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Optimising Europe's Benefits from the Copernicus Programme

Addressing the Structural Gaps in Operational Earth Observation

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Preamble

The field of Earth Observation (EO) has witnessed remarkable development since the first proof-of-concept and technology demonstration missions of the 1960s. This is true not only because new generations of satellites and instruments have led to an exponential growth in monitoring capabilities, but also because EO as a practice is moving into a new development phase in its life cycle. With the introduction of operational services – a capacity that is currently being implemented under the Copernicus programme – both the playing field and the market for Earth Observation will be transformed in a number of ways.

First and foremost, the new data streams and the six services defined within the programme will further increase the benefits associated with existing use and it is expected that that they will enable the market to generate additional added value streams as new applications are developed – also beyond the purposes of environmental monitoring and security, such as agriculture and traffic management. In addition, the introduction of operational services will open up new opportunities to monitor and communicate to society the health of our planet. Moreover, the user driven character of Copernicus has the potential to create a truly public good, its evolution steered by its stakeholders. To benefit from these opportunities in an optimised fashion, however, the proper institutional mechanisms need to be in place – quite a challenge considering the multi-institutional involvement in the programme.

In order to reflect on these future opportunities and challenges related to Copernicus, the European Space Policy Institute (ESPI) organised a brainstorming session bringing around the table the authors of this piece. The purpose of the event was to reflect, with due modesty, on the road that has been taken in the development of operational Earth observation capabilities and on the potential future path of this most interesting field of space utilisation. The current document seeks to capture the findings and reflections of our brainstorming. First, the document reviews which policy and programme support functions have been addressed adequately and which elements might merit further action. Based on this evaluation the creation of a Copernicus Task Force is proposed as a first step towards overcoming the perceived missing links in the current programme architecture. The authors of the current document believe this Task Force proposal will facilitate the development of a sustainable programme approach that serves the interests of the involved agencies and ultimately the European stakeholders that will benefit from Copernicus. As a first step in this direction the authors propose that a workshop is arranged bringing together the main players to discuss in an open and constructive fashion which options could be further reflected upon or taken forward and how. The authors would like to stress that the review presented in this document is based upon a set of principles that should facilitate the technical and political feasibility of finding solutions:

- The analysis and recommendations presented are related to the programmatic and managerial aspects of the Copernicus programme only. The recommendations do not imply or suggest the establishment of additional infrastructure, neither in space nor on ground;
- The Task Force proposal is based on the premise that the roles and responsibilities of existing institutional players be left unchanged. In other words, the proposed recommendations do not imply the creation of a new agency in Europe, neither do they call for an extensive reorganisation of existing responsibilities;
- The recommendations endeavour to make use of existing European capabilities and expertise to the maximum extent possible. Achieving this will require that the different institutions involved in Copernicus will continue to cooperate in a spirit of trust and with a focus on the creation of increased beneficial outcomes for the citizens, enterprises and governments of Europe.

The ambition of this report is to improve the exploitation of Copernicus across the widest possible range of European user communities. As a consequence, recommendations made through the document lead to augmentation of existing infrastructure and services rather than their substitution, and to proposals for the establishment of improved delivery of information services through the Copernicus programme.

1. The Copernicus Programme: a Review

Over the last couple of decades both the socioeconomic and strategic importance of EO has risen considerably. Thanks to technological progress in the areas of remote sensing capabilities, environmental modelling and the ability to disseminate data, the benefits generated for the users are considerably higher than in the past. As a result governments and other decision-makers are relying ever more on environmental information and geospatial intelligence. They do so because it facilitates management tasks and daily activities and improves outcomes. Moreover, it supports the creation, evaluation and enforcement of a range of policies and enables them to link economic growth to sustainable development. Environmental monitoring capabilities are also indispensable for the scientific community seeking to increase the understanding of our planet and the environmental problems that create pressure on a planetary scale. The intensifying stresses on planetary resources and systems caused by human action, which can be monitored with ever greater accuracy by the use of satellite data, are of increasing concern not just to policy-makers and scientists, but also to ordinary citizens. All these elements have pushed the scientific, institutional and civic demand for environmental information whilst, in parallel, the utility of EO for a range of security challenges was increasingly realised. As a result the awareness became acute that operational monitoring capabilities were required, and thus the issue became more prominent on the political agenda.

