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- EU Space Industrial Policy. Releasing the Potential for Economic Growth in
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**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

EU SPACE INDUSTRIAL POLICY

**RELEASING THE POTENTIAL FOR ECONOMIC GROWTH IN THE SPACE
SECTOR**

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SECTOR**

1. A STRATEGIC INDUSTRY WHICH WILL CONTRIBUTE TO THE EUROPE 2020 STRATEGY

Space is more than a technological issue. It always had and will continue to have a strong political dimension which has not been developed properly at European level so far. The European Space Agency (ESA) has been conceived as an inter-governmental research and development agency allowing Europe to develop some unique scientific and technological capacities and placing it at face level with the leading space-faring nations in the world. But ESA is not a political actor. Over the past decades, the political dimension of space has been driven by national policies of those countries most active in space in Europe. However, with increasing competition from new emerging space-faring nations their individual political weights may no longer suffice to address the challenges ahead. An EU space policy could reinforce the European identity at international political level. At the same time, EU intervention could give space a stronger political impetus, for example by putting in place the right framework conditions to maintain and foster space activities in Europe and its industry's competitiveness at global level. This is where article 189 TFEU, which gives the EU a clear mandate to intervene in space matters, could make a difference.

Space is at the service of the European citizens. Many of the systems and services that are today essential for our well-being and security depend directly or indirectly on space. Without being aware of it, European citizens rely on space technologies when they use their mobile phones, do financial transactions, take an airplane, watch the weather forecast or look for the nearest restaurant in their cars. Space has become part of our daily live.

Space is a driver for growth and innovation, and contributes directly to the objectives of the European 2020 Strategy, Europe's growth strategy for a smart, sustainable and inclusive economy¹. The space sector is both a driver to scientific progress and enables systems and services with growth potential in areas such as telecommunications, navigation and Earth observation. These systems and services guarantee independence and security for the EU. They help us to address major societal challenges such as climate change, scarce resources, health, or the ageing of our population. They provide us with strategically important knowledge underpinning the EU's external relations in areas such as development-assistance and humanitarian aid. They stimulate innovation and competitiveness well beyond the space sector, and contribute to economic growth and job creation in almost all economic areas.

In December 2008, the European Council highlighted the potential of space to impact on innovation and economic recovery. In May 2009, the 6th Space Council emphasized "*the need to mobilise existing innovation support mechanisms at European, national and regional level, and consider new support instruments to ensure cross-fertilisation of knowledge, innovation and ideas between space and non-space sectors, and between space industry and leading research organisations and universities*".

Following the adoption of its Innovation Union flagship initiative, the Commission has put forward its proposal for the Horizon 2020 programme under the next Multiannual Financial Framework which encompasses research and innovation. Out of the proposed 80 billion Euro, 1.7 billion Euro are to be invested in space research and innovation.

Furthermore, space has become a global business. The European space industry has to face increasing competition from new emerging space powers such as China and India. EU

¹ "EUROPE 2020 A strategy for smart, sustainable and inclusive growth" COM (2010) 2020

intervention in space, together with those of its Member States and the ESA, needs to aim at strengthening the European space industry's competitiveness at global level.

The strategic importance and the specificities of this global industry call for a dedicated approach to industrial policy which is driven by the need to ensure cost-efficiency and competitiveness at global level, while ensuring steady consolidation and development of state of the art skills and competences and reaffirming a strong commitment with economic growth in line with the Europe 2020 strategy. The Commission underlined its intention to pursue a space industrial policy developed in cooperation with ESA and the EU Member States in its Communication on EU industrial policy adopted in October 2010². In April 2011, the Communication entitled "Towards a space strategy for the European Union that benefits its citizens"³ gave further orientations of a potential European space industrial policy. Member States supported this approach in the Council conclusions adopted in May and December 2011⁴.

This Communication builds also on the Commission's Industrial Policy Communication (COM(2012) 582 final) for A Stronger European Industry for Growth and Economic Recovery⁵.

Against this background, the EU's space industrial policy should be centred on five specific objectives:

1. Establish a coherent and stable regulatory framework
2. Further develop a competitive, solid, efficient and balanced industrial base in Europe and support SME participation;
3. Support the global competitiveness of the EU space industry by encouraging the sector to become more cost-efficient along the value chain;
4. Develop markets for space applications and services;
5. Ensure technological non-dependence and an independent access to space.

Regarding the last objective, it is of fundamental importance that the EU maintains its autonomy in strategic areas of the space sector such as the launch services. The EU space industrial policy should, therefore, ensure the availability of a reliable, secure and cost-efficient launcher system. It should create the conditions (including the financial conditions) necessary to maintain and strengthen independent European access to space in line with

² COM(2010)614

³ COM(2011)152

⁴ Council Resolution: "Orientations concerning added value and benefits of space for the security of European citizens", 18232/11, Brussels, 6 December 2011 which concluded "*that industrial policy for space should take into account the specificities of the space sector and the interest of all Member States to invest in space assets, and aim at the following common objectives: support the European capability to conceive, develop, launch, operate and exploit space systems; strengthen the competitiveness of European industry for both its domestic and export markets; and promote competition and a balanced development and involvement of capacities within Europe*". It also underlined "*the need to examine whether appropriate measures may be necessary at European and international level to guarantee the sustainability and economic development of space activities, including those of the European commercial sector*".

⁵ COM(2012) 582 final, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels, 10.10.2012.

institutional needs. To this end, the governance of the exploitation of the European launchers should evolve to increase financial efficiency in the management of user programmes. Ultimately, the actors of the European space policy will have to develop a real European launcher policy which exists in most space-faring nations.

An EU space industrial policy can only be effective if based on efficient cooperation between the three actors of the European space policy: the EU, ESA and their respective Member States. The TFEU states that the EU may "promote joint initiatives, support research and technological development and coordinate the efforts needed for the exploration and exploitation of space". Furthermore, the "Union shall establish any appropriate relations with the European space agency". Mechanisms should be found to ensure coordination within the EU framework so that Member States positions expressed in international organisations forums, including ESA, is consistent with and supports EU space policy.

2. A HIGH TECH INDUSTRY DEFYING GLOBAL COMPETITIONS

2.1. An industry facing international challenges

The European space industry differs from its main international competitors to the extent that its budget is smaller, it relies more on commercial sales, the share of military expenses is smaller and synergies between civil and defence sectors are far less developed. Unlike the US, the European market for downstream navigation and Earth observation services is only emerging. These features account for the fact that the European industry is facing commercial and innovation challenges.

