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DRAFT

ELEMENTS FOR A EU SPACE INDUSTRIAL POLICY

"A competitive European space industry is of strategic importance. Europe needs strong and globally competitive companies in the development and manufacture of space systems and the provision of satellite capacity and value-added services."¹

"The Commission ...will draw up a framework for a modern industrial policy, to support entrepreneurship, to guide and help industry to become fit to meet these challenges, to promote the competitiveness of Europe's primary, manufacturing and service industries and help them seize the opportunities of globalisation and of the green economy... the Commission will work...to develop an effective space policy to provide the tools to address some of the key global challenges and in particular to deliver Galileo and GMES..."²

1. THE EUROPEAN SPACE INDUSTRY

In most space-faring nations, the space industry started in the early 60's as a niche sector embedded in a wider national Aerospace and Defence industry, supporting national strategic objectives like independent access to space. Progressively, a **space manufacturing industry** developed around the production of launchers and satellites.

More recently, an industry of **satellite enabled services** started emerging as a result of the deployment and exploitation of large telecommunication, navigation and Earth observation satellites infrastructures. In return, this sector drives the demand on the commercial satellite market.

ESA and Member States policies have been successful in promoting a world class European space industry which has been the key enabler for Europe to transform its **space ambitions** into major achievements (e.g. the Ariane 5 launcher or the Columbus module of the International Space Station). This industry delivers today **assets and technologies** (telecommunication, navigation, Earth observation) which guarantee autonomy and security for Europe and provide solutions for a better day-to-day life,

¹ European Space Policy COM(2007) 212

² COMMUNICATION FROM THE COMMISSION "EUROPE 2020 A strategy for smart, sustainable and inclusive growth" COM(2010) 2020

addressing major societal challenges and needs of European citizens. Most of these technologies are of dual-use³.

The European space industry is **highly concentrated**⁴ and SMEs represent only 5% of the sector. They are mainly involved in the areas of instrumentation and satellite enabled services.

Space has become a **global business** with a broad market including non space nations and an increasing international competition. Emerging countries like China and India strongly support their space industry and are quickly closing their technology gap.

The European space industry is a high-tech, high-risk and investment intensive **strategic industry**⁵ fighting on the global scene. It continues to depend strongly on institutional programmes and to be shaped by strategic public objectives⁶.

Despite its relatively small size, it is also an important **economic sector** generating a much higher impact outside the sector itself, enabling an increasing range of derived applications.

2. A NEED FOR ACTION

Considering the strategic importance of the space industry, its dependence on public funding (both for R&D and sales) and the increasing global competition on the commercial market, EU Member States have stressed at several occasions⁷ the need to strengthen the space **industry's competitiveness** and the necessity of a **balanced involvement of capacities** in Europe. In order to reach to these objectives, the EU is setting-up an EU space industrial policy.

³ 90% of the technologies are dual. Space exportations are subject to specific dual-use and military export rules in all countries. (ITAR in the US; Council Regulation (EC) No 428/2009 of 5 May 2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items in the EU).

⁴ The industry is concentrated in the 6 main ESA contributors with 40% of the industry in France. Four large industrial holdings (EADS, Finmeccanica, Safran, and Thales) represent 70% of the European space manufacturing industry.

⁵ CFSP depend on space based observation for analysis, space based navigation for civilian and military crisis interventions, and space based communications for operations command, control and communications. Space programmes contribute to technological progress and support Europe's role on the global scene. Space applications and services, especially those derived from Galileo and GMES, contribute to address societal challenges (climate change, security of supply, health or ageing) and needs (development of a knowledge society).

⁶ Space market is largely institutional (60% of the turnover of European industry is based on the institutional market, 85% in the U.S.). In addition, due to its strategic dimension and the need for high levels of R&D investments, space-faring nations across the globe heavily subsidise their industry.

⁷ In particular, in the Resolution on the European Space Policy 2007 and the Conclusions of the Space Council 2009.

2.1. The basis for an EU space industrial policy

The **EU2020 Strategy** calls for a fresh look at industrial policy to achieve smart, sustainable and inclusive growth in Europe. Its Flagship Initiative "*An industrial policy for the globalisation era*" asks "*to develop an effective space policy to provide the tools to address some of the key global challenges and, in particular, to deliver on Galileo and GMES*". It calls for an industrial policy creating the best environment to maintain and develop a strong, competitive and diversified industrial base in Europe, while at the same time improving the business environment for SMEs.

The entry into force of the **Treaty on the Functioning of the European Union** (TFEU) in December 2009 has provided the EU with a dedicated legal basis for its actions and increased involvement in space, stressing in particular its responsibilities concerning industrial competitiveness.⁸

Some aspects of a space industrial policy have already been addressed in the European Space Policy (ESP) adopted in 2007 which calls on the European Commission to develop adequate instruments and funding schemes for Community actions in the space domain, taking into account the specificities of the sector, the need to strengthen its overall and its industry's competitiveness and the necessity of a balanced industrial structure. Two space Council Resolutions in 2008 and 2009 reiterated this call.

