)
- Koninklijk Nederlands Meteorologisch Instituut (KNMI), The Netherlands
- Météo-France (MF-CNRM), France
- The National Land Survey of Sweden, Sweden
- Országos Meteorológiai Szolgálat, Hungary
- Planetek Italia s.r.l., Italy
- Remote Sensing Application Center (ReSAC), Bulgaria
- Sveriges meteorologiska och hydrologiska institut (SMHI), Sweden
- SPACEBEL S.A., Belgium
- Centrum Badań Kosmicznych PAN, Poland
- Romanian Space Agency (ROSA), Romania
- Geodaten Integration und Analyse (GIA), Germany
- Technische Universität Wien, Austria
- Université catholique de Louvain, Belgium
- University of Leicester, United Kingdom
- Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany
- Vlaamse Instelling voor Technologisch Onderzoek NV, Belgium
- Valtion Teknillinen Tutkimuskeskus (VTT), Finland
- Università degli studi della Tuscia, Italy
- Suomen ympäristökeskuksen (SYKE), Finland
- Landbouw Economisch Instituut B.V., The Netherlands
- Land Network e.V., Germany
- HYGEO S SARL, France
- Centre National d'Etudes Spatiales (CNES), France

## COORDINATOR

**Astrium GmbH, Germany**

## CONTACT

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## PROJECT INFORMATION

geoland2

Integrated Project

Contract no: 218795

Starting date: 01/09/2008

Duration: 50 months

EU Contribution: € 22.399.424

Estimated total cost: € 32.505.552

[www.land.eu](http://www.land.eu) (GMES Land Services, geoportal)

[www.geoland.info](http://www.geoland.info) (product information)



# MyOcean

## LISTEN TO OCEAN STORIES

*Analyzing the ocean enables us to better understand the Earth. For example, in Europe, our climate depends on the state of the oceans and seas. Changes in ocean currents and temperatures have a direct impact on our weather. Helping Europe obtain essential data from a better understanding of the seas, the project MyOcean aims at setting up infrastructures and services in preparation for the **GMES Marine Services**.*

Public authorities and ships need to know when an oil spill threatens the marine environment. At the same time, information about the present and future impact of rising sea levels on coastal areas is of critical importance. And the range of applications keeps growing.

In this context, observing, monitoring and forecasting **temperature, salinity, currents and other parameters in oceans and seas provide important insights**. Today such information might enable vessels to choose faster shipping routes riding on currents, thereby saving fuel, reducing CO2 emissions and lowering costs.

Amongst possible applications, in the case of an oil spill, complex computer simulation models are used to reverse ocean currents. Comparing this data with shipping routes will enable public authorities to identify the origin of the spill and track down the perpetrators.

In the future, when dealing with climate change, **higher sea temperatures may impact currents such as those found in the Gulf Stream**, with profound impacts on European weather. Detecting higher temperatures requires monitoring and forecasting of the ocean as well as the availability of reference descriptions such as long time series of ocean data.



MyOcean will develop upgraded European capabilities for reference marine information and provide a wide range of key ocean indicators. Hence the project provides the major building blocks that are needed to allow the operational deployment of a full GMES Marine Service.

In cooperation with national metrological services, the European Environment Agency and the European Maritime Safety Agency (EMSA) amongst others, MyOcean will undertake the pre-operational validation of GMES Marine Services, and formally commission them. The project will establish a governance structure, which is intended to be adopted by the GMES Service.



**PIERRE BAHUREL**  
IS PROJECT COORDINATOR

MyOcean is composed of a consortium of 60 partners from across Europe and is structured around a core team of Marine Core Service operators, and connected to key R&D players and experts.

This project benefits from the European operational oceanography strategy started within EUROGOOS networks, and progressively implemented through subsequent projects such as MERSEA Strand1, MERSEA, and BOSS4GMES under the Sixth EU Framework Programme for Research.

## QUESTIONS & ANSWERS

### What do you want to achieve with this project?

MyOcean aims at deploying the first integrated pan-European capacity for ocean monitoring and forecasting. MyOcean will lead the setting up and operation of this new service, built on past investments in research & development, system development and international collaborations.

### Why is this GMES service important for Europe?

Implementing the European Marine Core Service is one of the top-three priorities of the GMES program. It will strengthen the economic development of downstream activities and reinforce Europe's voice in terms of environmental policy.

### How does your work benefit European citizens?

The supported applications are maritime security, oil spill prevention, water quality, marine resources management, coastal activities, seasonal forecasting, climate change and ice sheet surveys. MyOcean products will be open and free, directly accessible by European citizens.



## LIST OF PARTNERS

- GIP Mercator Océan, France
- Met Office, United Kingdom
- Istituto Nazionale di Geofisica e Vulcanologia, Italy
- Stiftelsen Nansen Senter for Fjernmaaling (NERSC), Norway
- Danmarks Meteorologiske Institut (DMI), Denmark
- Puertos del Estado, Spain
- Marine Hydrophysical Institute National Academy of Sciences of Ukraine (MHI NASU), Ukraine
- Collecte Localisation Satellite (CLS), France
- Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER), France
- Météo-France (MF-CNRM), France
- Koninklijk Nederlands Meteorologisch Instituut (KNMI), The Netherlands
- Consiglio Nazionale delle Ricerche (CNR), Italy
- Meteorologisk institutt (met.no), Norway
- Centre national de la recherche scientifique (CNRS), France
- Hellenic Ministry of Merchant Marine (HCMR), Greece
- Sveriges meteorologiska och hydrologiska institut (SMHI), Sweden
- EDISOFT - Empresa de Serviços e Desenvolvimento de Software, S.A., Portugal
- Institut National de Recherche Halieutique (INRH), Morocco
- Institute of Oceanology - Bulgarian Academy of Sciences, Bulgaria
- University of Cyprus, Cyprus
- Bundesamt für Seeschifffahrt und Hydrographie (BSH), Germany
- Carsten Brockmann Consult (BC), Germany
- Danmarks Tekniske Universitet (DTU-Space), Denmark
- Consejo Superior de Investigaciones Científicas (CSIC), Spain
- Starlab Barcelona, SL, Spain
- Tallinna Tehnikaülikool, Estonia
- Commission of the European Communities - Directorate General Joint Research Centre (JRC)
- ACRI-ST S.A.S., France
- Finnish Institute of Marine Research (FIMR), Finland
- Ente per le Nuove Technologie, l'Energia e l'Ambiente (ENEA), Italy
- Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), Italy
- Stato Maggiore Aeronautica - Ufficio Generale Spazio Aereo e Meteorologia (USAM), Italy
- Agenzia per la Protezione dell'Ambiente e per i servizi Tecnici (ISPRA)
- Israel Oceanographic and Limnological Research (IOLR), Israel
- Havforskningsinstituttet (IMR), Norway
- TechWorks Marine Limited, Ireland
- Università ta' Malta, Malta
- Instituto Superior Técnico, Portugal
- National Institute for Marine Research and Development (NIMRD), Romania
- Centro Euro-mediterraneo per i Cambiamenti Climatici (CMCC), Italy
- Natural Environment Research Council, United Kingdom
- Plymouth Marine Laboratory, United Kingdom
- University of Reading (URead), United Kingdom
- HR Wallingford Limited, United Kingdom
- The Secretary of State for Environment, Food and Rural Affairs (CEFAS), United Kingdom
- Institut Royal des Sciences Naturelles de Belgique (IRSNB-KBIN-RBINS), Belgium
- Leibniz-Institut für Meereswissenschaften an der Universität Kiel (IFM-GEOMAR), Germany
- Norsk institutt for vannforskning (NIVA), Norway
- Institute of Accelerating Systems and Applications (IASA), Greece
- Nacionalni institut za biologijo (NIB), Slovenia
- Aarhus Universitet (AU), Denmark
- Danmarks Tekniske Universitet (DTU-Aqua), Denmark
- Suomen ympäristökeskus (SYKE), Finland
- Latvijas Universitātes Matēmatikas un Informatikas Instituts, Latvia
- Center of Marine Research (CMR), Lithuania
- Instytutu Morskiego w Gdańsku (MIG), Poland
- Fisheries and Oceans Canada (DFO), Canada
- University of Plymouth (UOP), United Kingdom
- Scientific Foundation Nansen International Environmental and Remote Sensing Centre (NIERSC), Russia
- European Centre for Medium-Range Weather Forecasts (ECMWF), United Kingdom

## COORDINATOR

**Mercator Océan, France**

## CONTACT

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## PROJECT INFORMATION

MyOcean  
Contract no: 218812  
Starting date: 01/01/2009  
Duration: 39 months  
EU Contribution: € 33.800.000  
Estimated total cost: € 55.024.887  
[www.myocean.eu.org](http://www.myocean.eu.org)



# G-MOSAIC

GMES services for Management of Operations,  
Situation Awareness and Intelligence for regional Crises

## KEEPING EUROPE SAFE

*Being a global actor, the EU has a responsibility to pioneer solutions to today's complex security challenges. Enhancing Europe's ability to attain a peaceful global society, the project G-MOSAIC helps in **supporting EU External Relations policies**.*

Reaction to a crisis often proves to be too late. Effective intervention should ideally take place before a situation deteriorates, to minimise damage. This is why **intelligence information is of paramount importance to help keep Europe safe** from threats arising, from the proliferation of Weapons of Mass Destruction (WMD), or the violence of ethnic conflict, state failure and regional crises.

The project G-MOSAIC will provide intelligence to the EU and its Member States before, during and after a crisis occurs.

