



ESSC-ESF Statement following the ESA Council at Ministerial level 2016

The European Space Sciences Committee (ESSC) was represented by its Chair, Dr Athena Coustenis, and its Executive Scientific Secretary, Mr Nicolas Walter, at the ESA Ministerial Council, which took place in Luzern, Switzerland, 1 and 2 December 2016. The European Science Foundation was represented by its Chief Executive Dr. Jean-Claude Worms.

Hosted by the European Science Foundation, the ESSC is an independent expert committee that provides independent advice in the fields of space sciences to national and European stakeholders; this committee is composed of 32 European experts from all fields of space sciences. ESSC had previously communicated its position to the Ministers and Delegations and to the ESA Executive via its recommendation document and had its Statement included in the minutes of ESA Ministerial Council. The Statement is given hereafter.

Towards Space 4.0 for a United Space in Europe

The ESSC welcomes the overall strategy proposed by ESA Director General, *Towards Space 4.0 for a United Space in Europe*. This proposal calls for a united and collaborative spirit across Europe and embraces a holistic approach to foster European Identity, spirit and cohesion through excellence in space sciences and technology. Scientists and researchers naturally progress by fostering collaboration between academics and industry and across borders, regardless of nationality, gender, religion or disability. ESA proposes to foster such an approach with *Space 4.0*, irrespective of the political landscape in the EU and beyond.

The ESSC welcomes the visionary aspect of the approach and the paradigm shift it proposes. Space is indeed part of the European citizens' daily life, and deeply rooted in Europe's academic, industrial and economic landscape; it is also inspirational for the young (and older) generations.

Towards Space 4.0 for a United Space in Europe also sets the scene for an improved coordination between ESA and the European Union institutions. This has been advocated by ESSC for a long time and naturally, the Committee supports this aspect of the proposal. Furthermore, it notes with satisfaction that, besides the DG proposal, the *EC-ESA Joint statement on shared vision and goals for the future of Europe in space* signed on October 26, 2016 was also welcomed by ESA Member States. The ESSC highlights that ESA-EC common interest in space sciences and technology should cover all scientific domains, including curiosity-driven research.

Overall Subscription

The ESSC highlights that the overall 10.3 billion€ subscription agreed upon at the ESA ministerial council acknowledges the ESA Member States' interest and willingness to invest in space science, technology and infrastructure. Space sciences catalyse the development of highly innovative, cutting-edge space instrumentation which enhances European technological capability and improves the competitiveness of European industry. In line with the numerous Member States' statements on the

importance of science, the ESSC urges ESA and its Member States not to overlook or underestimate the unique potential space sciences has on triggering socio-economic benefits and wellbeing but also on inspiring interest, enthusiasm and vocations for its citizens.

Space science is not a cost, it is a high-return investment with a broad and exciting leverage effect on the people and the economy.

Mandatory Science Programme

The ESSC acknowledges – and welcomes – the annual adjustments approved by Member States leading to an increase of 1% per annum of the mandatory science programme. However, the Committee also notes the exceptional contribution of the mandatory science programme to the ExoMars programme (97 M€) which is part of the required budget for the mission completion.

In this specific context, the ESSC is concerned by the fact that the interplay between the 1% increase and the contribution to ExoMars will not allow the scientific programme to compensate the inflation over the 2017-2021 period. This will inevitably impact the purchasing power of the programme and decrease it by an estimated amount of 70-90 M€ over that period. This decrease in buying power may eventually, and regrettably, impact the capacity of ESA to implement Cosmic Vision at the current pace and to the intended increased support to its Member States. Furthermore, the science programme ambition of implementing new activities and making room for original science ideas allowing for new communities to participate in the programme may not be feasible during that period.

More generally, the ESSC urges ESA Management and Member States to consider the mandatory programme contribution to ExoMars as exceptional and not as setting a precedent. The committee insists on the benefits of separate budgets between mandatory and optional activities. This approach has allowed ESA to coherently implement a full range of very successful programmes, responding to a variety of interests and motivations from the European nations and communities, while preserving a common, stable core set of outstanding scientific activities. This balance should be guaranteed in the future.

