

**European Space Sciences Committee (ESSC)**

# **ESSC Contribution to the EU FP8 / Common Strategic Framework**

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## **Contents**

- 3 • Background
- 3 • Boundary conditions
- 4 • Strengthening Space Foundations – SSF
- 4 • Data exploitation

- 5 • Technologies
- 5 • Science of Near-Earth Objects
- 5 • Cooperation
- 6 • Role of ESSC in the ERA and the frame of the Lisbon Treaty

## Foreword

On 9 February 2011 the European Commission initiated a consultation for the preparation of the next (8<sup>th</sup>) Framework Programme by issuing a Green Paper entitled “From challenges to opportunities: towards a common strategic framework for EU research and innovation funding”. The EU budget review indeed proposed that the full range of EU instruments for research and innovation work together in a Common Strategic Framework (CSF).

The European Science Foundation (ESF), together with the European Heads of Research Councils (EUROHORCs), is preparing an overarching White Paper on the CSF. It will be complementary to the inputs from its scientific committees such as this document. It will constitute an important step in creating a unified voice for science and will influence future policy.

In specific areas covered by the European Commission such as the Space Theme, this consultation started even earlier. On 8 December 2010, the EC’s Directorate General for Industry and Entrepreneurship organised a hearing that gathered over a hundred participants to discuss the topic of Space in the next Framework Programme. The ESF delivered an invited talk on space research needs for Europe, based on the discussion initiated within the ESF’s European Space Sciences Committee (ESSC).

The present document details this discussion and provides a first series of the ESSC recommendations to the EC regarding the space component of the future Common Strategic Framework.

**Professor Jean-Pierre Swings**  
ESSC-ESF Chair



### Cover

#### The Night Lights of Europe

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## Background

The European Space Sciences Committee of the European Science Foundation (ESSC-ESF) has regularly been providing expert advice to the European Commission (EC) and European space stakeholders since 1992. Specific recommendations were provided concerning the space sciences content of the EC's Framework Programmes 5, 6 and 7. Furthermore the ESSC-ESF was a prominent actor and contributor to the White Paper on Space, published by the EC in 2003.

This document compiles draft recommendations discussed and agreed by members of the ESSC-ESF on the occasion of its 40<sup>th</sup> plenary meeting held in Frascati, Italy, on 7-8 July 2010 and updated since. It was circulated to committee members and updated with their comments, and further discussed and agreed by the Committee on 29 March 2011.

This document is a first draft input to the current discussion that has started on the EC 8<sup>th</sup> Framework Programme and the Common Strategic Framework. As such it does not yet represent a peer-reviewed and formally approved ESF-ESSC report. The discussion process will continue in the following months in order to come up with an approved official document that will be forwarded to the EC in due course.

These recommendations were discussed with an understanding of the financial boundary conditions under which FP8 should operate, *i.e.* an overall funding envelope similar to that for FP7, but with a decreasing share for GMES (Global Monitoring for Environment and Security) over the years. The annually available envelope for activities under the heading "Strengthening Space Foundations" (SSF) is not formally established at present although estimates around 60 ± 10 million Euros per Call (per year) in the period 2014-2020 were indicated. Other funding opportunities can be derived from the innovative approach of the CSF.

## Boundary conditions

There is a strong need to ensure continuity of long-term space projects. It is in particular mandatory to assess in detail the achievements of FP6 and FP7 to ensure that FP8 can build on progress made. The interim evaluation of FP7 which has just ended should also be used for this purpose. A second pre-requisite stemming from this need for continuity is the fact that Framework Programmes of the European Union are currently not tailored to enable the implementation of long-term scientific roadmaps. This is a major weakness of the current system that prevents Europe from adequately supporting the development of visionary "grand challenges" in space sciences and exploration and, in particular, from supporting the long-term planning architecture developed through the European Space Agency (ESA) and its Member States. Improving this situation would help to give the EU the "world-beating science base" that is being advocated in the European Commission's Green Paper.