The industrial policy should however go beyond the elements introduced in the ESP and consider current needs and challenges faced by the industry as well as trends in industrial policy at EU level.

2.2. The challenges faced by the European space industry

2.2.1. The industry competitiveness

The competitiveness of the European space industry is jeopardized by a number of factors, including the following:

- absence of a coherent European industrial policy adapted to the needs of the sector;
- framework conditions (in particular public procurement practices) not always favouring cutting-edge competitiveness of the sector;
- less than adequate market entry of new European actors (in fields like downstream space applications or commercial spaceflight);
- lack of efficient cross-fertilisation between space and non-space sectors limiting the capacity of technology take-up by the space industry.

⁸ Article 189 of the TFEU states: "To promote scientific and technical progress, industrial competitiveness and the implementation of its policies, the Union shall draw up a European space policy".

2.2.2. *The increasing global competition*

The European space industry is exposed to increased competition from new space countries including China and India benefiting from low wages, strong subsidies and protectionist approaches. In addition, Chinese and Indian space technological levels should reach Europe's current level very soon.

Another risk is posed by the foreseeable large-scale entry of US companies into global commercial markets, the emergence of a new US-led commercial spaceflight industry (e.g. SpaceX, Orbital Sciences Corp) and the unfavourable EUR-USD exchange rate.

There is a substantial risk of “dumping” in an international crisis context where manufacturers look for cash flow, resulting from the fact that production costs of satellites are mostly at the stage of development and that the marginal cost of producing any additional satellite is very low.

The increased competition from other technological solutions (e.g. optical fibres) in some areas like broad-band communication endangers the established satellite services.

2.2.3. *The technological non-dependence*

Currently, on average, **60% of the electronics** on board a European satellite are imported from the U.S.. Those imports are subject to ITAR export regulations. This situation leaves the European industry in a situation of dependence towards U.S. manufacturers (dependence on their production capacity in terms of availability and delays) and towards U.S. government (dependence on U.S. policy). It has a negative impact on industry competitiveness and presents a risk for European institutional programmes.

2.2.4. *The development of satellite enabled services*

In order to contribute to addressing societal challenges, innovative solutions derived from GMES and Galileo should be identified, developed and deployed. This requires strong R&D and innovation supports, coordinated at all levels (EU, MS and local), including demand-side innovation (pre-competitive procurement, etc.).

3. ELEMENTS OF AN INDUSTRIAL POLICY

The EU space industrial policy aims at supporting the growth of a diversified and balanced space manufacturing and services industry and its competitiveness on the global scene. It will stimulate the whole supply chain, building on the technological and industrial potential of Member States and promoting the involvement of SMEs.

The peculiarities of the space sector call for a combination of measures at EU, ESA and Member States levels. However, heterogeneous approaches at different levels are

detrimental to the competitiveness of the European space industry, although some differences are unavoidable and must remain. The proposed EU policy is coherent with ESA industrial policy and sets guidelines that might contribute to surpassing existing differences between industrial policies at different level.

The EU industrial policy is deployed along 3 main action lines:

- use of public investments through adequate **procurement policy**
- improvement of the **regulatory framework**
- implementation of efficient **Research and Innovation programmes**

Its specific objectives are to develop a balanced industrial base in Europe, support industry competitiveness and the market for space products and services.

3.1. Support the development of a balanced industrial base through appropriate EU procurement policy

In order to ensure a balanced development of the sector in Europe, the EU must adopt an adequate **procurement policy** for the development and deployment of operational infrastructures. Such policy, based on open and transparent competition, would not rely on geographic return rules, but on an intelligent and flexible use of the existing EU Financial Regulation, taking into account the peculiarities of the space sector and addressing the key challenges it is facing. Procurement practices could include provisions like limitations for companies to be prime contractors, application of targets for subcontracting, determination of maximum aggregate value of activities (lots) that can be awarded to any independent legal entity, double sourcing, where appropriate, etc.

3.1.1. Ensure an adequate development of the sector in Europe

Due to the way the European space industry emerged, it is concentrated in a limited number of countries and industrial integration has reduced furthermore the number of competitors, leading in certain areas to de facto monopolies. However, competition and an increased use of industrial competences that might exist in other countries (including non ESA member states) could, in some cases, be beneficial to the competitiveness of the European space industry as a whole.

- Develop EU procurement policy including the appropriate combination of the elements above for each object/service to be procured, in order to avoid fostering monopolies, promote competition and the existence of double sourcing where appropriate and support the full development of the industrial potential in Europe.
- Encourage the opening up of national space procurements to intra-European competition.

3.1.2. Promote SMEs participation

SMEs represent only 5% of the space manufacturing industry. They are however strategic actors because of their capacity to quickly innovate

in a number of areas and transfer skills, knowledge and jobs to society. SMEs participation in the supply chain of the manufacturing industry should be encouraged, in particular in the instrumentation domain. New satellite infrastructures like Galileo and GMES provide also a huge potential for start-ups creation and SMEs development in the fast-growing sector of satellite enabled services.