European Exploration Enveloppe Programme (E3P)

As to the E3P programme, the ESSC warmly welcomes participating states' approval of the envelope programme concept for European robotic exploration and human spaceflight in LEO and beyond. This novel and adaptive vision could permit getting the most out of each individual programmatic element and contribute to making E3P a highly competitive programme on the international scene.

The ESSC warmly welcomes the full subscription to the ExoMars programme that will allow for the operations of the 2016 TGO mission and the completion of the 2020 mission. This decision allows to remove any remaining uncertainty on the mission implementation -as has been strongly advocated by the ESSC in the past years- and will stimulate the community to continue preparing to support mission operations and data exploitation. The ESSC is convinced that both ExoMars missions (2016 TGO and 2020) will produce exciting and excellent new world-class science.

The ESSC welcomes the decision made on the ISS extension to 2024 and on the two long-duration ESA astronaut missions proposed in the E3P programme. This will provide the conditions to further build on the momentum gained over the past years through the ELIPS programme. The committee also

highlights the importance of research platforms complementing the ISS such as sounding rockets, parabolic flights and ground-based equipment.

However, although the ISS exploitation part of the programme is almost fully supported, the ESSC strongly regrets that E3P core scientific element (Science in Space Environment – SciSpacE) is undersubscribed by almost 50% and notes that the resulting level of resource is significantly lower than the one of the previous ELIPS phase. This undersubscription will prevent grasping the full return on the substantial European investment in ISS infrastructure in terms of scientific opportunities and benefits to European citizens. Resulting delays and/or lack of adequate utilisation will strongly impact both the European scientific community as well as the industry developing high-technology space research hardware. This raises the risk, in both cases, to lose unique (and world-leading) knowledge and expertise.

The ESSC strongly encourages ESA management and E3P Participating States to take advantage of the novel flexible structure that the E3P offers and aim, in priority, at buffering this undersubscription in order to maximise the science return via SciSpacE. As a science-led programme, the ESSC strongly recommends that SciSpacE be governed by scientific excellence only – without any geographical and political interference – and informed through an independent assessment of the programme implementation plan.

Earth Observation

The ESSC commends the achievements of ESA's Earth Observation programme over the past years as well as its coherence and consistency. Through its different elements, and in particular the Earth Observation Envelop Programme, the ESA EO programme has delivered a large number of original and ambitious missions that produce excellent data for scientific research.

While the ESSC welcomes the level of subscription to the EarthWatch elements, the Committee regrets that the fifth phase of the Earth Observation Envelop Programme has been undersubscribed by approximately 18%; the committee is in particular concerned by the impact of this undersubscription on the coherence and stability of the Earth Explorer programme. The ESSC furthermore calls the member states attention upon the fact that the Earth Explorer missions are flagships for European EO science and engineering.

Space Situational Awareness (SSA)

Space Situational Awareness is becoming increasingly important for the European society. Considering the critical importance space assets have on our daily life and also the potential vulnerability of humans and ground infrastructures, it is critical to better monitor and understand major solar events, Near Earth Objects as well as space-debris objects. In this context, the ESSC regrets that the SSA programme has been undersubscribed by more than 50%.

It is also clear that SSA is an issue of common interest between ESA and the European Commission; the ESSC strongly recommends therefore that ESA and EC SSA activities are coordinated in a way that would avoid duplication of efforts and maximise the investment made towards increased knowledge and improved operational capabilities.

There is only one single space environment impacting the Earth. With a limited level of resource, the ESSC strongly recommends that ESA prioritises its efforts towards collaborating on improved

monitoring and predictions capability with international partners. In particular, it is of utmost importance that Europe plays its part in creating a global fleet of monitoring spacecraft and sensors for space weather prediction purposes. Budgets agreed should be used preferentially for participation of ESA and Europe in a global context.

Asteroid Impact Mission (AIM)

The AIM programme had a very strong significance for European citizens and had the capability to mobilise public interest. This concept had the huge advantage of reaping the benefits of a unique opportunity presented by a binary asteroid. It would also have allowed to foster international cooperation on planetary defence issues.

