WORK PROGRAMME 2011

COOPERATION

THEME 9

SPACE

(European Commission C(2010)4900 of 19 July 2010)

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THEME 9: SPACE

Objective:

The objective of the FP7 space work programme is to support a European Space Policy focusing on applications such as GMES (*Global Monitoring for Environment and Security*), with benefits for citizens, but also other space foundation areas for the competitiveness of the European space industry. This will contribute to fulfil the overall objectives of the European Space Policy, complementing efforts of Member States and of other key players, including the European Space Agency.

I CONTEXT

Policy context

Europe has been active in the space sector for several decades, and activities encompass a wide spectrum ranging from launchers to application satellites. Space activities, through scientific research and especially through their direct applications, are acknowledged as strategic for their contribution to the construction of Europe and the competitiveness of the European Union.

Recently, the Lisbon Treaty has strengthened the European Union's competence in the area of space. With its article 189 the Member States have again confirmed the strategic importance of space for the European Union. This article describes the three basic elements of the Union's space activities, namely the European space policy, the European space programme, as well as appropriate relations with the European Space agency. The treaty gives the European Union the responsibility to promote joint initiatives, to support research technological development, and to coordinate space related efforts.

Besides its strategic relevance, the space sector provides a stimulus to innovation and growth in the European economy, and is crucial if the EU wants to remain competitive. Furthermore, Europe is increasingly dependent on space infrastructure and applications thereof for the daily functioning of our society and proper policy development and implementation at European and national level. Space technologies have been identified by the European Council[1] end of 2008 and by the Competitiveness Council[2] in May 2009 as a key area of the Economic Recovery Plan to be included among other six highly innovative technologies in the European Innovation Plan. The Commission supports these sectors with a view to generating applications and services that benefit European citizens (e.g. environmental monitoring, security), and to stimulating technology spin-offs that benefit other industrial sectors. Given the size of investments needed to develop these sectors, there is a clear added-value of common and coordinated EU-level action.

[1] Presidency Conclusions; Doc. 17271/1/08, dated 13.02.2009

[2] Council Resolution on "The Contribution of space to innovation and competitiveness in the context of the European Economic Recovery Plan, and further steps"; Doc. 10500/09, dated 29.05.2009

EU Policies

The EU considers the space domain as a strategic area as it can directly contribute to the implementation of a large group of policy objectives, such as:

- *Sustainable Development including climate change*, (e.g. through information gathering in support of the Kyoto-protocol monitoring and the actions resulting from the Johannesburg Summit on sustainable development, taking into account also the "Lisbon Declaration on GMES and Africa" adopted under the aegis of the Portuguese Presidency, as well as the Africa-EU Dialogue on the "Implementation of the Africa-EU Partnership for Science, Information Society and Space").
- *Common Foreign and Security Policy* (e.g. in support of borders control, conflict prevention and crisis management).
- *Europe 2020* (e.g. through better opportunities for Space related industries and geo-information services, improved access to space-based data for services such as GMES).

European space policy

The Communication on the European Space Policy[3], a joint document of the European Commission and the ESA Director-General, was adopted in April 2007. In contrast to the reception of the White Paper[4] published in 2003, the Member States of both the EU and ESA have given strong political support to the Policy at the fourth European Space Council of 22 May 2007. It provides the overall political **framework** for the development of a viable and strong European space sector which will allow to:

- Develop and exploit European **space applications**, such as Galileo, GMES and satellite communication applications to secure maximum political, economic and social return from the investments in space technologies;
- Establish appropriate **funding arrangements** for the operational phase of GMES, in order to ensure the sustainability of the services for users;
- Improve coordination of and to better exploit **synergies between civilian and military programmes** – to find ways and means to improve the coordination between civilian and defence space programmes in long-term arrangements[5].. This will help to ensure that each sector can take maximum advantage of the investments of the other;
- Invest to **maintain technological expertise** as well as knowledge in space-based science and space exploration, for example by the extensive use of the International Space Station (ISS) and as well as to maintain independent access to space;
- Develop a more coordinated and coherent approach to **international relations** in space;
- Create, for the first time, a **common European Space Programme**, serving as a basis for transparency of European and national space programmes.

A direct support by the EU in the field of Space should act as an incentive to exert leverage on other public players as well as on the private sector, and to encourage them to intensify their investments. Sustaining a competitive industry (including manufacturers, service

[3] COM(2007) 212 final, 26 April 2007 "Communication from the Commission to the Council and the European Parliament : European Space Policy

[4] COM(2003) 673, 11 November 2003'"Space: a new European frontier for an expanding Union"

[5] Council Resolution 2008/C 268/01 23.10.2008. Taking forward the European Space Policy.

providers and operators) and providing appropriate services and infrastructures requires new research into new technologies and their exploitation.

Global Monitoring for Environment and security (GMES)

The strategic role of GMES in the development of the EU's role as a global actor has been outlined in the February 2004 Communication[6] of the Commission, which also identifies the major EU policies to be addressed by GMES services. These can be summarised as follows:

- Europe's environmental commitments, within EU territory and globally, by contributing to the formulation, implementation and verification of the European Union environmental policies[7], national regulations and international conventions;

- other EU policy areas such as agriculture, regional development, fisheries, transport, maritime policy, external relations with respect to the integration of the environmental dimension in the respective domains and their specific requirements;

- Common Foreign and Security Policy (CFSP), including the Common Security and Defence Policy (CSDP);

- other policies relevant to European citizens' security at European Union and national levels[8], notably the potential that exists for application to, e.g., policies related to Justice and Home Affairs activities of the European Union, such as border surveillance.

A number of GMES services shall contribute to 'achieving by 2008 an **operational** and **autonomous** European capability', as expressed at the June 2001 Gothenburg summit and in a subsequent Council Resolution[9].

In its November 2005 Communication[10], the Commission has confirmed its intention to move *from concept to reality* in supporting a variety of EU policies with geospatial information through GMES, and it has outlined the roles and responsibilities of EU institutions, the European Space Agency (ESA), and their Member States. In particular:

The **EU** will define the priorities and requirements, aggregate the political will and user demand, and ensure the availability and continuity of services. **ESA**, its Member and Co-operating States will develop space technologies and systems in the scope of the European Space Policy, will support and define the technical specifications of the GMES space component, implement it, establish coordinating centres of excellence across Europe; and advise the EU on future space component requirements. In this context, EU Member States may strengthen internal co-ordination of related data collection and management activities and federate national demand, contribute to the implementation of the necessary spatial data infrastructures and in-situ components, and support the implementation of the space component.

As a consequence of the above roles and responsibilities, ESA should manage the development of those space infrastructures which are identified to be the ones in support of FP7, in accordance with the rules of this programme, integrating these activities with its own

[6] COM(2004)65 final, 3 February 2004

[7] The 6th Environmental Action Plan (2004 to 2010) addressing climate change, nature and biodiversity, environment and health, natural resources and waste

[8] "A secure Europe in a better world–European Security Strategy" Javier Solana 12/12/2003

[9] Council Resolution 2001/C 350/02 (13.11.2001)

[10] COM(2005)565 final, 10 November 2005

in this area. The Commission will manage the development of GMES services supported through FP7 and assure optimal integration of data from in-situ monitoring.

In its November 2008 Communication[11], the Commission has reaffirmed all the steps undertaken so far to move GMES from concept to reality and the planning for the GMES programme implementation. In 2009, the Commission has made a legislative proposal for an EU Earth observation programme[12] and has examined the operational funding necessary for GMES during 2011-2013. Activities to be conducted in the GMES Initial Operations and in the FP7 GMES Activity should complement each other as far as possible. Decisions on funding and organisational arrangements after 2013 will have to be determined as part of the next multi-annual financial framework of the EU.

Crucial to the success of the GMES service component is the compliance with the requirements and the guidelines included in the INSPIRE proposal for a directive[13]. FP7 research and development activities for GMES shall therefore contribute to the ongoing INSPIRE implementation, as far as practically relevant. Furthermore, timely, reliable and relevant information on the state of environment should be made available to all and be easily understood. To this end the Commission has proposed[14] to improve, modernise and streamline the present information systems by establishing a European Shared Environment Information System, to which GMES shall contribute, as far as practically relevant.

International Cooperation

In the context of international cooperation, a diversified approach is a key element in Europe's space policy. Candidates for cooperation among other established or emerging space powers are the United States, Russia, Canada, People's Republic of China, India, and the Ukraine. To support implementation of bilaterally identified cooperation areas, the participation of countries for which a specific Space dialogue (e.g. South Africa) or S&T cooperation agreements (e.g. Brazil) are in place, is particularly welcome. The European Neighbourhood Policy covers relations with Eastern and Southern neighbours (i.e. Black and Caspian Sea region) and countries of North Africa and the Middle East (i.e. Mediterranean region). The use of space applications can contribute to their economic and social development and support environmental protection.

International cooperation with third countries (ICPC)[15] will be supported in view of expanding the use of earth observation data, and the corresponding data processing and management methods in third countries, and enhancing the relations with established space powers.

In the framework of the European Development Policy space applications such as Earth observation or satellite communications have been recognized as a central tool to support Africa in its sustainable economic and social development.[16] In particular, African and European policymakers and stakeholders got together in Lisbon at the end of 2007 calling for an Action Plan on *GMES and Africa* to be prepared during 2008-9 in close cooperation with

[11] COM(2008)748 final, 18 November 2008
[12] COM(2009)223 final, 20 May 2009
[13] Directive 2007/2/EC - OJ L 108 of 25.4.2007, p. 1.
[14] COM(2008)46 final, 1 February 2008
[15] International Cooperation Partner Country (ICPC) is a third country which the Commission classifies as low-income, lower-middle-income or upper-middle-income country and which is identified as such in the work programmes, see list in Annex 1 to the Work Programme "Cooperation"
[16] COM(2005) 489 final, 12 October 2005, "EU Strategy for Africa: Towards a Euro-African Pact to Accelerate Africa's Development"

the African Union[17], along a wide consultation process with the objective of expressing African needs for the development of GMES-related services and capacities.

Furthermore, for GMES to become the main European contribution to the global 10-year implementation plan for the GEOSS, FP7 GMES projects will also provide opportunities for data exchange with international partners, in the area of environment monitoring (especially in areas such as global climate change), and will encourage the increased use of Earth observation, as well as the development of a system of worldwide observation systems.

Additional activities, such as dedicated policy studies, can serve as valuable tools to negotiate future cooperative activities with international partners, and to better understand the benefits and risks of cooperation in order to define the scope of cooperative activities with third partners in the field of space.

Approach for 2011

The action plan underlying the Space Work programme is based on the European Space Policy. The Work programme follows the direct recommendations of the ESP Communication, the Resolutions of the Space Council[18], the "GMES Partners Board"[19] of Member States, the Space Advisory Group, as well as the User Implementation Groups for the GMES Services. All these bodies will also be instrumental in providing guidance to the Commission in the annual update of the Work Programme and of emerging needs, including for GMES information by policy makers.

Furthermore, the close adherence of principles and values expressed in various European policies will support the general acceptance of these in Europe. Ethical principles and gender mainstreaming are typical examples of such principles.

The following paragraphs define the activities and action areas covered by the Space theme of the Framework programme, and highlight a potential range of topics which could be funded during 2007-2013. The roadmap for the Space theme foresees annual calls with a final call in 2013. Some of the research topics mentioned in section I of the work programme will be funded during 2011 as part of the call published in 2010 – these call topics are specifically elaborated in section II 'Content of calls for budget 2011', together with specific call topic codes (e.g. SPA.2011.1.1-01). Furthermore, some of the topics will be implemented through mechanisms other than a call for proposals (e.g. identified beneficiary support actions, call for tenders) – these are identified in Section IV. Other potential research topics, having already been prioritised for a later call, are outlined in section V in order to enable applicants to better plan ahead. Calls beyond the call conducted in 2010, however, will still be detailed in annual updates to the FP7 Space Work Programme. Applicants are advised to keep the overall scope and strategic requirements expressed in section I, as well as the actions described in section IV, in mind when responding to specific topics of a call. Furthermore, ethical principles and gender aspects must always be taken into account. The forms of the grant to be used for the different funding schemes mentioned in the Space theme Work Programme are given in Annex 3 to the Work Programme "Co-operation" 2011.

[17] under the EU/AU Partnership on Science, Information Society and Space

[18] 4th Space Council Resolutions [also COM(2007) 212 final], 22 May 2007; 5th Space Council Resolutions, 25-26 September 2008

[19] This replaces the GMES Advisory Council, see also Commission Decision 2010/67/EU of 5 February 2010 - OJ L 35 of 6.2.2010, p. 23.