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**Since there is a need to support pan-European teams working on the preparation and/or the exploitation of space missions, secured funding over 5-7 years and programme continuity would be required. Framework Programmes are not presently tailored to these needs, unless a way can be found to "bridge" support to such activities from one Framework Programme to the next. The Common Strategic Framework proposed by the European Commission, through the bridging of various funding opportunities, should be used to identify ways to improve on the current, unsatisfactory situation.**



## Strengthening Space Foundations – SSF

It is agreed that the involvement of the EC in space exploration is desirable because of the additional financial and political capital that only the EC can bring to a European exploration programme. The Space Advisory Group of FP7-SPACE has recently recommended basing the implementation of the 8<sup>th</sup> Framework Programme on three pillars. Two of these pillars are the use of space for (i) exploring the solar system and the universe, and (ii) grand challenges on Earth.

Beyond the funding aspect, one of the main advantages of the involvement of the EC through a Common Strategic Framework would be to enable the creation of pan-European networks or consortia of researchers involved in ESA science missions. In the present situation, Member States fund the development of ESA missions, under the global umbrella of ESA. However the development of the instruments is undertaken by individual institutes, sometimes in collaboration with others, but without any institutional organisation. The Principal Investigator of an instrument does not have any idea, for example, whether a partner will or will not be funded by its national agency. This situation can remain uncertain for a long time. The situation is even worse for the exploitation phase of the missions where it is impossible to constitute networks or consortia with a minimum degree of organisational efficiency.

For Earth Observation missions, funds for such pan-European networks would also be needed, *e.g.* for Earth Explorer missions and for the scientific exploitation of the Sentinel data. In addition, for several of these missions, instruments are in some cases provided by national contributions, which makes pan-European cooperation difficult to fund (this is for instance the case for the Sentinel 5 precursor mission). For these missions pan-European funds would therefore be very important to support space sciences and exploration in Europe.

Coordinating these national approaches and contributions, and mobilising and pooling together funding from the Member States, are thus key issues that the Common Strategic Framework should address.

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**The role of the European Commission and of the Framework Programmes would especially be to constitute and adequately support pan-European consortia in all domains of space sciences, and not only to provide the additional funds that are also needed, for instance to support post-doctoral students.**

This would enable Europe to play its full role at an international level, for instance in the emerging Global Exploration Strategy, provided the roles and contributions of the EC, ESA, and national agencies within such a programme are clarified.

## Data exploitation

Clearly, the objectives of the FP7 3<sup>rd</sup> Call were not fully achieved in this regard; the EC and concerned stakeholders (including the ESSC) should therefore make a special effort to better inform potential proposers of the existence of this option already in FP7.

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**Adequate mechanisms and funding should be identified within the CSF for supporting the scientific exploitation of European space missions. There is a clear consensus that this part of FP7 should be retained and strengthened in the future.**

From this standpoint, and in order to properly prepare the grounds for FP8/CSF, future FP7 calls should already be oriented towards several specific areas, which have been insufficiently addressed in previous calls and will demand pan-European funding for scientific exploitation in the second half of the decade, including associated ground-based observations when needed:

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- **Planetary science, exploration, and ground-based preparations related to the ExoMars missions.**
- **Space science in support of the ESA Cosmic Vision programme. In particular, Solar Orbiter, EUCLID and PLATO will require a strong multinational effort, as well as GAIA for data exploitation; here FP8 could play a major role.**

- ISS activities (life and physical sciences in space and preparation of exploration missions) already involve a large number of European laboratories. The FP8/CSF should identify means to support close collaborations between small groups of laboratories selected on the basis of scientific excellence.
- EC support should include funding of Earth-based preparatory research, e.g. in the area of terrestrial analogues and field studies for exploration.
- Scientific exploitation of GMES Sentinel mission data to integrate and strengthen the European Research Area, in addition to the operational data exploitation carried out under GMES already.

GMES supports product development for services in relationship with environment and security but does not support scientific exploitation of the Sentinel missions. For example in the case of Sentinel 4 and 5 data, detailed climate research, such as chemistry-climate interaction and specifically the relationship between climate and anthropogenic emissions as estimated from space observations, are not covered by GMES. Apart from the assessment of the emissions of greenhouse gases and aerosols, assessment of emissions of air pollutants (NO<sub>2</sub>, SO<sub>2</sub>, HCHO and CO) are also essential to understand climate change and the relationship between climate change and air pollution. Relevant sub-topics are air quality and long range transport, which are best studied in cooperation with international partners from emerging economies.