- Set-up procurement rules promoting adequate involvement of SMEs (e.g. mandatory subcontracting, following Galileo FOC procurement rules).
- Further develop the support provided by the Enterprise Europe Network to space SMEs:
 - Promote and facilitate SMEs access to EU R&D and innovation programmes, especially those SMEs and service companies not used to pursue regular R&D activities with space agencies.
 - Support SMEs access to finance and promote the use of existing instruments (Cohesion and regional funds, JEREMIE programme, EIB and EIF instruments etc.).
 - Promote technology transfer and cross-fertilisation between space and non-space SMEs.
- Support the development of better links between academia and SMEs (in particular in the fields of instrumentation and satellite enabled services).

3.2. Support the market for space systems and services

3.2.1. *Promote a sustainable and predictable public demand in Europe*

The European space manufacturing industry relies at 60% on the institutional market. It is important that industry may rely on a **stable and predictable institutional demand** to compensate for the cyclic nature of the commercial market and preserve essential assets.

- Develop and provide to industry a **long term and clear vision** of the institutional market at European level seeking political commitment beyond 7 years of financial perspectives.

3.2.2. *Support access of European industry to the global market*

Export barriers are huge obstacles to the development of the European space industry both at system and subsystem/equipment levels. Ensuring a **fair reciprocal market access** with international partners is vital.

In particular, the **U.S. market** is **protected** through access restrictions while European operators and institutions do buy American. Action

must be taken to support not only primes, but the whole supply chain to access international markets.

- In international negotiations and dialogues with its major space partners, EU will promote an international ‘level playing field’ in space, through e.g. reciprocal opening of supply chain and public sector markets for space systems and services, and a careful monitoring of possible dumping on the international market.
- Establish a map of MS measures and good practices supporting access of their companies to the international markets and disseminate it to member states.

3.2.3. *Support the development of the European satellite market*

Differences in regulations, specific requirements and procurement procedures and other market barriers exist in the institutional market for satellites which result in a **fragmentation of the demand** preventing economies of scale and creating competitive disadvantages for the European industry. It is necessary to develop as much as possible a European-wide market for satellites in Europe. The EDA concept of centralising commercial procurement and pooling of national requirements results in cost savings of 10% on average and may be a source for inspiration.

- Promote large trans-European programmes enabling and ensuring economy of scales through demand aggregation and coordination of requirements.
- Encourage opening to competition at European level.

Radio spectrum is a scarce resource shared between wireless applications in several sectors from short range devices to electronic communications services like satellite communications and terrestrial telecommunication services. It is crucial for the development of the satellite communication industry to ensure the availability of this vital resource.

- Ensure that sufficient and appropriate spectrum is available in Europe for the efficient operation of satellite applications and services, including a broadband coverage of the most remote areas of Europe.
- Based on a review of current use of orbital resources (orbital positions and related spectrum rights) available for EU member states, promote a more efficient use of these resources, via
 - a) the development and implementation of new and innovative technology solutions
 - b) the EU-level harmonization of conditions of use of spectrum allocated to satellite services

- Develop a common EU position regarding the coordination of key spectrum bands with non-EU neighbouring countries
- Contribute to the preparation of the World Radio communications Conference and ITU negotiations in order to defend EU interest in the field of satellite communication."

3.2.4. *Support the development of a market for satellite enabled services*

The markets of satellite enabled **navigation and earth observation** services are emerging markets depending for a large part on public customers at national and local level. These markets are still **limited** and **fragmented** today. The emergence of new applications need to be stimulated through **innovation** actions, including demand-side measures raising users' awareness of the potential of satellite enable technologies to address their problems, including most grand societal challenges like climate change, security of supply, health or ageing.

There is also a need to stimulate the demand for new type of **satellite communication** services for different user segments (multi-dwelling, transactional, transportable, land-mobile and aeronautical ...) in order to invigorate this sector as well.

- Promote at all levels (EU, MS and local) the development and coordination of **innovation measures** supporting the emergence, development and deployment of innovative satellite-enabled services addressing societal challenges and the use of available funding sources including **regional funds**.
- **Encourage institutional customers**, including at local level, to embrace large-scale EO and navigation applications to address societal challenges and federate the demand.
- Promote at EU level the integration of satellite-based services in major infrastructure programmes like **trans-European networks** in the areas of transport, telecommunications and energy infrastructures.
- Ensure a coherent **earth observation data access policy** to facilitate acquisition and exploitation by service providers and users, while at the same time guaranteeing the control of the dissemination of sensitive.
- Promote the development of **pre-competitive procurement, standardisation, interoperability** and the **convergence of procurement mechanisms** across different governmental stakeholders.