In particular, G-MOSAIC **Situation Awareness and Intelligence applications** provide information on major **Threat Warning Factors**. Such factors include monitoring of critical assets as part of efforts to combat WMD proliferation. They also consist of extended routes' surveillance, and assessment of structural crisis indicators, such as population density and agricultural production, and monitoring of illegal activities such as illegal mining or logging that contribute to a better understanding of where regional crises - state failure, ethnic conflicts, or government instability - might occur.

Moreover, G-MOSAIC **Crisis Management Operations** provide intelligence once a conflict has erupted, aimed at **supporting EU intervention activities** in the form of preparedness, crisis management, damage assessment, reconstruction and resilience.

G-MOSAIC's activities will be devoted to developing and exploiting GMES services as assets supporting security-related activities on external regional crises situations, whilst contributing to identifying the Core and Downstream geo-spatial intelligence services in the framework of the current status of the GMES Initiative.

European Commission services such as the External Relations, Development and Environment Directorates-General, and the Office for Humanitarian Aid (ECHO), European Union bodies such as the EU Military Staff, the European Council Situation Centre, and also Member State Ministries of Foreign Affairs are among this project's reference users.



**SERGIO PROIETTI**  
IS PROJECT COORDINATOR

## QUESTIONS & ANSWERS

### What do you want to achieve with this project?

G-MOSAIC aims at identifying and developing pilot services for the provision of geo-spatial information supporting EU external relations policies directed to maintain a peaceful global society, thus contributing to demonstrating sustainability of the GMES global security perspective.

### Why is this GMES service important for Europe?

G-MOSAIC services will contribute to understanding where outside Europe, Regional Crises such as state failure, ethnic conflicts, have high probability to occur thus supporting institutions in the prevention of those crises that on the long term may negatively affect Europe.

### How does your work benefit European citizens?

G-MOSAIC services will support EU intervention in External Regional Crisis, which can be regarded as an indirect threat to Europe as they can likely scale up to a global dimension and as a direct emergency for European citizens living, working or visiting the involved nations.



G-MOSAIC monitors critical assets.  
Anyka © Fotolia

# G-MOSAIC

GMES services for Management of Operations,  
Situation Awareness and Intelligence for regional Crises



## LIST OF PARTNERS

- Telespazio S.p.A., Italy
- Infoterra France SAS, France
- Thales Communications S.A. (TCF), France
- Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany
- INDRA Espacio SA, Spain
- GMV Aerospace and Defence S.A., Spain
- European Union Satellite Centre (EUSC)
- Commission of the European Communities - Directorate General Joint Research Centre (JRC)
- Centrum Badań Kosmicznych Polskiej Akademii Nauk, Poland
- Istituto Affari Internazionali (IAI), Italy
- Fondation pour la recherche stratégique, France
- Satelitarne Centrum Operacji Regionalnych S.A. (SCOR), Poland
- Thales Alenia Space Italy S.p.A. (TAS-I), Italy
- Thales Alenia Space France (TASF), France
- ARSENALE NOVISSIMO SARL (AN), France
- Astrium SAS, France
- Infoterra Limited, United Kingdom
- Infoterra GmbH (ITD), Germany
- Technische Universität Bergakademie Freiberg, Germany
- Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek (TNO), The Netherlands
- Consiglio Nazionale delle Ricerche (IMAA), Italy
- Università degli Studi della Basilicata (UNIBAS), Italy
- Eurosense-Belfotop Nv, Belgium
- Libera Università Internazionale degli Studi Sociali Guido Carli (LUISS), Italy
- Skysoft Portugal, Software e Tecnologias de Informação S.A., Portugal
- Instituto Superior Técnico, Portugal
- JOANNEUM RESEARCH Forschungsgesellschaft mbH, Austria
- Universität Salzburg, Austria
- Planetek Italia s.r.l., Italy
- Università degli Studi di Roma "La Sapienza" (CRPSM), Italy
- Gisat s.r.o, Czech Republic
- King's College London (KCL), United Kingdom
- SYNESYS SA, France
- Adelphi Research GmbH, Germany
- Sistematica S.p.A., Italy
- Swisspace Foundation, Switzerland

## COORDINATOR

**Telespazio S.p.A., Italy**

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## PROJECT INFORMATION

GMES services for Management of Operations,  
Situation Awareness and Intelligence for regional Crises  
(G-MOSAIC)

Contract no: 218822

Starting date: 01/01/2009

Duration: 36 months

EU Contribution: € 9.600.000

Estimated total cost: € 15.300.000



# AEROFAST

## Aerocapture for Future Space Transportation

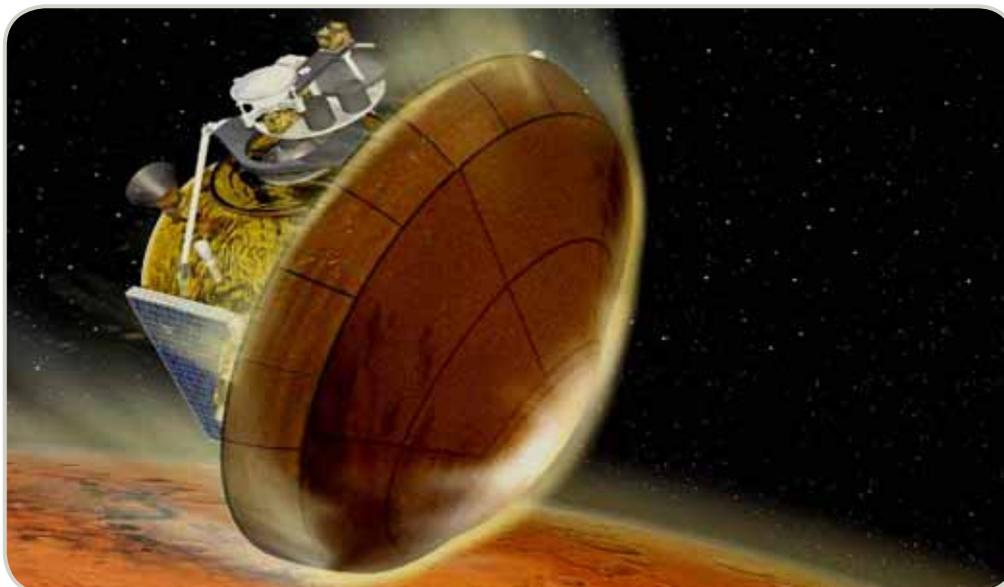
### FLY ME TO THE MOON

*The discoveries of pioneers such as Columbus, da Gama, and Cook led to transportation across oceans and this paved the way for large scale human settlements on new continents. Similar to the trans-Atlantic boats of the past, **advanced space transportation systems** will take today's pioneer missions into space further and allow for enhanced mobility of humans and cargo between Earth and space. The project AEROFAST supports these developments, refining aerocapture technology.*

"But Man is not a tree – he has no roots; he has feet, he walks", states Spanish author Juan Goytisolo, writing about today's globalised world where **enhanced mobility reshapes reality at high speed**. In the future such mobility is taken into a much vaster sphere, as advanced space transportation systems herald enhanced mobility between Earth and space.

In the decades ahead, **aerocapture technology** is predicted to become one of the core capabilities needed for **inter-planetary transportation**. The technology allows for the production of vehicles that are mass effective, using atmospheric drag to slow them. Such technology holds the potential to make lunar and Martian missions more affordable and more feasible, assuming high launch rates.

**Aerocapture allows for up to 30 percent of mass to be saved when a spacecraft is launched.** The technology is fully adapted to large weight missions carrying both cargo and humans.



Future space transportation takes new forms.  
© AEROFAST

With current propulsion technology, a spacecraft which would enter into a Mars orbit would only arrive with 41% of its initial mass. With refined aerocapture technology, this number would be doubled.

AEROFAST's main goal is to improve aerocapture transportation technology. Today the technology readiness level (TRL) of an aerocapture mission is roughly 2 to 3 in Europe. AEROFAST's goal is to prepare for a flight demonstration on a planet with atmosphere - the Earth or Mars - and to reach a TRL level of 3 to 4. The project is an important step towards the development of advanced transportation systems that will allow for **human expansion into the solar system**, moving humans and cargo more easily between Earth and space, and also returning humans from the Moon or from Mars. Indeed, looking ahead, today's globalised world might seem small, when future generations live in a time of high speed inter-planetary mobility.



**FRANCINE BONNEFOND**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

AEROFAST's main goal is to invest and improve the AEROCAPTURE transportation mean. AEROFAST's goal is to prepare for a flight demonstration and to reach TRL 3 - 4 in the frame of this FP7 first call.

#### Why is this project important for Europe?

An important step for human expansion into the solar system is to develop advanced transportation systems to move humans and cargo between geostationary and Low Earth orbits or return from Moon or Mars. Improving this technology allows Europe to be a valuable partner within the international cooperation.

#### How does your work benefit European citizens?

Human expansion in the solar system is part of our dreams: using the aerocapture technology to slow space vehicles is regarded as one of the largest contributors to making both lunar and Martian missions affordable.