2.1.1. Threats on commercial markets on which EU manufacturing industry is highly dependent

The space manufacturing industry (satellites, launchers and ground segment) is a strategic, high-tech, high-risk and investment intensive industry with long development cycles and low production rate. In all space-faring nations, space industry mainly depends on institutional programmes, which take two forms: financing of research and development programmes and buying space products and services, as customers of the industry⁶.

Concerning research, institutional space R&D policies are one of the main instruments to shape the sector. Total European R&D is roughly estimated to account for 10% of unconsolidated sales turnover of the EU space sector. In an international context though, the funding of European R&D pales (into insignificance) in comparison with the US. US civil space budget spent on RTD is at approximately 25%⁷. Expressed per capita, the US NASA civil space budget⁸ is approximately four times higher than all the European civil space budgets combined (national, ESA and FP7).

In comparison to other space-faring nations, the European institutional market is also relatively small. In 2009 the US budget was almost ten times higher than the European. Moreover, although space is a global market, it is difficult to speak of "a" European market. The institutional market is indeed fragmented due to the existence of many public

⁶ The Space Economy at a Glance 2007, OECD

⁷ NASA financial report 2009, Euroconsult 2009, and estimates of space technology budgets by ESA for 2009.

⁸ It should, however, be noted that a considerable share of public resources for space research comes not from NASA but directly from other public agencies.

stakeholders and the implementation of different national and ESA's space industrial policies, without always the necessary coordination. The European market alone is therefore not sufficient to sustain the current level of excellence of the European space industry. In addition, institutional markets of most space faring nations are closed to other space faring nations' industry. For these reasons, the European industry has to also rely on commercial and export sales, which represent 45% of its activities according to Eurospace data, a situation quite different compared to its competitors.

Overall, the European manufacturing and launcher industry has performed well in the global commercial market, with a growing market share for satellites (mostly telecom) and a stable market share of around 50% for commercial launches. However, sales on the commercial market, which are vital for the European space industry, are at risk since commercial sales exhibit cyclical downturns and since commercial and export markets are subject to increased and sometimes aggressive⁹ competition from other space faring nations. Because of the long lead time in this sector (10-15 years development for complex systems) it is essential to anticipate well in advance any possible (market) evolution. Moreover, the situation can evolve very rapidly in certain strategic sub sectors, such as launchers¹⁰.

2.1.2. Securing its positions: Preserving a world class industry on the telecommunication markets

The satellite-based service industry is of major importance for the EU economy as it turns the investment made in space infrastructures into concrete applications and services to the benefit of citizens. The satellite communications (SatCom) manufacturing industry is instrumental in sustaining Europe's entire space industry. According to Eurospace, sales of telecommunications satellites represent more than 60% of European satellite manufacturers' turnover over the last 10 years. Europe can rely on a world-class industry to develop and deliver SatCom services. Those services are key in delivering information, one of the most important resources of the growing sectors of the digital society. They contribute to several actions proposed in the Digital Agenda for Europe, notably to closing the broadband gap in low density populated areas. SatCom is a highly effective solution where terrestrial technologies are too costly or non-existent¹¹, as well as to provide cross-border digital services. Besides, it provides a resilient and robust fallback solution in the event that other networks should fail (natural disasters, terrorist attacks etc).

Besides increasing competition, the European SatCom industry faces a technical and political challenge: it has to face the scarcity of radio spectrum¹², which is a vital resource for the efficient operation and development of satellite communications. In order to maintain the SatCom industry's competitiveness this issue needs to be addressed.

⁹ High tech competitive products can be released on the market at marginal costs, since development costs have already been taken in charge by institutional programmes. The "market price" is arbitrary and linked to a nation's strategic and political goals.

¹⁰ Given the very small launch rate for all launch service providers (fewer than 10 yearly launches for the European operator), every launch is of crucial importance and a reduction of more than one launch in a given year endangers the very existence of the sub sector and, in the long run, of Europe's space industry, with potential dramatic consequences on Europe's strategic independence.

¹¹ For instance, in the high-sea, satellite communication services are the only available option. Furthermore, affordable satellite communication can support the EU's "blue growth" strategy to support growth in the maritime sector.

¹² Spectrum is used by an increasing number of wireless applications in several sectors from short range devices to electronic communications services like satellite communications and terrestrial telecommunications services.

2.1.3. *The new frontier: Positioning the EU industry on emerging markets of navigation and Earth observation applications (services and products)*

The European satellite navigation (SatNav) and Earth observation (SatEO) service industry is an emerging industry with a high worldwide potential for growth and job creation, mainly made up of SMEs and start-ups (which form the backbone of our economy). They will be of increasing importance for our economy and citizens' well-being. GNSS business experts estimate that in ten years this market will reach \$ 300 billion¹³.

It is estimated that, already, 6-7% of GDP in Western countries, i.e. € 800 billion in the European Union, is dependent on satellite radio navigation¹⁴. The benefits arising from a fully-fledged operational Copernicus (new name for GMES) programme through 2030 are estimated at 34.7 € billions, comparable to 0.2 % of the EU GDP¹⁵.

The deployment of GNSS and Copernicus infrastructures will soon open up new opportunities for the sector in Europe. Galileo and EGNOS are expected to generate economic and social benefits worth around € 60-90 billion over the next 20 years¹⁶. Europe cannot afford to miss out on the growth of space activities and related services. Although some private applications have already proven successful, satellite enabled products and services still depend to a large part on public customers at national and local levels at this stage of development.

In Europe, several barriers slow down the development of innovative applications and therefore market development: the uncertainty concerning the service availability and the legal framework, the lack of awareness by possible users of their potential, the lack of cooperation between space and non-space sectors, the lack of cooperation between data providers, service developers and end users, the insufficient support to the creation of start-ups and the development of high-growth companies.

2.2. To address these challenges, Europe should achieve technological non-dependence, security of supply and maintain independent access to space

Technological non-dependence, security of supply and independent access to space¹⁷ not only meet the imperative of strategic independence: they represent the basic conditions for a sustainable development of the European space industry.

2.2.1. *Technological leadership, security of supply and non-dependence require sustained efforts and the availability of the necessary skills*

To face the increasing competition on the global market, European industry must maintain its technological edge and stay at the forefront of technological progress in selected areas. The challenges faced by industry include how to ensure technological non-dependence and

¹³ Len Jacobson, GNSS Markets and Applications (GNSS Technology and Applications), Artech House Inc, 2007

¹⁴ Report from the Commission to the European Parliament and the Council, *Mid-term review of the European satellite radio navigation programmes*, COM(2011) 5 final, Brussels, 18.1.2011

¹⁵ Study carried out by PriceWaterhouseCoopers entitled "Socioeconomic benefits analysis of GMES, available at http://esamultimedia.esa.int/docs/GMES/261006_GMES_D10_final.pdf, p. 180.

