

‘Space Partnership’

Answers to MS comments

Introduction

This document intends to answer the questions and comments raised during the meeting on the proposal for European Partnership for Globally competitive Space Systems (‘Space Partnership’ in the following) held on the 15/12/2020 with members of the shadow strategic and ‘Digital, Industry and Space’ configurations of the Horizon Europe Programme Committee as well as the written questions and comments received afterwards from a number of delegations. The different points raised by the different delegations have been organised in a number of themes, which are addressed successively in this document.

In order to keep the document short and against the background of the provisions of the draft Horizon Europe legal acts, we refer to three key documents: the Strategic Research and Innovation Agenda (SRIA) for EU-funded Space research supporting competitiveness¹, the proposal for a European Partnership on Globally competitive Space Systems published in May 2020² and the template Memorandum of Understanding (MoU). The two first documents are attached, elements of the MoU are reproduced in Annex.

European Partnerships

European Partnerships bring the European Commission and private and/or public partners together to address some of Europe’s most pressing challenges through concerted research and innovation initiatives. They are a key implementation tool of Horizon Europe, and contribute significantly to achieving the EU’s political priorities.

Three types of Partnerships exist in Horizon Europe: co-programmed, co-funded and institutionalised.

The Space one is a ‘Co-Programmed’ Partnership: a Partnership between the Commission and private and/or public partners, based on a Memorandum of Understanding.

Stakeholder involvement, openness of the process.

A Strategic Research and Innovation Agenda (SRIA, attached) has been developed involving a stakeholders Consultation Platform and the sub-group on space technology (SPEG-T) of the Informal Commission Space Policy Expert Group (SPEG) composed of Member States, Norway, Switzerland and the European Space Agency.

The backbone of the consultation platform are the five associations Eurospace, SME4space, ESRE and EARTO (research centres) and EASN (academia). While these associations have contributed on a voluntary basis, stakeholders who do not belong to these associations have also been invited, including from ‘New Space’. Five Member States (AT, DE, ES, FR, IT) have participated from the beginning to the work of the Working Groups of the platform, including the Working Group on Synergies and opportunities where the possibility of implementing the SRIA with a Co-Programmed Partnership has been discussed and where examples of existing Partnerships under H2020 such as Factories of the Future were presented.

¹ https://ec.europa.eu/growth/sectors/space/research_en

² https://ec.europa.eu/info/horizon-europe/european-partnerships-horizon-europe/candidates-digital-industry-and-space_en

Since January 2020, all SPEG Members are invited. ESA attended the work of the platform as an observer. The first meeting of the platform was in July 2018.

The SPEG has been regularly informed of the progress on the content as well as on the governance at each of its meeting i.e. every two or three months since the creation of the platform.

In December 2019 / January 2020, the agenda received a broad consensus by both the consultation platform and the SPEG. A discussion on governance took place at the SPEG-T of January 2020.

In May 2020, the proposal (attached) was made public and was presented to the ensemble of the Participants to the platform and to the SPEG-T members at two meetings in June 2020.

A first draft of the template of the Memorandum of Understanding has been circulated to the Stakeholders and the SPEG-T in June 2020.

Added value

Like for other Partnerships, the key elements of the added-value are **directionality and additionality**. Compared to H2020 where there was no overall strategic research agenda, no multiannual roadmap and thus no monitoring of progress versus, these, the current proposal comes with an already endorsed SRIA and the multi-annual roadmaps are being developed.

The methodology to monitor the progress relies on objectives and KPIs which are identified in the proposal. While it is shortly described in the proposal (section 2.2.5), it has been refined together with DG RTD services and is part of the template MoU.

The additionality (section 2.3.1) is also clearly spelled out with the additional activities which the industry, including SMEs, research centres and academia can bring. In the proposal, this additionality was estimated to bring a leverage factor of 1,2 i.e. for each EUR of EU-funding, another 1,2 EUR will be invested by the Partners under the form of an in-kind contribution.

Like for other Partnerships, more details were requested on these additional activities by the central services of DG RTD. The section 'Additional activities' in annex details for each line of activities of the SRIA the envisaged additional activities, together with an estimate of the value. This leverage factor is a commitment of the ensemble of the Partners i.e. this does not require that each Partner demonstrate a leverage of 1,2 individually.

The monitoring of both the progress against the SRIA and the multiannual roadmap as well of the additionally have also been refined in the template MoU (Section 6) and the space Partnership is bound to the same obligations than others. The draft text for Section 6 is given in annex.

Overall, we see the following added values:

- The Partnership is the most **appropriate tool** in the EC toolbox to build **structural and transparent relations** with industry, to pursue common European objectives and make European industry more competitive. Space is a well-defined industrial domain; as such it is an excellent candidate for the Partnership instrument.
- Europe needs to **reduce industrial fragmentation and duplications**: the instrument helps create a European critical mass around shared objectives.
- The very tangible nature of the Space offers **clear, practical and measurable** objectives. Those are set in the SRIA and are well developed.
- A Partnership on Space will **help establish relationships and build synergies** with other industrial domains (i.e. digital domains, manufacturing) in a much easier fashion than any other setup that does not foresee a Space Partnership.
- The Partnership instrument **mobilizes industrial private investments** on top of the EU one.