3.3. Support industry competitiveness

3.3.1. Strengthen industry's technological basis and promote innovation

The **space manufacturing industry** is a high-tech industry with technology cycles longer than the average. From concept definition to certification and actual deployment in orbit, it may take up to 10 years and product lifetime may exceed 20 years. This implies very high technological and financial risks that the private sector can often not bear. The technological evolution is mostly driven by institutional programmes based on public sector needs (defence and science) or anticipated commercial requirements.

All segments of the European space industry face today an increasing competition from a number of emerging countries who are quickly closing their technological gap. To sustain this competition, the European industry must maintain **its technological edge** and stay at the forefront of the technological progress. Some existing technologies are however more than 20 years old. Technological progress must consequently be boosted in a number of strategic areas, **breakthrough** technologies must be developed, **cross-fertilisation** with other sectors promoted and the overall **R&D** effort further supported by institutional programmes.

The **satellite enabled service sector** is an emerging sector largely made of SMEs and start-ups building on the technological potential of the satellite infrastructures progressively deployed. Strong research and development effort needs to be undertaken in order to exploit the full potential of these new technologies.

- Launch a **new EU flagship programme**, like exploration, able to federate public and private R&D efforts around well selected strategic technologies.
- Further increase in **FP8** R&D support to industry, including the service sector.
- Develop a fully fledged **space innovation programme** as part of the next Innovation Framework Programme supporting technology cross-fertilisation with other sectors, emergence and deployment of innovative satellite enabled services and applications, etc.
- Support the development and the use of procurement schemes promoting innovation like **pre-commercial procurement**.
- Encourage the use of existing financing instruments, such as for example **EIB loans**.
- Develop mechanism to support the development of **breakthrough** technologies which have had no room until now in the private and public research plans due to the high risk linked to funding these future oriented projects.

Due to the nature of the space sector (specific requirements, small series, etc), space R&D activities have always been developed in a rather isolated manner. In addition to continue supporting research and development of space technologies through existing instruments, there is a need for new actions supporting the development of breakthrough technologies and increasing **cross-fertilization between space and other sectors**. Mechanisms need to be set-up to **identify potential areas of cross-fertilisation** and **increase the cooperation with other sectors**, rationalizing the efforts invested, allowing the space sector to profit from the progress made in emerging technologies like nanotechnologies, biotechnologies, energy.

- Support identification of areas for **cross-fertilisation** involving instruments including the Enterprise Europe Network and European Technology Platforms.
- Support **spin-in/spin-off** mechanisms and **common R&D**.
- Support the development of **joint research programmes** between EU and ESA in areas like energy.

90% of space technology and systems are of **dual use**, and most military space capabilities remain under the remit of Member States. Synergies exist (e.g. European Framework Cooperation for security and defence research) but there is substantial room for increased coordination, sharing and pooling of resources.

- Promote a better **exploitation of synergies** between civil and military use of space technology/systems in Europe, encouraging the use of interoperable civil-military technical requirements and avoiding unnecessary duplications, in particular in the area of Earth observation.

3.3.2. *Ensure the development of necessary skills*

The European space industry is affected by a shortage of highly-skilled aerospace engineers and technicians coming out of the EU educational system.

There is also a lack of knowledge and skills in the area of the emerging navigation and Earth observation technologies, hampering the development of the service industry and the related markets.

- Support the development of adequate **training programmes** and reinforce cooperation between industry and universities.
- Propose the setting-up of a **Knowledge and Innovation Community (KIC)** in the area of satellite enabled services for climate change within the **European Institute of Innovation and Technology (EIT)**.

- Encourage the emergence of **world-class** universities and research centres.

3.3.3. *Enhance the technological non-dependence of EU industry*

In order to reduce the risks on institutional programmes and the negative impact on industry competitiveness linked to delays or unavailability of imported electronic components, the European industry should ensure its non-dependence towards imported critical technologies.

- Support the development of alternative sources and their long term availability through e.g. supporting R&D in and public procurement of indigenous European technologies.

3.3.4. *Reinforce industry position on the commercial launchers market*

Today Europe does not have an **own product suited to** the growing market demand for medium-class telecommunications satellites and micro-satellites. In addition, the **reactivity of the industry** to adapt its products to the market demand is very low as it relies on institutional programmes characterized by very long development cycles (Vega development took 14 years) to define its new commercial launchers. Due to a faster evolution of the satellite market and a growing competition on the launcher market this may put at risk the capacity of the European industry to compete on major segments of the commercial market.

- Investigate new mechanisms allowing for increased industrial reactivity in developing launch vehicles for commercial applications.
- Develop support mechanisms to promote commercial launch of micro-satellites and trigger private initiatives (Prize or by other incentives).

4. ANNEX – INDUSTRY AND MARKET OVERVIEW

4.1. A strategic industry ...

4.1.1. *The European space Manufacturing Industry*

The European space manufacturing industry represents today about 5% of European Aerospace and Defence industry and delivers three types of products: **launchers** (including manned space infrastructure and planetary exploration systems), **satellites** (and other unmanned spacecraft) and **ground systems** (for satellite and launcher operations, and to test and integrate space systems).