¹⁶ Report from the Commission to the European Parliament and the Council, *Mid-term review of the European satellite radio navigation programmes*, COM(2011) 5 final, Brussels, 18.1.2011.

¹⁷ "Independence" implies that all needed space technologies are developed in Europe, whereas "Non-dependence" refers to the possibility for Europe to have free, unrestricted access to any required space technology.

security of supply, the need to replace or update existing technologies and products, the challenge to develop new ones and the difficulty to maintain critical skills in a market with long programme cycles and highly fluctuating orders. Besides, synergies between civil and defence sectors are not sufficiently exploited today, which hinders the emergence of a real European space power. Furthermore, the lack of efficient cross-fertilisation between space and non-space sectors limits joint R&D activities and the capacity of technology take-up from both sides.

Technological non-dependence of this strategic sector is not guaranteed. In a number of critical technology areas European programmes are fully dependent on one supplier¹⁸. The European Space Technology Platform (ESTP) estimates that, on average, 60% of the electronics on board a European satellite are currently imported from the United States, because of the lack of a business case to develop those components at European level. Moreover, those imports are subject to ITAR export regulations, which evolve according to US concerns, often create procurement delays and put in the short run the European industry in a further situation of dependence towards US policy fluctuations. In addition, space sector represents a small sector in comparison to the industry worldwide and often also a small part in the turnover of big industrial firms. It therefore has to cope with evolutions which do not take its specific needs into account. More than other sectors, space industry is required to anticipate future evolutions – in terms of products availability and regulations, such as REACH¹⁹ – which is all the more difficult given the long time lead to develop space products. In such a situation, changes in the commercial positioning or legislation, financial difficulties in key companies or lack of profitability due to the small market share can put European space programmes at risk, with delays and cost overruns. Both for industrial and strategic reasons, efforts made to develop alternative supply sources for technologies and materials together with ESA and EDA should be strengthened in Horizon 2020.

Without sufficient workload, the space industry's skilled workforce will be dismantled and it will take significant time and resources to reassemble the required teams to develop new programmes. Knowledge and skills in the emerging sector of navigation and Earth observation technologies are currently not sufficient. In the meantime, new space faring nations are rapidly closing their "researchers' gap" with industrialised countries.

2.2.2. European independent access to space must be preserved and strengthened in the long-term

In all space faring countries around the world, launcher development and operations were and still are financed by public money, without which the commercial sector would not exist. Moreover, the commercial prices obtained on the market do not cover the full costs, notably the development phase. The size of institutional budgets devoted by space faring nations to launchers reflects their willingness to enjoy independent access to space. In all competitors' countries, public procurements are paramount for the survival of the sector and the local launcher industry would not exist without institutional programmes which are de facto closed to foreign industry.

¹⁸ This is for example the case with the atomic clocks on board the Galileo satellites, which is the core payload for such satellites and is produced in Europe by one single non-EU supplier, who is selling to China and India as well.

¹⁹ Some components or materials used for space (on board satellites or launchers) are listed in REACH and need substitutes if possible.

In Europe, the launchers issue concerns, on the institutional side, the EU, the ESA and their Member States in two ways: first because of the political responsibility relating to Europe's independent access to space; secondly as customers of the launcher industry aiming to carry out and launch their programmes cost efficiently. Private operators are also concerned as customers. They would benefit from a European independent access to space, as this increases their leverage in negotiating lower launch prices at international level.

The EU and its Member States support the political objective of maintaining independent access to space, as stated in several Space Council and Competitiveness Council resolutions²⁰. Historically, the European launch service was created to ensure Europe's capacity to develop satellite based services, following the refusal by other countries to launch European commercial satellites. Besides security and strategic considerations, were Europe deprived of independent access to space, such refusals could happen again and would cause delays in the implementation of our space programmes, which increase costs and threaten European competitive position both on manufacturing and services markets. The availability of a reliable and competitive European launch service therefore continues to be a sine qua non factor ensuring the development of a world-class European space industry and of satellite-based applications.

As clients, to carry out their programmes on time and thus avoid cost overruns, the EU, the ESA and their Member States must have at their disposal a launcher system which is:

- Reliable from a technical point of view,
- Secure, which may require launches to take place from a space port on European soil,
- Available and independent: this covers control of the launch manifest and the need to avoid dependency on actors with conflicting industrial or geopolitical objectives,
- Cost efficient, as this contributes to affordability.

Today there are not enough institutional launches in Europe to ensure the sustainability of the European launcher Ariane 5²¹. Arianespace is facing stronger international competition and is having difficulties maintaining its financial balance. Furthermore the current range of launchers will need to be replaced by 2025 in order to maintain the European launcher capability, an issue which needs to be addressed now.

With over 30 satellites to be put into orbit, the EU as a whole could become the European industry's biggest institutional customer over the coming years. As stated in November 2010 and May 2011 Competitiveness Council conclusions, all European institutional actors are invited, in order to maintain and strengthen an independent, reliable and cost effective access to space at affordable conditions, to consider as a high priority the use of launchers developed in Europe and to explore issues relating to their possible participation in launcher-related exploitation activities. European-developed launchers will therefore be adapted to qualify for the launch of some of these satellites.

European independent access carries a cost in the short term, in view of an aggressive commercial policy by our competitors which usually face lower costs. Parts of these additional costs are justified on objective grounds (guaranteeing the viability of European

²⁰ For instance 2007, 2008 and 2010 Space Councils, May 2011 Competitiveness Council.

²¹ A minimum volume of institutional launches, as well as development programmes are needed without which reliability is no longer a given and the skills base could not be retained.

know-how and reliability, lower labour costs of some of our competitors, size of foreign subsidies²² and institutional market). Another part of these costs is the result of industrial inefficiencies, which should be reduced. In the medium term however, independent access would have a positive economic impact, both for institutional actors and private operators. It would ensure Europe benefits from space-based applications, offers additional security (double-sourcing) and constraint its competitors to bid competitive prices on the European market, favouring private operators. Moreover, for some programmes, there is no choice but to choose European launchers, for security considerations.

3. OBJECTIVES OF AN EU INDUSTRIAL POLICY

Considering the strategic importance of the space industry, its dependence on public funding and the increasing global competition on the commercial market, the EU will draw up a space industrial policy to support the development of the sector, thereby fostering economic growth. This policy should encompass not only space manufacturing industry but also the services. The objectives of such a policy have been analysed in various studies. The issue is also addressed in the Resolution of the 7th Space Council and the May 2011 Competitiveness Council.