Focus of the Space Partnership

The Space Partnership has a clear focus and concentrates on the two main section of the SRIA:

- Foster competitiveness of space systems and
- Reinforce access to space where the global competition is particularly fierce.

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One section which is not considered is 'Contribution to space science'. The proposal gives for each of the sections under consideration the specific objectives, the proposed actions, the targeted impact and the Key Performance Indicators (Section 2.2)

Stakeholder's Association

The Space Partnership foresees the creation of a **unique association open to all stakeholders** who want to become member. These members become at the same time Partners in the Partnership. All Partners have the **same rights and obligations** e.g. they can participate in the Technical Groups but will also be required to report about their additional activities.

To become member of the association, one does not need to be member of any of the five founding associations.

The five associations Eurospace, SME4Space ESRE, EARTO and EASN will be the founding members. Other associations may join later on.

Stakeholders who are not member of any of the above associations can become members and there will be the possibility for them to sit in the Partnership Board.

Risk of dominance of large players versus e.g. SMEs

Large players have means of representation, which are of course more important than smaller players (e.g. SMES, New Space). Large industry in particular is well organised when it comes to promote their

interests. In the absence of a formalised consultation framework, no doubt that they will use these means. While the consultation platform is a first step towards an organised and more transparent framework, it remains informal.

The proposal for a Space Partnership provides a clear and transparent process with principles of openness and transparencies laid out in the MoU.

The unique association provides to any interested stakeholders the possibility to be Member or Partner and to have its voice heard.

In the case of the space Partnership, it is to be noted that in the process of establishing the Partnership, **SME interests are promoted by SME4SPACE** which is present in 24 European countries, and gathers 800 members; **research centers** interests are promoted thanks to 2 associations **ESRE and EARTO**, also with a wide geographical coverage and academia's interest are promoted by **EASN**. All these associations have a European dimension (see their description in Annex of the proposal) and it is not excluded that other associations or stakeholders join.

One should also acknowledge that the large players are the ones who have enabled Europe to be a strong global competitor.

This Partnership is therefore seeking for an inclusive and balanced representation of the space ecosystem.

Governance

Role of Member States

At the time of the publication of the space Partnership proposal in May 2020, the draft MoU was not yet available. The last update provided by DG RTD in December clarifies a number of points. The Space Partnership plans to follow this draft MoU.

It also foresees to establish

- **a States Representative Group (SRG)**

In accordance with the MOU:

The Partnership Board will form a States Representatives Group. The Partnership Board will ask each Member State and each Associated Country to nominate a representative to the States Representatives Group. The States Representatives Group will elect a chairperson from among its members.

- The States Representatives Group will actively support the achievement of objectives of the European Partnership and ensure complementarity with national policies, priorities and programmes. They will review information and provide opinions on the progress of the European Partnership towards its scientific, economic and/or societal impacts.
- The States Representatives Group will provide information to, and act as an interface with the European Partnership on the following matters:
 - a) The status of activities performed under national or regional policies, priorities and research and innovation programmes which are relevant to the European Partnership and identification of potential areas of cooperation, including concrete actions taken or envisaged for the deployment of relevant technologies and innovative solutions at the national or regional level;
 - b) Specific measures taken at national level or regional level to maximise the impacts of the results achieved, in particular dissemination events, dedicated technical workshops and communication activities;
 - c) Specific measures taken at national or regional level to support the exploitation, deployment and/or scale-up of the results achieved within the European Partnership.

- The States Representatives Group may also make proposals to the Partnership Board on the above matters”.
- **an Advisory Committee**
According to the draft MOU:
 - The Partners will form an Advisory Committee. The members of the Advisory Committee must reflect a balanced representation of experts and stakeholders from across Europe within the scope of the priorities of the European Partnership, including e.g. from academia, industry, SMEs, end-users, non-governmental and civil society organisations, stakeholder associations and regulatory bodies.
 - The Advisory Committee will advise on the priorities to be addressed, in line with the Strategic Research and Innovation Agenda and the Horizon Europe strategic planning, and suggest, in view of the progress of the European Partnership, corrective measures or re-orientations to the Partnership Board, where necessary.
 - **two working groups:** one on access to space, one on space competitiveness. These two working groups will allow Member States to have direct interaction with the Partners of the Partnership and discuss in detail the road mapping activities of the Partnership.

Finally, it is also proposed to add a statement in the **Strategic Plan** which clarifies further the role of MS regarding the topics of the work programme related to the Space Partnership. In particular, the statement proposed for the Strategic Plan reads as follow:

"The preparation of topics related to this partnership for the Work Programme will entail the due involvement of the Horizon Europe Programme Committee, as specified in the Horizon Europe Specific Programme, including its Annex II, last sentence. Calls related to this Partnership shall have an opening date as from the year 2022."

This addition intends to:

- clarify that the Horizon Europe Programme Committee, as well as the ad-hoc meetings foreseen for space in the Horizon Europe Specific Programme, are the fora where the preparation of the Work Programme Topics related to the recommendation made by the Space Partnership will be discussed and agreed; and
- ensure that the Topics related to the Space Partnership would be launched at the earliest in 2022, thus leaving ample margins to settle the detailed implementation modalities.