Modalities of Implementation: Research Executive Agency

Calls for proposals under this work programme Theme Space will be implemented by the Research Executive Agency (REA) according to the provisions of Commission Decision C/2008/3980 final of 31 July 2008 "delegating powers to the Research Executive Agency with a view to performance of tasks linked to implementation of specific European Union programmes People, Capacities and Cooperation in the field of research comprising, in particular, implementation appropriations entered in the Community budget". The management of all projects to be funded as a result of this work programme will be implemented by REA, with the exception of:

- actions implemented on the basis of calls for tenders
- identified beneficiary actions (being in support of policy)
- other specific topics explicitly identified as being of a strategic nature for the European Commission.

Gender dimension

The pursuit of scientific knowledge and its technical application towards society requires the talent, perspectives and insight that can only be assured by increasing diversity in the research workforce. Therefore, all projects are encouraged to have a balanced participation of women and men in their research activities and to raise awareness on combating gender prejudices and stereotypes. When human beings are involved as users, gender differences may exist. These will be addressed as an integral part of the research to ensure the highest level of scientific quality. In addition, specific actions to promote gender equality in research can be financed as part of the proposal, as specified in Appendix 7 of the Negotiation Guidance Notes [ftp://ftp.cordis.europa.eu/pub/fp7/docs/negotiation_en.pdf]".

Activities

Two main activities, complemented by a set of cross-cutting activities, will be undertaken to achieve the policy objectives expressed above, and several specific action areas are prioritised within these activities. However, not all specific action areas will be open for specific call topics in 2011.

***Activity 9.1.* Space-based applications at the service of the European Society**

The **first activity**, the development of GMES (Global Monitoring for Environment and Security) being central to this activity, is focussed on five main *action areas*:

1. Support to the **(pre-)operational validation of GMES services and products** based on the integration and harmonisation of related observation data (both satellite-based and in-situ, including ground-based, ship-borne and airborne), starting with the Fast Track Services.
2. Integrated use and application of **satellite communication and satellite navigation solutions with space-based observation systems**, and with related non-space systems.

3. **Support to the coordinated provision of observation data**, both from space-based infrastructure and from in-situ observation systems. [20]
4. Development of **Earth observation satellites**, which relate to the management of the environment and security, and which complement in-situ systems.
5. Continuity of **GMES services in the areas of Marine and Atmosphere** (**NEW**)

   In order to ensure complementarity and consistency with the proposed GMES Regulation on the European Earth observation programme (GMES) and its initial operations (2011-2013)[21], an additional action area of "providing continuity of GMES services in the areas of Marine and Atmosphere" has now been added to the first Activity 9.1.

***Activity 9.2*. Action areas strengthening the foundations of Space**

For the **second activity**, the strengthening of foundations of Space science and technology, the support is to be maximised through synergies with initiatives of ESA or other European, national or regional entities. This activity comprises three more *action areas*:

1. Support to research activities related to **space science** and **exploration**,
2. New concepts in **space transportation**, and **key technologies** including **critical components**,
3. Research to reduce the vulnerability **of space assets**.

***Activity 9.3.* Cross-cutting activities**

The **third activity** comprises a number of horizontal issues:

1. Activities in **SME relevant research** will be embedded *in all the action areas* mentioned. Applications of GMES and other space infrastructures typically require very sophisticated, state-of-the-art processing, which are often the result of research and developments done in specialised academic organisations and commercial spin-offs. Typical opportunities for SME participation in GMES may be found in the development and/or adaptation of methodologies and tools for services tailored for specific applications. Concerning space science, exploration, space transportation and space technologies spin-in and spin-off activities could be encouraged.
2. **International cooperation** with third countries (ICPC)[22] will be supported in view of expanding the use of earth observation data, and the corresponding data processing and management methods in third countries, and enhancing the relations with established space powers, with a view of facilitating access to space. Candidates for cooperation among other established or emerging space

[20] Coordination and Support Actions with identified beneficiaries for these activities are regarded as policy related actions and will not be managed by the Research Executive Agency (REA)

[21] COM(2009)223 final, 20 May 2009

[22] International Cooperation Partner Country (ICPC) is a third country which the Commission classifies as low-income, lower-middle-income or upper-middle-income country and which is identified as such in the work programmes, see list in Annex 1 of the Work Programme "Cooperation" .

powers include the United States, Russia, Canada, Japan, the People's Republic of China, India, and the Ukraine. The European Neighbourhood Policy governs relations with Eastern and Southern neighbours (i.e. Black and Caspian Sea region) and countries of North Africa and the Middle East (i.e. Mediterranean region).

All projects conducted in the Theme Space are open for such participation of third parties under the normal participation rules, with the topics mentioned above being of particular interest for international participation. Participants are eligible to participate and to be funded in the context of the Space Theme calls described in this Work Programme.

3. Effective **dissemination actions** are of importance as significant wider benefits are expected to arise from the research projects and actions supported under this programme.
4. **Cross-thematic approaches:** in this work programme, complementarity is ensured with other Themes of the Cooperation Programme. In particular, the topics in Activity 9.1 relating to GMES in this work programme are complemented by work in the Theme 'Environment (including Climate Change)'. Also 'Space critical technologies' topic in this work programme is complemented by activities in the Themes ' Nanosciences, Nanotechnologies, Materials and new Production Technologies', and 'Information and Communication Technologies'.
5. Actions (in order to better understand the opportunities and challenges associated with the **European Space Policy implementation** process will be undertaken.

II CONTENT OF CALLS

The current planning foresees one call in 2010 covering an annual work programme, for projects to be funded from the 2011 Space theme budget. No further call on these activities is currently planned based on the commitment appropriations of 2011.

Activity: 9.1 Space-based applications at the service of European Society

Area 9.1.1 (Pre-)operational validation of GMES services and products

SPA.2011.1.1-01 GMES Security: exploring operational governance options

The 6th Space Council of 29 May 2009 has invited the Commission and ESA to explore options for the long-term operation of relevant missions including procurement of data, by starting structured dialogues, based on terms of reference to be determined following close consultation of EU and ESA Member States, with those Member States owning infrastructure, in order to discuss programmatic, governance and financial aspects.

Such a dialogue should be based on well-prepared definitions of governance options, possible implementation scenarios and the respective benefits these create for GMES. With respect to specific security expertise it will be necessary to consider what the EUSC or similar institutions could offer for GMES to sustain this major EU initiative. Building upon its capacities and expertise, and bearing in mind that GMES is a civil system under civil control, as stated in the resolution on the European Space Policy, several scenarios involving the EUSC could be envisaged.

The debate on the possible future role of the EUSC is converging on the following three axes:

- To act as an interface between GMES and CFSP/EDSP users.
- The extension of the EUSC services beyond the sole remit of ESDP users in areas where it has developed a strong expertise.
- To take in the long term a coordinating role for space data access in the field of security.

Although these axes will be refined through the dialogue between GMES and EUSC stakeholders, it is necessary to conduct a *Coordination and Support Action* to:

- Further support the definitions of these axes.
- Understand how these could be implemented taking into account GMES framework.
- Evaluate the foreseen benefits for GMES.

The proposal should base its activity on a dialogue mechanism, and should be implemented involving **national authorities and EU organisations** in the definition process. It should take into account the current state of the GMES programme, (in particular aspects such as international cooperation, GMES data policy) with respect to its Security Dimension.

Funding schemes: one *Coordination and Support Action* (supporting or coordinating) with an upper eligibility limit of EUR 1 000 000 European Union requested contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected impact:

The project is expected to significantly contribute to the identification of options available for implementing a coordinated approach to space data access in the security field. It is to provide an overview of national and European stakeholder positions and deliver insights how GMES as a civil system under civil control can contribute in an operational capacity in the CFSP/EDSP context. The involvement of these stakeholders is expected to contribute directly to the impact of the project.

Area 9.1.2 Integration of satellite communication and satellite navigation solutions with space-based observing systems

This part will **not be open** for specific call topics in 2011.

Area 9.1.3 Support to the coordinated provision of observation data

This part will **not be open** for specific call topics in 2011, but **funding support is addressed in Section 4.2.**

Area 9.1.4 Development of earth observation satellites

This part will **not be open** for specific call topics in 2011, but **funding support is addressed in Section 4.1.**

Area 9.1.5: Continuity of GMES services in the areas of Marine and Atmosphere

The current FP7 projects implementing the **Fast-Track and Pilot services**, initiated from the first call of FP7, started at the beginning of 2009 and **will come to an end of their funded period towards late 2011**. Whereas the Commission's proposal for a Regulation on the European EO programme GMES and its initial operations (the GMES-Regulation) make funding allowances for the domains of **land monitoring** and **support to emergency response**, it is clearly stated in the recitals to the proposed Regulation that *"Marine and atmosphere services will continue to be developed […] with support of the research and development funding under the Seventh Framework Programme"*. It should also be noted, that within the context of GMES service capabilities, the development of capabilities to

support **Climate Change and Security** is still an R&D priority, as stated in the 2008 Communication *Global Monitoring for Environment and Security (GMES): we care for a safer planet.*[23]

In its recommendations on GMES developments, the Space Advisory Group has also clearly stated that *"there is the need for a follow-up support of the Fast Track Core service activities, especially for the Atmosphere and Ocean Core services"*. As these two services are providing both climate-change and security-relevant observational data, their continuity is of paramount importance. Resources are made available in 2011 for the continuity of Marine and Atmosphere services. Further forward planning for developments in other GMES thematic domains is provided in Section 5 "Indicative priorities for future calls".

The aim is to move away from the current approach based on the use of research funding to support "the validation of pre-operational services", and to set up prototype operational Marine and Atmosphere services. At the same time, within the same project some closely associated R&D efforts will also be required to continuously improve the quality of such operational services.

It is therefore foreseen to support this advanced prototypical stage of activities via the combination of two funding schemes, namely the *Combined Collaborative Project (Large-scale integrating project) and Coordination and Support Action*. **Proposers are urged to consult the Guide for Applicants[24] for details on how to structure their activities within this combined CP-CSA funding scheme.**

SPA.2011.1.5-01 Prototype operational continuity of GMES services in the Marine Area

Previous FP7 activities have been advancing the pre-operational marine service capabilities by conducting the necessary research and development. To enable the move to full operations as of 2014, project funding is now targeting support to prototype operations, and developing the necessary management and coordination environment to provide GMES users with continuous access to the GMES service products, as well as the interfaces necessary to benefit from independent R&D activities.

Funding is to be provided using the combination of Coordination and Support Action (CSA) and Collaborative Project (CP) funding schemes in one project. The CSA can be utilised to finance "operational support", provided that this is in "support of research"[25], and the CP can be utilised for providing necessary development work to sustain the operations of service chains.

Research in areas such as marine environment assessment and management is expected to benefit from the output of such an operationally oriented CP-CSA project. This CP-CSA should also prepare the ground for dedicated GMES Climate Change monitoring activities, and mitigation and adaptation policies which are to be further considered in future calls. The

[23] COM(2008)748, 18 November 2008.

[24] Guide for Applicants for "Combined Collaborative Project (Large-scale integrating project) and Coordination and Support Action", FP7-SPACE-2011-1

[25] Annexe III of Decision No. 1982/2006/EC and FP7 CSA Guide for Applicants, Pg 7. Support actions may cover a wide range of activities relevant to GMES operational service structures such as: operational support, specific services activities related to the [GMES] research infrastructures, preparatory technical work, or contribution to the construction of a new [GMES] infrastructures.

CSA funding should be targeted at running costs, staff efforts for data preparation, routine intervention in the service chain, user service desk and product delivery.

It should be noted that European Union financial support under the CSA part shall not include any capital investment costs for infrastructure, but focus on the additional costs of usage of already existing infrastructure, and sustaining the operational service, for instance through staff efforts and including running costs for high-performance computing.

Day to day maintenance of the service chain, to adapt it to new input data, making minor improvements to existing production systems to maintain performance, investigating performance problems arising, developing suitable solutions and upgrades to maintain product delivery, and responding to user queries should be addressed. Development needs will have to be met with short response times (of about one year), and the R&D within this project is to be closely coupled to the operational needs.