Against this background, the EU space industrial policy could be centred on five specific objectives:

– *Establish a coherent regulatory framework*

The expansion of space activities and in particular the growing market for space products and services raise legal issues which are not being fully addressed at European level and only partly addressed at national level by a few Member states through national laws, which reflect national interests. Fully taking into account existing legislations and according to the respective competences of the different actors, the Commission will explore whether actions need to be undertaken to improve legal coherence and foster the emergence of a European market for space products and services.

– *Further develop a competitive, solid, efficient and balanced industrial base in Europe and support SME participation*

Europe needs a stronger industrial base. The European space industry should further improve its performance, benefiting from a less fragmented environment. A balanced industrial base does not mean the equal spread of this niche industry all over Europe, but an industry that builds on competitive advantages of the whole supply chain and provides fair access to SMEs as a means to ensure dynamism and innovation and, in particular, to develop the space service industry. The participation of small businesses and mid-size industries in the supply chain is essential for the competitiveness of the European space manufacturing industry and for not merely consolidating, but also expanding a skilled workforce.

– *Support the worldwide competitiveness of European space industry and encourage the sector to become more cost-efficient along the value chain*

The European space industry should maintain and increase its share of the global market and should remain at the cutting edge of technological developments with a capacity to produce breakthrough technologies and be actively involved in cross-fertilisation with other sectors. It

²² Whose real level has to be assessed over the entire value chain, from public funding in the development phase, public support in the production phase or for the launch base to preference for domestic launches and access to market.

should aim at becoming more cost-efficient along the value chain. The industry should also be able to rely on sufficient high-skilled manpower, in particular in the emerging sector of navigation and Earth observation technologies. Policy should support increased market access.

– *Develop markets for space applications and services*

European industry must be in a position to exploit the potential offered by space infrastructures (SatCom, SatNav and SatEO) in order to deliver reliable and cost-efficient services responding to economic and societal needs. This means for certain service categories not only the development of new capacities within existing industry but also the quality improvement of Copernicus data, the creation and stimulation of an environment allowing the take-up of new satellites technologies and the emergence of new operators, given notably the importance of small businesses in this area. Together with the second objective, the achievement of this one will help maintain space investments attractive to all Member States.

– *Ensure the technological non-dependence and an independent access to space*

For Europe to be able to pursue strategic policy initiatives and provide key services for citizens' benefit, it requires an independent access to space. Furthermore, European industry should be triggered to further develop its technological non-dependence, especially in critical technologies, to continue to be able to deliver the products and services needed for economic growth and its citizens' well-being.

4. HOW TO ACHIEVE THE OBJECTIVES OF THE EU INDUSTRIAL POLICY

In order to achieve the objectives of this policy in collaboration with ESA and the Member States, the EU can use the instruments at its disposal, which are mainly improving the framework conditions, supporting research and innovation, promoting better use of financial instruments and of existing procurement regulations²³.

4.1. Improving framework conditions

As space activities expand, the appropriateness of the existing regulatory framework needs to be examined to ensure the security, safety and sustainability of such activities and their economic development.

4.1.1. Improving the regulatory framework for the service segment and the manufacturing sector

The expansion of space activities and in particular the growing market for space products and services raise legal issues which are not being fully addressed at European level, but only partly addressed by the most active Member States in this domain through national law. The majority of Member States have not yet developed space legislation. The scope and objectives of these emerging space national laws are diverse and have implications that go beyond national boundaries.

National legislation alone will not ensure a coherent coverage of space-related legal issues and a harmonised legal framework for all Member States. An inconsistent legal framework may negatively affect the functioning of the internal market. It may therefore be necessary to take steps towards the establishment of a coherent EU space regulatory framework to tap the

²³ The initiatives proposed will be set up and implemented in full conformity with the Community rules on State aid, in particular with regard to situations where Member States funds would be involved.

potential of an internal market for space by filling legal gaps in a coherent way, preventing diverging national legal frameworks, safeguarding national and European security interests.

To take an example, some European countries have national legislation on liability which foresees the coverage of physical damage caused by space activities. Some countries limit, under certain conditions, the liability up to a certain amount, or provide governmental guarantee under certain conditions. Some countries request an insurance or another financial guarantee to compensate possible damages. The absence of coherent rules in EU countries could create distortions of competition on the internal market and lead to "forum shopping".

Examine the possibility of a legislative initiative on certain aspects that have an impact on the emergence of a single market for space products and services

The Commission will therefore assess to which extent this fragmented framework could hinder the proper functioning of the internal market and whether an EU intervention would be justified.

The first step in this direction could be a legislative initiative on production and dissemination of private satellite data (see below) and a regulation on EU GNSS third party liability²⁴.

EU action may also be required in dual-use export control and spectrum policy. In other fields such as commercial spaceflights, the opportunity of EU intervention should be further assessed.

In order to ensure the full exploitation of space-based information and to boost users' access to space data and services, the EU could consider establishing an overarching data access policy. Such a data access policy could be based upon principles as: free and open access for public organisations at EU and national level guaranteed (as a minimum) with limited restrictions when fully developed and operated with EU public funds; establishment of specific conditions regarding data access policy (at least for public organisations) when there is an EU intervention in the development of space assets or markets.

Consider proposing a legislative initiative on production and dissemination of private satellite data

The production and dissemination of satellite data raises three main issues. First, the security restrictions imposed by national authorities on satellite data according to national security interests may endanger competitiveness and innovation (downstream development of related services) and lead to legal uncertainty in the internal market, and raise liability issues such as compensation claims for potential damages, for example those caused by incorrect data. Second, the inadvertent release of data acquired by satellite sensors (e.g. high-resolution imaging) could pose a threat to security of EU and EU Member States. Third, the cross-border nature of satellite data exchanges requires cooperation between countries concerned by Earth observation. Such cooperation would effectively ensure the compatibility of competitiveness standards with security considerations.

²⁴ EU GNSS will have a global coverage. Claims could be lodged in any country in the world before the local courts under the applicable local legislation. The EU is preparing a regulation on EU GNSS third party liability. A similar discussion was held under the aegis of UNIDROIT ("International Institute for the Unification of Private Law") with respect to all services offered by the GNSS. Discussions in this forum have been put on hold in order to potentially integrate initiatives to be adopted at regional level.