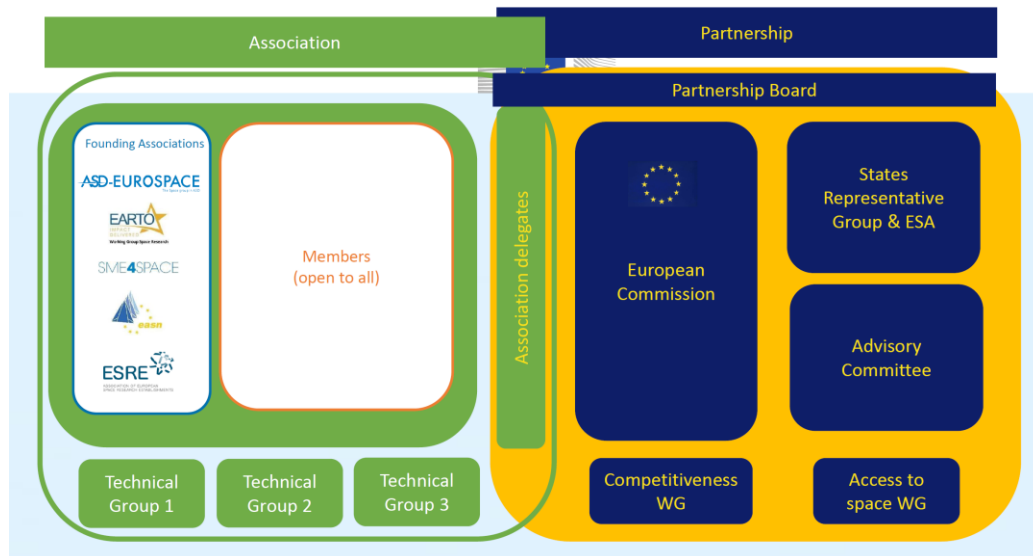
The ad-hoc meetings will provide for Member States the possibility to scrutinize everything that comes out of the Partnership before it is further processed by the Programme Committee. This will also ensure that Member State security interests are duly protected.

As regards the composition of the ad-hoc meetings, it will be the same as for the Programme Committee. Ad-hoc meetings can be convened under the same rules as the Programme Committee.

Role of ESA

Regarding **the role of ESA**, many references are made throughout the proposal to the numerous interactions and links existing with ESA (e.g. Harmonisation process, Joint Task Force on Critical Technologies) and to the fact that synergies with ESA programmes such as ARTES or FLPP must be ensured and states that: "All the links are therefore in place and active and will continue to be used in the frame of the Partnership”.

The following text is currently foreseen in the draft MoU regarding the role of ESA: *'The European Space Agency is an important space R&I player in Europe, has a unique knowledge on R&I programming, including at European level as well as strong expertise and experience in the field of space. ESA will be invited to provide advice and information to, and act as an interface with the European Partnership regarding the coherency of the programming, identifying synergies and avoiding un-necessary duplication with respect to its own activities, in particular those relevant to the SRIA. It is foreseen to invite ESA to SRG meetings.'*



Comitology

The input the Commission receives from the Partnership, typically in the forms of Strategic Research and Innovation agendas and roadmaps, contributes to the definition of Topics in the Horizon Europe's Work Programmes that are discussed with the Member States with the standard comitology procedures. There is no automatism in taking the Partnership inputs as-is into Topics, and a specific sentence to further highlight this has been suggested by the Commission services to be added to the Horizon Europe's Strategic Plan.

Open calls

The Topics are part of the Horizon Europe calls for proposals published in the Work Programme and **are open to all eligible stakeholders no matter their affiliation/association with the partnership:** In other words, a company or an organization can participate in calls for proposals also in case that it is not a member of the Partnership association.

Budget, risk of underfunding other parts of EU funded space research

The budget for Cluster 4 has only been recently set by the co-legislator. The exact distribution within Cluster 4 is not yet fully decided. However, the following indications with regard to the Space Partnership can be made:

- It is clear that DG DEFIS will not make a proposal which would result to an underfunding of R&I for the space research under Horizon Europe. This would be against the EU's interests.
- The legislator has indicated that Horizon Europe should contribute to space objectives at a level of spending that is at least commensurate proportionally with that under Horizon 2020
- In Horizon 2020 the space research budget devoted to access to space and competitiveness (including critical technologies) was at around 25% of the total budget for space R&I.

Lifetime and auditing of the Partnership

In the space Partnership proposal published in May 2020, it was proposed to couple the life of the Partnership with Horizon Europe, i.e. start in 2021 and phasing out in 2027. Section 2.2.6 of the proposal describes the exit strategy, which is based on the fulfillment of the objectives, measured by the KPIs.

The Commitments of the Partners was assessed on the basis of the fulfilling the selected scope of the SRIA over 7 years. These additional activities have been assessed (see section additional activities in Annex) on this assumption.

The monitoring of these is further precised in the Template MoU (see section on Monitoring and reporting in the updated MoU in Annex). It foresees among other:

'The monitoring and reporting by the Partners will be carried out at least annually for the duration of the Memorandum of Understanding.