The marine service is to produce generic services based upon the common-denominator ocean state variables that are required to help meet the needs for information of those responsible for environmental and civil security policy making, assessment and implementation. The marine service is consisting of the following activities:

- Data acquisition from the ground segment of the space based observing systems and in situ networks.
- Acquisition of atmospheric forcing data (atmospheric winds, temperatures, fluxes) from National Meteorological Services and ECMWF.
- Compilation of these data into quality controlled thematic datasets suitable for the generation of more extensive data sets for subsequent use, analytical products and assimilation by ocean models. (Regular reviewing of accuracies and quality of information products should be undertaken). Thematic Assembly Centres are to be formed in this task by the Thematic Groups that are in charge of compiling the following data sets: sea surface temperature, ocean colour, sea level, sea ice, surface winds and fluxes wind, and in situ data.
- Running of numerical ocean models in near real time to assimilate the thematic data and generate analyses and forecasts from them to an agreed and generally perpetually repeating cycle. The centres also need to operate offline to produce reanalyses /hindcasts. Monitoring and Forecasting Centres are operating regional and global models: global, Arctic, Baltic, North West shelf, Irish-Bay of Biscay and Iberian Coast, Mediterranean Sea and Black Sea.
- Preparation of products suitable for external service provision.

The proposal should include the arrangements made to obtain the necessary input data from other external initiatives and data providers such as EuroArgo (and Argo), drifters, moored buoys, XBTs, Ferry boxes etc. The proposal should also take into account the information that could be provided under the current DG MARE's preparatory action (Call for tenders – ref. MARE/2010/02) for European Marine Observation and Data Network (EMODnet) physical parameters which will be assembling real time and archived physical data.

The proposal will contribute to the implementation of the marine environmental reporting, especially under Marine Strategy Framework Directive, which establishes a framework for community action in the field of marine environmental policy[26]. The project should

[26] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 (OJ L 164, 25.6.2008)

demonstrate and prove the mechanisms to be used in the post-2014 operational GMES phase, particularly how existing capabilities and capacities across Europe will be used effectively.

Proposals should structure their activities to ensure service provision until at least September 2014.

Space-based observation data necessary to the development of each project will have to be detailed in the proposals, particularly if the data needed is envisaged to be possibly provided, completely or in part, through the data access arrangements between the EU and ESA.

Funding schemes: one *Combined Collaborative Project (Large-scale integrating project) and Coordination and Support Action* with an upper eligibility limit of EUR 28 000 000 requested European Union contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected impact:

The project is expected to provide a continuity to the pre-operational capacities achieved in the GMES research framework context, establishing a stable base on which operational activities with a starting point in late 2014 can be established. The project is expected to have a significant impact on the emergence of a technically robust and sustainable GMES service infrastructure in Europe, able to supply both source and interpreted data, as well as forecasts. The service should significantly contribute to the environmental information base allowing Europe to independently evaluate its policy responses in a reliable and timely manner.

SPA.2011.1.5-02 Prototype operational continuity of GMES services in the Atmosphere area

Previous FP7 activities have been advancing the pre-operational atmospheric service capabilities by conducting the necessary research and development. To enable the move to full operations as of 2014, project funding is now targeting support to prototype operations, and developing the necessary management and coordination environment to provide GMES users with continuous access to the GMES service products, as well as the interfaces necessary to benefit from independent R&D activities.

Funding is to be provided using the combination of Coordination and Support Action (CSA) and Collaborative Project (CP) funding schemes in one project. The CSA can be utilised to finance "operational support", provided that this is in "support of research"[27], and the CP can be utilised for providing necessary development work to sustain the operations of service chains.

Environmental research areas expected to benefit from the output of such an operationally oriented CSA project, including also Climate Change monitoring. This should also prepare the ground for dedicated GMES Climate Change monitoring activities, and mitigation and

[27] Annexe III to Decision No. 1982/2006/EC and FP7 CSA Guide for Applicants, Pg 7. Support actions may cover a wide range of activities relevant to GMES operational service structures such as: operational support, specific services activities related to the [GMES] research infrastructures, preparatory technical work, or contribution to the construction of a new [GMES] infrastructures.

adaptation which are to be further considered in future calls. The CSA funding should be targeted at running costs, staff efforts for data preparation, routine intervention in the service chain, user service desk and product delivery.

It should be noted that European Union financial support under the CSA part shall not include any capital investment costs for infrastructure, but focus on the additional costs of usage of already existing infrastructure, and sustaining the operational service, for instance through staff efforts and including running costs for high-performance computing.

Day to day maintenance of the service chain, to adapt it to new input data, making minor improvements to existing production systems to maintain performance, investigating performance problems arising, developing suitable solutions and upgrades to maintain product delivery, and responding to user queries should be addressed. Development needs will have to be met with short response times (of about one year), and the R&D within this project is to be closely coupled to the operational needs.

The GMES Atmosphere Service should address four themes: air quality, climate forcing, stratospheric ozone (plus UV radiation), and solar radiation. It consists of five core activities:

- Observation acquisition and pre-processing aiming at interfacing with data/product providers and perform quality control of inputs, validation and blending for modelling use.
- Global monitoring, assimilation and forecasting transforming the quality-controlled observations into assimilated global fields and producing global forecasts as well as emission fluxes.
- An ensemble of European-scale monitoring, assimilation and forecasting systems combining the outputs of several models at European scale to produce fields and forecasts.
- Data and Products interface to users, ensuring the dissemination of all output products to the users with high quality.
- Core R&D allowing problems analysis in all service components and processes, and driving R&D on specific short term issues.

The GMES Atmosphere Service will interface with other GMES services with regard to climate change, the identification of sources and sinks as well as for emergency situations.

The implementation and architecture of the GMES Atmosphere Service is to be based on a service chain concept. This integrated service is to meet common data and information requirements of a broad range of application areas, corresponding to the following criteria:

- Focus on wide geographical coverage – global, regional (i.e. European) scale;
- Address the needs of downstream services and end users, but with downstream services outside the scope of this topic;
- Avoid duplications of efforts and operations.

The GMES Atmosphere Service should integrate the following service chain elements:

- Satellite retrieval work, whilst taking benefit from other existing capacities and initiatives such as the ESA Climate Change Initiative;
- Production of centralised Stratospheric ozone products, based on up-to-date developments from previous ESA and FP7 funded projects;

- Production of near-real time global compositions of Greenhouse gases, reactive gases and aerosols, including the main air pollutants at a higher resolution European scale;
- Global delayed mode and reanalysis production streams, with special focus on air quality issues at European scale ;
- Flux inversions for Carbon dioxide, methane and aerosols;
- Estimates of direct and indirect climate forcing from aerosols;
- Boundary value provision for regional modelling of tropospheric and stratospheric chemistry, and local and urban modelling for air quality;
- Global fire monitoring and emissions;
- Emission fluxes of aerosol components and reactive gases at the high(er) resolution EU scale, to support accountability studies of major EU policies (transport, industry);
- To promptly respond, when needed, with specific products related to major events of EU importance (such as volcanic ash, major fires....).

The outputs of the prototypical GMES Atmosphere Service should include both data products and elaborated products. Policy support tools to help the operational interpretation of atmospheric variables should be generated, including easy access to observational data, data delivered in Near Real Time (NRT) (especially for AQ), GCOS essential climate variables (CF), and gridded fields. Elaborated products are forecasts and analysis products, i.e. long-time trends as established by reanalysis, and "low volume" information and scenarios for policy makers, as well as the identification of sources and sinks. Added value should be derived from combining space and in-situ observations and assimilating them in models.

These GMES Atmosphere Service service-chains should benefit from using infrastructure that has been developed over many years in Europe (an example of such capacities being numerical weather forecasting), and the funded tasks should contain only the activities necessary for upholding GMES service levels in a continuous form.

The proposal should include the arrangements made to obtain the necessary input data from other external initiatives and data providers such as the regional AQ regulatory and scientific networks, the EMEP network, ICOS, IMECC, IAGOS, AirCE and GEOMON. For UV, the European UV network is the main capacity. Tropospheric content and profiles relies mostly on research funding, requiring also suitable arrangements to be in place. Close liaison with the coordination activities of the EEA in respect of in-situ networks should be foreseen and detailed in the proposal.

Products are to be provided as public goods, particularly for R&D efforts in Europe. It is also expected that the Atmosphere service will provide significant support to Climate Change research. Product dissemination and provision to facilitate access and utilisation within the research community in particular should also be included.

The service should meet the needs of users/actors at both European and national levels dealing with policies on air quality, renewable energies, climate change mitigation and adaptation as well as the protection of the ozone layer. Focus should be on supporting international commitments for these policy areas, (e.g. Montreal protocol, Kyoto protocol, Convention on Long Range Transboundary Air Pollution, European Air Quality Directives), in particular to meet established requirements set out in documents such as GCOS 2nd Adequacy Report or IGACO. The user communities for these services are wide ranging and includes environmental authorities and agencies, meteorological & health agencies, NGOs, research/science community, private sector, developing countries, other GMES services, and - last but not least - EU citizens.

Explanations and descriptions of interfaces to deal with users of the operational service would have to be provided within the proposal, including those with downstream projects (particularly from the second FP7 call, FP7-SPACE-2009-1).

The project should demonstrate and prove the mechanisms to be used in the post-2014 operational GMES phase, particularly how existing capabilities and capacities across Europe will be used effectively.

This also includes management and interfaces to be able to take benefit from R&D activities, and thus the service project should also provide

- specifications of tools in GMES Atmosphere Service project production systems (e.g. compilers/programming languages, data interfaces and formats, etc);

- testing environments for software in R&D activities utilising GMES Atmosphere Service project data repositories, or providing ancillary input for future GMES Atmosphere Service service-chains.

Proposals should structure their activities to ensure service provision until at least September 2014.

Space-based observation data necessary to the development of each project will have to be detailed in the proposals, particularly if the data needed is envisaged to be possibly provided, completely or in part, through the data access arrangements between the EU and ESA.

Funding schemes: one *Combined Collaborative project (Large-scale integrating project) and Coordination and Support action* (CP-CSA) with an upper eligibility limit of EUR 19 000 000 requested European Union contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected impact:

The project is expected to provide continuity to the pre-operational capacities achieved in the GMES research framework context, establishing a stable base on which operational activities with a starting point in late 2014 can be established. The project is expected to have a significant impact on the emergence of a technically robust and sustainable GMES service infrastructure in Europe, able to supply both source and interpreted data, as well as forecasts. The service should significantly contribute to the environmental information base allowing Europe to independently evaluate its policy responses in a reliable and timely manner.

SPA.2011.1.5-03 R&D to enhance future GMES applications in the Marine and Atmosphere areas

The prototype operational Marine and Atmosphere service supported in topic 1.5-01 and 1.5-02 through CP-CSA funding schemes will exclude research work, i.e. longer term R&D devoted to the evolution of GMES services. Both Marine and Atmosphere services will require R&D work to be conducted in parallel to improve the quality of operational services,

include new scientific methodologies, develop new applications and to improve user uptake of such new applications.

Medium to long term R&D which will benefit the GMES applications beyond 2015 should be considered within this topic 1.5-03, as operations and immediate research needs of the Marine and Atmosphere service projects are already covered under topics 1.5-01 and 1.5-02 of this call.

The suitability of current GMES service products on atmospheric composition and marine state variables for application by the Climate Change research community is also considered to be an important candidate for research attention in this topic. Such research and development actions on innovative products will go beyond the prototype GMES operations addressed in Topic 1.5-01 and 1.5-02 for the future and fill any major gaps that may not be covered in the prototype GMES operational services.

Specific topics that still need to be addressed as a follow-on from the Fast-Track and Pilot service projects could be identified from the service descriptions prepared by the GMES service implementation groups, concentrating on medium to long-term developments.

Project proposals are also expected to meet the product specifications and requirements as identified by the Atmosphere and Marine Implementation Groups in the Final Reports[28] and proposers need to demonstrate how their proposed activities represent significant progress of the state of the art as compared to the current operational service capacities in Europe.

Projects should include activities aiming at disseminating knowledge and increasing public awareness of the results achieved through the integration of space technology and in-situ observation systems. Project output could include an assessment of the type of data and level of spectral, spatial and time resolution expected from the next generation of satellites and in-situ data sources.

Space-based observation data necessary to the development of each project will have to be detailed in the proposals, particularly if the data needed is envisaged to be possibly provided, completely or in part, through the data access arrangements between the EU and ESA. With regard to ***in-situ data*** necessary to the development of each service, the proposals should also describe which efforts the proposers will undertake to obtain these data. An interface with coordination activities of the EEA in this respect should be foreseen, it being understood that the EEA will not provide in-situ data as such through this coordination activity.

In general needed in-situ data could include:

(i) data collected by networks of sensors deployed on land, sea, water and in the atmosphere aimed at measuring and providing a complete description of the Earth system.

(ii) surveys aimed at collecting socio-economic data, land cover and land-use data, geology, soil conditions, bio-diversity information and other topographic or geographical data such as elevation, administrative boundaries, transport and utility networks etc.