As national legislation alone cannot guarantee a coherent regulatory EO framework at EU level, EU action could be justified on grounds of subsidiarity. Taking into account the benefits in terms of legal certainty, downstream development of markets and the protection of security, an EU intervention in this domain could bring clear added value.

Monitor and improve the export control and intra-EU transfer frameworks

Many components of space systems are considered of dual or military nature and, hence, are subject to the new regulatory framework on intra-EU transfer and dual-use export control²⁵. Simplified rules and procedures that will facilitate intra-EU transfers of components of a military nature will be implemented from 2012 onwards²⁶. This will improve the competitiveness of European industry, in particular SMEs.

In conformity to Article 25 of the Dual-use Regulation, which requires the Commission to prepare a report on the implementation of the EU export control system, a Green paper²⁷ has been adopted to launch a broad public debate concerning the functioning of the current EU dual-use export control system. A formal report to the European Parliament and the Council is foreseen in September 2012. In the meantime, the impact of this regulation on the space industry should be closely monitored with a view to identifying major problems and proposing appropriate solutions.

Ensure the availability of spectrum

To contribute to ensuring the availability of a radio spectrum for space operations that is immune from interference, to enable economies of scale and optimise operational costs for pan-European systems, the Commission, together with the EU Member States, will investigate how to best take into account the future spectrum needs for SatCom in the context of the Radio Spectrum Policy Programme and contribute to the preparation of the next ITU World Radio Communications Conference in order to defend EU interests in the field of global and regional spectrum allocation.

Explore whether commercial spaceflights activities need to be embedded in a legal framework

“Suborbital aeroplane projects” or commercial spaceflight projects are emerging, mainly in the United States. Suborbital flights could constitute a promising market for: (i) scientific experiments: microgravity experiments, astronauts training, test of satellite payloads, (ii) space tourism and (iii) future clean, high altitude, high speed and point-to-point air transport systems. Furthermore, suborbital flight vehicles could offer more cost-efficient access to space e.g. for small satellites.

Only the US Federal Aviation Administration (FAA) and its office of Commercial Space Transportation have issued a regulatory framework for suborbital planes applicable in their

²⁵ Regulation (EC) No 428/2009 of 5 May 2009 setting up the EU export control regime for dual-use goods and Directive 2009/43/EC of 6 May 2009 regarding the transfer of defence-related products within the Community.

²⁶ Previous requirements imposed a significant administrative burden on companies (estimated at 225 hours/licence in the impact assessment of the Directive 2009/43/EC on EU intra-Community transfer of defence products). They also implied long lead times – up to several months – in order to obtain transfer or export licenses.

²⁷ The dual-use export control system of the European Union: ensuring security and competitiveness in a changing world COM(2011) 393 final.

country. It is based on an “informed consent” regime for carrying the crew and space flight participants²⁸. Passenger safety is therefore not ensured by the regulation.

Some European industry stakeholders call upon the EU to put in place a stricter regulatory framework, with adequate certification rules derived from aeronautic best practises, to better guarantee passenger safety. Industry argues that the predictability of the regulatory framework is key for private investors, since it will drive the technology used and the development activities. Other European stakeholders call upon the EU to put in place a more innovation-friendly regulatory framework.

This request is for the time being not a priority in the rulemaking programme of the European Aviation Safety Agency (EASA). The Commission will further investigate this issue to determine whether it needs to be addressed in the near future.

4.1.2. Pursue the Standardisation process

The importance of standardisation for space activities in Europe is growing as the EU, ESA, national space agencies and European industry are faced with new technical challenges within more demanding economic constraints. Through a more efficient and effective use of space technologies and space-based applications and services, standardisation has a role to play in boosting the competitive position of the European space industry in the world market, notably by increasing the series and thus decreasing the prices, and in helping SMEs enter certain segments of the space market. Space standardisation supports the uptake of space-based innovative services and applications. Space missions are moreover a risky business where technology is pushed to the limit, where there is very limited possibility to correct problems that were not identified before launch. Standardisation is therefore seen as a way to decrease the risks of failure, to guarantee the technological reliability of space products/components and to reduce the development and operational costs. Finally, since European space production is split between several countries, the development of "standardised" working procedures can help reduce some of the inefficiencies currently present in the value chain.

The main European space agencies and industry started the European Cooperation for Space Standardisation (ECSS) in 1993. More than 120 standards have been published. While upstream space activities have been covered, space downstream activities geared toward systems and services still need standardisation. A comprehensive standardisation programme was proposed in March 2010 and identifies ten specific sectors where future standardisation work could be carried out by technical bodies in CEN/CENELEC, ETSI and ECSS – the European Standardisation Organisations (ESOs). The programme has been translated into a new mandate (M/496) which has been issued on the 1st of September 2011 and addressed to the ESOs. The work has started in 2012 and should extend over a three-year period.

4.1.3. Ensure the availability of necessary skills

The availability of a skilled workforce has a direct impact on the capacity of the European space industry and space activities in return have a direct impact on workforce availability in the European economy, through the impact of leading edge development programmes in the development of expertise in new technologies. In order to remain competitive, Europe will be facing a triple challenge in the years to come: to keep and expand its own resources (skill-

²⁸ To obtain a license, the operators of suborbital aeroplane just have to inform paying passengers about the risks of the launch and re-entry phases and the safety record of the vehicle type. The passenger then signs a waiver accepting the risk taken.

levels and workforce numbers), to develop new skills to satisfy the need of emerging sectors and to attract talent from third countries.

Institutional space programmes can help maintaining a sufficient level of industrial activity, attracting leading talent to European universities and research centres, and facilitating mobility between Member States and between the public and private sectors.

The European institutional customers should develop and provide to industry a long term and clear planning of the institutional market in Europe. The EU could set up a mapping and foresee regular updates of the supply chain to ensure the right level of European independence, expertise and competitiveness.

Together with the Member States and their regions, the EU should address and turn around the shortage of highly-skilled aerospace engineers and technicians coming out of the European educational systems, promote the establishment of mutually recognised academic space qualifications in Europe, include in future R&D framework programmes dedicated actions in which part of the research must be done by PhD candidates, encourage the development of lifelong learning programmes through strengthened cooperation between industry and universities and enhance its appeal to foreign researchers.

4.1.4. Support access of European industry to the global market

It is vital for the European space industry to maintain and strengthen its position on the commercial market. However, major third countries' institutional markets are not accessible to the European industry. Some Member States have proposed Export facilitation mechanisms to support industry access to the global market. The possibility to develop such mechanisms should be further assessed.