Upon request, the Partners other than the Union will provide the European Commission with all additional necessary information for the assessment of the achievements of the European Partnership in the context of the overall Horizon Europe evaluation, and in the context of the Strategic Coordinating Process for European Partnerships (e.g. input to the biennial monitoring of the European Partnerships).'

The template MoU also foresees to associate the SRG who 'will review information and provide opinions on the progress of the European Partnership towards its scientific, economic and/or societal impacts'.

Process of adoption, timeline

Consistent with article 4a of the draft Horizon Europe specific programme (general approach of 29 September 2020), the draft strategic plan has identified European Partnerships according to Article 8(1)(a and b) of the Horizon Europe proposal for a regulation establishing this EU Research and Innovation Framework programme.

The same article 4a precises that the strategic plan aims at “preparing the content in the work programmes (as set out in Article 11) covering a maximum period of four years, while retaining sufficient flexibility to respond rapidly to new and emerging challenges, unexpected opportunities and crises”.

The adoption of the plan is subject to an examination procedure mentioned at article 12(4) of the above mentioned proposal for a decision according to comitology rules. This adoption is distinct of the subsequent adoption of the related work programmes for 2021-2022 and 2023-2024.

A consultation of the shadow Strategic Configuration of the Horizon Europe Programme on the Strategic Plan is foreseen between mid and end January.

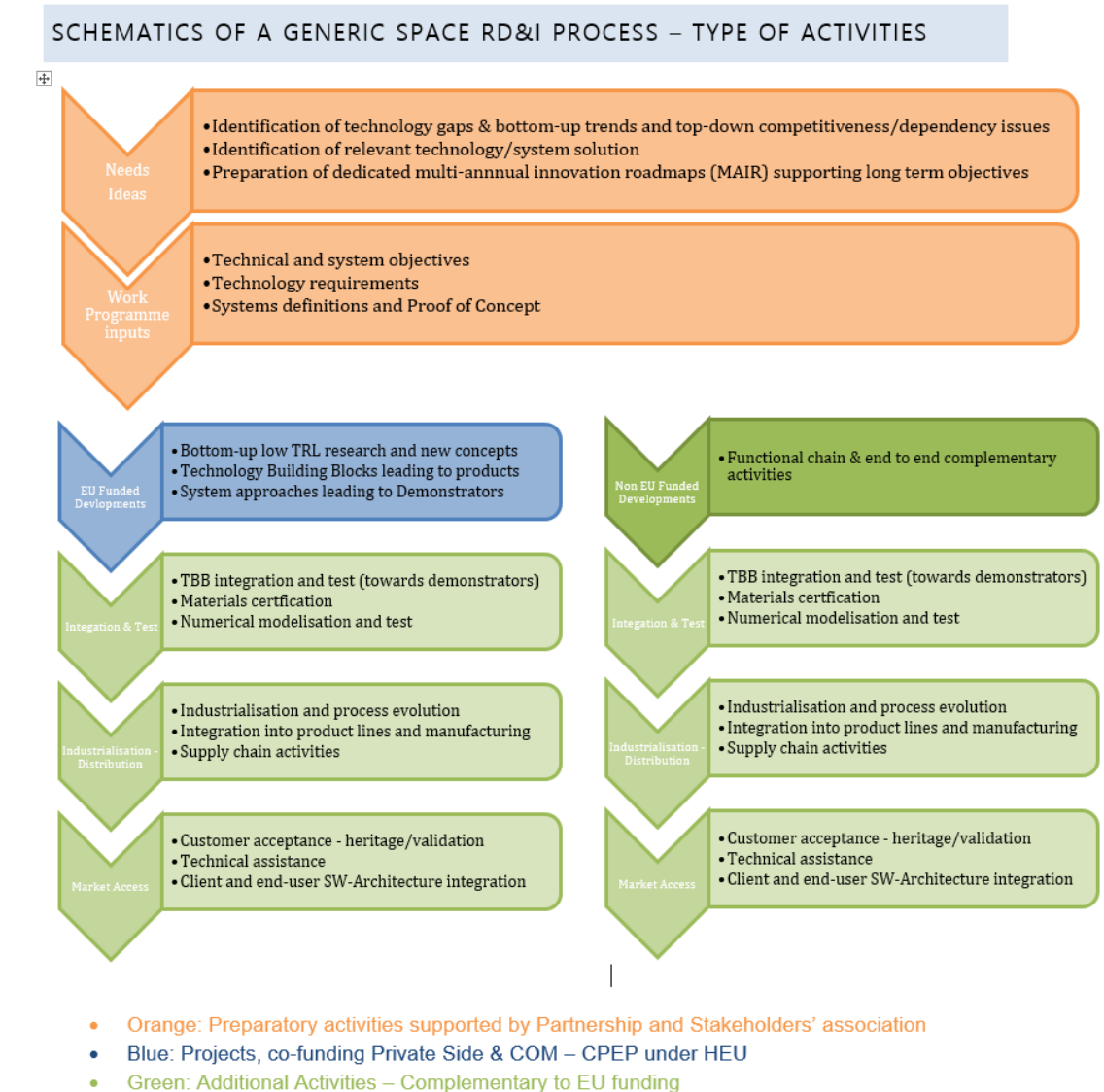
As regards the preparation of the Partnership, and as indicated in the meeting on 15 December, the Commission services intend the ad-hoc meetings on space to be used to fine-tune the details and prepare the work programme topics for this Partnership. The Commission intends to follow the following timeline:

- February 2021 first ad-hoc meeting to focus on added value & scope
- March 2021 second ad-hoc meeting to focus on governance
- May 2021 third ad-hoc meeting to focus on all remaining questions
- July 2021 fourth ad-hoc meeting for final discussions

Annex

Additional activities

The schematic below illustrates the overall functioning of the R&I process in the context of the proposed Partnership.