In particular ***in-situ data*** should meet the immediate needs of the specific proposed service and should cover, inter alia, the following requirements:

- Timeliness, in function of the service requirements.
- The provision schemes and their corresponding delivery interfaces (FTP, other internet protocols, dedicated communication schemes);

[28] Further information on the GMES service Implementation Group reports is available on at the website http://www.gmes.info/pages-principales/library/implementation-groups/.

Specific needs for dedicated in-situ data for the development of each service should be detailed in the proposals.

Funding schemes: *Collaborative Projects* (small or medium-scale focused research project) with upper eligibility limit of EUR 2 000 000 European Union requested contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected impact:

The projects will be expected to establish innovative new GMES products or applications. In the context of already existing capabilities, projects will be expected to contribute to the integration of future lines into (pre)operational service chains of the GMES services.

Further insights into the uptake of products, possible models for operational supply, and the evolution and trends of future sensor needs will be demonstrated. The results obtained will contribute directly to the sustainability and competitiveness of European value-adding services.

The projects should also examine the impact that their products and services could have in a socio-economic context. They should also contribute to reducing climate change uncertainties in related geo-spatial information products. The projects will reflect the mutual dependency of technology, organisational dynamics, societal issues as well as related legal/economic aspects

The impact of the system should also be demonstrated through pilot tests.

It is expected that projects have an impact on widening participation to GMES, by mobilising actors in the marine and atmosphere research communities, not involved in the GMES core service projects. Apart from addressing specific knowledge generation enabling better policy making at European level, projects could also help stimulate new commercial spin-offs and thereby have a beneficial impact on SMEs active in the value-adding sectors. Developing products specifically tailored for subsequent integration into production chains of such SMEs, or strong participation of SMEs in the project should help realisation of that impact.

Activity: 9.2. Strengthening the foundations of Space science and technology

Area 9.2.1: Research to support space science and exploration

SPA.2011.2.1-01 Exploitation of space science and exploration data

Space based observations play a leading role in Earth, Planetary, Universe, Environmental, Physical and Life sciences, providing a privileged vantage point of our planet and objects of the universe, especially when taken in synergy with ground based observations, data analysis and modelling tools and other research in laboratories. Collaborative proposals in the field of data exploitation are of particular importance since ESA has supported many science and exploration missions, but data analysis has mainly been limited to national effort on a project by project basis, therefore limiting a full exploitation of raw data.

Research projects are intended to strengthen cooperation on scientific problems including data exploitation related to space exploration, including astrophysical insights. To keep a realistic time and budgetary frame, the focus should be on robotic-exploration and pre-requisites to human exploration, such as biomedical studies. Widest use should be made from data gathered on European and international space missions, enhancing their value by combining these with non-space based research results. Results from in-space experiments (such as the International Space Station) could also be included in the research activities. Project proposals should clearly demonstrate how their proposed combination of data sets, e.g. from multiple sources or combining space and non-space based data, leads to strong synergies.

The Work Programme topic on space science and exploration is open to international cooperation and should focus on downstream R&D activities complementing space missions, such as the **effective scientific exploitation** of existing data. Missions currently in operation produce data sets of potentially immense value for research but may need additional funding for a more comprehensive interpretation.

Cooperation with international partners from third countries (ICPC)[29], or countries with S&T agreements, as well as other space-faring nations (e.g. US, Japan) will help to expand the use of data, the corresponding data processing and management methods in third countries, and enhance the relations with established space powers. Therefore such international partners *will be eligible to participate and to be funded.*

Funding schemes: *Collaborative Projects* (small or medium-scale focused research project) with upper eligibility limit of EUR 2 000 000 European Union requested contribution.

Note: Limits on the EC financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected impact:

Projects are expected to add value to space missions and earth based observations by significantly contributing to the effective scientific exploitation of collected data. They are expected to enable space researchers to take full advantage of the potential value of data sets. Expanding the use of data the corresponding data processing and management methods in third countries, and enhance the relations with established space powers are regarded to add value to European space missions.

Projects are expected to contribute to the much needed coordination of the exploitation of existing and future data collection, and thereby enhancing the possibility to base research on datasets providing comprehensive or full coverage, while at the same time addressing the potential need for further analysis of existing datasets. It is also expected that the projects will facilitate access to and appropriate use of data for those scientists who are not part of the team having obtained it.

Furthermore, projects are expected to add value to existing activities on European and national levels, and to raise the awareness of coordination and synergy efforts among stakeholders.

[29] International Cooperation Partner Country (ICPC) is a third country which the Commission classifies as low-income, lower-middle-income or upper-middle-income country, and which is identified as such in the work programmes, see list in Annex 1 to the Work Programme "Cooperation".

SPA.2011.2.1-02 Research and development for space exploration

Technologies relevant for space exploration, with the focus on robotic explorations will be supported. Research proposals should cover topics such as *innovative instrumentation* (e.g. for the detection of traces of early life forms, for the preservation and the processing of the samples, to be acquired and analysed in situ or returned to the Earth), *mobility on planetary surfaces* (robotic exploration, rover, robots and cooperative systems), *in-space and from-surface propulsion* (as well as entry, descent and soft and precision landing, in orbit rendezvous, capture and high precision attitude control systems), *in-space power generation* (as well as making use of novel power sources or photo-voltaic technologies) and innovative *techniques for survivability in space*, including habitation, life support and protection against environmental influences, including radiation. Activities should be in coherence with the existing and planned developments at ESA.

Human presence in space is costly, and to employ their unique capabilities as effectively as possible in space, in the short and medium term robots with autonomous capabilities and some form of artificial intelligence should be able to take over certain tasks from astronauts, thereby freeing them to perform complex or supervisory tasks. On the other hand, robots also extend human handling capabilities in space, outside habitable structures. In the long-term, assembly of space structures in orbit or on planetary surfaces could be performed by autonomous, distributed and co-operating robotic systems. To make such highly accurate maneuvers in space possible, also suitable micro-propulsion systems are sought which deliver the needed small thrust levels. Research proposals should cover topics preparing such advanced concepts for *autonomous distributed and co-operating systems* for future space application.

The participation of SMEs, the inclusion of international partners (from third countries (ICPC)[30], countries with S&T agreements as well as other space-faring nations (such as the US and Japan) will help to advance technologyand enhance the relations with established space powers. These aspects should be taken into account in the proposal. International partners will be eligible to participate and to be funded.

Funding schemes: *Collaborative Projects (*small or medium-scale focused research project) with upper eligibility limit of EUR 2 000 000 European Union requested contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected impact:

Projects are expected to strive for innovative in-space technologies, which enable robotic exploration missions with a higher scientific return. Accomplishment of this objective will allow future space exploration mission planners to shift their focus from the difficulty of the journey to the science challenges at the destination. Projects are expected to improve robotics technologies, which enable meaningful planetary science under harsh and unexpected environments, and they are expected to provide new concepts for in-orbit operations, which will improve exploration mission concepts in terms of transportation time and reliability.

[30] International Cooperation Partner Country (ICPC) is a third country which the Commission classifies as low-income, lower-middle-income or upper-middle-income country, and which is identified as such in the work programmes, see list in Annex 1 to the Work Programme "Cooperation".

Projects are expected to complement planned space exploration missions by significantly contributing to the availability of advanced transportation, robotics and GNC and attitude control technologies. It is expected that the project will be complementary to, and clearly demonstrates an added value to, the efforts already carried out in this field by ESA or at national level. Furthermore, projects are expected to contribute to the potential long-term preparation of human space flights and settlements on planets for the benefit of life on Earth.

Research funding in this area should have a beneficial economic impact on SMEs in the space sector. A strong participation of SMEs in the project should help to realise this impact.

Area 9.2.2: Research to support space transportation and key technologies

SPA.2011.2.2-01 Space transportation technologies

In the domain of Space Transportation, the objective is to enhance the European competitiveness for the next generation of launchers, in coherence with the existing and planned developments at ESA. The confirmed needs in this domain are the independence of European access to space and the capacities for space exploration as set out in the European Space Policy.

Research and development proposals shall contribute to increase the innovation capacity of future developments by proposing and evaluating new concepts and disruptive technologies, offering a wider range of choice for the next developments. This could cover activities in the domain of:

- Launcher concept itself: contributing to define new possible missions which could serve challenges such as environmental preservation and servicing capabilities;

- New propellants: developing more energetic, low-cost and safer options, including evaluation of new molecular structures;

- Innovative materials and simulation methodologies: increased capacities, reduced cost and weight of launcher components or tanks (e.g. making use of nano particles);

- Long duration power systems, including fuel cells integration concepts in a launcher;

- Reducing weight of electronic and electrical hardware, including miniaturisation of instrumentation, transducers and their electronic system (reliability, integration capacity, precision, power consumption).

Projects are expected to demonstrate their complementarity with existing ESA road-maps and ongoing or planned activities. Proposers should clarify how their proposals add value for Europe in light of these developments.

International cooperation with existing and emerging space powers may be considered where necessary and appropriate. In such cases, proposers should clarify how the international cooperation adds value to European capacities, and contributes to an independent European access to space, to justify that international partners *will be eligible to participate and to be funded*.

Funding schemes : *Collaborative Projects* (small or medium-scale focused research project) with upper eligibility limit of EUR 2 million European Union requested contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected impact:

Projects are expected to improve the European competitiveness for the next generation of launchers. In coherence with the objectives set out in the European Space Policy, projects are expected to contribute to the independent European access to space and to enhance capacities for space exploration. Projects are expected to consolidate the long term sustainability and to improve the economical aspects of a domain known to be demanding in terms of reliability by experimenting novel techniques and methodologies. Furthermore, they are expected to increase the innovation capacity of future developments by proposing new concepts and disruptive technologies.
Research funding in this area should have a beneficial economic impact on SMEs in the space sector. A strong participation of SMEs in the project should help to realise this impact.

SPA.2011.2.2-02 Space critical technologies

The space sector is a strategic asset contributing to the independence, security and prosperity of Europe and its role in the world. As underlined in the European Space Policy, recognised in the European Parliamentarian Resolution[31] and stressed and highlighted in the Resolutions from the Space Council from 2007[32], 2008[33] and the 6th Space Council held on 29th May 2009, Europe needs non-dependent access to critical space technologies, which is a condition-sine-qua-non for achieving Europe's strategic objectives. "Non-dependence" refers to the possibility for Europe to have free, unrestricted access to any required space technology.

Critical Technologies for European Non-Dependence are not restricted only to specific electric or electronic components, but include all those technologies which are surveyed and monitored by the Joint EC-ESA-EDA European Non-Dependence process encompassing platform, payload and launcher technologies. A number of priority technologies have been identified for Framework Programme 7 support as summarised in a table of technologies below. The table should only be regarded as a first guidance of the technologies which can be addressed - **proposers are required to consult the detailed table available on the CORDIS call webpage in the "Additional Information" section before drafting proposals, in order to ensure the correct alignment with European strategic challenges and technology readiness level (TRL) required.**
Careful coordination with ESA technology programmes is required, technologies not covered by the table will be regarded as out of scope of the call.

ID	***Title***
1*	~~Core processors for DSP computers~~
2	ASICS
3*	~~High speed DAC-ADC based on European Technology~~
4	Very high speed serial interfaces

[31] Resolution of 20 November 2008 on the European space policy: how to bring space down to earth
[32] Space Council Resolution 22. May 2007, "RESOLUTION ON THE EUROPEAN SPACE POLICY"
[33] Space Council Resolution 26. September 2008, "Taking forward the European Space Policy"

5*	~~FPGAs~~
6	Solid state gyroscope components
7	Power amplification: TWT materials
8	European State of the Art Dielectric Materials
9*	~~Make available Submmw Local Oscillator Sources~~
10	Space-worthy solid-state laser sources
11	Enhanced performance and space-worthy 1-D and 2-D Sensor focal planes operating from X-ray to the Infrared
12	Bladder tanks for bipropellants
13	Propellant flow and distribution components for electric and chemical propulsion
14	Development of Large Deployable structures
15	Development of low shock (NEA-like) initiators
16	Advanced Ablative Systems for high speed re-entry
17	Passive Components
18	Active Components
19	Very High performance microprocessors
20*	~~Advanced microwave components - MMIC~~
21	Low-cost high-resolution L and X-band SAR components
22	Advanced thermal control systems
23	Advanced thermal control materials
24	High density (up to 1000 pins) assemblies on PCB
25	Space qualified carbon fibre and pre impregnated material sources for satellite subsystems

* Domains with greyed out cells and struck- out text have already been significantly or partially addressed in previous FP7 Space calls and will not be open for proposals in this call.

