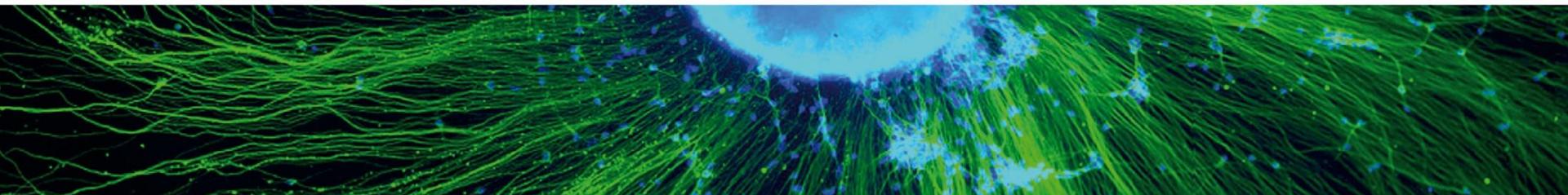
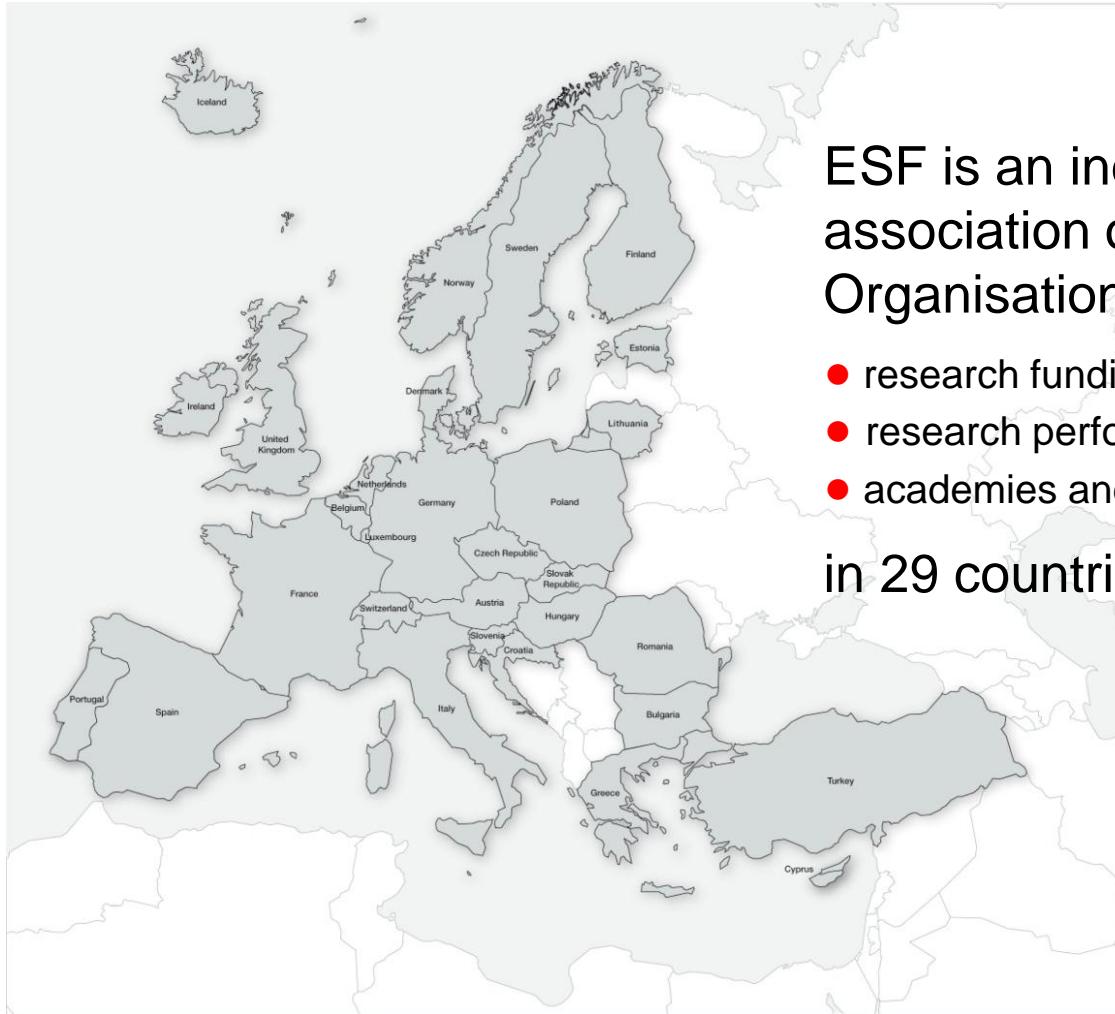