1.1 Copernicus's Implementation: the Facts

A major milestone in the process of establishing operational monitoring capabilities was the European decision to set up the Copernicus programme, formerly known as Global Monitoring for Environment and Security (GMES). In February 2004, after a five year reflection and preparation period following the signing of the Baveno Manifesto in 1998, the European Commission released a Communication with a concrete Action Plan aimed at establishing a working GMES capability by 2008. More specifically, the core capacity of the programme would be structured around an architecture of four interrelated components, as illustrated in figure 1 below.

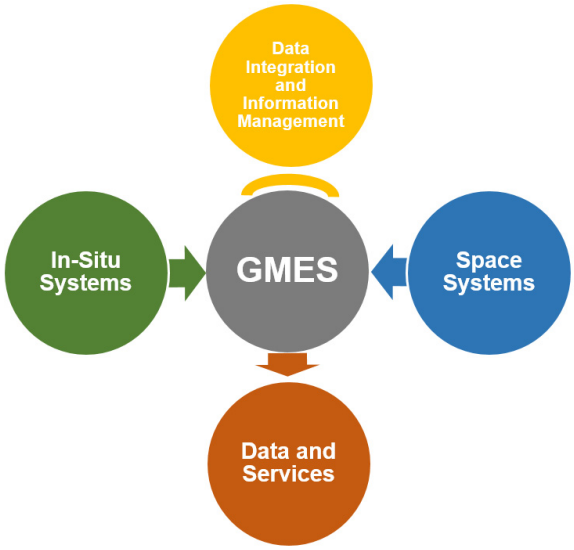

Figure 1: Copernicus System Architecture.

The system's data input would be provided by two main sources. The in-situ observations would be coming from ground-based stations and airborne and seaborne measurements. The space component would consist of new infrastructure in the form of the Sentinel satellites and of contributing missions. In addition to the data streams generated by the constellation, output would be provided in the form of thematic services in six predefined fields: (1) land monitoring, (2) marine monitoring, (3) atmosphere monitoring, (4) emergency management, (5) security and, (6) climate change.

Since the utility of the data output and the six services are highly dependent on the integration of additional socio-economic and statistical data with the data sets provided by the physical systems, a data integration and information management component is added to the overall GMES system. The modular structure was partly chosen to assure sufficient flexibility during the deployment of the programme, taking into account that the data provision components would be built in parallel to the different sets of services.

The overall system architecture clearly reflects the multilateral nature of the programme, which has very much determined the course of its implementation. The institutional responsibilities were distributed, as foreseen, to different European organisations according to their technical expertise and mission. The European Space Agency (ESA) is responsible for the implementation of the space component which consists of the Sentinel satellites, their instruments and the required ground infrastructure. More specifically, the Agency oversees and co-funds the development of the Sentinel 1, 2 and 3 satellites and the Sentinel 4 and 5 instruments flown on the satellites of the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). Around the time the Action Plan was published, the EC/ESA Framework Agreement entered into force. This document already included provisions to deal with the legal and managerial basis for the establishment of the GMES space component. In 2005 further clarifications regarding the ESA-EU responsibilities were made in the "Orientations on GMES" document.

EUMETSAT is responsible for the operation of the Sentinel satellites that have objectives closely related to its core missions of meteorology and climate monitoring. This entails the Sentinel 4 and 5 satellites that deal with atmospheric monitoring, Sentinel 3 for marine monitoring and Sentinel 6 for ocean altimetry. To this effect it signed a Framework Agreement with ESA in 2009 concerning the cooperation on the GMES space component.