To address the strategic challenges on space technologies, FP7 intends to complement current efforts of the European Union and to contribute to the European Space Programme. Projects are expected to demonstrate their complementarities and possible synergies with national agency and ESA funded activities, as well as relevant Harmonised European Space Technology Roadmaps.
Emphasis for these activities should not necessarily be on the advanced nature of their scientific innovation, but, more importantly, be on the **expected medium term impact** for Europe to develop or regain the capacity to operate independently in space, e.g. by developing in a timely manner reliable and affordable space technologies that in some cases may already exist outside Europe or in European terrestrial applications.

Funding schemes: *Collaborative Projects* (small or medium-scale focused research project) with upper eligibility limit of EUR 2 000 000 European Union requested contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected impact:

The projects are expected, first and foremost, to reduce the dependence on critical technologies and capabilities from outside Europe for future space applications, *as identified in the EC-ESA-EDA Critical Space Technologies for European Strategic Non-Dependence - List of Urgent Actions 2010/2011.*

In addition, projects should enhance the technical capabilities and overall competitiveness of European space industry satellite vendors on the world wide market. The projects are expected to open new competition opportunities for European manufacturers by reducing the dependency on export restricted technologies that are of strategic importance to future European space efforts. They should enable the European industry to get non-restricted access to high performance technologies that will allow increasing its competitiveness and expertise in the space domain. Projects should improve the overall European space technology landscape and complement the activities of European and national space programmes.
In this context, technological spin in and/or bilateral collaborations should be enhanced between European non-space and space industries and projects are expected to provide advanced critical technologies that are of common interest to different space application domains (e.g. telecom, Earth-observation, science, etc.).
Research funding in this area should have a beneficial economic impact on SMEs in the space sector. A strong participation of SMEs in the project should help to realise this impact.

Area 9.2.3: Research into reducing the vulnerability of space assets

SPA.2011.2.3-01 Prevention of impacts from Near Earth Objects (NEOs) on our Planet

The potential threat of Near Earth Objects (NEOs) such as asteroids and comets to life on earth is receiving increased attention. In order to assess the risk posed, further understanding of their orbits and their composition is required.

In the light of growing information from newly available space-and ground-based telescopes, many scientific questions can be addressed, such as the material properties of such NEOs, as well as their stability. Their orbit and position relative to Earth can be studied with higher reliability and precision, allowing for better forecasting and risk estimation.

Furthermore, it is time to launch a new joint effort for exploring technological and scientific ways to prevent a potential large impact from cosmic objects like comets or asteroids on our planet. Proposals should explore the feasibility of methodologies and capabilities necessary to prevent a collision of Earth with such outer space objects. This feasibility should, where appropriate and possible, be validated experimentally.

As several space-faring nations have reached a level of technical capability and scientific expertise, which might be sufficient to develop potentially successful strategies to prevent an impact, research proposals in this domain should be conducted with the appropriate international participation, in particular from Russia, the USA or Japan. Such international partners *will be eligible to participate and to be funded.*

Funding schemes: *Collaborative Projects* (small or medium-scale focused research project) with upper eligibility limit of EUR 4 million European Union requested contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected impact:

The projects are expected to significantly enhance the capability to understand these NEOs, the threat they pose, help to mitigate the risks, and to develop successful strategies to prevent an impact. The projects should also contribute to establishing a coordinated global approach on this potential threat, together with established space powers.

Activity: 9.3 Cross-cutting activities

Area 9.3.1: SME specific research

This part will **not be open** for specific call topics in 2011.

This means that SME participation in proposals is encouraged in all call topics, but does not constitute a minimum eligibility criterion.

Area 9.3.2: International cooperation

SPA.2011.3.2-01 Support for "GMES and Africa" Initiative

Activities initiated under the Lisbon Process on "GMES and Africa" have been successful in drawing in stakeholders from both the European and African continents in using Earth observation technology in a multitude of application domains in support to development policies. The initiative is an integral part of the Joint Africa-EU Strategic Partnership, being pursued under Partnership 8 (Science, ICT and Space). The Action Plan on GMES and Africa, identifying needs priorities for action, has been drafted and will be issued after a wide consultation exercise taken place throughout 2010 both in Africa and in Europe. It will be submitted by the end of 2010 to the Africa-EU Summit, in Libya, for endorsement and implementation.

As of 2011, the next phase of the implementation of "GMES and Africa" action plan is expected to start, and FP7 is expected to be one important supporting instrument in the frame of the Joint African Europe Strategy under Partnership 8 on Science, Information Society and Space[34].

Coordination of the GMES and Africa initiative is being done by a team composed of African and European stakeholders, largely on a volunteer basis. Once the Action Plan will be endorsed, it will be necessary to promote, accompany and supervise its implementation through appropriate coordination, awareness and communication mechanisms in support to the group of stakeholders leading the initiative.

Continued support to the group of stakeholders is to be given through a Coordination and Support Action, particularly regarding the involvement of the African partners in steering it, ensuring African up-taking and ownership along the principles agreed in Lisbon in 2007 and those governing the Joint Africa-EU Strategy. Firstly, the activity should aim at facilitating the capacity for selected African experts to attend key coordination events and conferences over the post-2011 implementation period of 2 to 3 years, as well as at the organization of a major awareness and coordination event in Africa, likely on a yearly basis. Secondly, it should provide support *in-loco* to the African entity responsible to coordinate the

[34] Further information on Africa-EU Partnership is available on the website http://www.africa-eu-partnership.org/partnerships/science-information-society-and-space

implementation of the Action Plan. Thirdly, it should provide yearly reports on how GMES services could fulfill the needs identified in the GMES and Africa Plan, making use of the expertise in Africa and in Europe, and the efforts of relevant FP7 funded projects, contributing for coherence between the developments in Europe and in Africa, exchange of know-how, economy of scale and long-term sustainable cooperation.

Funding schemes: It is expected to fund one *Co-ordination and Support action* (coordinating or supporting type[35]) with an upper eligibility limit of EUR 1 million European Union requested contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected Impact:

The project is expected to significantly enhance the effective participation of African stakeholders in the joint Africa-EU Strategy on GMES and Africa, catalyse user involvement, Africa ownership and long-term sustainable cooperation in the space applications sector (w.r.t. Earth Observation). It will facilitate the implementation of the Action plan. It will contribute to harmonise GMES Europe and Africa initiatives, inducing an economy of scale in the implementation of services.

SPA.2011.3.2-02 Facilitating access to space for small scale research missions

Cubesat platforms and other small-scale satellites have become an important standardised base for conducting scientific experiments in space, giving both university and commercial researchers the means to access space. Despite an increasing popularity of Cubesats for research, the lack of launch opportunities has limited the exploitation. Launch opportunities so far are mostly intended as a first step to boost hands-on development by students in complement with other education project activities, thus providing a suitable and qualified space workforce for the future. Additionally to such usage as an educational tool, valuable research and science by other research entities, including SMEs, could receive a boost, if suitable low cost launch possibilities were made available. Improved accessibility to low-cost launches will allow the placement of small-scale satellites into dedicated orbits optimised for specific research flights, rather than opportunity orbits only.

Integration of a large number of such experimental platforms on one launcher, allowing for the simultaneous launch of several different research missions can also lower access costs per satellite, but requires complex deployment mechanisms. The development of the interface suitable for a launch with a low-cost launcher should be included. Additionally, providing a means to utilise double-cubesats or multiple-cubesats in a modular approach would further enhance the exploitability of this universal platform. Furthermore, the technology developed

[35] Please note, for Coordination and Supporting Actions aiming at supporting research activities and policies the minimum condition shall be the participation of one legal entity. For Coordination and Supporting Actions aiming at coordinating research activities and policies the minimum condition shall be the participation of three legal entities.

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should address the specific requirements necessary for orbit insertion suitable for formation flying or deployment of swarms of spacecraft.

Launch concepts affordable to the science community in Europe and/or the development of a mechanism suitable to deploy cubesats (or alternative nano-satellite platforms) are to be supported with funding, and a proposal should include demonstration. Such a demonstration should include payload placements in orbit performing realistic space based research, typical of the type of research flights to be offered in future. These experiments could encompass for example in-situ environmental monitoring in the thermosphere, climate-change monitoring, materials testing, in-orbit validation of components, medical or biological research or microgravity research. Proposals addressing several different experiments are preferred.

Appropriate attention should be given in proposals to the end of life de-orbiting of the deployed space hardware.

The active participation of international partners (from third countries (ICPC)[36], countries with S&T agreements as well as other space-faring nations (such as the US and Japan) is **mandatory** (eligibility criteria), and this has to contribute to the scientific and technological excellence of the project and/or lead to an increased impact of the project's results. International partners *will be eligible to be funded.* Proposers should therefore clarify how this international cooperation gives added value to European capacities.

Funding schemes: *Collaborative Projects* (small or medium-scale focused research project) with upper eligibility limit of EUR 8 million European Union requested contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- Expected impact:

Proposals are expected to contribute to the availability of affordable launch opportunities for the scientific community. The capability for realising specific research flight scenarios, possibly utilising complex multiple payload placements, should be enhanced, and the scope of achievable space-based experiments should be enlarged. The affordability and viability of the proposed research flight scenario(s) should be demonstrated.

[36] International Cooperation Partner Country (ICPC) is a third country which the Commission classifies as low-income, lower-middle-income or upper-middle-income country, and which is identified as such in the work programmes, see list in Annex 1 to the Work Programme "Cooperation".

Area 9.3.3: Dissemination: Transnational and international cooperation among NCPs

SPA.2011.3.3-01 Trans-national and international cooperation among NCPs

Reinforcing the network of National Contact Points (NCP) for FP7 under Space theme is to be supported by promoting trans-national and international co-operation. A project was funded from the 2007 budget, which will end in 2011. It is intended to extend the scope to also support information provision in the international domain. Special attention should be given to helping less experienced NCPs rapidly acquire the know-how accumulated already in other countries, and to promote the SMEs participation within the Space Theme of FP7.

The action will focus on identifying and sharing good practices. This may entail various mechanisms such as benchmarking, joint workshops, training, and twinning schemes. Practical initiatives to benefit cross-border audiences should be included, such as the organisation of information days in preparation of calls, and trans-national brokerage events. The specific approach should be adapted to the nature of the theme and to the capacities and priorities of the NCPs concerned. Proposals are expected to include all European NCPs who have been officially appointed by the relevant national authorities. If certain NCPs wish to abstain from participating, this fact should be explicitly documented in the proposal.

The action may also involve FP7 contacts from third countries and the international cooperation partner countries. This is of particular importance for countries which have concluded specific S&T cooperation agreements in the Framework Programme context, and where national contact persons may also have been nominated. Where such FP7 contact points have not yet been active, the establishment of a FP7 contact could be promoted through the national space agency or space research institutes. It is expected that the project should provide also assistance to the R&D community during the start-up of post-2013 Space research funding in the EU.

The Commission expects to receive a single proposal under this heading.

Funding schemes: It is expected to fund one *Co-ordination and support action* (coordinating type[37]) with an upper eligibility limit of EUR 1 million European Union requested contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

- *Expected impact:*

The proposal is expected to lead to an improved NCP service across Europe, therefore helping to simplify access to FP7 calls, lowering the entry barriers for newcomers, and

[37] Please note, for Coordination and Supporting Actions aiming at supporting research activities and policies the minimum condition shall be the participation of one legal entity. For Coordination and Supporting Actions aiming at coordinating research activities and policies the minimum condition shall be the participation of three legal entities.

raising the average quality of submitted proposals. A more consistent level of NCP support services across Europe and outside should result. More effective participation of SMEs and organisations from third countries is expected, alongside European organisations, in line with the principle of mutual benefit.

Area 9.3.4: Cross-thematic approaches

This part will **not be open** for specific call topics in 2011.

Area 9.3.5: Studies and events in support of European Space Policy

SPA.2011.3. 5-01 European Space Policy Studies

Several different supporting and coordinating projects are to be funded within this part of the Work Programme, ranging from studies and event organisation to research coordination and setting of European space research agendas.