# AEROFAST

Aerocapture for Future Space Transportation



## LIST OF PARTNERS

- Astrium SAS (AST-F), France
- Astrium GmbH (AST-D), Germany
- DEIMOS Engenharia S.A., Portugal
- Amorim Cork Composites S.A., Portugal
- Samtech S.A., Belgium
- Università degli Studi di Roma "La Sapienza", Italy
- Instituto Nacional de Engenharia, Tecnologia e Inovação (INETI), Portugal
- Solar-Terrestrial Influences Laboratory at the Bulgarian Academy of Sciences (STIL-BAS), Bulgaria
- Instytut Lotnictwa (IoA), Poland
- Centrum Badań Kosmicznych Polskiej Akademii Nauk (SRC-PAS), Poland
- Office National d'Etudes et Recherches Aéropatiales (ONERA), France
- Kybertec s.r.o., Czech Republic

## COORDINATOR

**Astrium SAS, France**

## CONTACT

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## PROJECT INFORMATION

Aerocapture for Future Space Transportation (AEROFAST)

Contract no: 218797

Starting date: 01/01/2009

Duration: 30 months

EU Contribution: € 1.924.374

Estimated total cost: € 2.961.592



# AGAPAC

## Advanced GaN Packaging

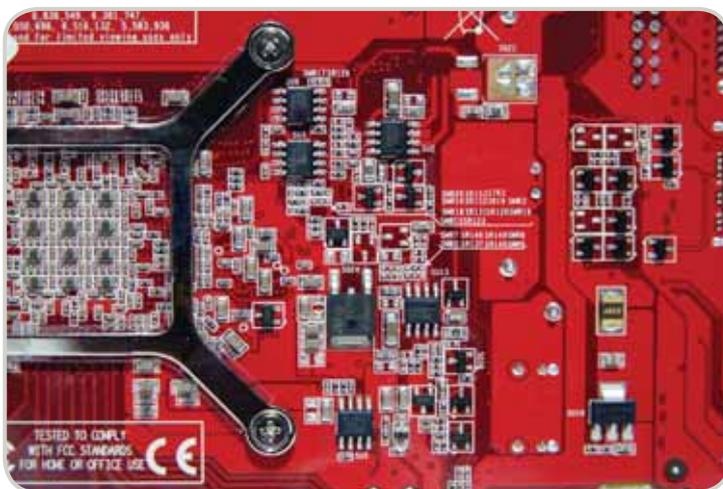
### POWER AMPLIFICATION IN A SPACECRAFT

*Reducing size and, in parallel, increasing power capabilities of electronic devices in a spacecraft is of immense importance for the overall performance of any satellite. Recent developments have brought Gallium Nitride devices to maturity. As the power density increases it is of critical importance to have packaging technologies available which can transport the generated heat to the surrounding environment and keep the temperature of the device within its specified limits.*

For power packages, it is compulsory to provide at the same time minimized thermal resistance and high protection to all devices and circuits with respect to contaminations, mechanical aggressions, radiations and electromagnetic perturbations.

**Gallium Arsenide (GaAs)** technologies have been introduced in the 80's and are currently operated at about 0.5 W/mm including space application de-rating rules. Gallium Nitride (GaN) has emerged as **the technology of choice for the next generation high power electronics**. Its ability to handling high power also makes it the perfect technology candidate for highly survivable receiver components.

With power transistors providing 5W/mm the GaN devices can be decreased in size, allowing a power density increase of about 10 times compared to existing Gallium Arsenide technologies.



AGAPAC contributes to achieving European strategic non-dependence in an area of critical technologies.  
Frelon © Fotolia

According to recent assessments, GaN will lead to a revolution in space-borne electronics.

The project **AGAPAC stands for "Advanced GaN Packaging"**.

The ultimate goal of the project is to have a space compliant power micropackage able to dissipate up to **100 W of power with a maximum junction temperature of 200°C**. This new micropackage technology based on innovative high thermal conductivity diamond or nano-composites will be available as an industrial supply chain for European space industry by 2010. It will cover the need for GaN based High Power Amplifiers (HPA) for space applications but also with different designs for other sectors such as base stations.



**OLIVIER VENDIER**  
IS PROJECT COORDINATOR

One of the missions of AGAPAC is to put together actors and industry from material science (in Spain and Austria), thermal and mechanical analysis (UK and France), with the packaging industry (France), and GaN device manufacturing (Germany) around the needs of major space actors in Europe.

The expected impact is to progress towards the sustainable provision of packaging technologies suitable for GaN technologies needed by the European space community to become independent from non-EU manufacturers.

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

In this project, AGAPAC, which stands for "Advanced GaN Packaging", we endeavour to establish a space compatible European supply chain for packaging solutions of GaN discrete transistors and GaN monolithic microwave integrated circuits by 2010.

#### Why is this project important for Europe?

The market for GaN transistors is expected to have a strong growth, with main turnover in 3G base station, satcom, and military. This project targets packaging for space applications to enable Europe to maintain a strong position in the highly competitive space industry.

#### How does your work benefit European citizens?

Involvement of "High tech" SMEs together with large industrial groups will trigger innovation at European level. In addition, it will ensure new employment opportunities for Europe, as AGAPAC targets enable technologies for next generation space systems.

# AGAPAC

Advanced GaN Packaging



## LIST OF PARTNERS

- Thales Alenia Space France (TAS-F), France
- EGIDE, France
- Plansee SE, Austria
- United Monolithic Semiconductors GmbH, Germany
- Fundación Inasmet, Spain
- Centre National d'Etudes Spatiales (CNES), France
- University of Bristol, United Kingdom

## COORDINATOR

**Thales Alenia Space France (TAS-F), France**

## CONTACT

**Olivier Vendier**

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## PROJECT INFORMATION

Advanced GaN Packaging (AGAPAC)

Contract no: 218851

Starting date: 01/10/2008

Duration: 36 months

EU Contribution: € 1.764.628

Estimated total cost: € 2.795.866



# GRASP

## Green Advanced Space Propulsion

### LET'S MAKE SPACECRAFT GREEN

*Space research generates technologies which can be used to monitor the Earth and its environment. However, space missions pollute when launched. The project GRASP aims at developing Green Propellant, which can contribute to making spacecraft more environmentally friendly, whilst securing independent European access to space.*

Independent access to space is a strategic objective for Europe in pursuit of scientific progress, vital in the 21st century knowledge-based society. However, environmental concerns increasingly shape behaviour, and rightly so. Tomorrow's space missions should be conducted with respect for the environment. So, let's make spacecraft greener.

Today spacecraft propulsion heavily relies on toxic and carcinogenic hydrazines as propellants. These **propellants are a threat to people and the environment**. Moreover, handling them requires costly safety measures.

In recent years, new technologies have emerged which hold the potential to improve this situation. Today **Green Propellants herald improvements** with respect to both performance and cost.

Hence the goal of the GRASP project is to select the most promising green liquid propellant candidate(s), and to push the propulsion technology to the level needed to prove that Green Propellant technology is feasible and competitive.

Whilst production of Green Propellants might contribute to making spacecraft more environmentally friendly, Europe also needs to develop a reliable independent source of propulsion components to secure strategic non-dependence and **independent access to space**.

In Europe, research and development on Green Propellants and propulsion technology is geographically fragmented. This project brings together some of the keyplayers in Europe to reduce this fragmentation, pooling joint capabilities to meet this demanding goal.

Across all sectors of our economies, **reducing emissions is an environmental challenge, but also an opportunity**. Such efforts enhance technological development and improve efficiency. Indeed, developing a Green Propellant for the benefit of our environment, which is also more effective, secure and reliable, represents a European challenge that carries immense opportunities.



CARSTEN SCHARLEMANN  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

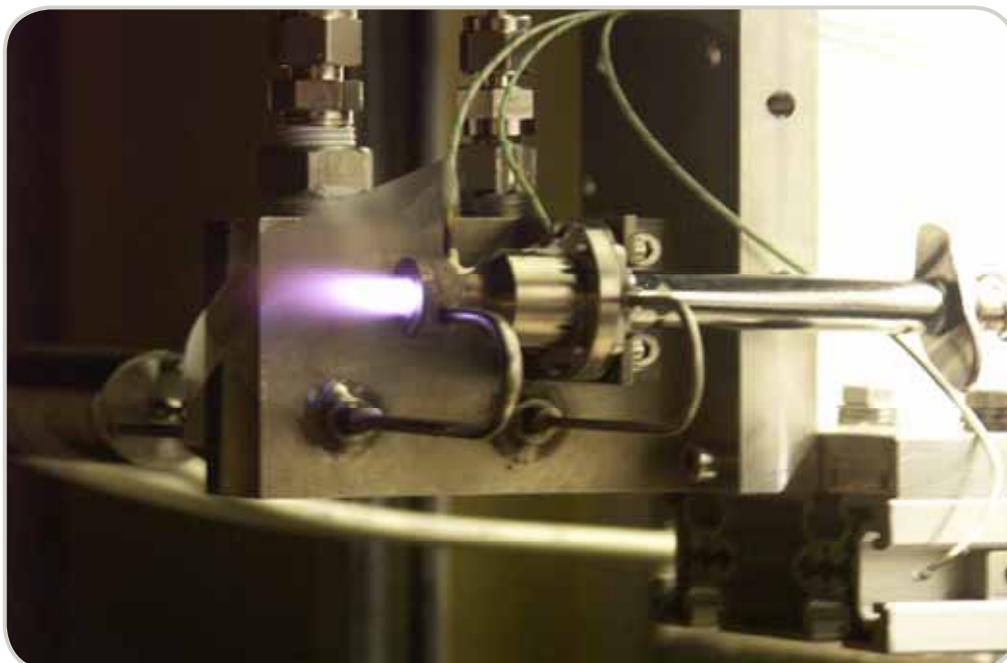
One significant cost factor of space missions is the propellant and its handling respectively. GRASP will investigate advanced propellants which potentially significantly reduce the associated costs and therefore strengthening the competitiveness of Europe's space industry.

#### Why is this project important for Europe?

The European space industry provides essential services to the European citizens. To ensure their ability to do so in the future, efforts are necessary to provide this important industry with the tools to respond to the ever increasing challenges of future space missions.

#### How does your work benefit European citizens?

GRASP has a significant potential to reduce the costs associated with propellants by replacing the toxic and carcinogenic propellants presently used. This will support the European Space Industry in providing essential services to the European citizens in the future.