Activities related to the functioning of the Partnership

As illustrated by the two top blocks of this diagram, a certain number of actions are needed to be undertaken by the Partners for the operation of the Partnership, using their own in-kind resources. For this purpose, most of the other Partnerships have established a specific association for the Partnership purpose where members work together, independently from the fact that they are affiliated or not to another association. The work is mostly carried out by participation and support to the Partnership Working Groups and the Partnership Board. This includes:

- Consultation beyond the community of members and Partners of the association

- Identification of technology gaps, of bottom-up trends, top-down competitiveness/dependency issues, etc. and identification of relevant technology/system solution
- Preparation of dedicated multi-annual innovation roadmaps (MAIR) supporting long term objectives example when updating the SRIA or developing multi-annual roadmaps
- Monitoring of the investment target as described under section 2.2 i.e. of their in-kind contribution on R&I and other activities they are carrying out in the frame of the Partnership (e.g. participation to Working Groups, to road mapping and monitoring activities, etc.).
- Most of the activities described in this proposal under the section communication, dissemination and exploitation in particular towards the community outside of the members and Partners, for example for the spin-in and spin-out of technologies, awareness campaigns on the activities of the Partnership, the calls for proposals, the projects selected in a spirit of openness and widening, relying on a web site and appropriate social medias, organising public workshops, etc.

The investments associated with this type of activities is estimated to [EUR ...]

Activities to be carried out aside from EU-funded R&I

Below the two top blocks, the two columns of the schematic illustrate a generic process in the field of space, which follows an end-to-end approach to build up concrete and innovative products and associated services, which we will find on the markets of satellites and launchers in the medium to long term.

The process starts with R&I on new concepts and maturation of technologies at low TRL (see for example the left column). These Technology Building Blocks (TBB) will be part a system which will be tested first in demonstrators. If successful, steps will be undertaken towards the industrialisation of the product and services. This is clearly outside if the scope of EU-funded with tasks such as certification, adaptation of the company numerical and modelling and testing environment. This has then to be integrated in the product lines and in the manufacturing process. Manufacturing calls for handling the supply chain activities. Finally these product and services have to be tuned to the specific customer needs and eventually technical assistance provided.

By supporting the maturation of existing technologies and development of new technologies, EU funding participates to the full range of developments of Technology Building Blocks and related functional chains, up to demonstrators (left hand side column). While the two columns are identical in terms of process and terminology, it is clear that not all the required needs will be addressed by the Horizon Europe Work programme.

Needs not addressed by EU funding need to be covered by own funds or by other fund providers (which could be other public funds such as national funds or ESA funds). These neighbouring developments support the same objective and may lead to a single demonstration, and/or ensuring the complete functional chain. The private sector is ready to undertake these complementary activities as required for a final product or service to emerge. For example, developments on Quantum Key Distribution (QKD) require the development of optical communication, terminals and antennas. In order to provide a complete service for QKD, all the technology building blocks are necessary. If the terminals are not able to be developed in the frame of the Partnership, the private sector shall be ready

to undertake their developments. All these activities will be providing additional leverage to EU investment.

Moreover, the European space supply chain is facing heavy non-recurring costs in RD&I processes which is not covered by EU projects funding.

Currently, for the majority of the SMEs, ESA-programmes remain the core funding instruments for space R&I. EU-funding represents a niche in the overall public financing of space activities. The public-private partnership for space in Europe should reinforce the place of EU funding in the SME context by focusing on elements of high importance of space SMEs and create leverage with ESA funds which is a public/public type of leverage.

Research centres and academia are also in a situation to bring a public / public type of leverage, resulting from Member States national funding programmes or through ESA. Research centres are bridging the gap between academia and industry and typically cover activities going from TRL2 to TRL6. However, in the case of space, research centres are exceptionally able to deliver a product (e.g. development of a scientific instrument). For generalist research centres such as EARTO members, European projects allow to develop further their technology platforms in different markets, including space. Part of the subsidies received from the states are complementing the European projects, whose co-funding ranges from 45 to 55% of the total budget of the project. This is due to very high indirect cost owing to the very expensive facilities and equipment to maintain. One of the missions of research centres is to innovate and transfer technologies to industry, it is necessary to mature these technologies with different sources of funding before industry is interested in their uptake. In addition of Member States public funding, research centres are also using ESA funds (from ESA Member States) made available through programmes such as ARTES (telecommunications), ESA General Support Technology Programme (GSTP) or Technology Development Element (TDE). These programmes, often combined in successive sequence with EU funded projects, enable research centres to cover a wide range of TRL, typically from TRL 2 to TRL 6, for example in successive projects, e.g. TDE (TRL 2-3), EU funded RIA (TRL 3-4) and GSTP or ARTES project (TRL 4-6).