The Council conclusions of 26 September 2008 set priorities for the future implementation of the European Space Policy, notably in the areas of space and climate change, space and security, space exploration and the contribution of space to the Europe 2020 as new priority areas. The conclusions of the European Council of December 2008 call for the launching of a European plan for innovation encompassing all the conditions for sustainable development and the technologies for the future including space technologies and derived services. Thus, the European Council linked space to innovation and – in a wider sense to the need to prepare for European economic recovery. In view of this, the Space Work Programme 2011 supports studies focusing on the **implementation of the European Space Policy** following the September 2008 Space Council and the 2008 European Council. Of particular interest are studies related to the link between space and innovation (forming the basis for a series of brainstorming sessions or workshops with industry representatives and the different innovation actors in Europe leading finally to a roadmap for space and innovation), the socio-economic benefits attached, and on questions related to space exploration, Europe's role in the global space exploration initiative as well as the European Union's role in this important field.

In the area of space exploration, **educational activities** are required to raise the public's awareness to our specific situation in space, to develop a public understanding of the solar system and the co-evolution of life and spaceship Earth. They are to increase awareness that Space exploration is an enterprise on global scale and thus requires global cooperation – a new and interesting challenge for humankind. Activities proposed in this context should combine different ongoing national activities.

In order to facilitate better planning of European Space activities, support or coordination actions are to be funded which aim at **coordination of different R&D activities** in exploration, such as the experimentation potential on the ISS, roadmaps for future robotic missions (e.g. Mars sample-return), as well as to develop a long-term perspective on human exploration. Such roadmaps could also contribute in particular to finding a European position on human Space exploration, and should also investigate the potential and benefits from international cooperation.

Funding schemes: *Coordination and Support Actions* (supporting or coordinating) with upper eligibility limit of EUR 300 000 European Union requested contribution.

Note: Limits on the EU financial contribution apply. These are implemented strictly as formal eligibility criteria.

III IMPLEMENTATION OF CALLS

- **Call title: Space Call 4**
- Call identifier: **FP7-SPACE-2011-1**
- Date of publication[38]: 20 July 2010
- Deadline[39]: 25 November 2010, at 17.00.00, Brussels local time
- Indicative budget[40]: EUR 99 million

The budget for this call is indicative. The final budget awarded to actions implemented through calls for proposals may vary:

- The final budget of the call may vary by up to 10% of the total value of the indicated budget for each call; and
- Any repartition of the call budget may also vary up to 10% of the total value of the indicated budget for the call.

- Topics called:

Activity/ Area	Topics called	Funding Schemes
9.1.1 **Space-based applications at the service of European Society** / Pre-operational validation of GMES services and products[41]	SPA.2011.1.1-01 GMES Security: exploring operational governance options	Coordination and Support Action (supporting or coordinating)
9.1.5 **Space-based applications at the service of European Society** / Continuity of GMES services in the areas of Marine and Atmosphere[41]	SPA.2011.1.5-01 Prototype operational continuity of GMES services in the Marine Area	Combined Collaborative Project (Large-scale integrating project) and Coordination and Support Action
	SPA.2011.1.5-02 Prototype operational continuity of GMES services in the Atmosphere area	Combined Collaborative Project (Large-scale integrating project) and Coordination and Support Action
	SPA.2011.1.5-03 R&D to enhance future GMES applications in the Marine and Atmosphere areas	Collaborative Projects (Small or medium-scale focused research project)
9.2.1 **Strengthening of Space foundations**/ Research to support space science and exploration	SPA.2011.2.1-01 Exploitation of science and exploration data	Collaborative Projects (Small or medium-scale focused research project)

[38] The Director-general responsible for the call may publish it up to one month prior to or after the envisaged date of publication

[39] The Director-general responsible may delay this deadline by up to two months

[40] Under the condition that the draft budget for 2011 is adopted without modifications by the budget authority.

[41] For the Activity 9.1, four ranking lists will be established; one for each of the topics (SPA.2011.1.1-01, SPA.2011.1.5-01, SPA.2011.1.5-02, and SPA.2011.1.5-03)

	SPA.2011.2.1-02 Research and development for space exploration	Collaborative Projects (Small or medium-scale focused research project)
9.2.2 **Strengthening of Space foundations /** Research to support space transportation and key technologies	SPA.2011.2.2-01 Space transportation technologies	Collaborative Projects (Small or medium-scale focused research project)
	SPA.2011.2.2-02 Space critical technologies	Collaborative Projects (Small or medium-scale focused research project)
9.2.3 **Strengthening of Space foundations** / Reducing the vulnerability of space assets	SPA.2011.2.3-01 Prevention of impacts from Near Earth Objects (NEOs) on our Planet	Collaborative Projects (Small or medium-scale focused research project)
9.3.2 **Cross-cutting activities /** International Cooperation	SPA.2011.3.2-01 GMES and Africa	Coordination and Support Action (supporting or coordinating)
	SPA.2011.3.2-02 Facilitating access to space for small scale research missions	Collaborative Projects (Small or medium-scale focused research project)
9.3.3 **Cross-cutting activities /** Trans-national cooperation among NCPs	SPA.2011.3.3-01 Trans-national and international cooperation among NCPs	Coordination and Support Action (coordinating)
9.3.5 **Cross-cutting activities/ Studies and events in support of** European Space Policy	SPA.2011.3.5-01 European Space Policy Studies	Coordination and Support Action (supporting or coordinating)

- Eligibility conditions:

  - The general eligibility criteria for the different funding schemes are set out in Annex 2 to this Work Programme, and in the guide for applicants. Please note that the completeness criterion also includes that part B of the proposal shall be readable, accessible and printable.

Funding scheme	**Minimum conditions**
Combined Collaborative Project and Coordination and Support Action	At least 3 independent legal entities, each of which is established in a MS or AC, and no 2 of which are established in the same MS or AC
Collaborative Projects	At least 3 independent legal entities, each of which is established in a MS or AC, and no 2

	of which are established in the same MS or AC
Coordination and Support Actions (coordinating action)	At least 3 independent legal entities, each of which is established in a MS or AC, and no 2 of which are established in the same MS or AC
Coordination and Support Actions (supporting action)	At least 1 independent legal entity established in a MS or AC.

- The following additional eligibility criteria and funding constraints apply in this call

- For Activity 9.1, Topic 1.1.01, the maximum eligible EU contribution is EUR 1 000 000 for Coordination and Support Actions, proposals requesting in excess will be ineligible. Only CSA are requested.
- For Activity 9.1, Topic 1.5.01, the maximum eligible EU contribution is EUR 28 000 000, proposals requesting in excess will be ineligible. Only Combined CP-CSA are requested.
- For Activity 9.1, Topic 1.5.02, the maximum eligible EU contribution is EUR 19 000 000, proposals requesting in excess will be ineligible. Only Combined CP-CSA are requested.
- For Activity 9.1, Topic 1.5.03, the maximum eligible EU contribution is EUR 2 000 000, proposals requesting in excess will be ineligible. Only CP are requested.
- For Activity 9.2, Topic 2.1.01, Topic 2.1.02, the maximum eligible EC contribution is EUR 2 000 000 for Collaborative Projects, proposals requesting in excess will be ineligible. Only CP are requested.
- For Activity 9.2, Topic 2.2.01, the maximum eligible EU contribution is EUR 2 000 000 for Collaborative Projects, proposals requesting in excess will be ineligible. Only CP are requested.
- For Activity 9.2, Topic 2.2.02, the maximum eligible EU contribution is EUR 2 000 000 for Collaborative Projects, proposals requesting in excess will be ineligible. Only CP are requested.
- For Activity 9.2, Topic 2.3.01, the maximum eligible EU contribution is EUR 4 000 000 for Collaborative Projects, proposals requesting in excess will be ineligible. Only CP are requested.
- For Activity 9.3, Topic 3.2.01, the maximum eligible EU contribution is EUR 1 000 000, proposals requesting in excess will be ineligible. Only CSA are requested.
- For Activity 9.3, Topic 3.2.02, the maximum eligible EU contribution is EUR 8 000 000, proposals requesting in excess will be ineligible. Only CP are requested. Participation of international partners (from third countries (ICPC)[42] or countries with S&T agreements or other space-faring nations (such as the US and Japan) is **mandatory,** proposals without such participation will be ineligible.
- For Activity 9.3, Topic 3.3.01, the maximum eligible EU contribution is EUR 1 000 000, proposals requesting in excess will be ineligible. Only CSA are requested.
- For Activity 9.3, Topic 3.5.01, the maximum eligible EU contribution is EUR 300 000, proposals requesting in excess will be ineligible. Only CSA are requested.

[42] International Cooperation Partner Country (ICPC) is a third country which the Commission classifies as low-income, lower-middle-income or upper-middle-income country, and which is identified as such in the work programmes, see list in Annex 1 to the Work Programme "Cooperation".

- Only information provided in part A of the proposal will be used to determine whether the proposal is eligible with respect to budget thresholds and/or minimum number of eligible participants.
- Participants may use flat rates to cover subsistence costs of travel in their FP7 Grants Agreements as outlined in Commission decision C(2009)1942 of 23 March 2009.

In accordance with Annex 3 to this work programme, this call provides for the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions. For further information, see the relevant Guides for Applicants for this call. The applicable flat rates are available at the following website: http://cordis.europa.eu/fp7/finddoc_en.html under 'Guidance documents/Flat rates for daily allowances'.

- Evaluation procedure:

  - The standard procedures set out in the FP7 Rules for submission of proposals, and the related evaluation, selection and award procedures, will apply
  - The evaluation criteria (including weights and thresholds) and sub-criteria, together with the selection and award criteria for the different funding schemes are set out in Annex 2 to this Work Programme. For Activity 9.1, Topics 1.5.01 and 1.5.02, the evaluation criteria applicable to Collaborative project proposals will apply for the Combined Collaborative Project (Large-scale integrating project) and Coordination and Support Action.
  - A one-stage submission procedure will be followed.
  - Proposals may be evaluated remotely.
  - During final ranking, the procedure for prioritising proposals with equal scores described in Annex 2 to the work programme will be modified as follows for the proposals in GMES area 9.1 only:

    – "The following approach will be applied successively for every group of ex aequo proposals requiring prioritisation, starting with the highest scored group, and continuing in descending order:

      (i) Proposals, that address topics not otherwise covered by more highly-rated proposals, will be considered to have the highest priority.

      (ii) These proposals will themselves be prioritised according to the scores they have been awarded for the criterion **impact**. When these scores are equal, priority will be based on scores for the criterion **scientific and/or technological excellence**. If necessary, any further prioritisation will be based on other appropriate characteristics, to be decided by the panel, related to the contribution of the proposal to the European Research Area and/or general objectives mentioned in the work programme (e.g. presence of SMEs, international co-operation, public engagement).

      (iii) The method described in (ii) will then be applied to the remaining ex aequos in the group."

  - CP, CP-CSA and CSA will be ranked separately.
  - For the topics SPA.2011.1.5-01 and SPA.2011.1.5-02 coordinators of proposals that pass all the individual evaluation thresholds will be invited to a hearing.

- Indicative evaluation and contractual timetable:

This call in 2010 invites proposals to be funded in 2011. The evaluation is to commence within 2 months of the call deadline, with negotiations of successful proposals commensurate with the 2011 budget expected to commence in the first half of 2011.

Proposals recommended for funding, which cannot be financed from the available budget will be put in a reserve list after evaluation, to allow for later funding in case of availability of additional budget or failure to complete negotiation of a proposal recommended for funding.

- Implementation

Calls for proposals under this work programme Space will be implemented by the Research Executive Agency (REA) according to the provisions of the Commission decision C/2008/3980final of 31 July 2008 "delegating powers to the Research Executive Agency with a view to performance of tasks linked to implementation of specific European Union programmes People, Capacities and Cooperation in the field of research comprising, in particular, implementation appropriations entered in the Community budget".

All activities under 9.1 to 9.3 are included in this delegation, only tender actions and identified beneficiary actions (being in support of policy) are excluded from this delegation and will be managed by the Commission.

- Consortia agreements

The conclusion of a Consortium Agreement is required for any action under the Space Theme.

- The forms of grants and maximum reimbursement rates which will be offered are specified in Annex 3 to the Cooperation work programme.
- Particular requirements for participation, evaluation and implementation:
  - The minimum number of participating legal entities required, for all funding schemes, is set out in the Rules for Participation. Please note, that for Coordination and Supporting Actions, different minimum participation rules apply depending on whether they are aiming at supporting or coordinating research activities and policies.

- **Flat rates to cover subsistence costs:** In accordance with Annex 3 of this work programme, this call provides for the possibility to use flat rates to cover subsistence costs incurred by beneficiaries during travel carried out within grants for indirect actions. For further information, see the relevant Guides for Applicants for this call. The applicable flat rates are available at the following website: http://cordis.europa.eu/fp7/find-doc_en.html under 'Guidance documents/Flat rates for daily allowances'.