Miniaturized 1N bipropellant thruster operating with Green Propellants.  
Source: © GRASP

# GRASP

Green Advanced Space Propulsion



## LIST OF PARTNERS

- Austrian Research Centers GmbH - ARC, Austria
- Totalförsvarets forskningsinstitut (FOI), Sweden
- University of Southampton, United Kingdom
- Centre National de la Recherche Scientifique (CNRS), France
- DELTACAT Ltd., United Kingdom
- Università degli Studi di Napoli Federico II, Italy
- Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany
- Evonik Degussa GmbH, Germany
- SNECMA SA, France
- Céramiques Techniques et Industrielles ( C.T.I. ), France
- Instytut Lotnictwa, Poland

## COORDINATOR

**Austrian Research Centers GmbH - ARC, Austria**

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## PROJECT INFORMATION

Green Advanced Space Propulsion (GRASP)

Contract no: 218891

Starting date: 05/12/2008

Duration: 36 months

EU Contribution: € 2.778.952

Estimated total cost: € 3.622.352

[www.grasp-fp7.eu](http://www.grasp-fp7.eu)



# HAMLET

## Human Model MATROSHKA for Radiation Exposure Determination of Astronauts

### KEEPING PEOPLE SAFE IN SPACE

Outside of the Earth's atmosphere, space radiation could become dangerous to humans, depending on space flight location, duration and the Sun's activity. Future interplanetary human space missions need to be able to estimate the risks such as radiation which may harm astronauts. With the HAMLET project, Europe reinforces its worldwide leadership in this important health field of space dosimetry.

Space is a dangerous place for humans. **Astronauts face a high radiation exposure** both inside the International Space Station (ISS), and when undertaking space walks outside its realms.

The European Space Agency's (ESA) facility MATROSHKA (MTR) lead by the German Aerospace Center (DLR) is dedicated **to determining the radiation loads that astronauts face** both in and outside the ISS. Launched in January 2004, the project is currently in its fourth experimental phase.

Aiming at optimal scientific exploitation, the project HAMLET will bring together a European expert-committee, consisting exclusively of members of the MTR consortium, to process and compile the MTR data.

The MTR project uses over 6,000 radiation detectors that determine the depth and organ dose distribution of radiation in the body. It is the largest international research initiative performed in the field of **space dosimetry**, combining the expertise of leading research institutions all over the world. Consequently it generates a huge pool of data of immense value, which the HAMLET project further exploits.

**The aim is to build a three-dimensional model of the radiation dose distribution in an astronaut's body**, based on the experimental input obtained in the MTR project, as well as on radiation transport calculations. In this respect, the project goes beyond essential data analysis and incorporates a modelling approach to guide new experimental measurements and strengthen the predictive capacity of such models.

The scientific achievements springing from this research contribute to **radiation risk estimations for future interplanetary human space missions**. The synthesis of the data, which is foreseen to considerably extend previous knowledge, constitutes a major accomplishment by which Europe can reinforce worldwide leadership in this special branch of space radiation research.



**DR. GÜNTHER REITZ**  
IS PROJECT COORDINATOR



European Space Agency (ESA) astronaut Thomas Reiter, Expedition 14 flight engineer, works with the European Matroshka-R Phantom experiment in the Zvezda Service Module of the International Space Station.  
Source: © HAMLET

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

Bringing together leading European experts in the field of space dosimetry, HAMLET aims at the effective scientific exploitation of experimental data on the radiation dose distribution inside a human phantom as part of the ESA MATROSHKA facility exposed onboard the ISS.

#### Why is this project important for Europe?

In view of future human space exploration, HAMLET ensures European excellence in evaluating the effects of space radiation on humans and thereby assessing their radiation risk. Focusing European expertise will enable future generations to travel where nobody has gone before.

#### How does your work benefit European citizens?

Experimental assessment of this complex radiation environment will increase the knowledge of organ dose distribution, support the benchmarking of radiation transport codes and the development of radiation detectors, with a direct spin-off for heavy-ion cancer therapy in Europe.

# HAMLET

Human Model MATROSHKA for  
Radiation Exposure Determination of Astronauts



## LIST OF PARTNERS

- German Aerospace Center (DLR), Germany
- Technische Universität Wien (TUW), Austria
- Christian-Albrechts-Universität zu Kiel, Germany
- Magyar Tudományos Akadémia KFKI Atomenergia Kutatóintézet, Hungary
- The Henryk Niewodniczanski Institute of Nuclear Physics (IFJ PAN), Poland
- Chalmers Tekniska Högskola AB, Sweden
- Health Protection Agency (HPA), United Kingdom

## COORDINATOR

**German Aerospace Center (DLR), Germany**

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## PROJECT INFORMATION

Human Model MATROSHKA for Radiation Exposure  
Determination of Astronauts (HAMLET)  
Contract no: 218817  
Starting date: 01/09/2008  
Duration: 36 months  
EU Contribution: € 1.067.614  
Estimated total cost: € 1.382.974  
[www.fp7-hamlet.eu](http://www.fp7-hamlet.eu)



# HiPER

## High Power Electric propulsion: a Roadmap for the future

### TOWARDS NEW FRONTIERS IN SPACE

*We can dream about taking space travel to new frontiers, but we can't live the dream without transportation. In the future, **advanced space transportation** systems will allow for interplanetary space missions. Today, Europe is working to improve the nature of the systems that will make such space transportation and exploration possible.*

Embarking on a long journey, knowing what will take you there is essential. As Europe prepares for a new era of space exploration, **new technological solutions for space transportation** are now needed.

The HiPER project will **perform basic research and proof-of-concept experiments** on key space transportation technologies, allowing for the development of high power electric propulsion and power generation that may enhance space exploration and transportation capabilities.

HiPER will be the first comprehensive RTD project in Europe devoted to a spacecraft with power levels well in excess of 10 kW and an initial target of 25 kW, well beyond the present European state-of-the-art. High power electrical propulsion is currently seen as the only technology which can offer a satisfactory level of agility for future planetary missions.

The project's main objective is to initiate technological and programmatic consolidation in the development of innovative electric propulsion technologies, including its related power generation, which is needed to fulfil future European space transportation needs.

Such expertise is also paramount to ensure the development in Europe of assured independent access to efficient in-space propulsion technologies.



**GIOVANNI CESARETTI**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

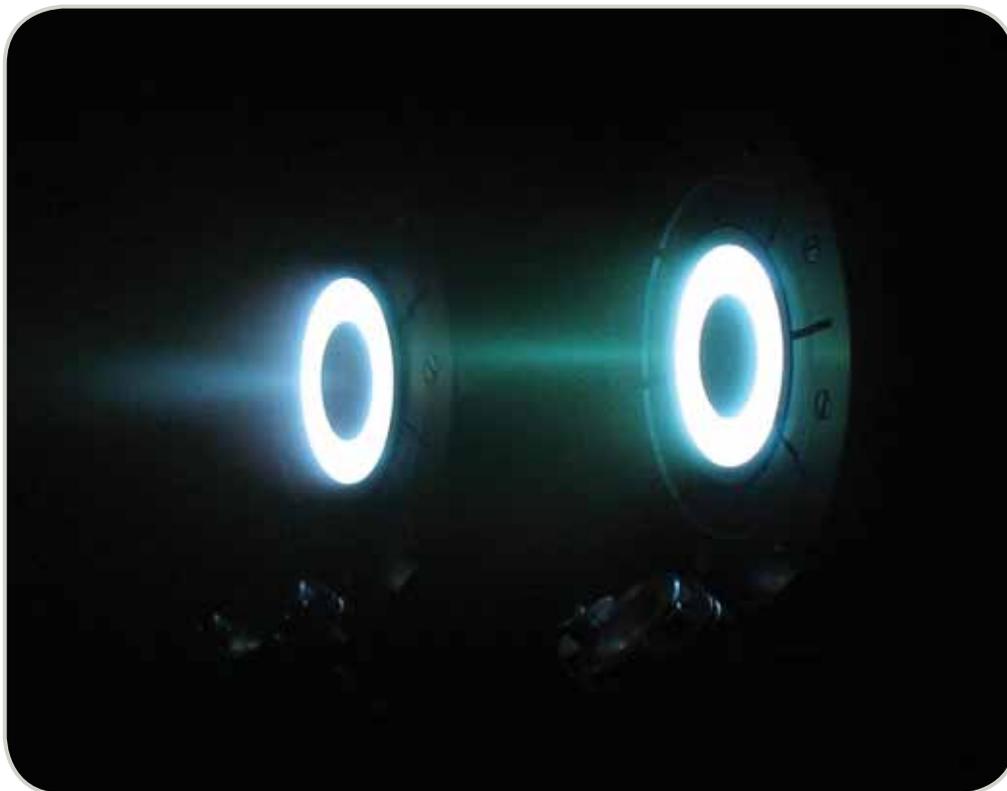
The goal is to draft a roadmap for the future development of high power electric propulsion and power generation, in order to enhance space exploration and transportation capabilities. Both the European Space Agency and national agencies will be involved to produce the best scenarios.

#### Why is this project important for Europe?

Firstly, because it groups most of the European actors in the field. Secondly, because it will provide a strategic workplan for the European Commission and ESA for future space endeavours. Finally, because it would have a very positive industrial and technological impact on the competitiveness of the European space industry.

#### How does your work benefit European citizens?

Obvious benefits will come from advances in technologies and exploration capabilities: more power and thrust onboard of a spacecraft implies a longer life and cost reduction. Possible transfer of the technology to "ground" sectors (industrial plasma, solar panels, power generation) would bring additional benefits.