Commercial agreements and trade negotiations can contribute to ensuring a "level playing field" for the European space industry at international level, provided EU has a strong enough stand in international negotiations. The Commission has therefore recently adopted a proposal on access of third countries to the EU's public procurement market²⁹. If adopted by the Legislator, this Regulation would improve the conditions under which EU businesses can compete for public contracts in third countries, by strengthening the position of the European Union when negotiating access for EU companies to the public procurement markets of third countries, in order to open up our trading partners' markets, and by improving, in line with the EU's 2020 strategy, business opportunities for EU firms on a global scale, thereby creating new jobs.

More generally, international cooperation should also serve as a market opener for the promotion of European technology and services in the space field and help strengthen this strategic industrial sector. The EU must ensure that space-related matters are better integrated into the Union's external policy.

4.2. Supporting Research and Innovation

Research, development and innovation not only are key elements of space industrial competitiveness, but also essential ingredients of a sustainable economic growth, be it in the short run as in the long run, with effects on the ability of the European Union to remain

²⁹ European Commission Proposal for a Regulation of the European Parliament and of the Council on the access of third-country goods and services to the Union's internal market in public procurement and procedures supporting negotiations on access of Union goods and services to the public procurement market of third countries, COM(2012)124 final

competitive in an increasingly globalised economy. The budget for Space under Horizon 2020 (the successor of FP7) is proposed to be 1737 million euro in current price (1548 million in constant 2011 price) for 7 years. Space in Horizon 2020 will cover R&D and innovation with the objectives to:

- **Enable European competitiveness in space**, non-dependence and innovation in space activities, focussed on industrial R&I, emphasizing SMEs;
- **Enable advances in space technologies**, ranging from basic technology research to close-to-application technologies for future generations of Copernicus/GMES and Galileo satellites;
- Full **exploitation of space data**, including data from scientific missions and commercial applications of space data;
- Enable European R&D in the **context of international space partnerships** (e.g. ISS, SSA, global robotic exploration programmes).

Concerning the latter, cutting edge space technology is increasingly taking place in international frameworks, making access to such programmes an important success factor for the competitiveness of European researchers and space industries.

4.2.1. Enable European competitiveness in space worldwide, notably by ensuring European non-dependence in critical technologies and by fostering innovation

The objective is to maintain a globally leading role in space by safeguarding and developing a competitive space industry and research community and by fostering space-based innovation.

First, the survival of a competitive commercial industry in the space sector in Europe and the capability for European institutional customers to implement their missions require a decrease in European technical dependence on non-European countries. It is of utmost importance to identify which technologies are critical and to ensure that for these Europe develops and maintains its own technology solutions and production capacities. Once the technology has been developed, it should be used consequently by institutional actors and European industry. Otherwise, it will be lost.

The European Commission, together with ESA and EDA have created a joint task force with the aim of producing a coherent list of critical technologies for priority development. This joint European non-dependence process has started in 2009. A list of urgent actions has been agreed upon and used as the basis for the FP7 4th Call on critical technologies. This initiative should be pursued.

Secondly, satellite enabled products and services constitute an emerging market and remain limited and fragmented. At this stage of development, they still depend to a large part on public customers at national and local levels. Incentives for new markets using space based services have been created in the US due to a long term policy of promoting governmental use which created a virtuous circle by boosting private businesses that need in turn more space based infrastructures. These initiatives boost the use of space for the benefit of public policies and make these companies more competitive on export markets. It should be assessed whether similar incentives can be provided to European industry.

In order to promote the exploitation of satellite infrastructures and develop the market for satellite based services, the EU should increase the promotion of space-based applications in EU policies. The creation of new applications needs to be stimulated across a variety of potential public and private users including new user communities (cities, regions, various

industrial sectors, etc), notably through ad-hoc take up actions, such as vouchers for local authorities or SMEs, to facilitate the adoption of new services by the final users. Their development and deployment, often by SMEs, need to be supported on a consistent basis to ensure sustainable effects on qualified employment.

More specifically, the full innovation potential created by the new European space infrastructures also needs to be supported. The Commission GNSS Action Plan to foster the development and adoption of satellite navigation applications using EGNOS and Galileo is a first step in that direction.

There is need for a much stronger effort, coordinated at European, national and local level. This requires the deployment of a whole range of innovation support measures³⁰ to industry with a specific focus on SMEs. However, in order to address this market failure, innovation support should be targeted to those services which would not be developed by the market otherwise. Such measures should in particular encourage demand-side innovation, the use of available funding sources including regional funds, demand aggregation and development of new businesses.

Finally, a number of challenges in space technologies have parallels to terrestrial challenges. Cross-fertilisation should be fostered, by promoting development of innovative products and services based on satellite infrastructures. As stated in the annex of the proposal for a Council decision establishing the Specific Programme Implementing Horizon 2020³¹, *"these commonalities offer opportunities for early co-development, in particular by SMEs, of technologies across space and non-space communities, potentially resulting in breakthrough innovations more rapidly than achieved in spin-offs at a later stage"*.

4.2.2. Enable advances in space technologies

The objective is to ensure the capability to access space and to operate space systems to the benefit of European society in the next decades. The EU notably intends to boost technological progress in a number of strategic areas and to contribute to the necessary effort in space research in particular in breakthrough technologies. With Horizon 2020 the EU would for instance support the exploitation of synergies in space research at European level, promoting further coordination of R&D activities, thus complementing ESA and national programmes already addressing these issues. Key Enabling Technologies have been recognized as key to all technological industrial competitiveness in Horizon 2020, but also in particular to innovative space technologies. The space industrial policy should therefore support their uptake in new space technologies.

Horizon 2020 could for instance promote R&D support to industry and space research organisations, support the development of application-oriented R&D programmes at universities related to space technologies and promote the transition from prototyping to product/market. Since users require mature technologies (already tested and validated), R&D support schemes should allow supporting validation and qualification. Hosted payloads³² could contribute demonstrating the required flight heritage for an increasing number of products and services. In order to mitigate the risk created by new technologies for the rest of

³⁰ For example market replication, pre-commercial procurement, clusters, living labs and other user-driven innovation mechanisms.

³¹ COM(2011) 811

³² It refers to the utilization of available capacity on commercial satellites to accommodate additional transponders, instruments, or other space bound items.

the payload, the possibility of cost-effective launch opportunities to embark and test new technologies should be assessed.

Furthermore, Horizon 2020 could be used to find alternatives for the components listed within the REACH framework³³, and which may need substitutes in the future.