4.1.1.1. Size of the industry

The European space manufacturing industry presents in 2008 a turnover of 5.8 B€ divided in satellite applications (3.7B€), launcher (1.3B€) and scientific activities including space station and science programmes (0.8B€). It represents a highly qualified workforce of 30,000.

4.1.1.2. Structure of the industry

As the result of a strong restructuration during the past decade (following the aeronautics industry evolution) the sector is now highly concentrated with **EADS Astrium** (no. 3 worldwide) accounting for nearly 50% of the work force of the sector (15,000 employees) and **Thales Alenia space** representing 25% (7,200 employees).

SMEs represent significantly less than 5% of the total space industry manufacturing employment, whereas small space units within larger companies represent around 20% of the total.

The launcher segment (20% of the sector workforce – also main suppliers of human related hardware (ISS, ATV)) is made of 25 companies structured in supply chains around Ariane's prime contractor **EADS Astrium space Transportation**. The industrial architecture of the segment is dictated by the share of competences and the ESA "geo-return" rule. The length of development cycles (10 to 20 years), the duration of the exploitation phase, together with the difficulty to implement any change in the qualified definition provided for extreme stability of the industrial structure of the launcher.

The spacecraft (or satellite) segment (68% of the sector work force) is composed of two large system integrators: **Thales Alenia space** and **EADS Astrium Satellites** (7.000

employees). In addition the growing satcom market has attracted at least one new integrator in Germany (OHB).

There are about 70 satellite equipment and subsystems suppliers in Europe, some of them being part of system integrators as subsidiaries or business units. A strong control over the supply of critical equipments is still considered as a condition for risk mitigation, in particular on the commercial market.

Beside those capabilities of primes and of their subsidiaries, there are still a few independent satellite equipment suppliers. Among them, the share of SMEs is very small, mostly due to the fact that barriers to entry remain a major challenge for new comers in the space business.

Access to prime contractorship is still very attractive to many member states and the growing demand for demonstrators and earth observation satellites allowed in the recent years the emergence of medium and small system integrators in the UK, Belgium, and Sweden.

The ground segment is composed of about 40 companies and represents 10 % of the sector workforce.

4.1.1.3. Geographical repartition

The European space manufacturing industry has been shaped by the national space policies of a number of countries (like France which represents 40% of the sector's workforce) and ESA's "geo-return" rule. In many ESA countries, the Agency is still, and by far, the main customer of the space industry.

The industry is distributed across all ESA countries, resulting in important fragmentation, particularly in the smallest contributors to ESA budget. Six countries (F, D, I, UK, E & B) concentrate 91% of space industry employment.

In recent years, given the relative stability of governments support to space programmes, a growth in industry's sales and employment took only place in those countries where industry has diversified sufficiently to participate in commercial programmes.

Eleven EU MS (Bulgaria, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia) are not ESA members. Bulgaria, Hungary, Romania and Poland had limited space activities in the past. They have now set-up Space Agencies or equivalent. Space activities often concentrated on space science and space-borne sensors. They have a limited space industry with no space manufacturing capacity. The satellite applications sector is more mature and commercially oriented and has potential for

further development. Some countries like Poland have also the ambition to develop a capacity to build satellites locally.

4.1.2. *The sector of satellite enable applications and services in Europe*

The satellite-enabled applications and service industry is a rather new and small sector which presents a high growth potential. It is a highly innovative and strategic sector, responsible for turning investments in satellite infrastructures into concrete applications and services to the benefit of the whole society. It mainly involves SMEs and start-ups. The space manufacturing companies are seldom involved in this sector, excepted in case of vertical integration (e.g. EADS with EADS Space Services serving governments customers with satellite communications and Earth observation imagery) but they are becoming more involved due e.g. to the often higher profit margins of space downstream activities. Indeed, a number of companies in the space sector are now proposing an increasingly complete package, incorporating downstream services previously only available from other players.

The service industry is composed of 3 sectors. Revenues of the sector for 2005 has been assessed by Euroconsult (see table below).

Revenues of the downstream value adding sectors of space-based applications for 2005 (Europe and Canada)

Sector	World revenues 2005	European revenues 2005	Europe %	2000-2005 CAGR Europe
Telecom	€54.3 billion	€18.1 billion	33%	6.5%
Navigation	€17.3 billion	€2.3 billion	13%	22%
Earth observation	€1.3 billion	€0.4 billion	31%	4%
Total	€72.9 billion	€20.8 billion	29%	11%

Source: Euroconsult (2007). data include Canada, an associate member of ESA, which accounts for around 10%.

4.1.2.1. Satellite communication services providers

Around the globe about **40 companies** distribute data in its broadest sense via geosynchronous satellites. These include for instance companies specialised in TV and radio broadcasting, mobile and broadband services. Subscription based TV broadcasting (Direct-to-home TV) represents the main activity. The sector represents a turnover of about **€55 billion** yearly and growing. Europe has 2 operators (SES and Eutelsat) in the top 5 and takes 33% of the market shares.