Alta HT-100 Hall Effect Thruster (HET) firing in cluster configuration inside a vacuum chamber. HT-100 is one of the smallest HEs developed, and has been fully designed at Alta. Source: © HiPER

# HiPER

High Power Electric propulsion: a Roadmap for the future



## LIST OF PARTNERS

- Alta SpA (ALTA), Italy
- SNECMA SA, France
- Galileo Avionica SpA, Italy
- Space Enterprise Partnerships Ltd. (SEP), United Kingdom
- Domaine de Beaugard Eurl (DdeB), France
- Astos Solutions GmbH, Germany
- Politecnico di Milano (PoliMi), Italy
- Centre National de la Recherche Scientifique (CNRS), France
- Office National d'Etudes et de Recherches Aérospatiales (ONERA), France
- Institute of Fundamental Technological Research of the Polish Academy of Sciences (IPPT), Poland
- Fundación Inasmet (TECNALIA-INAS), Spain
- KopooS Consulting Ind. (KopooS), France
- Consorzio RFX (RFX), Italy
- Centre National d'Etudes Spatiales (CNES), France
- University of Stuttgart – IRS (USTUTT), Germany
- University of Southampton (SES), United Kingdom
- Fraunhofer Institute – ISE, Germany
- Rolls Royce plc (RR), United Kingdom
- Acta Srl, Italy

## COORDINATOR

**Alta S.p.A. - ITALY**

## CONTACT

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## PROJECT INFORMATION

High Power Electric propulsion: a Roadmap for the future (HiPER)  
Contract no: 218859  
Starting date: 01/10/2008  
Duration: 36 months  
EU Contribution: € 3.633.702  
Estimated total cost: € 5.397.023  
[www.alta-space.com/hiper](http://www.alta-space.com/hiper)

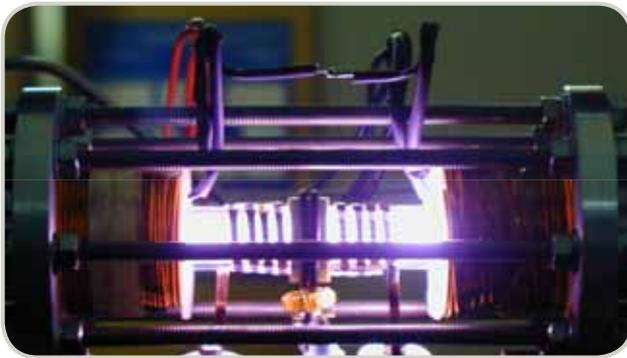


# HPH.com

## HeliconPlasmaHydrazine.CombinedMicro

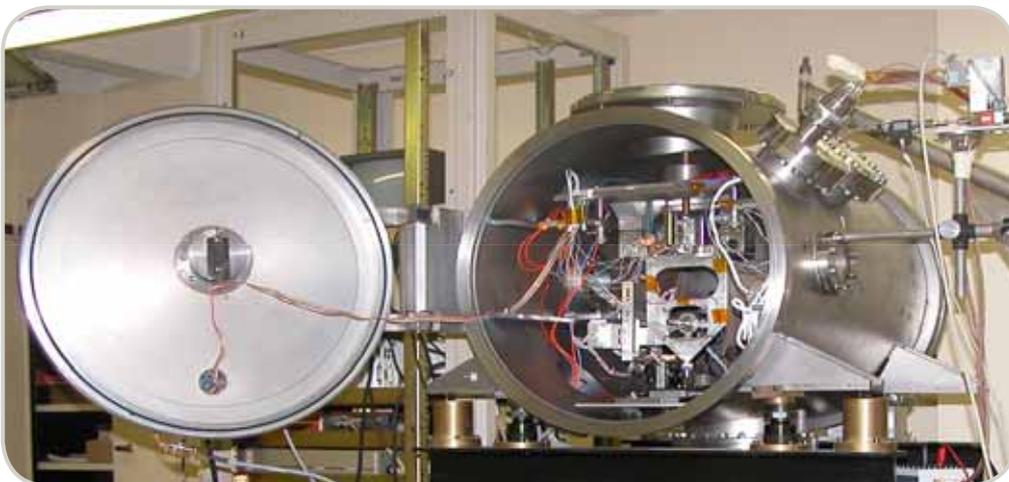
### TOWARDS THE NEXT GENERATION OF SPACECRAFT

*A new age of space travel is approaching. The bulky rockets of yesteryears may be replaced by new electric engines allowing more flexible use while using less fuel. These high-efficiency engines could pave the way for bigger payloads at lower cost, significantly enhancing mission capabilities. The HPH.com project aims at making an important step forward in this field.*



Plasma source.  
Source: HPH.com

Using the same engine for small manoeuvres and for long trips makes sense on Earth, but what about with spacecraft? In fact, **most spacecraft today use separate propulsion systems for making fine adjustments and major orbit changes.** The project HPH.com strives to simplify this situation, by developing a more flexible engine which is capable of doing both.



Helicon source based plasma thrusters are very promising, potentially reducing cost and enhancing reliability.  
Source: © HPH.com

The first step will be the **development of an engine – or thruster - using low frequency radio waves (helicons)** to create plasma, which is expelled out the back using a magnetic nozzle to push the spacecraft forward. A prototype will be built and incorporated into a test microsatellite for attitude and position control, demonstrating its applicability in space.

Next, the feasibility of using the plasma to heat a secondary propellant (such as ADN/HADN, HAN, HFN, Neutral Gas) will be investigated. The resulting **two-mode thruster** would be able to operate in both a high efficiency – low thrust mode, using only the plasma component, and a low efficiency – high thrust mode using both.

The result could be a **versatile, multipurpose propulsion system capable of making both fine adjustments in spacecraft attitude and larger orbital changes.** Since current spacecraft tend to use separate systems for this, the inherent simplicity of using just one, combined with the high efficiency of plasma propulsion, holds the perspective to translate into a longer operational lifetime, enhanced reliability and lower cost.



**DR. DANIELE PAVARIN**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

The objective of the research program is to design, optimize and develop a new type of space plasma thruster based on helicon-radio-frequency technology, which allows for higher versatility and lower costs compared with current systems.

#### Why is this project important for Europe?

This program is intended to increase the performance level and capability of future propulsion systems. Such enhanced performance makes new mission scenarios possible, enhancing European strategic non-dependence.

#### How does your work benefit European citizens?

This technology will allow for bigger payloads, leading to increased “mission capabilities” in new mission scenarios; hence new services at lower costs. Moreover, this technology could be applied to other industries, strengthening the competitive advantage of European companies.



### LIST OF PARTNERS

- Università degli Studi di Padova / Centro Interdipartimentale Studi e Attività Spaziali (CISAS), Italy
- Centro Interdipartimentale di Studi e Attività Spaziali "G.Colombo," Università degli Studi di Padova (UPD-CISAS), Italy
- Office national d'études et de recherches aérospatiales (ONERA), France
- Università degli Studi di Roma "La Sapienza" (UNIROMA1), Italy
- Thales Alenia Space Italia S.p.A. (TAS-I), Italy
- Ente per le Nuove Tecnologie, l'Energia e l'Ambiente (ENEA), Italy
- National Aerospace University Kharkiv Aviation Institute (KhAI), Ukraine
- Universidad Politécnica de Madrid (UPM), Spain
- Alma Mater Studiorum - Università degli Studi di Bologna (UNIBO), Italy
- Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences (KIAM), Russia
- Advanced Operations and Engineering Services Group B.V. (AOES), The Netherlands
- LMS Imagine S.A. (IMAGINE), France
- Roving A/S (ROVSING), Denmark
- Bradford Engineering B.V. (BRADFORD), The Netherlands
- Studio Progettazione e Realizzazione di Appareti Elettronici di Selmo Antonio (RESIA), Italy
- Centre national de la recherche scientifique - Laboratoire de physique des gaz et des plasmas (CNRS-LGPP), France

### COORDINATOR

**Università degli Studi di Padova /  
Centro Interdipartimentale Studi e Attività Spaziali  
(CISAS), Italy**

### CONTACT

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### PROJECT INFORMATION

HeliconPlasmaHydrazine.CombinedMicro (HPH.com)  
Contract no: 218862  
Starting date: 01/12/2008  
Duration: 36 months  
EU Contribution: € 3.572.011  
Estimated total cost: € 4.900.545  
[www.HPHcom.eu](http://www.HPHcom.eu)



# ORPHEE

## Innovative propellants in hybrid propulsion technology and its applications in space transportation

### REINVENTING THE ROCKET

*Getting to space safely and precisely is paramount. Hybrid rocket propulsion might contribute in this respect, by combining the advantages of solid- and liquid-fuelled rocket engines. The project ORPHEE seeks to improve hybrid rocket performance and ensure that Europe remains a key player in this innovative propulsion technology.*

Take one part fuel, one part oxygen, mix well and ignite. Use the resulting hot gases to propel forward. It's a recipe for success, and has been used by rocket builders since the 13th century. **The key ingredient is the oxygen** – rockets carry this on board in the form of an oxidizer, making them different than air-breathing car and jet engines.

**Solid or liquid?** This is the first question to ask when selecting rocket ingredients. Rockets usually employ either a solid fuel-and-oxidizer mixture like gunpowder, or liquid fuel and liquid oxidizer. **An innovative third variety**

**is the hybrid rocket**, which burns a liquid oxidizer with a solid fuel. This combines some of the best features of both: the solid component adds simplicity and lowers cost, while the liquid part allows for an adjustable throttle, adding precision to orbit insertion and safety.

ORPHEE will enhance European competence in hybrid rocket technology and advance its development, raising its Technological Readiness Level (TRL) from 1 to 3.

Moreover, the project seeks to significantly increase hybrid rocket engine performance. The availability of cutting-edge hybrid-rocket technology in Europe paves the way for future space missions, potentially reducing the global engine cost, whilst also increasing safety of future space transportation means.