Scope of additional activities needed to reach the objectives

1) Foster competitiveness of space systems

1.1) Foster Competitiveness of end-to-end systems and associated services: telecommunications, Earth observation, ground segment and data chain.

Both telecom and earth observation satellite markets are extremely active, the drive for new technologies is so serious and rapid, just to keep up with competition, that it pushes industry to invest heavily on R&D and development, in parallel with the search for institutional support.

Most of the non-recurring costs associated with new satellite product lines require large company investments in terms of product development, but also new modelisation tools, performance optimization tools, design tools, as well as new integration, test facilities (e.g. white room), logistics and transport facilities. Costs associated with materials certification and characterisation/requirements, customisation to the client and end user needs, software integration, linkage with the supply chain, Mission Control Center and Satellite Control Centres operational tools including automation are carried out by the companies.

For Telecom, it is estimated that industry effort will represent 80% of the total additional activities (e.g. EUR 200 million for HEU, or EUR 30 million per year).

We should also note that with the ARTES programme, ESA invests of the order of (to be checked with ESA) EUR 350 million of ESA Member States funding per year in R&I for telecommunication. R&I funded by Horizon Europe comes as complement and duplication of efforts should be avoided by the participation of ESA in the Partnership.

In the field of Earth observation, there is a strong drive for improved coverage, low latency and persistent surveillance have pushed the industry to develop new product lines, to be upgraded constantly. It is estimated that industry effort will represent 80% of the total additional activities and correspond to EUR 170 million.

The ground segment must also adapt to these trends, which lead to increased data flow rates, new requirements to handle larger constellations, etc. The main areas where developments are needed are ground data handling and processing, ground station and terminals, control centres and operations. Here also, it is estimated that industry effort will represent 80% of the total additional activities in this field i.e. EUR 70 million.

1.2) Future space ecosystems: new system concepts, new services including de-orbiting and active debris removal, on-orbit servicing, assembly, manufacturing, new system concepts.

This type of research is typically where the EU funding makes a major contribution and where private company investment are usually small owing to the longer term of the research and the difficulty to assess when and how much return on investment is needed. While this type of research is needed, significant private leverage cannot be expected there.

Leverage by public funds from research centers and academia is to be estimated.

1.3) New industrial processes and production tools: digitalisation and automation, Manufacturing, Assembly, Integration and Testing (MAIT) at larger-scale, lean qualification processes. How: spin-in industry 4.0 technologies (RIAs), in synergies with Made in Europe.

Additional activities & investments by Partners to be completed

1.4) Enabling technologies (cross-mission, space and ground) and disruptive technologies.

The rationale described under section 1.1) and 1.2) apply to the development of enabling technologies while the rationale of section 2.2) below apply to disruptive technologies.

2) Reinforce access to space

As a preliminary remark, it should be noted that the launcher sector and market are very different from the satellite markets. The share of institutional investments is much larger than for satellites i.e. the leverage from EU-funded by private industry funds will be much smaller. The leverage will therefore be more of the public / public type, even by private partners, owing to the public funds that company receive for the development of launchers. Also, it is a very specific sector with only two European launchers existing: Ariane and VEGA, both commercialised by a unique company: Arianespace.

2.1) Innovation for competitiveness, targeting initial operational capability by 2030: reusability concepts, optimised low cost propulsion systems, smart technologies.

The main development areas for reusability are stage reusability demonstration, engine technologies, thermal protection, function channel, avionics, Guidance Navigation and Control, autonomy and flight SW, health monitoring system, launcher control / handling qualities, tools and simulation for flight physics. The type of additional activities not covered by EU funding includes system integration of technologies and solutions (engineering, modelisation, architecture etc...), market and concept studies, customer acceptance, impact studies, legal clearance and air space impact. The volume of these additional activities is estimated to EUR 320 million of which approximately EUR 190 million for the supply chain.

2.2) Disruptive concepts for access to space.

This type of research is typically where the EU funding makes a major contribution and where private company investment are usually small owing to the longer term of the research and the difficulty to assess when and how much return on investment is needed. While this type of research is needed, significant private leverage cannot be expected there.

2.3) Fostering and enabling new commercial space transportation solutions: new space transportation services and concepts, new technologies for improved versatility, cost reduction and flexibility, new services requiring re-entry; in coordination with ESA.

Here the areas where developments are needed include micro-launchers, new solutions for the injection in orbit, in space transportation concepts to new space nodes, new landing solutions, more autonomy, data fusion, navigation, mission planning, power distribution, energy storage, thermal management and in space propulsion. The nature of the work not funded by Horizon Europe includes for example market, concept and impact studies, customer acceptance, legal clearance, air space impact, patents applications observatory. The estimation of the cost of these additional activities amount to EUR 400 million of which approximately EUR 230 million for the supply chain

2.4) Modern, flexible and efficient European test, production and launch facilities, means and tools: digitalisation and advanced data management, innovation in Europe's existing spaceports, flexibility and configurability of launch systems, promote the use of space test and launch facilities for new actors and concepts.