4.1.2.2. Navigation services providers

Navigation services providers have started developing in the early 90's, exploiting the GPS signal. The sector represents now the second most important satellite-based services sector in Europe.

Suppliers of navigation services and applications are part of a complex supply chain including many inter-relationships

between chipset manufacturers, equipment manufacturers or integrators, content providers, etc. The satellite navigation market is now truly global and open to industry from Europe supplying globally and vice-versa.

The European industry is made of several major and many small players. It has demonstrated, with success stories like TOM TOM, its capacity to bring on the market innovative products and set-up successful global businesses. Founded in 1991, TOM TOM is now the leader in Portable Navigation Devices, with over 3.000 employees and a revenue of €1,5 billion. Despite such examples, the European industry succeeded only to take 11% of the worldwide revenues of the sector which is dominated by U.S. and Asian suppliers. The deployment of Galileo should give to the European industry the opportunity to further develop.

4.1.2.3. Earth Observation downstream value added services providers

This sector is by far the smallest of the 3 satellite enabled services sectors, accounting only for 2% of the total revenue of the European services industry. This represents however 31% of the worldwide market. The sector includes in Europe and Canada about 150 SMEs with an average size of 20 employees and a turnover of around €2 million per company.

The sector is quite R&D intensive and requires highly skilled employees. Much of the innovative development is found among the large number of smaller companies.

The sector has experienced slow growth the last years (6.6% annually from 2003 to 2006). France, Germany and Italy are the most common location for EO companies. Spain and Portugal are developing.

4.1.3. *SMEs position in the space industry*

As described above, the involvement of SMEs in the space industry is concentrated on the service sector where they play the main role. Their involvement in the manufacturing supply chain is, on the contrary, quite limited (<5%), due to a number of barriers (certification requirements, long development cycles and lead times, high investments and high risk, need to ensure the sustainability of supply over long periods (>20 years), absence of significant series and low operational margins, cyclic demand, etc). SMEs are also confronted with the vertical integration process conducted by a number of major players like EADS Astrium and TAS seeking more efficiency and the risk to be excluded from the sector supply chain. They suffer from the current European overcapacity in many key areas, such as the manufacturing of structural parts, the development of software and power electronics. SMEs

operating within the space manufacturing supply chain are often active in other sectors.

The dynamism and innovation potential of SMEs is however of great added value to the space sector and SMEs generally consider their involvement in space business as a great opportunity for them.

SMEs involvement should be promoted in all segments of the space industry, improving the framework conditions to facilitate their access and developing appropriate research and innovation support measures.⁹

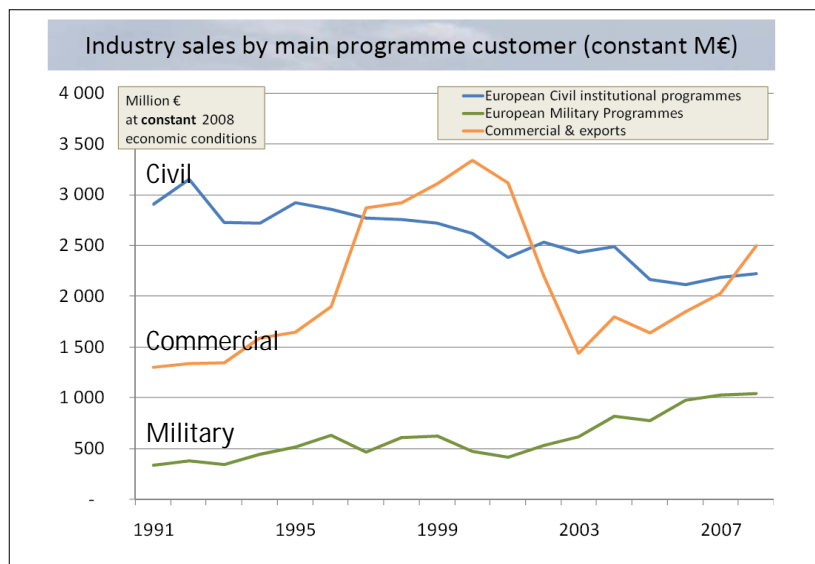
4.2. ... in a specific market

4.2.1. The market for space systems

4.2.1.1. Main customers are institutional

The European space industry has two main groups of customers for spacecraft and launch systems. **Institutional customers** are historically the first (European and national space Agencies, public satellite operators (e.g. Eumetsat) and military procurement agencies) and contributed to **60%** of industry sales in 2008. **Commercial programmes** really developed at the beginning of the 90s, supported by the

important development of TV broadcasting and other video applications. Sales of commercial systems (satellites and launch systems) represented **40%** of industry sales in 2008.