**FRÉDÉRIC DAUCH**  
IS PROJECT COORDINATOR



ORPHEE will enhance European competence in hybrid rocket technology, aiming for breakthroughs in the field of propulsion systems for space transportation vehicles.  
Source: Joe Stone © Fotolia

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

The main objective of the ORPHEE project, led by SNPE Matériaux Energétiques, is to achieve breakthroughs in the field of hybrid propulsion systems for space transportation vehicles.

#### Why is this project important for Europe?

ORPHEE will induce a new space mission definition with an innovative propulsive system. It will contribute to developing new methods and techniques providing European industry with competitive advantages regarding newcomer countries in the space community.

#### How does your work benefit European citizens?

ORPHEE project achievements will benefit European citizens through their contribution to sustaining European industry employment on innovative technologies development, as well as benefits in the field of environmental and safety aspects with development of hybrid propulsion systems.

# ORPHEE

Innovative propellants in hybrid propulsion technology and its applications in space transportation



## LIST OF PARTNERS

- SNPE Matériaux Energétiques, France
- Astrium SAS (Astrium ST F), France
- Astrium GmbH (Astrium ST G), Germany
- Avio S.p.A. (AVIO), Italy
- Office national d'études et de recherches aérospatiales (ONERA), France
- Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany
- Politecnico di Milano (POLIMI), Italy
- Università degli Studi di Napoli Federico II (DIAS), Italy
- Universitatea Politehnica din Bucuresti (UoB), Romania
- Thyia Tehnologije d.o.o. (THYIA), Slovenia

## COORDINATOR

**SNPE Matériaux Energétiques, France**

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## PROJECT INFORMATION

Innovative propellants in hybrid propulsion technology and its applications in space transportation (ORPHEE)  
Contract no: 218830  
Starting date: 01/01/2009  
Duration: 36 months  
EU Contribution: € 1.984.154  
Estimated total cost: € 3.056.570



# PRoVisG

## Planetary Robotics Vision Ground Processing

### A CLOSER LOOK AT MARS

*A picture is worth a thousand words, and a photo from another planet might even be worth a few more. The project PRoVisG aims at making the most out of robotic probes that explore Mars and other planets, by improving the processing and representation of visual data they send back.*

For a probe on another planet, **time is of the essence** since its operational life is often short. The harsh environment, extreme temperatures and pressures, dust and radiation threaten to damage the hardware and compromise the mission at any moment. Given the difficulty and cost of getting to other planets, obtaining a **high return on investment is crucial**. Accelerating the processing and improving the representation of visual data from such missions, the project PRoVisG aims at giving mission operators and scientists a better three-dimensional (3D) understanding of these new worlds, and showing all of us what it looks like to be there.

In order to maximize the use of a robotic probe during its limited lifetime, scientists immediately have to be provided the best achievable visual quality of 3D data products, and mission controllers need to minimize the time spent for planning the next activities. PRoVisG will facilitate this, developing technology for the **rapid processing and effective representation of visual data** by improving Planetary Robotic Vision Ground Processing facilities. Its ambition is to collect a tool set and integrate a versatile and flexible processing chain which can be easily adapted to the various tasks. Thereby, mission controllers and sci-

entists on the ground profit from **improved situational awareness**, enabling them to identify targets of interest and send the next commands with minimum delay.

PRoVisG brings together major EU and US research institutions and stakeholders involved in space robotic vision and navigation to develop a unified approach for robotic vision ground processing. One main result will be a **web-based Geographic Information System (GIS)**, facilitating the comprehensive processing of visual data and the visualization of the context, history, vision data and products of robotic planetary missions. Prototypes of rovers and airborne probes will be used in terrestrial field test campaigns to demonstrate visual processing ability going beyond that currently available with the Mars Exploration Rovers and currently envisaged ESA missions.

As a further benefit, the effective representation of planetary surface imagery will be useful for scientific research, education, and also for increased public awareness regarding space science and exploration.



**GERHARD PAAR**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

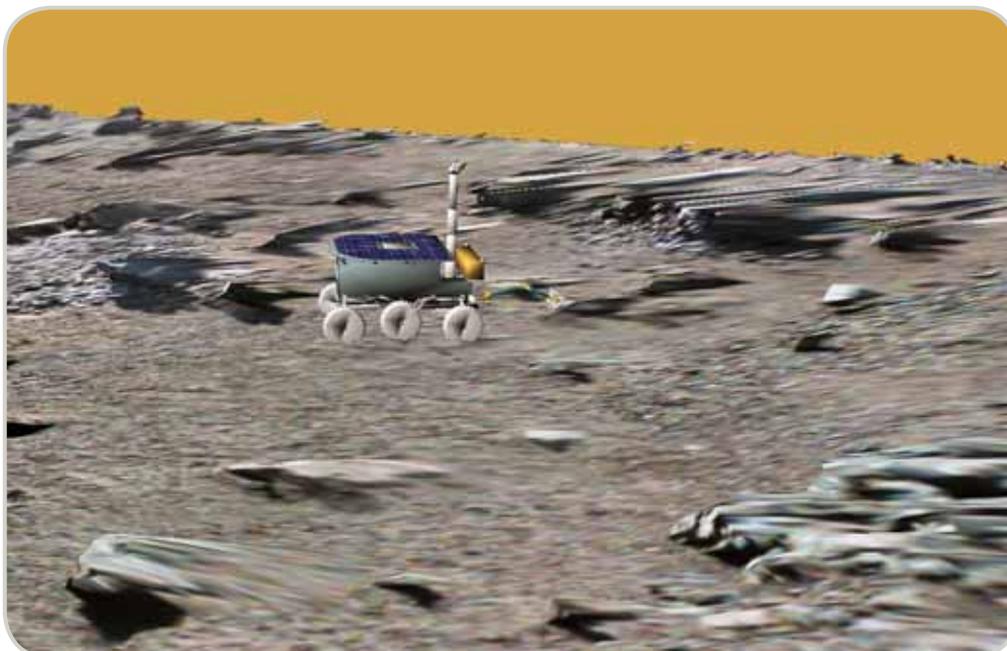
PRoVisG will build a unified European framework for Planetary Robotic Vision Ground Processing. State-of-art 3D computer vision will exploit the images gathered during past, present and future robotic space missions to the Planets for a significant enhancement of their scientific, technological and educational outcomes.

#### Why is this project important for Europe?

PRoVisG will demonstrate the potential of European industry and academia for high-level processing of image products from planetary surfaces. In this way Europe gains independence and reputation as a competitive partner for international research and exploration missions to the Planets.

#### How does your work benefit European citizens?

PRoVisG will conduct robotic field tests in Mars-like terrain. European scientists and engineers can provide exciting insights into what we can expect to see when Europe lands on the Moon or other planets and what such a system is capable of dealing with in natural non-vegetated terrain.



ExoMars Rover.  
Source: © PRoVisG

# PRoVisG

## Planetary Robotics Vision Ground Processing



### LIST OF PARTNERS

- Joanneum Research Forschungsgesellschaft mbH (JR) Institute of Digital Image Processing, Austria
- Aberystwyth University (AU), United Kingdom
- Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany
- České vysoké učení technické v Praze (CTU), Czech Republic
- SciSys UK Ltd (SciSys), United Kingdom
- Astrium Ltd (EADS), United Kingdom
- Technische Universität Berlin (TUB), Germany
- University College London (UCL), United Kingdom
- The Ohio State University (OSU), United States
- University of Surrey (UNIS), United Kingdom
- Centre Suisse d'Electronique et de Microtechnique SA - Recherche et Developpement (CSEM), Switzerland
- Centre national d'études spatiales (CNES), France

### COORDINATOR

**Joanneum Research Forschungsgesellschaft mbH (JR)  
Institute of Digital Image Processing, Austria**

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### PROJECT INFORMATION

Planetary Robotics Vision Ground Processing (PRoVisG)  
Contract no: 218814  
Starting date: 01/08/2008  
Duration: 39 months  
EU Contribution: € 3.465.132  
Estimated total cost: € 4.501.965  
[www.provisg.eu](http://www.provisg.eu)



# SOTERIA

## SOLAR-TERrestrial Investigations and Archives

### TOWARDS A BETTER SPACE WEATHER FORECAST

*In space, like on Earth, we need to adapt to changing weather conditions. Yet our knowledge about space weather is still limited. In order to better protect human beings and human assets in space and on Earth, the project SOTERIA aims at improving our understanding of space weather phenomena.*

Space weather is the concept of changing environmental conditions in space. It is distinct from the concept of weather within our own atmosphere. Our space weather is a consequence of the behavior of the Sun and the nature of Earth's magnetic field and it can affect the Earth significantly.

Yet we know much less about space weather than we know about weather on Earth. Whilst the International Space Station (ISS), satellites and spacecraft mostly experience calm space weather conditions, at times **solar eruptions and variations in the Earth's magnetic field lead to deteriorating conditions** that represent real risks to astronauts and satellites in space, and may even disturb power supply and telecommunications on Earth.

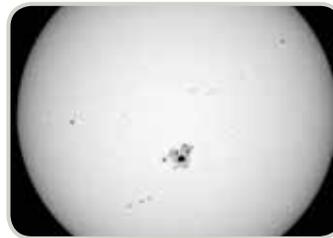
Studying such events in the fields of solar, space and geophysics is increasingly important. Today more than ever before, space assets such as satellites controlling telecommunication and power lines impact our life on Earth. Hence if they are affected by space weather, we feel the impact instantly.



Solar eruptions pose risks to humans and satellites in space.  
GeoPappas © Fotolia

**SOTERIA aims at facilitating a more reliable space weather forecast**, based on a space monitoring system. Analysing data from more than 20 satellites - some five of which are ESA missions - this project mobilizes more than 50 experts and resources from across Europe. New methods will be explored to analyse data on space weather not only from satellites but also from outposts on the ground.