The ESSC regrets that this mission did not leverage enough financial subscription from ESA Member States to make it viable. The Committee supports the ESA Director General in his endeavour to find an alternative solution to address the issue, although it is unfortunately unlikely that such a mission will benefit from the unique configuration allowed by a binary asteroid.



European Science Foundation - European Space Sciences Committee Address to the ESA Council at Ministerial level

Professor Athena COUSTENIS, European Space Sciences Committee Chair

Lucerne, Switzerland, 1-2 December 2016

Representing the European space sciences community, the European Space Sciences Committee (ESSC) strongly supports the scientific programmes proposed by the European Space Agency at the Ministerial Council 2016. In a situation of global economic torpor, the ESSC urges Member State delegations not to overlook or underestimate the unique potential space science has on triggering not only socio-economic benefits and wellbeing for European citizens as well as industrial innovation processes and growth, but also on inspiring interest, enthusiasm and vocations in its citizens. Space science is not a cost, it is a high-return investment with a broad and exciting leverage effect on the people and the economy.

With regard to the ESA DG's proposal Space 4.0, the ESSC offers the following comments:

- **As to the mandatory scientific programme**, the ESSC strongly supports the science objectives that underpin ESA's Cosmic Vision programme. It also recognises the outstanding scientific quality of this programme and its structuring effect on the European scientific community. The ESSC notes that the level of resources requested (increase of 2% on top of constant purchasing power) is essential to ensure the ambition of the science programme. Investments in new technologies are needed to meet the challenges of Cosmic Vision science concepts and pave the way for new fields and new ideas to emerge, further ensuring Europe's competitiveness in science and technology. The scientific community should continue to be a pillar of this programme via frequent consultations.
- **As to the European Exploration Envelope Programme**, the ESSC endorses the new concept of a European Exploration Envelope programme (E3P) for European robotic exploration and human spaceflight in LEO and beyond. The ESSC particularly welcomes the coherent long(er)-term vision of the E3P approach, as it is forward-orientated, integrative, adaptive, and well balanced. The ESSC notes that the level of resources requested in the programme proposal is fully consistent with its ambitions and recommends that the participating Member States subscribe to it. In its execution, the ESSC recommends that the overall programmatic balance, philosophy and diversity be preserved after consulting the stakeholders; it also recommends that budgetary decisions on any of the science-orientated programmatic elements be governed by scientific excellence, based on a transparent and independent (peer) review process.
- **As to the Earth Observation programme**, the ESSC highlights the excellence of the programme and considers that continuity of the Earth Explorer missions should be a priority for EOEP-5 in

order to secure the future of European Earth Observation science and engineering. Earth Observation science for society provides vital support to European science and the wider adoption of Earth Observation. The data quality actions and exploitation initiatives are crucial to secure returns on investment and promote the use of Earth Observation data for science and services. The increasing volumes of data generated require the platforms and tools that the Earth Observation Science for Society element will deliver. Member states are encouraged to subscribe to these activities to provide the essential support ESA needs for the coming budget period.

- **As to Space Situational Awareness**, the ESSC recommends that in order to safeguard the European technological systems in space and on the ground, and in order to ensure the highest level of safety for human missions, the European Union and ESA cooperate and participate in the global/international development of a coordinated robust space system of sun-heliosphere monitoring. This would ensure the acquisition of exhaustive real-time data sets and improve space weather understanding and predictions. ESSC also recommends focused research on the physical and chemical properties of Near Earth Objects and Space-Debris Objects in the near-Earth space, increasing our knowledge-based preparedness for mitigating the threats posed by these objects. An increased understanding of the science and resource potential of NEOs as a result of these investigations would be an added benefit.

Finally, for a long time the ESSC has been advocating for improved coordination between ESA and EC; therefore, the Committee notes with satisfaction the *EC-ESA Joint statement on shared vision and goals for the future of Europe in space* signed on October 26, 2016. In this context, the ESSC encourages ESA and EC to also 'look out' to astronomy, planetary sciences and microgravity research, thus complementing the essential Earth Observation activities.

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