The European Environment Agency (EEA) plays a key role in coordinating the in-situ component, which relies on a large number of facilities, instruments and services owned and operated at regional, national and intergovernmental levels both domestically and outside Europe. Unlike the space component, the in-situ infrastructure is largely developed and maintained by Member States and remains their responsibility.

The challenges related to the establishment of this complex programme architecture demanded a number of governance support bodies throughout the various implementation stages. To this effect two transitional bodies were called into existence by the 2004 Action Plan in order to coordinate the initial phase. For the management operations a GMES Programme Office was created. This body was implemented using mechanisms of the 2003 EU-ESA Framework Agreement and would oversee the implementation of the overall GMES operational management. It was staffed by representatives of the European Commission, ESA, seconded experts from Member States and relevant international organisations, such as EUMETSAT. In addition to this a GMES Advisory Council (GAC) was established that would provide advice to GMES management, coordinate activities, exchange experience and facilitate consensus-building around the development of a long term perspective. This body consisted of representatives of the European Commission, the European Union (EU) Member-States, the European Space Agency, the European Environment Agency, EUMETSAT, as well as other relevant EU agencies, space industry, service providers, users, research organisations and academia. As of 2006 the GAC started to provide advice to a newly created GMES Bureau. The latter was established within the space component of the European Commission's Directorate General (DG) Enterprise and Industry with the primary objective of ensuring the delivery of priority services by 2008. Other objectives of the GMES Bureau were to address the issues of the GMES governance structure and the long-term financial sustainability of the system.

In 2010 the transitional bodies – required for the initiation phase – were replaced by new structures that would assist the European Commission in managing the (pre)operational phases of the programme. A GMES Committee would ensure a coordinated implementation of the programme and identify gaps in the infrastructure. The Committee, consisting of national representatives, would assist the Commission in ensuring the coordination of contributions to Copernicus by the EU, the Member States and inter-governmental organisations as well as coordination with the private sector, making the best use of existing capacities and identifying gaps to be addressed at Union level. Finally, a GMES User Forum would advise the EC in the definition and validation of user requirements, and would be responsible for the coordination with public sector users. When the European Commission announced the name change of GMES to Copernicus in December 2012 the names of the GMES Committee and User Forum were changed accordingly.

In terms of funding, the European Commission and the European Space Agency co-fund the development phase of the programme – in which the space component is the most costly element. For the implementation phase of GMES the EC provided R&D funds under its Framework Programme (FP) 6 for the period 2003 - 2006 and under its FP 7 for the period 2007 - 2013. The operational phase of the programme, including further recurring satellites, relies on EC funding and is included in the 2014-2020 Multiannual Financial Framework (MFF) of the European Union. The deci-

sion to secure Copernicus funding inside the MFF followed difficult negotiations in the Council in 2013 and the result is a major achievement, considering that in 2011 it was proposed to finance the programme outside the MFF. The commitment of long-term funding is not only important from a practical perspective. Users and user communities secure in the knowledge that data streams will be available for the foreseeable future will be willing to increasingly rely on them and as a result their business models will ultimately change accordingly. In this sense financial commitment is key to the development of downstream business opportunities and thus for the overall viability of the downstream EO sector.

1.2 The Unresolved Issues

From an overall perspective, the programme's political and technical implementation has been successful. The road taken has resulted in the establishment of a solid programme and financial architecture, while the programme's physical components are structured and managed in a proper and sustainable fashion for the foreseeable future. This includes the distribution of responsibilities, the mechanisms for systemic integration and adaptability and the presence of long term financial continuity. In this sense the programme has come a long way since its conceptualisation in 1998. Europe has, in a relatively short time span, been able to transform a political commitment into a state-of-the-art Earth observation programme with global monitoring capacities.