# European Science Foundation



# ESF Member Organisations



ESF is an independent association of 67 Member Organisations

- research funding organisations
- research performing organisations
- academies and learned societies

in 29 countries

# Expert Boards and Committees

## Voices for European science

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Nuclear Physics European Collaboration Committee



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European Space Sciences Committee



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European Marine Board



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European Polar Board



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Committee on Radio Astronomy Frequencies



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Materials Science and Engineering Expert Committee



## ESSC Mission Statement

*“ The mission of the ESSC is to provide an independent European voice on European space research and policy. It is the ESF’s expert body on space research ”*

**Advice and policy  
foresight on S&T in  
FP7 and H2020  
FP7 contract coordination**

**Science base  
Inter-disciplinarity**

**ESF**  
Science  
Support  
Office  
23 staff

**ESF**  
5 scientific  
review groups  
6 expert  
boards

**EC-EU**  
SAG  
FP7/H2020  
DG-ENT,  
DG-RES

**ESSC**  
38 years old  
25 members  
4 panels

**ESA**  
Advisory  
Committees  
DG, Directors

National  
Space  
Agencies

Science  
community  
COSPAR  
(CSAC)

**U.S.**  
NAS  
SSB  
ASEB

**Advice and policy  
foresight on S&T**

# Ex officio representation

- **European Space Agency**
  - Council at Ministerial level
  - High-level Science Policy Advisory Committee
  - Scientific advisory committees at programme level
- **European Commission** (during FP7)
  - FP7 Space Advisory Group (individuals)
  - SAG Exploration sub-committee (individuals)
- **US National Academies**
  - Space Studies Board
  - Discipline committees of the SSB (CAPS)
- **Other representations**
  - COSPAR Science Advisory Committee (ex officio)
  - UKSA's Science Policy Advisory Committee
  - UN Office of Outer Space Affairs (NEO Action Team 14)
- **Past representations**
  - OECD (NEO Work Group)

# ESSC Chair: Jean-Pierre Swings

## Solar System and Exploration

- **Ian Crawford**, Moon (**Chair**)
- **Ester Antonucci**, Solar physics
- **Doris Breuer**, Mars
- **Kari Muinonen**, Small bodies
- **Hermann Opgenoorth**, Earth sciences and space physics
- **Petra Rettberg**: Exobiology, biology

## Research in Weightlessness

- **Gregor Morfill**, Complex plasmas (**Chair**)
- **Gilles Clément**, Neurophysiology
- **Dominique Langevin**, Fluid physics and foam
- **Michael Lebert**, Biology
- **Andreas Meyer**, Materials science

## Astronomy and Fundamental physics

- **Roberto Battiston**, Fundamental physics, (**Chair**)
- **Pierre Binetruy**, Fundamental physics
- **Paolo de Bernardis**, IR/sub-mm astronomy
- **Jørgen Christensen-Dalsgaard**, Exoplanets and astroseismology,
- **Jean-Pierre Swings**, Astronomy
- **Jordi Torra**, Galactic astronomy and astrometry
- **Stéphane Udry**, Exoplanets

## Earth Sciences

- **Frans von der Dunk**, Space law and policy, (**Chair**)
- **Heiko Balzter**, Land-atmosphere interface
- **Ian Brown**, Glaciology
- **Andreas Kääb**, Earth Observation and satellite-based glaciology
- **Vinciane Lacroix**, GMES and disaster management
- **Pieterneel Levelt**, Atmospheric physics and chemistry
- **Mathias Schardt**, Soil remote sensing

- **FP7 Coordination Actions (Coordinator/Project Office)**
  - CAREX (2008-2011) and THESEUS (2010-2012)
  - MEGAHIT\* (2013-2014) and ASTROMAP (2013-2015)
  - MASE (2013-2016)
- **Shaping Space in Horizon 2020 – written contribution in 2011 and SRC survey during summer 2013**
- **Commissionned studies (ESA)**
  - ELIPS programme 4<sup>th</sup> evaluation (2011-2012)
  - Planetary Protection guidelines evaluation for ESA on Mars Sample Return (2011-2012) and Phobos Sample Return (2014?)
  - Foresight on breakthrough technologies TECHBREAK (2010-2013)

\* with Russia



EUROPEAN SPACE SCIENCES COMMITTEE



ESSC statement on the outcome of the ESA Council at Ministerial level  
Strasbourg, 21 December 2012

The European Space Sciences Committee of the European Science Foundation (ESSC-ESF) attended the ministerial statement at the ESA Council at Ministerial level on 21 November 2012. It provided an oral statement during the council meeting, based on its position paper published in September. The ESSC met in plenary session on 25-27 November 2012 and is commenting here on the impact on science-relevant ESA's programmes resulting from the decisions (or lack of) taken in November.