IV OTHER ACTIONS

Activities implemented but not subject of a call

The following activities will be supported through funding by the Space theme in 2011, but **will not be subject of a call**[43] under the Space theme:

1) Development of GMES-dedicated space infrastructure
2) Support to GMES Initial Operations
3) Communication and Conferences
4) Monitoring, Evaluation, Studies and Impact Assessment
5) Risk-sharing Finance Facility (RSFF).

They are regarded to supplement the activities undertaken as a result of the calls for proposals in the FP7 Space theme. Applicants are invited to take benefit of these as appropriate in their proposals (for instance make use of access to the coordinated provision of observation data for GMES, or include the possibility of EIB loans to fulfil the Commissions co-financing requirements).

4.1 Development of GMES-dedicated space infrastructure

As stated in the GMES Communication of 2005, FP7 funding is foreseen to provide a significant part to the *GMES Space Component* (GSC) Programme of ESA, in particular regarding the development of GMES-dedicated space-based infrastructure.

Overall, of order 45% of the FP7 'Space' budget[44] could be made available for this action over the period 2007-2013. Based on the specific capacities provided by ESA in this domain, the Commission has decided to **delegate to ESA the management**[45] of the implementation of the FP7 funding of the GMES Space Component (GSC) Programme of ESA.

The respective annual financial contributions to be provided from FP7 shall be foreseen in the annual updating cycle of the Work Programme, taking account of any update or revision of the GSC. For 2011, a contribution of EUR 120 million is foreseen.

Financial support from FP7 should contribute to the activities proposed by ESA in the GMES Space Component Programme, starting with Segment 1[46], and followed by Segment 2[47].

EU funding to ESA will be contingent upon the effective implementation of the GSC programme in the ESA framework and compliance with the administrative and financial

[43] In accordance with Articles 14, 17 and 27 of Regulation (EC) No 1906/2006 of 18 December 2006 laying down the rules for the participation of undertakings, research centres and universities in actions under the Seventh Framework Programme and for the dissemination of research results (2007-2013).
[44] Including the corresponding share of support to the horizontal support to cross-cutting activities, as well as of the relevant administrative expenses.
[45] Commission Decision C(2008)563 of 8 February 2008
[46] ESA/PB-EO(2007)44 of 17 May 2007
[47] ESA/PB-EO(2009)30 of 9 Feb 2009

regulations applicable to the general budget of the European Union[48] and with the EC/ESA Framework Agreement[49].

With a view to ensuring the efficient and coherent monitoring and evaluation of the implementation of actions carried out by ESA on behalf of the Commission under FP7, an adequate monitoring and control process is put in place. It is in fact assumed that the GSC Programme continues to be developed by ESA in a way that is demonstrably coherent with the emerging user requirements being aggregated by the Commission. ESA shall also regularly inform the Commission of the overall progress of the implementation of the Specific Programme, as well as on the specific results of procurement actions, and shall provide timely information on allocations proposed or funded under this programme.

The issues of security of space infrastructure (e.g. in terms of encryption of data transmission, where necessary) and optimised data relay solutions (e.g. inter-satellite and satellite-to-ground transmission technologies) should also be examined in this context.

It is essential that best use of existing and planned European satellites and ground systems is being made – including those existing in other European agencies and organisations such as EUMETSAT – in order to efficiently ensure the continuity of data necessary to the establishment of GMES services on an operational basis - to the development of which this Work Programme is aimed.

In addition to the GSC technical activities covering development of dedicated satellites, ground segment and data access, a number of additional accompanying activities will also be undertaken by ESA, notably to achieve a significant participation of the non-ESA Member States in FP7, stimulating the active involvement of their industries and research organisations, improving visibility, accessibility and understanding of the tender selection procedures of ESA in line with the EU Financial Regulations and FP7 context. For these activities a variety of funding schemes in line with the EU Financial Regulation may be used. Further information on opportunities is available on Space Theme CORDIS website.

Funding scheme: other actions[50]

4.2 Support to GMES Initial Operations

The Commission's proposal for a Regulation[51] makes funding allowances for a number of operational objectives, however, support of the research and development funding under FP7 will also be required, and a dedicated support from FP7 by an amount of EUR 43 million over the three year period is foreseen. For the budget year of 2011, an amount of EUR 10 million has been earmarked for this support, with EUR 15 million and EUR 18 million being provisionally earmarked for budget years 2012 and 2013, respectively.

GMES Initial Operations (GIO) have according to the Commission's proposal the following 5 operational objectives:

[48] Council Regulation (EC,Euratom) No 1605/2002 of 25 June 2002 and Commission Regulation (EC,Euratom) No 2342/2002 of 23 December 2002

[49] COM(2004)0085, 11 February 2004. The EC/ESA Framework Agreement specifies, inter alia (Art.5.3) that: "*Any financial contribution made by one Party in accordance with a specific arrangement shall be governed by the financial provisions applicable to that Party. Under no circumstances shall the European Community be bound to apply the rule of "geographical distribution" contained in the ESA Convention and specially in Annex V thereto.*"

[50] In accordance with Article 53(d) of the Financial Regulation and Articles 35 and 43 of the Implementing Rules.

[51] COM(2009)223 final, 20 May 2009

(1) emergency response services, based on existing activities in Europe, shall ensure that Earth observation data and derived products are made available for the benefit of emergency response players;

(2) land monitoring services shall ensure that Earth observation data and derived products are made available for the benefit of European, national and regional authorities;

(3) measures to support take-up of services by users;

(4) data access, including support to in situ data collection;

(5) GMES initial operations shall ensure the operations of the GMES space component.

The 2011 Work programme will provide funding for GMES Data Access activities which are supporting these operational objectives and benefit the research community at large. The main objective of such GMES Data Access activities is to provide access to Earth observation data from all GMES Contributing Missions required by the user communities, such as the GMES Services, from the 4th quarter of 2010 until end 2013, and until the end of the commissioning phase of Sentinel-1A, -2A, and 3A:

- as a smooth continuation of the data supply under the GMES Space Component Data Access EC FP7 grant no FP7-223001 (GSC-DA)
- with a smooth continuation towards the GIO and full operations phase later.

The detailed description of the way ESA will perform these GMES Data Access activities for the period Q4 2010 – end 2013 is described in a Project Implementation Plan complementing the EC-ESA Delegation Agreement. These activities will be based on technical requirements defined by the EC, aiming at serving with EO data the GMES services both identified in GIO supported through the FP7 programme, and the community implementing GMES at large, and which were elaborated following a user Hearing on Access to GMES Earth Observation Data on 17 December 2009

The overall commitment appropriations for this activity will be up to EUR 10 million.

Funding scheme: other actions[52]

4.3 Communication and Conferences

Public events promoting the uptake of activities undertaken within the context of the FP7 Space, as well as fostering the implementation of the European Space Policy and the European Space Programme will also be funded from the FP7 2011 budget.

Support will be given to the organisation of events (conferences, workshops or seminars) related to the implementation of the European Space Policy and the priorities for

[52] In accordance with Article 53(d) of the Financial Regulation and Articles 35 and 43 of the Implementing Rules.

implementation identified last year (see chapter above). Special attention will be given to events which aim to explore and implement specific initiatives in the field of space for innovation, and the question how space exploration could contribute to innovation as well as events on space exploration related to space exploration. These events should support the political debate and consensus building in Europe.

During 2011, it is envisaged to conduct communication actions (such dissemination material) and large events in support of the implementation of the European Space Policy in general, and GMES and European Space Exploration in particular. Support may be given to the organisation of conferences and information events to strengthen wider participation in the programme (including that of 3rd countries), and to disseminate results of European research in the Space sector.

The overall commitment appropriations for this public procurement activity (by using framework contracts and/or calls for tender) will be up to EUR 2.2 million.

Funding scheme: CSA – public procurement

4.3 Monitoring, Framework Programme Evaluation, Studies and Impact Assessment

The Space Theme will comply with the prevailing requirements for monitoring and evaluating the Framework Programme and its impact, both ex-ante and ex-post. In preparation of the period after 2013, activities will be conducted to prepare the implementation of the European Space Programme.
This may involve studies and surveys as appropriate implemented through public procurement, and/or appointing (groups of) independent experts. This limited number of contracts may be implemented on the basis of framework contracts, in order to further ensure that the Commission is provided with appropriate and timely analyses, which in turn will facilitate the proper integration of policy studies into the preparation of new policy initiatives.
The overall commitment appropriations for this Activity in 2011 will be up to EUR 1.6 million.

Funding scheme: CSA – expert contract, public procurement

5.3 Risk-sharing Finance Facility

The preparation of operational service capacities, as well as development of the GMES space components correspond to large undertakings and projects, involving long-term investments, with considerable risks for participating industries. Promoters need access to additional cash-flow to fulfil the Commissions co-financing requirements, enabling them to finance more (and more risky) projects. It is for such R&D actions that the European Union will improve the access to private sector finance by contributing financially to the 'Risk-Sharing Finance Facility' (RSFF) established by the European Investment Bank (EIB). The Space theme is contributing to this funding facility, from its budget, and participants are invited to make use of this FP7 supporting scheme.

Further information on the RSFF is given in the Annex 4 of this Work Programme.

Indicative budget to be allocated as a result of calls and other activities

A total of EUR 237 million is to be committed from the 2011 European Union budget. The indicative budget allocated to the activities from the 2011 budget is given in the following table:

	2011 EUR million[53]	total
Call FP7-SPACE-2011-1 Activity 9.1 Space-based applications at the service of European Society : 1.1 GMES Security: exploring governance options	1	56
5.1 Marine service	28	
5.2 Atmosphere service	19	
5.3 R&D to enhance future GMES applications in the Marine and Atmosphere areas	8	
Call FP7-SPACE-2011-1 Activity 9.2 Strengthening of Space foundations: 1.1 Exploitation of Space Science and exploration data 1.2 Developments for space exploration 2.1 Space Transportation technologies	17	31
Call FP7-SPACE-2011-1 Activity 9.2 Strengthening of Space foundations: 2.2 Space Critical Technologies	10	
Call FP7-SPACE-2011-1 Activity 9.2 Strengthening of Space foundations: 3.1 Prevention of impacts from NEO	4	
Call FP7-SPACE-2011-1 Activity 9.3 Cross- cutting activities/International Cooperation 2.1. Support for "GMES and Africa" Initiative	1	12
2.2. Facilitating access to space for small scale R&D missions	8	
Call FP7-SPACE-2011-1 Activity 9.3 Cross-cutting activities 3.1. Trans-national and international coop. among NCPs 5.1. Studies and Events in support of European Space Policy	3	
ACTIVITIES NOT SUBJECT OF A CALL FOR PROPOSALS: 1 ESA Delegation Agreement (re. 9.1) 2 Space Data Access (via ESA Delegation Agreement) 3 Communication and Conferences 4 Monitoring, Programme Evaluation, Studies and Impact assessment	120 10 2.2 1.6	133.8
OTHER ACTIVITIES 1 FP7 Expert proposal evaluators payments	1.5	1.5
GENERAL ACTIVITIES (CF. ANNEX 4)	2.7	2.7
ESTIMATED TOTAL BUDGET ALLOCATION		**237**

[53] Under the condition that the draft budget for 2011 is adopted without modifications by the budgetary authority.

Summary of budget allocation to FP7 general activities for 2011 (cf. Annex 4)

	2011
Cordis[54]	EUR 0.411 million
Eureka/Research Organisations	EUR 0.018 million
COST	EUR 2.181 million
Cooperation of Non-University Research Org.	EUR 0.016 million
Strat. Support Action	EUR 0.031 million
Experts	EUR 0.005 million
Total	**EUR 2.662 million**

These general activities will not be administered by the Space Theme, but through the proposed horizontal mechanisms described in Annex 4.

All budgetary figures given in this work programme are indicative. The final budgets may vary following the evaluation of proposals.

The final budget awarded to actions implemented through calls for proposals may vary:

- The total budget of the call may vary by up to 10% of the total value of the indicated budget for each call; and
- Any repartition of the call budget may also vary by up to 10% of the total value of the indicated budget for the call.

For actions not implemented through calls for proposals:

- The final budgets for evaluation, monitoring and review may vary by up to 20% of the indicated budgets for these actions;
- The final budget awarded for all other actions not implemented through calls for proposals may vary by up to 10% of the indicated budget for these actions.

[54] This amount is reserved to support the CORDIS activities in 2011. The exact content of the CORDIS activities in 2011 will be specified through an update of Annex 4 to the Cooperation work programme at a later stage.