Now that Copernicus is entering its operational phase the promise it has carried is also starting to materialise. At the same time, however, the programme's ability to function as an operational and user-driven constellation becomes crucial. In this respect two main questions arise with regard to the future management of Copernicus as a public resource:

1. *How can the benefits of Copernicus be maximised?*
   Given the current programme architecture and technical capabilities of the first generation of Sentinels, how can the potential of the Copernicus system be optimised? In the first instance, this comes down to generating the maximal socio-economic benefits that can be derived from the data and services. This does, however, also raise the question of how EO can be used to serve less tangible objectives. How can it be assured that the scientific findings resulting from Copernicus can be effectively communicated to decision makers and the general public – leading to a better understanding of our environment and a will to take the necessary protective actions?
2. *How can stewardship of Copernicus be created?*
   Since Copernicus is going to be an operational system, it will be around for the decades to come and its capabilities will change as new generations of Sentinels will be launched. Considering this long term horizon and the desired user-driven character, how can it be assured that all relevant stakeholders join forces so as to guarantee its optimal functioning and structure in the future? In other words, how is it assured that Copernicus will remain a sustainable and widely shared and truly 'public good' for Europe?

The actors involved in the implementation of the programme have been active in addressing the above questions and a number of significant initiatives have been taken. Yet, there seems to be a recognition within the European Earth Observation community that there are unresolved issues in terms of creating a sustainable environment conducive to the optimisation of Copernicus success. The authors of the current document wish to provide impetus to a process which tackles the outstanding issues.

1.2.1 Maximising the Benefits of Copernicus

Maximising the benefits from Copernicus' data is currently pursued through two channels. The adoption in 2013 of a data policy for Copernicus of full, free and open access for users was an important pillar for allowing the data to be used widely. For most end-users, however, raw data is of little use and therefore the six thematic services were created in addition to the specific data policy. The implementation and operation of the services are, as illustrated in table 1 below, managed by different institutions in Europe. This strong degree of decentralisation was chosen in order to make best use of existing strengths, as there is a lot of valuable expertise present in the European institutional landscape.

Service	Status	Components and/or Projects
Land Monitoring	Operational	Global Component (coordinated by the JRC) Pan-European Component (implemented by the EEA) Local Component (implemented by the EEA)
Emergency Management	Operational	Copernicus Emergency Management Service (GIO EMS) European Flood Awareness System (EFAS) (implemented by the JRC)
Atmosphere Monitoring	Pre-Operational	Monitoring Atmospheric Composition and Climate - Interim Implementation (MAC-II)
Marine Monitoring	Pre-Operational	MyOcean2
Security	Under Development	Border Surveillance: G-MOSAIC Maritime Surveillance: • Development of Pre-operational Services for Highly Innovative Maritime Surveillance Capabilities (DOLPHIN) • New Service Capabilities for Integrated and Advanced Maritime Surveillance (NEREIDS) • Simulator for Moving Target Indicator System (SIMTISYS) Support to EU External Action: G-MOSAIC
Climate Change	Under Development	Development is supported by a series of FP7 projects

Table 1: The Six Copernicus Services, their Status and Components and/or Projects.

For this reason the services are compartmentalised into six and for many of them actual operations are split into subservices with different operators. The challenge in terms of benefit maximisation here is not the high degree of decentralisation of the services. Rather, it is the fact that no mechanism is in place to tackle the attendant management and optimisation challenges that follow from decentralisation. Thus, there is no operational function or mechanism in existence to coordinate the six services which involves all the relevant stakeholders, notably those with the most direct link to the users. In the current architecture neither the Copernicus Committee nor the Copernicus User Forum can fulfil these tasks in the manner that will be required for sustained optimisation of Copernicus's success. The Copernicus Committee has only the EC and EU Member States as full and voting members. The mandate is political in nature and the membership so wide that the Committee cannot play a coordinating role in an operational sense. Notably, the key partners of the Commission in Copernicus do not play a role in the Copernicus Committee which is commensurate with their stake in the success of the programme. Moreover, without a central management mechanism, the complexity in the distribution of Copernicus support functions across satellite, in situ and other ground infrastructure, operations, service operations and routine user input and feedback will stand in the way of optimisation. This does not imply that the services themselves are not performant. It means, however, that there is potential for further benefits to be harvested from the daily operations of the services and the interaction with the users and user communities.