- Concerning the promotion of Europe, and in order to promote sustained development and safeguard future high-level technology, the ESSC supported the view that some 5% of the 120 billion euro stimulation package agreed by the EU Heads of States should be made available to the space sector. No decision has been taken on this recommendation while the ESSC strongly feels that implementing it would represent a major opportunity for Europe to maintain its scientific competitiveness and growth for the space sector, in line with the agenda of the ESA Director General. Pro-active measures should indeed be taken to stimulate research development and education in the space sector, which is a present and future driver of innovation and jobs in Europe.

- Concerning the management of space data, no specific decision was taken but the Political Committee towards the European Space Agency to best serve Europe has proposed that the European Space Agency should take the lead in the analysis, interpretation, archiving, and distribution of space data and thus, to generate the required high-quality return on the investments made by Europe in its space infrastructure and outstanding instruments.

- Concerning the level of funding for ESA's science-relevant programmes, the ESSC supported the budget requests of the three ESA directorates carrying out scientific programmes, as laid down in the Director General's proposal.

- For the Science Programme, the outcome of this ministerial council is that there is now a loss of inflation compensation. The addition of new contributions by Poland and Romania implies that, while the purchasing power will be lost, it will be partially mitigated by the pre-existing and approaching sat over the next few years. In close to the assessment by the Science Programme planning, The ESSC is worried about the effects that this decision will have on the present elements of the programme, although it is pleased to see that the erosion of the purchasing power of the programme is being addressed. The ESSC is also worried about the future of the Science Programme. If any cuts to the present elements of the program have to be considered, in particular potential cuts in mission extensions should be discussed versus the impact of small delays in future missions, in order to achieve an optimum balance between both elements.

- For the optional robotic exploration programme (ExoMars), the community is facing a quite difficult situation. The programme is currently limited to the orbiter with a very minor contribution from the lander. The situation of the 2018 mission remains quite unclear and is a source of frustration for the community that continues to be concerned about accomplishing a complex mission with a potential for high science return within the next few years. The level of the uncertainty is high, as the mission was not approved in Naples with the approval of the DG's proposal but would have expected a stronger statement regarding the importance of the mission for the European planetary science, and a clearer strategy

## RECENT REPORTS AND PUBLICATIONS

# Upcoming

- Chair renewal foreseen at the May plenary meeting
- Next period marked by evolution of ESF and establishment of hosting entity for ESF Expert Boards and Committees
- Next ESSC Strategic Plan 2014-2018  
→ towards a European Space Board?
- Next (46<sup>th</sup>) plenary meeting in Leicester, UK, with presence of Charles and Michael

# News from Europe

## ESA (1)

- ExoMars : agreements with Roscosmos, approval of Science Management Plan, preparation of long term plans ( incl. Moon )
- postponement of Gaia's launch date
- PO/PR preparation of Rosetta's comet ( CG ) encounter + "docking"
- "end" of Planck

# News from Europe

## ESA (2)

- *Recommendation from ESA's SSAC ( Bern, Oct. 29 & 30 )*

*"Following consideration of the Senior Survey Committee and endorsements by AWG, SSEWG, FPAC, the SRE Director is proposing to the Science Policy Committee the selection of the science themes for the large L2 and L3 mission flight opportunities, along the following lines*

**Embargoed until 11/29/13**

- *For L2, currently scheduled in 2028, the Director proposes to select the science theme "**The hot and energetic Universe**", to be pursued by implementing a large collecting area X-ray observatory ( incl. gamma-ray bursts monitoring, note JPS )*
- *For L3 flight opportunity, currently scheduled in 2034, the Director proposes to select the science theme "**The gravitational Universe**", to be pursued by implementing a gravitational wave observatory*

# News from Europe

## ESA (3)

A first step towards an integrated, long-term vision for ESA on science and its enabling technologies

- **HiSPAC Grand Science Themes**
  - 1- Terrestrial & cosmic climate
  - 2- Understanding gravity
  - 3- Life in the Universe
  - 4- Cosmic radiation & magnetism
    - + grand astronautical challenges, enabling technology clusters for future science missions ( e.g. cold atom devices, large ultra-stable structures, large monolithic telescopes and mirrors )
- **ESSC TECHBREAK “Overwhelming Drivers”**
  - 1- Reduce mass, maintain stiffness
  - 2- Build a spacecraft that can last 50 years
  - 3- Deploy a 30m+ telescope into space
  - 4- Autonomous geophysical survey of planets
  - 5- Enable humans to stay in space for more than 2 years