4.2.3. *Stimulate the full exploitation of space data and the development of innovative applications*

The objective is to ensure more extensive utilisation of space data from existing and future European missions in the scientific, public and commercial domain. As stated in the annex of the proposal for a Council decision establishing the Specific Programme Implementing Horizon 2020, *"a considerably increased exploitation of data could be achieved if a concerted effort were made to coordinate and organise the processing, validation and standardisation of space data from European missions. Innovations in data acquisition and processing, data fusion, and data dissemination, utilising also innovative ICT enabled forms of collaboration, can ensure a higher return on investment of space infrastructure"*.

4.3. **Expanding the array and the use of available financial instruments**

Space infrastructures funding differs from space components/services financing. Large scale infrastructures which have to be built, developed, operated and maintained in order to ensure the continuity of operational services and applications, need large financial contributions over long periods, continuity of funding both for operational and financial reasons (any expense postponement results in additional costs) and flexibility/contingency instruments, given the associated risks. Existing financial products on the market might not match these needs, especially because of the important time lead between the decision to develop such projects and the return on investment by the deployment of sufficient downstream services. There basically is a market failure and public funding is needed before the long-term growth potential of such projects will emerge. Other space-faring nations have addressed this issue in their own ways³⁴. In its proposal concerning the next Multiannual Financial Framework, the Commission proposes a new type of instrument, i.e. the EU project bond initiative which would be used as a means of securing investment resources for infrastructure projects of key strategic European interest by making use of Public Private Partnership schemes to reinforce EU competitiveness and growth sustainability. Although the scope of this initiative is not foreseen to cover space in the first stage, space industry could be offered at a second stage the possibility to benefit from this mechanism, provided it fulfils the criteria, in particular regarding revenue generation³⁵.

SMEs' participation should be encouraged where appropriate in the supply chain of the manufacturing industry, in particular in niches, and in the fast-growing sector of satellite enabled services. The financial instruments of the Competitiveness and Innovation Framework Programme and also the Risk Sharing Financial Facility for SMEs (RSI) are available to enhance industrial and SMEs innovation capacities and competitiveness. As of

³³ In general, REACH addresses individual substances in the different lists associated to its processes. Some of these, like the "Candidate list" or Annex XIV (list of substances subject to authorisation) trigger direct information requirements on articles ("components") or require authorisation of the use of the substance in Europe.

³⁴ It refers notably to the two 10-year contracts recently awarded by the US government to two commercial satellite imaging companies.

³⁵ Cf. COM(2011) 659, COM(2011) 660 and COM(2011) 662 concerning the Europe 2020 Project Bond Initiative.

2014, SMEs may also benefit from the EU financial instruments (debt and equity finance) foreseen under the forthcoming programmes COSME and HORIZON 2020, which include venture capital.

Local authorities are key players to enhance the competitiveness of the space industry. Regions have a major role to play. The EU has developed a range of instruments strengthening economic, social and territorial cohesion, in particular the European Regional Development Fund (ERDF) and its schemes like the Joint European Resources for micro to medium Enterprises (JEREMIE). If the primary objective of EU cohesion policy is to reduce the significant economic, social and territorial disparities that still exist between Europe's regions, cohesion policy also has a key role to play in delivering the Europe 2020 objectives throughout the EU and could therefore, through its support to SME competitiveness and innovation, contribute to space projects financing and to promoting the use of space based services in accordance with eligibility rules of the Structural Fund (for instance, proven social and economic impact on the region or regional innovation impact). Space projects could be relevant to foster research and innovation in the framework of the national or regional strategies for smart specialisation.

4.4. Making a better use of procurement policy

Several Space Council Resolutions highlighted *the need to develop adequate EU instruments and funding schemes taking into account the specificities of the space sector*". In the space sector procurement is one means among others to achieve industrial policy objectives. It is perhaps the most important because it is through procurement that the vast majority of public funding is channelled to industry in this sector. It is therefore necessary to determine whether the space procurement approach can be improved.

Like the defence and security sectors, space is strategic and procurement of space systems and applications for public needs shares characteristic with those sectors, in particular non-dependence aspects, national security and safety aspects as well as high and long term investment needs in R&D phases. The impact of the implementation of the EU Directives on public procurement and defence procurement³⁶ on the national and European space markets should also be further analysed.

EU procurement is governed by the Financial Regulation and its Implementing Rules which are in line with the WTO Agreement on Government Procurement. These instruments embody the principle of non-discrimination and do not allow any form of geo return. As a customer of the space industry which is to deliver its programmes, the EU should develop and provide to industry a long term and clear planning of the institutional market. Besides, for programmes which involve joint funding by both the Commission and ESA, early coordination should take place to ensure a smooth transition between the development phase and the operational phase.

4.5. Establish and implement a real European launcher policy

EU autonomy in strategic sectors like launch services is of fundamental importance. In view of this, the EU space industrial policy should pursue the following objectives: (i) Ensure a reliable, secure, available and cost efficient launcher system; (ii) Create the conditions, and in particular the financial conditions, which are necessary to maintain and strengthen independent European access to space in line with institutional needs while proposing an

³⁶ Directives 2004/18/EC and 2009/81/EC

evolved governance of the exploitation of the European launchers to ensure financial efficiency in the management of user programmes.

A real European launcher policy must be established by the institutional actors, as is the case in the other space-faring nations, to avoid short term or case by case decision taking which would endanger the above goals. The EU should recognize the political stakes of independent access to space when implementing public programmes such as Galileo and Copernicus. Member States should consider accepting a share of the burden by putting their launcher purchasing policies in line with the goal of independent access and by putting the EU in a position to be able to contribute to that goal. In addition, the overall governance of the launcher sector, in particular as concerns its exploitation and the necessary measures to ensure the efficiency of its production, must evolve, in order to ensure sustainable financing of the exploitation.

4.6. Ensure the sustainability of space activities in Europe

With increasing dependence on space-based systems and services, ensuring their sustainable operations will become increasingly important. Any shutdown of even a part of space infrastructures which form the backbone of a wide range of services could have significant consequences for European citizens' safety and for the well-functioning of economic activities. However, space infrastructures are increasingly threatened by collision risks due to the growing population of satellites or the increasing amount of space debris in the most commercially exploited orbits.

In order to mitigate the risk of collision it is necessary to identify and monitor satellites and space debris, catalogue their positions, and track their movements (trajectory) when a potential risk of collision has been identified so that satellite operators can be alerted to move their satellites. This activity is known as space surveillance and tracking (SST). As operational SST services at European level do not exist, European satellite operators rely today to a large extent on US SST information. The need for a proper SST capability to improve the provision of SST information at European level was highlighted by EU Member States in several Council conclusions. In accordance with these conclusions, the Commission intends to come forward with a proposal setting out the organisational framework for the setting up and operation of a European SST service in partnership with Member States building on their existing assets and expertise.