In addition to this, an overlay coordination mechanism would make it possible to pursue a number of other strategic benefits, including increased impact internationally. Copernicus would be in an excellent position to gauge unaddressed societal needs related to EO data beyond the core purposes of environmental monitoring and security. The examples of the U.S. Geological Survey and the U.S. National Geospatial Intelligence Agency illustrate that there are strong arguments for more holistic approaches to data management in order to widen and broaden benefits. Interestingly, this would also offer the opportunity of leveraging what can be learned from EO to the benefit of society as a whole. In the current political debate on the health of the Earth there is a serious lack of distinction between what must be considered scientific fact and political assessment. There is a need to clearly communicate this important distinction. One of the most concerning issues today is that the political debate on the environment and climate is a debate which allows best scientific assumptions to be replaced by political convenience arguments. There is an urgent need to communicate Earth Observation science results in such a fashion that incontrovertible boundaries are set for political discussion. For this to happen the body politic must progressively get a better under-

standing of the results provided by Earth Observation. Again, the organisations which are closest to the data must ensure that a mechanism exists which effectively communicates science results to non-science stakeholders. It is important to note that this is not a problem unique to Copernicus and therefore it should not be expected to resolve this issue in isolation. A coordination mechanism for the Copernicus programme, however, could ensure the issue is picked up and that progress is pursued in conjunction with other players such as GEO.

In this respect, particularly over the longer term, it is also necessary to have an observatory on the lookout for 'black swan' phenomena. Copernicus is clearly a key tool to monitor the health of the Earth. But the Earth is presently observed based on what we know is relevant for Earth health today. Going forward it is necessary to assume that new threats to Earth health will arise and – as experience of the past few decades has shown – it is a highly advisable 'insurance policy' to be constantly on the outlook for new Earth health threats and for data uses and sources that could give insight into these possible new threats. To scan the horizon for the unknown requires holistic cooperation between the institutions having the best knowledge of the known, and this is another reason why an integrative partnership must be built between the European Commission and the organisations that are closest to the users and closest to the new enabling technologies.

The authors of the current document are aware that also the mechanisms and elements proposed in the above will not in themselves ensure that the full potential of Copernicus services is delivered. In fact, this could never be achieved by the institutional players only. After all, the full, free and open access data policy is meant to ensure that also a wider suite of services can be developed which will deliver more diverse benefits to a wider range of communities. In this sense the structure of the programme requires – and has acknowledged – a key role to be fulfilled by various non-institutional players. Thus the authors believe it is essential that steps be taken by the institutional players to facilitate and encourage data use by the non-institutional players. Again, this could be achieved through integrated cooperation by the Copernicus partners, this being beneficial both in terms of programme optimisation in the short term and for the long haul.

1.2.2 Creating Stewardship of Copernicus

Copernicus will be subject to a number of changes as it evolves over time. Although these developments are driven by different factors, many of them will eventually demand a stronger stewardship of the Copernicus programme. Also in this sense there is an increased need for centralised, integrative management in order to serve the diverse user communities in the best possible fashion.

A key issue in this regard is the governance role of the European Commission, which will increase considerably in the future. The EU is already responsible for the availability and continuity of services and the aggregation of political will. However, the funding situation for new generations of Sentinels will change. The later phases of second generation Sentinel satellites will presumably no longer be co-funded with ESA because operational services fall outside ESA's scope of research and development. In the long run this centralisation of governance will confront the European Commission with a number of important decisions regarding the constellation's sustainability.

Copernicus' success over the long term, i.e. over several generations of infrastructure, hinges on the ability of the programme structures to accommodate new and changed user needs over time and, to reconcile them with the continuity requirements. To this effect, mechanisms to capture these needs and prioritise them in accordance with available funding have to be in place. At this time the Copernicus User Forum does not join users with all the major decision makers and does not provide for substantive mechanisms to filter and prioritise needs relative to available funds. The Copernicus Committee and the Copernicus User Forum are without doubt essential, but there still remains an important gap. The European Union clearly desires to create a truly user-driven programme, as has been frequently stated. This requires that the organisations which are closest to users continue to be part of a partnership model with the European Commission, and that the partnership evolves towards a more integrative model.