The main areas of R&I needed here include digitalisation, advanced data management, flexible and configurability of ground services, modernisation of existing facilities, support new launch facilities, promote the use of existing space tests and launch facilities for new actors. The nature of these additional activities include market, concept, impact and environmental studies, integration into global launch site architecture, trade-offs analysis and compliance activities (REACH, Space law...).

The estimation of the cost of these additional activities amount to EUR 150 million of which approximately EUR 80 million for the supply chain.

Overall, it is estimated that a leverage factor of at least 1.2 can be made by this Partnership yielding a total volume of activity which could worth up to EUR 3 billion (including EU-funded research).

The planning and reporting of additional activities and investments by the Partners other than the Union will respect justified confidentiality requirements from the latter.

Furthermore, the Partners other than the Union will report on fulfilling their commitment to the objectives of the European Partnership as part of their annual reporting.

For the methodology of assessing the fulfilment of commitments for additional activities, the following is proposed at this stage for discussion, subject to possible changes and the need for validation with central Commission services:

- In the planning activities are linked to an estimated value;
 - Monitoring of activities checks that they have taken place;
 - If implementation is confirmed: estimated value is accepted.
- For other investments: collected by the association.

Section 6 on Monitoring and reporting in the updated MoU

The activities of the European Partnership shall be subject to continuous monitoring and periodic reviews in accordance with Article 45, Annex III and Annex V of the Horizon Europe Regulation. The outcomes of monitoring and periodic reviews shall feed into the evaluations of the Co-Programmed European Partnerships as part of Horizon Europe evaluations.

6.1 General systems

The Partners commit to set up and implement an effective reporting and monitoring system that allows the European Partnership as well as the European Commission to track progress over time towards the stated objectives and impacts, as well as to provide implementation and management data at the appropriate level of aggregation to allow for a portfolio analysis in line with the Horizon Europe monitoring provisions. The data provided will cover inter alia :

- a) Detailed information on the implementation and results of the calls for proposals in the Horizon Europe Work Programme dedicated to the European Partnership, the proposals received, the grants resulting from these calls, the individual beneficiaries, the results achieved by individual projects and their overall progress towards impact, or any other information deemed necessary for developing, implementing, monitoring and evaluating Union policies or programmes. Such access rights are limited to non-commercial and non-competitive use and shall comply with applicable confidentiality rules;
- b) Activities and fulfilment of commitments by the Partners other than the Union as described in Section 5, including their results, outcomes and impacts.

The European Commission will provide regular information on point a), supported by the Partners other than the Union that will provide any additional information necessary, e.g. by identifying individual beneficiaries, companies and researchers that are constituent entities of the Partners other than the Union.

The Partners will report to the European Commission on an annual or biennial³ basis on their contributions, quantitative and qualitative leverage effects, on progress towards specific policy objectives, deliverables and key performance indicators, allowing for an assessment over time of their results and progress towards impacts, their visibility and positioning in the international context, and potential needs for corrective measures.

This will be carried out in a structured and harmonised way. In particular, data shall be provided based on common data models agreed with the Commission services. It will inform the biennial⁴ monitoring of the R&I partnerships.

³ i.e. once every two years.

⁴ i.e. once every two years.

6.2 Reporting method for In-Kind Contributions to Additional Activities

The value of the in-kind contributions from the Partners other than the Union will be calculated on the basis of a common methodology. The Association will keep a record of these contributions from its constituent entities, which will provide the basis for periodic reporting of the total value by the Partners other than the Union of in-kind contributions to the partnership's activities.

Constituent entities that do not have a (reliable) cost accounting system⁵ may report an estimated range, with a minimum and maximum value, for their in-kind contributions.

Each constituent entity will keep a record of its method for calculating the value of its in-kind contributions.

6.3 Key Performance Indicators and reporting

The following Key Performance Indicators are defined for the European Partnership and will be included in monitoring and reporting [*n.b. it is mandatory to list here all KPIs directly related to the achievement of the partnership's **General objectives** (impacts – long-term), **Specific objectives** (outcomes, based on the use and diffusion of results – medium-term), **Operational objectives** (results by the end of the projects – short-term) and **Management and implementation data** (other data related to the functioning of the Partnership).*]

[list of agreed KPIs related to the achievement of the objectives]

[list of key Management and implementation data related to the operations and functioning of the Partnership]

1. Foster competitiveness of space systems
 - a. Satellite based communications:
 - i. KPIs: payload throughput, total system bandwidth, bandwidth/power ratio, network efficiency, ground terminal size and cost; at least one demonstration mission carried out by the end of the Partnership – Assessment of the impact of the demonstrator mission to increase the capacity of EU industry to bid on international markets, market studies to investigate evolution of market shares.
 - b. Earth Observation
 - i. KPI: at least one demonstration mission carried out by the end of the Partnership - Market studies to investigate evolution of market shares and influence of demonstrator mission.
 - c. Future Space Ecosystem for On-orbit Operations and new system concepts
 - i. KPI: by 2027, demonstrator has reached high maturity phase , by 2027 the EOF is operational.
 - d. Ground segment:
 - i. KPI: 2 pilots demonstrations to support both telecom and EO end-to-end demonstrators
 - e. Industry 4.0
 - i. KPI: Evaluation of cost and time evolutions by the end of the partnership on the supply chain.
2. Reinforce European capacity to access and use space
 - a. Launcher competitiveness

⁵ SMEs, but also other kinds of constituent entities that do not have a cost accounting system or whose accounting system does not produce exact or reliable figures, may use this option.