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ESSC-ESF recommends that scientific activities in Earth Observation are also included within an SSF funding line, where they are not already covered by GMES.

## Technologies

The funding for technological developments related to future missions should be maintained in FP8. Missions should include Earth and space sciences in general, *i.e.* planetary exploration and solar system science, astronomy and astrophysics, Earth observation, and fundamental physics.

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The development of critical technologies for European non-dependence should be adequately supported (*i.e.* the development of those elements that are available in other countries but not yet in Europe, or affected by ITAR and similar regulations).

ESSC felt however that the funding of technologies for launchers was not really relevant for FP8 within this topic, because it would require very significant funding to be really useful, which is not coherent with the objectives of this topic.

## Science of Near-Earth Objects

The panel supported funding the scientific study of NEOs. It looks however somewhat premature for the EC to engage in the topic of prevention against NEOs. These activities should be coordinated with other countries (for instance within the context of the United Nations COPUOS), since they obviously represent a global threat and it would be nonsensical to duplicate the studies.

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Coordination with the new ESA Space Situational Awareness programme would be very much needed from the early stages.

## Cooperation

ESSC-ESF agrees that this topic should be maintained within FP8.

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The Committee suggests increasing the budget for proposals dealing with Space Policy Studies, since the present envelope is considered to be too low to be useful.

## Role of ESSC in the ERA and the frame of the Lisbon Treaty

While recognising that science is only one thread of the overall case for European involvement in space exploration (the others being industrial and technical innovation; stimulus for science and engineering education; and geopolitical benefits both within and outside Europe), science is the particular concern of the ESSC-ESF. Thus, as EC involvement in space develops the ESSC should aspire to providing independent scientific advice on those elements which affect science.

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**The EU and its institutions need to rely on an independent scientific advisory body and the ESSC is ready to play this role. This will require adequate support from the relevant European institutions.**

There seems to be a clear consensus that the ESSC-ESF can help improve coordination at a scientific level between the different agents funding space activities in Europe: ESA, EC and national programmes. This role could be strengthened in various areas, such as:

- providing advice to mission/instrumentation calls in national programmes;
- advising national institutions of the situation in other European centres concerning specific areas, for example when they start planning on future national missions;
- providing a bridge between ESA and EC on scientific issues.

In addition to this science thread, the involved stakeholders should also strive to keep space technology development as one basic pillar of the European space venture. Establishing the right connections between science and technology in space is indeed a major goal and tool, space being a main technology driver. Support for the development of key critical technologies has been advocated as a vital element of Europe's space policy.

The space sciences advisory body to the EU should therefore also be able to integrate the technology element into the picture (within the space domain and between space and non-space technologies), in addition to integrating views across the various space-related scientific disciplines. This is mandatory in order to be able to deliver strategic recommendations on a European space policy.

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**The independent space science advisory body to the EU should incorporate a space technology sub-committee composed of independent technology specialists, to inform European decision-makers on space technology-related matters.**

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The European Space Sciences Committee (ESSC), established in 1975, grew from the need to give European space scientists a voice in the space arena at a time when successive US space science missions and NASA's Apollo missions dominated space research. More than 35 years later, the ESSC actively collaborates with the European Space Agency (ESA), the European Commission, national space agencies and the ESF Member Organisations. This has made ESSC a reference name in space sciences within Europe. The mission of the ESSC today is to provide an independent forum for scientists to debate space sciences issues. The ESSC is represented ex officio in all ESA's scientific advisory bodies, in ESA's High-level Science Policy Advisory Committee advising its Director General, it has members in the EC's FP7 space advisory group, and it has observer status in ESA's Ministerial Council. At the international level, ESSC maintains strong relationships with the National Research Council's (NRC) Space Studies Board in the US. The ESSC is the European Science Foundation's (ESF) Expert Committee on space sciences and the ESF's interface with the European space community.

**[www.esf.org/essc](http://www.esf.org/essc)**

The European Science Foundation (ESF) was established in 1974 to provide a common platform for its Member Organisations to advance European research collaboration and explore new directions for research. It is an independent organisation, owned by 78 Member Organisations, which are research funding organisations and research performing organisations, academies and learned societies from 30 countries. ESF promotes collaboration in research itself, in funding of research and in science policy activities at the European level.

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