Such a partnership model should aim at retaining the fields of authority of each partner, whilst allowing the particular expertise of each partner to flow into a decision making process which makes prioritisations and funding decisions on new data use and next generations of infrastructure on the most informed basis. This is true in terms of user needs, technical feasibility and the avenues possibly opened by new technology. But also

continuous monitoring of the six defined services to allow for an evolutionary path, and constant consideration of cross fertilisation between the services and the appropriateness of creating new services should be considered in this fashion. It is in this respect important to also capitalise on the ability of Copernicus data to serve wider communities than just those of environmental monitoring and security.

2. Potential Solution: a Copernicus Task Force

The above review acknowledges that many essential components of the Copernicus programme have been addressed very well. Nevertheless a few functions essential for the operational status of the programme remain underdeveloped. More precisely, a number of key issues – required to optimise the potential benefits and turn Copernicus into a user-driven constellation – are either not yet in place, or insufficiently so. Interestingly, these issues share to a large extent the same root cause and therefore they could be jointly addressed.

Copernicus appears to lack an institutional clearing house function which has an overview of the many scattered programme functions and which would aggregate, through mechanisms of centralisation, the required critical mass in terms of demand, exposure, expertise and authority. The issues identified in our evaluation are to a large extent the result of the lack of a central clearing house function.

The authors therefore propose the creation of a "Copernicus Task Force" as an initial governance solution to address the missing links and the resulting lack of certain programme support functions. It was already stressed in the introduction that such a vehicle should not imply the creation of any new physical infrastructure or organisations and that it should be established in a way that respects the respective responsibilities of the organisations currently involved as they have evolved before and throughout the implementation of Copernicus. Thus, a Copernicus Task Force should be conceived as a light-weight structure that serves as a counter-weight to the very pronounced degree of decentralisation in the current programme architecture. One important advantage of the Task Force proposal over other perhaps more stove-piped initiatives one could imagine, is that it has the potential to go beyond the crucial tasks of spurring user uptake and developing user involvement mechanisms. Given the proper mandate it could serve the purpose of a clearing house for the key stakeholders in order to reinforce informed decisions that would ensure programme optimisation drawing on an integrated and holistic perspective. The authors believe it might be desirable to establish the Task Force in such a way that its precise scope would be able to evolve and expand over time – in accordance with the changing status and scope of the Copernicus programme.

In practical terms this would require formal and centralised coordination mechanisms and communication channels to be established with the major players involved in Copernicus, such as the European Commission, the European Space Agency, the European Environment Agency, EUMETSAT, The Joint Research Centre and the European Union Satellite Centre (EUSC).

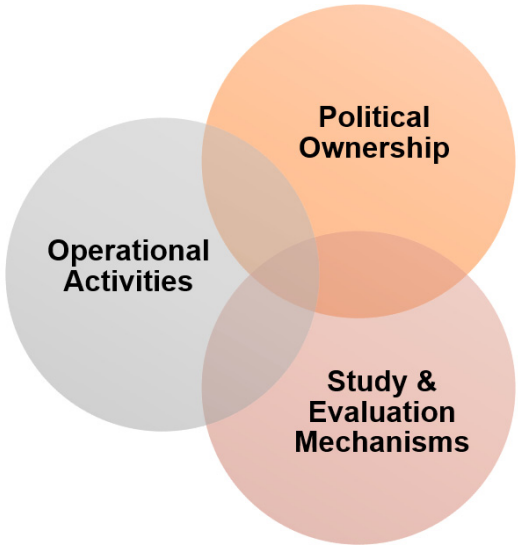

Figure 2: The Task Force's Support Functions.

EU Member States, major institutional users, private industry, end users and user communities could be consulted within their remits and involved correspondingly, noting, however, that the Copernicus Task Force should not replace the Copernicus Committee or the Copernicus User Forum.