This endeavour will lead to the establishment of **new databases on space weather**, the quality of which go beyond the present state-of-the-art in this field. Moreover, the results springing from SOTERIA will be made available online to the scientific community at large, also **facilitating access to open data from relevant satellite missions**.



Source: © SOTERIA



**GIOVANNI LAPENTA**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

The goal is to provide new and existing data from ground based and spaceborne observations and models crucial for space weather forecasting. The fundamental approach is to make the information from diverse sources readily available to the user in a homogeneous format.

#### Why is this project important for Europe?

Europe has a key interest in the good design and operation of its space technical and human operations and of its large scale infrastructure (power lines, pipelines). Soteria will produce tools to better understand space weather events that pose a serious and even lethal threat to such activities.

#### How does your work benefit European citizens?

Soteria will benefit society by providing tools for the European capability of predicting space weather events that have a key adverse impact on space activities, on human health in space and on large scale infrastructures and on the ground (power lines, pipelines).

# SOTERIA

SOLar-TERrestrial Investigations and Archives



## LIST OF PARTNERS

- Katholieke Universiteit Leuven, Belgium
- Universität Graz, Austria
- Schweizerisches Forschungsinstitut für Hochgebirgsklima und Medizin (PMOD/WRC), Switzerland
- MTA Konkoly-Thege Miklós Csillagászati Kutatóintézet, Hungary
- Centre national de la recherche scientifique (CNRS), France
- ROYAL OBSERVATORY OF BELGIUM (ROB), BELGIUM
- Observatoire de Paris, France
- Centrum Badań Kosmicznych Polskiej Akademii Nauk (SRC-PAS), Poland
- MTA KFKI Részecske- és Magfizikai Kutatóintézet (MTA-KFKI), Hungary
- Technical University of Denmark (DTU), Denmark
- Oulun Yliopisto (UOULU), Finland
- Georg-August-Universität Göttingen, Stiftung Öffentlichen Rechts (UGOE), Germany
- Sveučiliste u Zagrebu, Croatia
- Noveltis SAS, France
- Lebedev Physical Institute of the Russian Academy of Sciences (LPI), Russia
- Informatique, Electromagnetisme, Electronique, Analyse Numerique (IEEA), France

## COORDINATOR

**Katholieke Universiteit Leuven, Belgium**

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## PROJECT INFORMATION

SOLar-TERrestrial Investigations and Archives (SOTERIA)  
Contract no: 218816  
Starting date: 01/11/2008  
Duration: 36 months  
EU Contribution: € 3.922.966  
Estimated total cost: € 5.161.155  
[www.soteria-space.eu](http://www.soteria-space.eu)



# ULISSE

## The USOCs KnowLedge Integration and dissemination for Space Science Experimentation

### RESEARCH AT THE INTERNATIONAL SPACE STATION

*Since 1998, the International Space Station (ISS) provides for a permanent human presence in space. A prime example of successful international cooperation, ISS serves as mankind's outpost laboratory for space experimentation. The project ULISSE provides ground support for the optimum exploitation of ISS experiments.*

Some 400 km above Earth, travelling orbits at a speed of 27,700 km/h, the ISS is home to a permanent crew of 3-6 astronauts from Europe, Russia, USA, Canada and Japan. Here at the junction between Earth and outer space, the **ISS' tough environment provides an ideal setting for scientific experiments** that pave the way for future space travel to the Moon and Mars.

ULISSE provides specific services and tools for their exploitation through a software platform. These experiments include **Space Medicine research, biotechnology**, and the life science area of **exobiology**. Further knowledge in these diverse domains offers new insights on how human beings may be able to sustain living in space over extensive time periods, which is essential for the success of future interplanetary space missions. Also, we learn more about how cells are affected by long periods of weightlessness and radiation, and - in the area of exobiology - we aim at learning more about the most extreme conditions any form of life may survive in the universe.



Mankind's outpost laboratory, the International Space Station (ISS) is home to research facilitated by User Support and Operations Centres (USOC) across Europe. sharply\_done © Fotolia

The ULISSE project is conceived by a large number of partners already operative in **space experimentation**. The project links these existing User Support and Operation Centres (USOC) from across Europe and is adding value by facilitating further exploitation of competences and resources, and is complementing ISS activities with new initiatives aimed at increasing the return of scientific space activities.

For this purpose, ULISSE intends to pursue the **valorisation and exploitation of ISS scientific data** and of the already available data from previous space experiments as well as data from other space platforms.

The aim of the project is **increased involvement of European researchers in scientific research on the ISS**, and enhanced awareness among Europeans of the outstanding possibilities that the world's outpost laboratory offers all of us, whilst circling the Earth some 15 times a day in fast orbit high above.



**LUIGI CAROTENUTO**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

ULISSE will develop a middleware software platform to collect, exploit and valorize scientific data from previous and future space science experiments on various platforms like the ISS. To this aim specific services will be developed involving specialized scientific communities.

#### Why is this project important for Europe?

ULISSE exploits competences of the User Support and Operation Centers (part of the European Ground Infrastructure for space experimentation) to make scientific data available to a broader user community and to implement services that maximize space experimentation exploitation.

#### How does your work benefit European citizens?

ULISSE will contribute to further capitalize on the investments made by the European society in space research. ULISSE also increases the citizens' awareness of the contribution of space research to human knowledge and its daily life application.

# ULISSE

The USOCs KnowLedge Integration and dissemination for  
Space Science Experimentation



## LIST OF PARTNERS

- Microgravity Advanced Research and Support Center S.r.l. (MARS), Italy
- Telespazio S.p.A., Italy
- Institut d'Aéronomie Spatiale de Belgique, Belgium
- Consiglio Nazionale delle Ricerche (CNR-ISTC), Italy
- Institut de Médecine et de Physiologie Spatiales (MEDES), France
- Space Applications Services (SpaceApps), Belgium
- Centre National d'Etudes Spatiales (CNES), France
- Università degli Studi di Roma "La Sapienza", Italy
- Damec Research Aps - Danish Aerospace Medical Centre of Research, Denmark
- Stichting Nationaal Lucht- en Ruimtevaartlaboratorium (NLR), The Netherlands
- Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany
- Eidgenössische Technische Hochschule Zürich (ETH), Switzerland
- NTNU Samfunnsforskning AS, Norway
- Centrum Badań Kosmicznych Polskiej Akademii Nauk (SRC PaS), Poland
- Universidad Politécnica de Madrid, Spain
- Werum Software & Systems AG, Germany
- European Low Gravity Research Association (ELGRA), The Netherlands

## COORDINATOR

**Microgravity Advanced Research and  
Support Center S.r.l. (MARS), Italy**

## CONTACT

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## PROJECT INFORMATION

The USOCs KnowLedge Integration and dissemination  
for Space Science Experimentation (ULISSE)  
Contract no: 218815  
Starting date: 01/01/2009  
Duration: 36 months  
EU Contribution: € 4.858.223  
Estimated total cost: € 6.678.549



# SWIFT

## Supporting awareness and information dissemination activities for GMES Fast Track Services

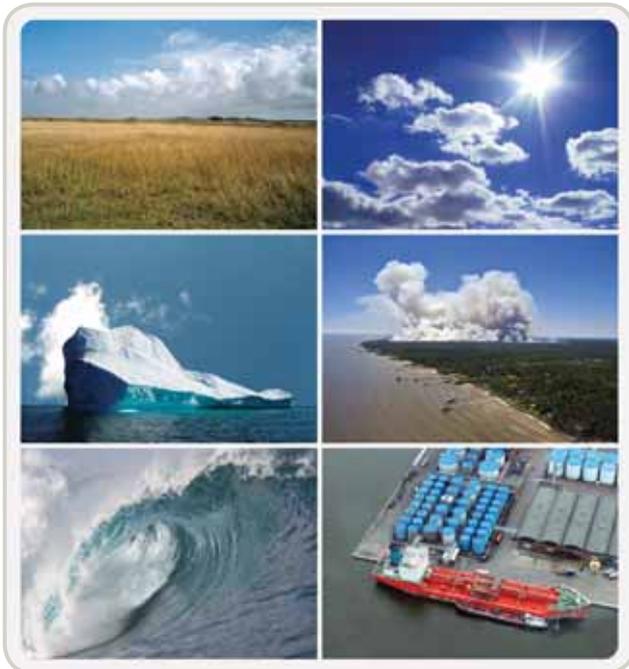
### GMES - BECAUSE WE NEED TO KNOW

*Global Monitoring for Environment and Security (GMES) provides for improved evidence based policy making. Yet to succeed, such insights need to be effectively disseminated. The support action SWIFT helps raise awareness about GMES, promoting its results.*

**GMES** is building European capabilities to **monitor the state of our planet from space**, thereby assessing the probability of future environmental changes. The programme generates knowledge, which can help to keep the Earth healthy and save lives when disasters strike. Space-born data create a better basis for decisions to be taken in an increasingly challenging global environment.

In Europe, major high-level policy fields such as Sustainable Development, the Common Foreign and Security Policy (CFSP) and the long-term competitiveness of European industry are also influenced by successful space activities.

Yet information is much more valuable when it is effectively shared.



GMES geo-information services are grouped into six interacting themes: land, atmosphere, climate change, emergency, ocean and security.  
© Fotolia

The **SWIFT** coordination and support action addresses this challenge, as it helps **raise awareness about the GMES programme**.

SWIFT supports information activities and dissemination efforts of the three GMES Fast Track Services, which are being implemented by the projects SAFER (Emergency Response), geoland2 (Land) and MyOcean (Ocean), as well as the GMES Pilot Projects MACC (Atmosphere) and G-MOSAIC (Security). It has two major objectives: the first objective is to maximise and add value to these projects' dissemination activities. The second objective is to support efforts promoting the GMES initiative as a whole.