- i. KPI: at least two in-flight demonstrations performed by end of the Partnership – analysis of the launch service cost saving contribution
 - b. New space transportation services
 - i. KPI: at least three new technologies matured by the end of the Partnership – analysis of the benefits of these technologies to the new space transportation services; at least two challenge-based actions and/or options for the use of financial instruments available for the concerned actors by the end of the Partnership and addressing new commercial space transportation EU solutions or services
 - c. European test, production and launch facilities
 - i. KPI: at least two technology demonstrations in an operational environment - analysis of the launch service cost saving contribution
- 3. Accelerate the pace of innovation
 - a. Accelerate the pace of Innovation by a more efficient and effective programming
 - i. KPI: Existence of a SRIA, multi-annual roadmaps and monitoring methodology at the end of Y1, estimate of the gain on development time over the duration of the Partnership
 - b. Enhance and accelerate technology transfer, spin-in, spin-off and synergies
 - i. KPI: Number of the technologies developed in the Partnership that will bring innovation to other markets
- 4. Foster scientific endeavour
 - a. Disruptive technologies
 - i. KPI: Number of such technologies having reached TRL [4-5] during the life of the Partnership, estimate
 - b. Scientific output of EU-funded project under the Partnership
 - i. KPI: Number of publications and patents produced under the Partnership, living document on the analysis and structuring of the scientific output, existence of publicly available communication material; creation of a knowledge management database at the level of the partnership.
- 5. Enable autonomy for EU, its infrastructures and its citizens
 - a. Reinforce autonomy in accessing and using space
 - i. KPI: Dependence reduces from currently 50% to [x -tbd]% over the duration of the Partnership; highly skilled EU jobs employed in the sector; public bodies purchase volume for space based services made in EU.

The monitoring will be done on the basis of evidence provided by both Partners. To the extent possible, both Partners will provide monitoring data in close to real-time following the Horizon Europe regulation, in particular management and implementation data. Where relevant, the indicators and methodologies used to monitor the progress of the Partnership towards its objectives and scientific, economic and societal impacts shall be harmonised and aligned with the monitoring framework of Horizon Europe (Key Impact Pathways), and the monitoring criteria of European Partnerships. The indicators will be reported in a timely manner.

In line with Annex III of Horizon Europe Regulation and Article 45, the data provided by the European Partnerships shall include as a minimum:

- (a) Time-bound indicators to report on an annual basis on the progress of the activities towards the achievement of the objectives, as well as along impact pathways set out in the Horizon Europe Regulation, Annex V;

- (b) Information on the level of mainstreaming social sciences and humanities, the ratio between lower and higher Technology Readiness Levels in collaborative research, the progress on widening countries participation, the geographical composition of consortia in collaborative projects, the use of two stage submission and evaluation procedure, the measures aimed at facilitating collaborative links in European research and innovation, the use of the evaluation review and the number and types of complaints, the level of climate mainstreaming and related expenditures, SME participation, private sector participation, gender participation in funded actions, evaluation panels, boards and advisory groups, the co-funding rate, the complementary and cumulative funding from other Union funds, the time-to-grant, the level of international cooperation, engagement of citizens' and civil society participation.
- (c) The levels of expenditure disaggregated at project level in order to allow for specific analysis, including per intervention area.
- (d) The level of oversubscription, in particular the number of proposals and per call for proposals, their average score, the share of proposals above and below quality thresholds.

An **annual progress report** to the European Commission will include a dedicated section where the Partners other than the Union report on the functioning of the European Partnership, including on openness, transparency, governance, etc. in line with the implementation criteria for European Partnerships. It will feed into the biennial⁶ monitoring report for European Partnerships in the context of the strategic coordinating process.

The progress report will also include individual structured and representative “impact case studies”⁷ that will be shared with the Commission. These will be used to highlight lessons learned from specific projects/activities, their drivers and barriers to impact and their possible follow-up with the appropriate instruments, including other forms of support outside the European Partnership.

The annual progress report will also report on the progress of the European Partnership towards its objectives and the expected scientific, economic and societal impacts (following the Horizon Europe Key Impact Pathways), taking into account input available from all Partners. This reporting will also contain a qualitative assessment of the KPIs for the past year.

With due regard to their respective competencies, institutional settings and operational frameworks, the Partners will regularly inform and consult each other on the results of the monitoring, including to assess the contributions of the In-kind Additional Activities and Investments in operational activities undertaken by the Partners other than the Union.

Upon request, the Partners other than the Union will provide the European Commission with all additional necessary information for the assessment of the achievements of the European Partnership in the context of the overall Horizon Europe evaluation, and in the context of the Strategic Coordinating Process for European Partnerships (e.g. input to the biennial monitoring of the European Partnerships).

The monitoring and reporting by the Partners will be carried out at least annually for the duration of the Memorandum of Understanding.

⁶ i.e. once every two years.

⁷ i.e. high potential project outcomes that can be fast-tracked towards further investment and rapid development.