- Engagement with the EC since at least 1992 (FP3-FP4) and contribution to Science in GMES (2001), Green & White Papers for Space (2005) → European Space Policy
- ESSC current and former members in EC's Space Advisory Group (ESSC was asked to nominate people in previous SAG)
- EC DG-ENT systematic presence in ESSC plenary meetings
- Observer role and keynote presentations on EC-ESA international ministerial conferences on space exploration (Prague 10/2009, Brussels 10/2010)
- Keynote presentations on H2020-SPACE at an EC Hearing (Brussels, Dec. 2010)
- Keynote presentation, round table participation and concluding speech at an EC conference on FP7-SPACE (Budapest, May 2011)
- Keynote presentation at an FP7/H2020 conference (Lisbon, May 2011)
- Rapporteur at an EC conference on space technologies (Brussels, July 2011)
- **ESSC round table participation on Future Directions in European Space Research (Cyprus, November 2012)**
- **ESSC keynote presentations and Rapporteur role at EC consultation workshops on Strategic Research Clusters in H2020 (Brussels 01/2013 & Madrid 02/2013)**

# SRC survey and ESSC report

## January-February and April 2013



ESSC recommendations for the Strategic Research Clusters of Horizon 2020

ESSC Recommendations for the SRC of Horizon 2020  
Comparison with the EC Draft Work Programme 2014-2015

Call "Protection of European assets in and from space – 2014 (page 19)

The present call concerns space weather and Near Earth Objects (NEOs) (... Note: The NEO SRC was dropped from the ESSC final proposal)

Space Weather activity aims at monitoring understanding and forecasting such phenomena to prevent it. Research is needed to improve our understanding and convert our scientific knowledge into an operational service.

PROTEC 1 – 2014 – Space Weather (page 19)

Exploratory work studying new ideas for data analysis and modeling of space weather with a view to enhancing the performance of space weather prediction. Research into further improvement of existing models and their validation in the context of international cooperation with leading space weather service providers and/or related to emerging European space weather services;

(page 18) This should contribute to new services able to predict with a significantly higher precision than today, space weather events affecting the Earth and the near-Earth space environment

**SRC proposal for Space Situational Awareness - Space Weather**

The focus of this activity would be an integrated approach to space weather data and systems. Our fundamental understanding of space weather phenomena is still insufficient to provide very efficient forecast or even warnings. Solar weather activity has impact in all aspects of the European society, in particular in aspects such as satellite communications (Galileo), energy pipelines, airline safety, etc. In many of these areas Europe already has an impressive track record in terms of research and development, contributions to space missions and scientific publications.

The final goal would be to understand solar activity/impact on the Earth and its environment to a level allowing prediction.

Areas of coordination within this SRC can be:

- To develop a coupled system of models that can forecast space weather from the Sun to the Earth's surface to help protect satellites, power grids, aviation, navigation, and other forms of modern technology. The coordination action will ensure support for the science underpinning space weather.
- Support for observatories (ultraviolet, magnetometers, neutron monitors, radio burst monitors and coronagraphs and others) to guarantee continuous high quality near real-time data delivery, as well as European autonomy in space weather monitoring. This is an area where the EC can really complement the ESA efforts in the domain.
- From a space mission definition point of view, the current level of knowledge of space environment often leads to excessive design margins ("overdesign") and higher mission costs than necessary. The coordination action will lead to the development of engineering standards to deal with "normal" space weather as well as low frequency, high impact events. This is the area that will benefit most the European space

# ESSC recommendations (SRCs)

- **Space Situational Awareness - Space Weather**  
an integrated approach to space weather data and systems. Goal: understanding solar activity impact on the Earth and its environment to a level allowing prediction.
- **Scientific Research Enabling Human Space Exploration**  
to further study the effects of long duration space flight and simulations on crew health and performance, to further develop efficient countermeasures, and to facilitate post-flight re-adaptation to the terrestrial environment.
- **Astrobiology and Planetary Protection**  
an integrated approach to space analogue sites that encompasses life in extreme environments, planetary protection aspects and “Search for Life” research.
- **Space Data for Climate Models**  
to develop well-calibrated space data with quantified uncertainties to be used to initialise, constrain and validate climate models

# ESSC recommendations (overarching and other issues)

- **Data exploitation**  
to improve framework conditions, manpower and infrastructure for space data preservation and exploitation
- **Sustaining (ESA) missions related large communities**  
upstream and downstream support to mission teams and/or networks
- **Advanced propulsion**  
an enabler for science and industry and a cornerstone for space science and exploration
- **Small satellites and Cubesat development**  
popular topic amongst the European space sciences community
- **Technology Development**  
important goal strongly supported by the community

## H2020 Work Programme 2014/2015

- No SRC directly linked to “basic” space research
- A lot of convergence between the WP language and ESSC recommendations, including more-technology-oriented SRCs (e.g. advanced – nuclear – propulsion)
- A particularly important inclusion in that language, if followed by budgetary support, is the upstream support to missions (aspect not adequately covered in Europe by ESA, nor MS)