V INDICATIVE PRIORITIES FOR FUTURE CALLS

The Work Programme evolution is foreseen to include follow-on activities from the current FP7 call, with the objective to

- strengthen further GMES service developments;
- integrate satellite communication and satellite navigation solutions with space-based observing systems fostering the convergence of these space-based capacities;
- provide an opportunity within FP7 for strengthening international cooperation activities started at the end of the previous Framework Programme, as well as preparing GMES as the European contribution to GEOSS.

Activity: 9.1 Space-based applications at the service of European Society

In order to ensure complementarity and consistency with the proposed GMES Regulation on the European Earth observation programme (GMES) and its initial operations (2011-2013)[55], the work programme 2011 has been structured to provide the continuity of GMES services in the areas of Marine and Atmosphere. Beyond the thematic domains highlighted for funding in the GMES Regulation, the particular importance of GMES services in the areas of Climate Change and Security has also been recognised. The financial support to be given to operational activities in the different thematic areas is still to be defined in the Work programme of the GMES regulation following its adoption by the legislative authorities.

Complementary R&D activities accompanying GMES Initial Operations will be supported from FP7 in the annual work programmes of 2012 and 2013.

The amounts to be devoted to each thematic (Land Monitoring, Emergency Response support, Marine, Atmosphere, Security and Climate Change) are subject to the availability of budget (i.e. subject to the decision of the budgetary authorities for 2012 and 2013), and the decisions to be taken on the proposed GMES Regulation on the European Earth observation programme (GMES) and its initial operations (2011-2013)[56]. The final allocation of the available budget in the work programme remains subject to the opinion of the FP7 Programme Committee responsible for the FP7 Cooperation Theme Space.

It should be noted that for Strengthening Space Foundations, a similar level of funding as in 2011 is foreseen in addition to the GMES budgets for the years 2012 and 2013 subject to the annual budgetary decision procedures of 2012 and 2013.

[55] COM(2009)223 final, 20 May 2009
[56] COM(2009)223 final, 20 May 2009

Area 9.1.1: Pre-operational validation of GMES services and products

Further development of service capabilities for supporting Climate Change and Security issues in Europe are prioritised to be addressed in subsequent calls (2012 and 2013), to build on existing activities and to provide further evolution of GMES services in these areas. It should be noted that Climate Change projects are being funded as a core subject in FP7 Theme 6 (Environment and Climate Change), through the ESA-GMES ECV programme and FP7 Space projects selected from the 2nd Call. Security service-relevant projects are funded as a result of the 3rd call (published in 2009) and under the FP7 Security theme.

It is also foreseen to open the final two calls to the development of downstream services. A specific sector which could receive attention is sustainable energy management, also in the urban development context.

These final two calls could also include:

Area 9.1.2: Integration of SatCom and SatNav with GMES for prevention and management of emergencies

The objective is to integrate satellite communication and satellite navigation solutions with space based observing systems for prevention and management of all kinds of emergency. The target should be a service platform, with the objective of validating the technological concepts and acknowledging the benefits of an integrated communication/ navigation/observation infrastructure with the users. Complementarity of the satellite capabilities with terrestrial capabilities, where appropriate, should be assessed on the basis of a medium to long term view based on the foreseeable evolution of telecommunication technologies, the related economics and addressed as an integral part of the proposed action. The validation of specific test-beds, based whenever possible and appropriate on real situations, is encouraged.

Area 9.1.3 Support to the coordinated provision of observation data - Preparing the ground for use of GMES Sentinel data

Activities conducted by the EU and ESA in the implementation of the GMES Space Component will provide Europe with an unprecedented source of operational satellite data products. First streams of space data will be available from Sentinel 1 in 2012/2013, to be followed shortly thereafter with data from Sentinels 2 and 3. Data streams are expected to amounts to several Terabyte per satellite orbit, which will require user-friendly data-mining and searching techniques.

Space data products generated within the GMES Space Component Programme are already being specifically tailored to the needs of the three Fast Track services and two Pilot services. Beyond this, however, the wider group space data users and providers of geo-information services in Europe also should be enabled with access tools, to be ready when these products come online, and have efficient access to the Sentinel data products.

In a first instance, this will require identification of potential applications and market segments, as well as coordinating the formulation of user requests.

Once the GMES Space component data products are defined, preparation activities will also require R&D devoted to ease access to the future Sentinel data, using test simulated products in sample applications, testing dissemination mechanisms, distribution and product selection tools, allowing efficient formulation of user demands. Projects should demonstrate applications including data validation activities.

At the stage when user interfaces have been further defined, preparing the user for these products through specific training will also be a follow-on task.

Apart from SMEs in the service provider sector, this research topic should also attract active participation of researchers in academia, specialising on the use of sentinel data and their integration and/or comparison with other sensor data; and actively involve students performing research with simulated sentinel data and their integration with data coming from other sensors. This would have the advantage of both mobilising Europe's research potential, as well as prepare the next generation of active data users.

Activities not part of calls: Coordinated provision of space-based observation data for GMES and development of Earth Observation Space Infrastructure

As elaborated above in the section 'Approach', GMES service development, validation and operational scenario demonstration requires a comprehensive supply of data from space-based observation systems and the development of dedicated Earth Observation Infrastructure. Overall, of order 8% and 45% of the FP7 'Space' budget[57] could be made available respectively for these actions over the period 2007-2013.

First financial support from FP7 was foreseen in the 2007 budget line, for a preliminary pilot action with a volume corresponding to EUR 48 million over a three year period. Financial support from FP7 has been provided from the 2009 and 2010 budget lines for the development of Earth Observation Space Infrastructure, as described in section 4.2.

The Commission's proposal for a Regulation[58] makes funding allowances for a number of operational objectives, however, support of the research and development funding under FP7 will also be required, and a dedicated support from FP7 by an amount of EUR 43 million over the three year period is foreseen. Beyond the provisions described in section IV, for the budget years 2012 and 2013 funding of EUR 15 million and EUR 18 million are being provisionally earmarked. This further funding to be devoted to data access is envisaged to become part of the delegation agreement of the Commission entrusting ESA with the technical management of the GMES Space Component.

Activity: 9.2. Strengthening the foundations of Space science and technology

Area 9.2.1: Research to support space science and exploration

Current space exploration programmes, in Europe and elsewhere, intend to extend the human presence, in a real or virtual way, through missions to the Moon and to Mars or through automatic missions in direction to objects of the solar system. Complementary to, and in close co-operation

[57] Including the corresponding share of support to the horizontal support to cross-cutting activities, as well as of the relevant administrative expenses.
[58] COM(2009)223 final, 20 May 2009

with respective activities undertaken by ESA and other interested national agencies in this domain, the FP7 Space Work Programme will support research aimed at improving the capability to access planets surfaces, to move, to select and collect and finally return samples to Earth in the frame of space exploration activities.

Further analysis and scientific exploitation of space data, adding further added value to the investments made in building European satellites will be supported.

New generations of technologies for space missions (science and exploration)

The Work Programme on space sciences and exploration should focus on space missions upstream activities for the strengthening of the technological base.

The R&D activities are crucial for the development of new capacities (vehicles, platforms, instruments) responding to the new generation of space missions. The research objective here is to maintain the network of expertise in order to consolidate the enabling technologies, in particular:

- The technologies allowing new types of observation missions: formation flying, satellite autonomy, interferometry systems, measurement and relative positioning control, measure and transmission of high precision timing.
- Space based solar power generation – solar energy collected in space is concentrated and to be transmitted to Earth. In order to address such development concepts, technological advances at component and system level will be required.
- Nanosatellites.
- New sensors for the different spectrum windows for astronomy.
- Foldable mirror technologies for observation purposes in space, allowing for development of novel instrumentation in the longer term.
- The technologies and measurement methods for the future Earth observation missions: specific laser sources, low frequency radars, synthetic aperture optics for observation from geostationary orbits.

Area 9.2.2: Research to support space transportation and key technologies

Space transportation (follow-on activities)

The European Space Policy, as highlighted in the Resolutions from the 2007 and 2008 Space Councils, aims at guaranteeing the continuity of autonomous, reliable and cost-efficient access to space at affordable conditions for the EU, ESA and their respective Member States. This is based on the availability of a set of adequate and competitive world-class launchers, and an operational European space port. Moreover, space has been recognised by the EU as one of the priorities and key building blocks of the European knowledge-based society. Scientific research should therefore also focus on new concepts and development for future Launcher technologies.

Innovation is the key factor for preparation of the future Space Transportation systems. Priority should be given to technologies enhancing reliability and cost efficiency of Space Transportation systems, reducing the cost of access to space for small, medium and bigger size payloads, also enabling new missions for the benefit of the society. Computer tools necessary for this trade-off analysis should be addressed.

Research should focus also on new concepts for emerging strategies such as direct injection to geo-stationary orbit by means of cryotechnic or heliothermic propulsion, advanced structures and new energy generation systems.

Reducing economical risks requires strong simulation capacity and technology validations. Consequently the research activities should address the modelling of combustion and complex fluid movements, behaviour of specific materials for launchers and propulsion, shock analysis, dynamics of the payloads, system integrity monitoring. Due to the technological complexity of the domain, in relevant cases, international cooperation may be considered.

Space technologies (follow-on activities)

The space sector is a strategic asset contributing to the independence, security and prosperity of Europe and its role in the world. As underlined in the European Space Policy, recognised in the European Parliamentarian Resolution[59] and stressed and highlighted in the Resolutions from the Space Council from 2007[60] and 2008[61], Europe needs non-dependent access to critical space technologies, which is a condition-sine-qua-non for achieving Europe's strategic objectives. "Non-dependence" refers to the possibility for Europe to have free, unrestricted access to any required space technology.

Critical Technologies for European Non-Dependence are not restricted only to specific electric or electronic components, but include all those technologies which are surveyed and monitored by the Joint EU-ESA-EDA task force on Critical Technologies encompassing platform, payload and launcher technologies. Further calls addressing priorities identified in the task force are foreseen.

Area 9.2.3: Reducing the vulnerability of space assets

Security of space assets

Space assets, and their associated ground facilities, are sensitive to external events that can endanger their proper functioning, such as space debris, jamming, viruses, natural or men-made electro-magnetic disturbances. These events might have transient effects that can be recovered or have permanent effects leading to the non-functioning of the asset and consequently of its expected services. The research should focus on complementarities with the proposed ESA Space Situational Awareness (SSA) programme, and more specifically on options to reduce the vulnerability of space assets.

Activity: 9.3 Cross-cutting activities

Area 9.3.2: International cooperation

International co-operation in GMES

Proposals will be sought which develop activities to disseminate and implement outside the EU(e.g. Latin America, and especially in developing countries) products and services derived or customised from current GMES development activities, for instance for risk management, resource management and land planning, marine and atmospheric environment monitoring, and in the domains of management of water resources and security. Proposals addressing Early Warning Systems linked to natural disasters, food security or disease prevention are also encouraged.

[59] Resolution of 20 November 2008 on the European space policy: how to bring space down to earth
[60] Space Council Resolution 22. May 2007, "RESOLUTION ON THE EUROPEAN SPACE POLICY"
[61] Space Council Resolution 26. September 2008, "Taking forward the European Space Policy"

In the framework of the European Development Policy, space applications such as Earth observation or satellite communications have been recognized as a central tool to support Africa in its sustainable economic and social development[62]. The pursuance of the objectives set forth at the initiative "GMES for Africa" and included in the "*Lisbon Declaration on GMES and Africa*" represents a special focus for the proposed research activities in GMES. For this reason, actions have been funded to support the preparation of an action plan of the European Commission and the Commission of the African Union for the endorsement at the next EU-Africa Summit (2011).

Support has been given to networking between information providers, user networks and centres of excellence in Europe and African Countries, along the priority lines being identified in consultation with the African Union under the 'GMES and Africa' initiative, with the aim to coordinate better existing GMES research and services activities in Africa. The conclusions of the "GMES and Africa" Action Plan will set the basis for further GMES activities in the African context, to be included in future FP7 calls. Priority will be given to activities complementing current actions already financed under past calls on "International Cooperation" for Africa, and along priority lines of the Action Plan.

GMES and Africa will be a strong EU contribution towards GEOSS and future calls should leverage on the results, as a strategy to implement future programs or expand the EU contribution to other regions of the Globe, in the framework of GEOSS. Priority will also be given to proposals to study the potential for current and foreseen GMES services to provide the building blocks for the EU contribution to GEOSS. Proposals should assess current services and information products against the GEOSS requirements, identify service/data gaps and barriers such as restrictive data use and re-use policies, and suggest implementation actions.

[62] COM(2005) 489 final, 12 October 2005, "EU Strategy for Africa: Towards a Euro-African Pact to Accelerate Africa's Development"