5. CONCLUSIONS

Space industrial policy supports the objectives of the Europe 2020 strategy, Europe's growth strategy for a smart, sustainable and inclusive economy. It is an integral part of the industrial policy flagship, which calls for a European industrial policy creating the best environment to maintain and develop a strong, competitive and diversified industrial base in Europe, improving employment and knowhow of the sector. However, the Europe 2020 strategy also recognises that space policy contributes to the competitiveness of European industry well beyond the space sector.

ANNEX

MEASURES ENVISAGED FOR THE SPACE INDUSTRIAL POLICY

1. IMPROVING FRAMEWORK CONDITIONS

1.1. Improving the legislative framework for the service segment and the manufacturing sector

1.1.1. Develop space legislative framework to strengthen the European space market

- Propose a legislative instrument on production and dissemination of private satellite data;
- Examine the possibility of a legislative instrument on certain aspects that have an impact on the emergence of a single market for space products and services such as: obligation of insurance, registration and authorisation of space activities and services , sanctions, environmental issues.

1.1.2. Monitor and improve the export control and intra-EU transfer frameworks

- Monitor the impact on the space industry of the implementation of Regulation (EC) No 428/2009 of 5 May 2009 setting up the EU export control regime for dual-use goods and Directive 2009/43/EC of 6 May 2009 regarding EU intra-Community transfer of defence products.

1.1.3. Ensure the availability of spectrum

- Investigate how to best take into account the future spectrum needs for SatCom in the context of the **Radio Spectrum Policy** Programme;
- Contribute to the preparation of the next ITU **World Radio Communications Conference** in order to defend EU interests in the field of global and regional spectrum allocations.

1.1.4. Explore whether commercial spaceflights activities need to be embedded in a legal framework

- Launch a study to assess the market potential of **suborbital spaceflights** to determine whether to develop a European regulatory approach.

1.2. Pursue the Standardisation process

- Pursue the development of **European Standards** for the space industry on the basis of the work started by the ECSS (European Cooperation for Space Standardisation) and the third mandate to CEN-CENELEC and ETSI.

1.3. Ensure the availability of necessary skills

- Develop and provide to industry a **long term and clear vision** of the institutional market at EU level;
- Carry out and update a mapping of the supply chain to ensure the right level of European independence, expertise and competitiveness;
- Support the development of **appropriate skills** required specifically by the space sector and promote the establishment of **mutually recognised academic space qualifications** in Europe (initiate and coordinate between Member States the development of space academies);
- Include in future R&D framework programmes dedicated actions in which part of the research must be done by PhD candidates – as is currently the case in air traffic management;
- Encourage the development of **life long learning programmes** through strengthened cooperation between industry and universities, in particular in the emerging area of satellite based applications;
- Enhance EU appeal to **foreign researchers**.

1.4. Support access of European industry to the global market

- Analyse measures and good practices developed by Member States to **support access to international markets**;
- Ensure that the specificities of the space sector and the European space industry are taken into account in trade negotiations and relevant commercial agreements, to **foster a level playing field**.

2. SUPPORTING RESEARCH AND INNOVATION

2.1. Enable European competitiveness in space, notably by ensuring non-dependence in critical technologies and by fostering innovation

- Continue to coordinate the Commission's efforts with those of Member States, ESA and EDA in order to identify the **critical space components** and to ensure their availability;
- Examine whether it is feasible to boost the emerging Earth observation market through incentives such as long term contracts with Earth observation industry;
- Promote the **use of space-based applications in EU policies**;
- Support **awareness raising campaigns** to make possible users (cities, regions, various industrial sectors, etc) aware of the potential of space-based applications, thus stimulate their needs for such applications and facilitate with ad hoc take up actions (e.g. vouchers for local authorities or SMEs) the adoption of new services by the final users;

- Support the **development of innovation support measures** to industry at EU, national and regional level with a specific focus on SMEs in the downstream satellite-enabled services sector;
- Implement the **Commission GNSS Action Plan** to foster the development and adoption of satellite navigation applications using EGNOS and Galileo;
- Support space technology **cross-fertilisation** with other sectors and spin-in/spin-offs in R&D and Innovation programmes.

2.2. Enable advances in space technologies

- Increase space research efforts, in particular in **breakthrough technologies**;
- Support the **development of alternative technologies** to those of competitors;
- Promote R&D support to industry and space research organisations, including the **downstream service sector** and support the development of application-oriented R&D programmes at universities related to space technologies and promote the transition from prototyping to product and market;
- Assess **hosted payloads** business case, to explore the potential for further institutional and scientific use and identify the best ways to address the challenges ahead such as legal issues, government/military requirements, etc;
- Assess other cost-effective launch opportunities in order to embark new technologies to test them;
- Use Horizon 2020 to accelerate the implementation of substitutes to raw materials needing replacement such as those listed within the framework of the REACH regulation.

2.3. Stimulate the full exploitation of space data and the development of innovative applications

- Ensure more extensive utilisation of space data from existing and future European missions in the scientific, public and commercial domain.

3. EXPANDING THE ARRAY AND THE USE OF AVAILABLE FINANCIAL INSTRUMENTS

- Explore possibilities to **facilitate access to finance, especially by SMEs**, by promoting the further development of innovative financial instruments and the use of the existing instruments;
- Encourage Member States and regions to **increase the use of structural funds** and innovative financial instruments to promote the development of innovative satellite-based services by SMEs;

- Ensure the rapid extension of the scope of the **EU project bond initiative** to space infrastructures.

4. MAKING A BETTER USE OF PROCUREMENT POLICY

- Develop and provide to industry **a long term and clear planning of the institutional market**;
- Analyse the impact of the implementation of the **EU Directives on public procurement and defence procurement** on the national and European space markets;
- For programmes which involve joint funding by both the Commission and ESA, early coordination should take place to ensure a smooth transition between the development phase and the operational phase.

5. ESTABLISH AND IMPLEMENT A REAL EUROPEAN LAUNCHER POLICY

- Establish in coordination with the other institutional actors **a real European launcher policy**, as is the case in the other space-faring nations.

6. SUPPORT THE SETTING UP AND OPERATION OF A EUROPEAN SST SERVICE

- Provide an organisational framework (governance) to support the setting up and operation of a space surveillance and tracking (SST) service at European level building on existing national assets and expertise; define a related data policy taking into account national security interests.