Hence as GMES takes form on the ground, and its Fast Track services deliver results for the benefit of citizens, SWIFT helps enhance visibility for such progress, keeping citizens informed about the wide ranging benefits springing from this important European space initiative.

The nature and number of communication and dissemination actions undertaken by SWIFT will include a wide range of means such as video presentations, exhibition booths, articles, website, link to online scientific and educational fora, posters and flyers.



**FRÉDÉRIC COLLOMB**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

In spite of the major achievements of GMES over the last 10 years, this initiative and the role that the European institutions have played remain relatively unknown. A major objective of SWIFT is to make GMES more largely known by decision makers, potential users and citizens.

#### Why is this project important for Europe?

GMES is crucial for Europe but it will be successful in achieving its objectives only if it is largely recognised and supported by decision makers, users and more generally the public. Any action, like SWIFT, aiming at promoting GMES among these communities will benefit Europe.

#### How does your work benefit European citizens?

SWIFT will contribute to the achievement of GMES objectives, which relate directly to EU citizens' quality of life. SWIFT will also contribute to informing citizens about this major programme, thus illustrating with concrete examples the role of EU institutions in their daily life.

# SWIFT

Supporting awareness and information dissemination activities for GMES Fast Track Services



## LIST OF PARTNERS

- France Développement Conseil (FDC), France
- SQUARIS Consultants, Belgium
- European Service Network (ESN), Belgium

## COORDINATOR

France Développement Conseil (FDC), France

## CONTACT

**Frédéric Collomb**  
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## PROJECT INFORMATION

Supporting Awareness and Information dissemination for GMES Fast Track Services (SWIFT)  
Contract no: 218789  
Starting date: 01/06/2008  
Duration: 36 months  
EU Contribution: € 1.200.000  
Estimated total cost: € 1.370.000  
[www.gmes.info](http://www.gmes.info)



# COSMOS

## Cooperation Of Space NCPs as a Means to Optimise Services

### JOINING FORCES TO BETTER SERVE FP7 APPLICANTS

*The National Contact Points (NCP) for Space from 32 countries now work together in the project COSMOS. The support action aims at making it easier for applicants to the EU's Seventh Framework Programme for Research (FP7) to find international partners and to exchange good practices.*

Cosmos means an orderly or harmonious system. It originates from the Greek meaning "order, orderly arrangement, ornaments", and is the antithetical concept of chaos. Yet cosmos also defines the idea underlying the COSMOS support action, which is to bring about an orderly arrangement for the service of NCPs including **dissemination of information about the FP7 Space theme** in a varied context comprising some 32 countries across Europe and the Near East.

**COSMOS** - Cooperation Of Space NCPs as a Means to Optimise Services - **aims at building a network of Space NCPs.**

With the introduction of space as an independent topic in EU Framework Programmes for Research, which contribute to the implementation of the European Space Policy (ESP), NCPs for Space have been set up in almost all EU Member States and Associated Countries,

as well as in certain Third Countries. Whilst some countries have a long history and proud legacies in space activities, others are discovering new opportunities dealing with Space in FP7.

Against this backdrop, **NCPs participating in COSMOS will identify and exchange good practices**, elaborate and conduct training courses for staff, and gather and provide up-to-date information on space and space relevant topics for the benefit of citizens.

Moreover, **COSMOS will contribute to improving project partner search**, making it easier for FP7 applicants to find international partners. The aim is to ensure a more balanced and high quality NCP service for the benefit of new as well as experienced FP7 applicants, whilst raising awareness of the opportunities space represents for European businesses and organisations - both public and private, and large and small alike.



**ADRIAN KLEIN**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

National Contact Points (NCPs) for Space support researchers interested in applying for funding in the FP7 topic Space. Within COSMOS these NCPs discuss, evaluate and optimise their services. This will lead to an improved overall quality of service for the benefit of the researchers.

#### Why is this project important for Europe?

By helping to improve the quality of FP7 proposals the COSMOS network supports the development of the European Research Area (ERA). Via the partner network it is further ensured that all FP7 participating States get their chance to become part of and contribute to the ERA.

#### How does your work benefit European citizens?

Supporting European researchers means ensuring a sustainable development and innovation of space based services like weather forecasting and telecommunication. This is basis for a competitive European industry depending on a leading position in leading-edge technology.



9 September 2008, COSMOS was launched with a Space Info Day in Prague.

© COSMOS

# COSMOS

## Cooperation Of Space NCPs as a Means to Optimise Services



### LIST OF PARTNERS

- Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany
- Solar-Terrestrial Influences Laboratory – Bulgarian Academy of Sciences, Bulgaria
- Technology Centre AS, Czech Republic
- Foundation for Research & Technology, Greece
- Agenzia per la Promozione della Ricerca Europea, Italy
- Malta Council for Science and Technology, Malta
- SenterNovem, The Netherlands
- Instytut Podstawowych Problemów Techniki Polskiej Akademii Nauk, Poland
- Romanian Space Agency, Romania
- The Scientific and Technological Research Council of Turkey, Turkey
- Österreichische Forschungsförderungsgesellschaft mbH, Austria
- Service d'information scientifique et technique / Dienst voor Wetenschappelijke en Technische Informatie, Belgium
- Remote Sensing Application Centre, Bulgaria
- Euresearch, Switzerland
- Research Promotion Foundation, Cyprus
- Forsknings- og Innovationsstyrelsen, Denmark
- Centro para el Desarrollo Tecnológico Industrial, Spain
- Archimedes Foundation, Estonia
- Finnish Funding Agency for Technology and Innovation, Finland
- Centre National d'Etudes Spatiales (CNES), France
- Croatian Institute of Technology, Croatia
- Enterprise Ireland, Ireland
- Israel-Europe R&D Directorate for the EU Framework Program, Israel
- Agency for International Science and Technology Development Programmes, Lithuania
- National Agency for Innovation and Research, Luxembourg
- Riga Technical University, Latvia
- University Cyril and Methodius, FYROM
- Swedish National Space Board, Sweden
- Swedish Governmental Agency for Innovation Systems, Sweden
- GR Aero Ltd, United Kingdom
- The Icelandic Centre for Research – RANNÍS, Iceland
- Agência de Inovação, Inovação Empresarial e Transferência de Tecnologia, S.A., Portugal
- Jožef Stefan Institute, Slovenia
- Slovak Research and Development Agency, Slovakia

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### PROJECT INFORMATION

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[www.fp7-space.eu](http://www.fp7-space.eu)



# STAVE

## Space Transportation Assets Valorisation in Europe

### UNITING EUROPE IN SPACE

*Even when Europe was divided by the Berlin wall, Europeans shared a common passion for space. Today a united Europe reaches for new horizons, which is why the need to benefit from the space skills which exist in Central and Eastern European countries is imminent. The project STAVE facilitates such an exchange of knowledge, as it undertakes a comprehensive mapping of the human and technological resources that New EU Member States possess in the area of Space Transportation.*

Some thirty years ago the son of a Czech mother and a Slovak father, **Vladimír Remek**, became the **first European Astronaut** from outside the superpowers. For more than seven days he circled the Earth onboard the Soyuz 28 spacecraft.

Space exploration is strongly rooted all across Europe, and as European space endeavours move forward, harvesting knowledge and potential in Central and Eastern European countries is key to success.

Focussing on the area of Space Transportation, which is essential for future European missions to the Moon and Mars, **the STAVE support action aims at identifying, evaluating and valorising space skills in the New Member States**, taking a closer look at research laboratories, universities, research institutions as well as SMEs and industry that may add value to joint European undertakings. A qualified mapping of technical skills applicable to Space Transportation will be carried out.

In particular, the mapping will include a **focus on novel techniques and methodologies** that are potentially applicable to heliothermic propulsion, and new generations of solid, electric and cryogenic propulsion.



Europeans share a common passion for space.  
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Hence STAVE contributes to achieving the overall European Space Policy objective of **maintaining an independent European access to space**, whilst also facilitating European efforts in the area of technologies for European strategic non-dependence.

The consortium behind STAVE is composed of partners from France, Germany and Italy that represent 90 percent of European efforts in the Space Transportation domain. In accordance with existing national and European Space Agency roadmaps, this team will **outline scientific and technological needs** that might be filled by Central and Eastern European expertise in the Space Transportation area.

Further to the scientific mapping, STAVE also includes important outreach elements, as effective dissemination of its results is key to its success.

History shows Europe is stronger united on the ground. With STAVE, the case is made for a strong and united Europe in space.



**MICHEL PONS**  
IS PROJECT COORDINATOR

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

STAVE aims at a wider participation of European New Member States (NMS) in European Access to Space, and provides for a double mapping: existing skills and capacities useful for Space Transportation in the 12 European NMS are identified together with all the existing or future programs in Europe.

#### Why is this project important for Europe?

Space Transportation is a European Strategic priority and highlighting the stakes enables strategic decisions for participation in large developments of the future. Europe must benefit from the diversity of its technological culture, enhancing the capacity of innovation.

#### How does your work benefit European citizens?

This project aims at enhancing research and industry in the Space Transportation domain, favouring innovation and technological development through more integration of all potential actors, enhancing knowledge, integration, worldwide competitiveness and therefore also the economy.

# STAVE

Space Transportation Assets Valorisation in Europe



## LIST OF PARTNERS

- Centre National d'Etudes Spatiales (CNES), France
- A.S.I. - Agenzia Spaziale Italiana, Italy
- Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany

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## PROJECT INFORMATION

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**FURTHER INFORMATION IS AVAILABLE AT**

[http://ec.europa.eu/enterprise/space\\_research](http://ec.europa.eu/enterprise/space_research)



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