The European space manufacturing industry is depending strongly on institutional programmes (civil and military, also including non European countries). The overall budgets of the **European civil space agencies** have roughly been kept constant in current

economic conditions. In actual value over the last 15 years, this results in a dramatic and steady decrease (30% since 1991) of these activities which represent now only one third of the overall European space industry business.

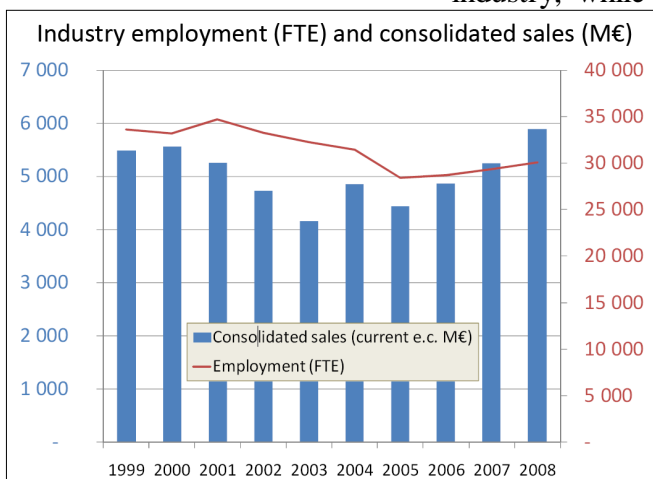
⁹ "Any effort should be implemented to address the basic needs of Space SME: Remove bureaucracies barriers, support Space technology development, encourage Space service and innovative Space application exploitation." (RECOMMENDATION FROM THE FIRST EUROPEAN SPACE SME CONFERENCE ROME 11-12TH MAY 2009)

Over the same period, the European space **defence market** has strongly developed and quantitatively compensated for the erosion of the civil space budgets. However, this market is essentially oriented towards the procurement of capacities to meet operational needs and doesn't necessarily come with the relevant R&T budgets for the development of new technologies. Such developments used to be ensured through civil space budgets.

The competitiveness of the European space manufacturing industry can be appreciated through the significant share that it gets from the **global open market**. However, this business is essentially prone to external factors. In the early 90s, the generalisation of broadcast by satellite brought a growth cycle which downturned in 2000. The recent increase of turnover to a historic height is mostly due to the recovery of the space telecommunications commercial market from this 2000 downturn. Nevertheless, with the development of the global economic crisis, this positive trend should not be expected to continue. Operating margins which are traditionally already low in the space industry (below 10%) are even lower on the commercial market and strongly depends on the overall competition. For these reasons, number of companies (Lockheed and Boeing in particular) prefer to concentrate effort of governmental market when this market provide sufficient business like in the US.

4.2.1.2. Sales are cyclical

The institutional programmes provide a necessary constant base for the activities of the European space manufacturing industry, while the commercial market allows boosting the



industry competitiveness but provides a cyclical workload, resulting in a global fluctuant situation. Sales of the industry vary over the last 15 years between 4 and 6 B€

The dramatic fluctuations observed over the last few years show the great flexibility required from industry to adapt to variations of such amplitude. They also demonstrate that commercial business should not be expected to provide by itself for the stability required to guarantee the

long term sustainability of the European space industrial base. In the U.S., due to the much higher level of institutional programmes, the industry is far less dependent on commercial sales (about 15% of sales).

The institutional market is vital for the European space manufacturing industry. In most countries, however this

market is captive to the domestic industry as strong competition from foreign suppliers is prevented (for strategic or security reasons).

4.2.1.3. Competitiveness of the European industry

Market shares show that European companies are very competitive, having managed to gain around 40% of the international commercial market. This success is partly due to a lower competition of the U.S. industry who concentrated during the last decade mainly on its institutional market as a result of the increased of governmental budget after September 11, 2001 and the entry into force of the ITAR rules. This favourable situation might, however, not last with the current pressure on the U.S. institutional budgets and manufacturers from other space powers such as Russia, China or India, progressively entering on the commercial market. In most segments, European industries still present higher technical capabilities that preserve their competitive advantages. In other areas, however, like small GEO telecommunication satellites (comsats) with standard capability, the European and U.S. manufacturers may be at a disadvantage against other industries which can offer solutions at lower costs.

4.2.1.4. The launcher market

The commercial launcher market is currently in a situation of over capacity, with strong competition rising from U.S. and Japan (the impact of the new U.S. space strategy on commercial launcher needs to be assessed) and emerging countries like China, India and Brazil.

Arianespace is the worldwide leader on the commercial market. Arianespace's launcher family concept allows it to respond to market developments that include the continued trend toward two primary satellite segments: one for medium-class telecommunications spacecraft (2.5-3.2 metric tons), and the other for large-class spacecraft (5.2 to 6.2 metric tons).