The programme support functions of the Task Force could be grouped into three self-reinforcing categories: Operational Activities, Study and Advice Mechanisms, Political Ownership.

Operational Activities

The operational activities are perhaps the most urgent element, because of the criticality of optimising the services, the user uptake and the user involvement. This entails agreeing on mechanisms to promote the use of the data proactively by reaching out to new user groups, encouraging existing users to use data and data products more extensively, looking for synergies between services and uses. This should include steps to create a Copernicus product ecosystem allowing value added products and applications to be shared effectively, and product innovation to be stimulated. These steps would be an addition to the existing tools intended to spur the market for downstream applications.

Study and Advice Mechanisms

Including study and advice functions within the remit of the Task Force could be a powerful accompaniment to the operational activities. Study and advice functions could include market studies and the Black Swan phenomena monitoring activities mentioned earlier, but could also involve more general socio-economic benefit analyses. In this context it is noted that there is a virtuous circle effect to be had from linking such study activities to the consideration of new, modified or evolved data sources. Additionally, study and advice could be generated and used by the Task Force to reflect on evolutions in terms of governance, data policy, archiving, and data distribution methods. The Task Force could also seek to measure system performance across the board by the use of defined performance indicators, this again providing a key input for system optimisation.

Finally, the Task Force should be given the task of stimulating the communication of scientific findings to non-science stakeholders, with the aim of explaining what best science 'facts' are, so that the necessary political debates will be focused on how to take action, based on the best evidence science can give.

Political Ownership

Since the Task Force would serve as a clearing house for many of the decentralised projects and responsibilities, it offers an excellent opportunity to facilitate political ownership of the entire Copernicus programme by the partners – keeping in mind that the role of the European Commission will become even more distinct over time because of its increasing funding role. If cohesive political ownership is leveraged properly it could strengthen the overall Copernicus governance, increase transparency and lead to even better informed decisions. Strong political ownership is needed in order to reinforce Europe's position on the global stage concerning environmental monitoring issues. This, in turn, would facilitate a better fit between Europe's capabilities and those of non-European actors in the EO field.

Conclusions and a Possible Way Forward

The Copernicus programme is rapidly moving towards full operational status. From an overall perspective Europe can be proud of what it has achieved in a rather short time. It has been able to successfully implement an integrated state-of-the-art environmental monitoring constellation with global observation capabilities. Nevertheless, the authors have detected a realisation among the various players involved that a number of important issues remain to be addressed.

In order to address these issues in an integrated and sensible fashion the authors propose the creation of the Copernicus Task Force. By making use of the existing expertise and distribution of responsibilities the

Task Force would fulfil three essential programme support functions. First, it would have an operational component within which stronger user uptake and user involvement schemes would be developed. This should further increase the expected benefits generated by Copernicus. Second, it would be supported by study and advice mechanisms that provide critical reflection and information to the stakeholders that ultimately steer the programme's long term evolution and would coordinate more effective communication of scientific findings. Third, the scope and structure of the task force would offer an excellent opportunity to strengthen and centralise the political ownership over the programme. The latter would lead to best-informed decision making, increased transparency and better international outreach.

The authors of this document believe that a task force constituted as described could be a helpful step towards a more integrated way of working together and filling the gaps that can be identified currently. However, the authors do not necessarily think that this is the only way that gaps could be filled and programme outputs optimised. Hence, it would seem sensible to seek to get all the relevant players, EC, ESA, EUMETSAT, EEA, EUSC together for an exploratory discussion of the task force proposal and what other realistic alternatives may be identified.

It is urgent to get a dialogue going among the key stakeholders, without such a dialogue being pre-conditioned on an acceptance of the task force proposal.

Mission Statement of ESPI

The European Space Policy Institute (ESPI) provides decision-makers with an informed view on mid- to long-term issues relevant to Europe's space activities. In this context, ESPI acts as an independent platform for developing positions and strategies.

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