The Ariane 5 ECA's heavy-lift capability enables Arianespace to orbit the world's biggest telecommunications satellites as solo payloads, as well as team-up 2 medium-class satellites on dual-payload missions. The upcoming introduction of Soyuz will open up additional capacity for medium-class payloads, enabling Arianespace to launch satellites as they become available (no need to wait for the second one for dual launch). Finally, the Italian/European launcher Vega will soon complete the family with launch capacity for small- to medium-sized satellite payloads.

4.2.1.5. Satellite market

The turnover of the European satellite manufacturing industry is made of nearly 60% of institutional contracts for communication, navigation and earth observation satellites.

The international commercial market for **satellite telecommunications** (satcoms) represents 40% of the European industry's turnover. This market is highly cyclical, driven by the replacement of obsolete infrastructures and entry new operators.

Outside satcoms, export opportunities emerge for commercial and government Earth observation satellites. A growing number of countries without a competent domestic industry acquire such satellite for defense, security and economic development. European manufacturers appear to be more present on that market than U.S. manufacturers that are certainly hampered by export control.

The market for navigation satellites is concentrated around a number of institutional programmes reserved to the domestic industry.

The European satellite manufacturing has currently a large backlog for satellites to be launched in the next 3 to 4 years, both for GEO and non-GEO satellites with 3 large constellations to build (Galileo, Globalstar 2G, 03b) in addition to LEO satellites for science and applications.

Beyond that horizon, the structural cyclicity of the commercial satcom market and the end of constellations' development make the future more uncertain for both integrators and equipment & part suppliers. In addition, the impact of the financial crisis may only impact the industry in 2-3 years, a period commensurate with the lead time to procure, build and launch a satellite.

It is important for the industry to maintain its position on the international commercial market for satcoms (50% share). This commercial market is necessary to reach a critical mass and be able to maintain a minimum of employment, and specialised know-how.

European industries are facing three main issues in the area of satcoms:

1. Competition from China and India:

Due to the high strategic importance of space, China and India are massively supporting and financing space technological developments. It is estimated that Chinese and Indian manufacturers will be at the same technological level

than European manufacturers within 5 years, if the development of new generation satellites is not boosted in Europe. Costs are far lower in those countries, providing their industry with a competitive advantage.

European Satellite manufacturers react by entering into partnerships with ISRO for example, which may look like the beginning of a delocalisation strategy leading, as in other sectors, to the vanishing of a strategic manufacturing capability in Europe.

2. Dependence on U.S. components & competition from U.S. manufacturers

Currently, 60% of the electronics on board an average European satellite is U.S. imported. Those imports are subject to ITAR export regulations. In the present context, there is no high risk that the U.S. would considerably tighten its export authorizations.

Nevertheless, this situation leaves the European industry in a situation of twofold dependence towards U.S. manufacturers (dependence on their production capacity in terms of availability and delays) and towards U.S. government (dependence on U.S. policy).

There is consequently a risk of unavailability of those U.S. electronic components including for European institutional programmes. In November 2008, the EC/ESA/EDA Joint Task Force (JTF) was established to address Critical space Technologies for European Strategic Non-Dependence. Yet it is unlikely that this dependence could be reduced considerably with an initiative of this limited scale.

3. Evolution of the Direct to Home TV market towards terrestrial products

Broadcasting and Direct to Home TV are the main satcom applications on the commercial market.

On-demand TV services are progressing quickly on the European and American markets. Such services are easier to supply with terrestrial technologies than with satellite technologies, leading to a possible erosion of the demand for satellite broadcasting.

To maintain their market shares, satellite operators and industries push for the development of integrated satellite-terrestrial solutions, as proposed by the Integrated Satcom Initiative technology platform.

4.2.2. *The market of satellite enabled applications and services in Europe*

The large-scale effort made by Europe to develop space infrastructures in the fields of satellite communication, satellite navigation (Galileo and EGNOS) and Earth observation (GMES) offers today to European industries a **huge potential¹⁰ for developing innovative services** derived from these technologies.

Only in the area of satellite **navigation**, the world-wide market for derived product and services was estimated €124 bn in 2008. It has been growing double digit from 2001 on and is expected to reach an annual value of over €230 bn euro by 2025 (with some predicting over €400 bn.). All sectors of modern economies are affected by the development of satellite navigation technologies. Some 3 billion satellite navigation receivers should be in service by 2020. A fierce competition is however expected to appear soon as countries like Russia, China, India and Japan have declared their intention to deploy their own GNSS capabilities for civilian use and promote the development by their applications industry based on their own system.

The market **of Earth Observation** (EO) services was estimated to stand at 1.5bn in 2007. EO services are very diverse and may be divided in five main market segments (Marine, Land, Disaster management and humanitarian aid, security). Institutional customers represent 80% of the market, but the policy of open and free data access is expected to boost the development of a commercial market of innovative services. Overall, sustained growth is expected in this sector in the coming years.

¹⁰ "As regards space-based services, the European flagship projects Galileo and GMES, identified as first priorities for the implementation of the European Space programme, will create significant opportunities for the development of new, highly innovative downstream services and markets"
Conclusions of the 6th Space council 29/05/09