



Economic and Policy Aspects of Space Regulations in Europe

Part 2: Space Related Regulations - On Track for
Space Technologies and Space Based Services

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Executive Summary

This study is the second part of a set of two studies aimed at providing an overview of the impact that space legislation and regulations have on the development of commercial space activities. While the first study focused on the legislation of space activities as such, this second study analysis the impact of non-space specific regulations on the commercial development of space technologies and applications.

As space technologies and space based services and applications evolve into the commercial arena, they become subject to non-space specific regulations. Those regulations are not adapted to the specificities of space and yet they affect the development of space technologies and space based services and applications. The development of the latter will depend on how well they adapt to general regulations as well as on how well general regulations are able to incorporate the peculiarities of commercial space activities. This study looks into three regulatory areas that create most concern in the space sector.

Radio-Regulations and Frequency Allocation

The radio frequency spectrum is vital to all telecommunications regardless of their nature, however it is a limited natural resource that needs to be managed if the effective and efficient functioning of telecommunication services around the world is to be ensured.

Frequency allocation is governed by the "Radio Regulations", which is the international treaty adopted by the International Telecommunications Union (ITU), and its application through national regulations on licensing the use of the radio spectrum.

This combination has resulted in a highly regulated market that is currently struggling to accommodate the rapid development of media telecommunications and the massive increase of spectrum demand.

Using current technical solutions that enable a more flexible and efficient use of the radio spectrum, national regulators are shifting toward more liberalised frequency allocation. Liberalisation of spectrum allocation is often based on principles of "technology neutrality" and "service neutrality" through which frequencies are allocated to the most efficient

technologies and services on the sole basis of their competitiveness.

Regulations introduced in the context of the European Digital Agenda and, in particular, the "Telecoms Reform Package" are a good example of the intention to introduce more flexible frequency allocation regulations. The Reform Package was based on a free market philosophy in which the two neutrality principles were applied. The difficulty, however, is that the European telecommunications authorities did not take account of the fact that not all technologies are of an equally flexible nature. This is particularly the case for satellite communications, which rely strongly on fixed and secured frequency bands. The dramatic growth of wireless technologies seeking to use frequencies that are currently being allocated to fixed satellite communications thus threatened the efficient functioning of satellite communications and their competitiveness in the market.

The eventual compromise reached by the telecommunications package concedes an exception to the neutrality rules when there is risk of interference, thus opening a gateway to take account of the special character of space.

Export Control Regimes. The Battle between Security and Trade Interests

Export control regimes respond to national strategic interests as well as international commitments to the non-proliferation of weapons of mass destruction, and are applicable to both armaments and dual use goods. Because space technologies fall in this second category of dual-use items and technologies, trade in space technology, and with it international cooperation and competitiveness, are compromised.

The regulation of export controls starts at the international level and is implemented by national regulation at the national level.

At International Level

The Export Control for Conventional Arms and Dual-Use Goods and Technologies (WA), the Missile Technology Control Regime (MTCR), International Code of Conduct Against, Ballistic Missile Proliferation (The

Hague Code of Conduct, HCOC) and UN Resolution 1540 set the foundations for regulating export controls of space technologies and items.

The Wassenaar Arrangement: acts as a forum of coordination for national policies on export controls and exchange of information. It establishes a munitions list that is binding for all state parties and has incorporated non-listed dual-use items as well as intangible technology transfers (ITT) into the list of controllable items. In addition, it generates soft law on future issues of concern.

The MTCR: safeguards the non-proliferation of unmanned delivery systems capable of delivering weapons of mass destruction. In order to attain that aim, the MTCR seeks to coordinate national export licensing efforts aimed at preventing their proliferation. The MTCR is based on "Guidelines for Sensitive Missile-Relevant Transfers" and an annex listing the equipment, software and technology subject to export control. The coverage of space goods by the MTCR is limited to launch vehicles and systems leaving aside other spacecrafts and technologies.

The Hague CoC: the HCOC is perhaps the mechanism that most clearly takes space into consideration. In its formulation, the HCOC includes the commitment to the Outer Space Treaty, the Liability Convention and the Registration Convention, while stating that cooperation in space as well as its utilisation must not contribute to the proliferation of ballistic missiles capable of delivering WMD and must and that States must exercise the maximum restraint possible in the development of ballistic missiles

UN Resolution 1540: UN Resolution was adopted to prevent the manufacturing and acquisition of WMD by non-state entities and imposes upon States the obligation to establish controls to prevent the proliferation and delivery of WMD.

The European Export Control Regime

In Europe the trade-security dichotomy is characterised by its impact on the internal market and the intricacies of complex institutional setting and decision making. This has strongly contributed to an unclear and complex export control regime that has been subjected to reform and recast with the intention of clarifying the export control regulatory framework.

The current regime is provided by Reg. 1334/2000 as recast by Reg. 428/2000. The regime aims at greater harmonisation in the export control practices of Member States

(MS) while ensuring that they comply with their international obligations.

Some of the most relevant characteristics are:

- The introduction of a Community General Export Control Authorisation and its conditions as well as the approximation of the conditions for National General Export Control Authorisations (NGEA). The regime encourages the use of these authorisations which are valid throughout the EU as a means of easing administrative burdens
- Reliance on national authorities for the implementation of the regime. MS Authorities may decide to require authorisation for non listed items on grounds set by the international agreements or when they deem that public security is compromised
- Possibility of requiring intra-community authorisation in given cases.
- Lack of compliance mechanisms

The EU regime incorporates a list of dual use items whereby the majority of space items and technologies are covered.

Despite the efforts for harmonisation, the strong reliance on national authorities and the considerable individual variations in their policies, together with a very broad definition of intangible technology transfers, has created a rather complex and non transparent framework that far from facilitating trade puts excessive burden on exporters. The impacts on space were illustrated by the Vega case whereby France authorities refused to transfer flight control technology software to the Italian company ELV Spa. for the development of the European Launch Vehicle Vega.

The Case of the U.S.: ITAR and Its Reform

Export of space goods and technologies in the U.S. is currently regulated by the International Traffic in Arm Regulations (ITAR), which subjects all defence related goods to the supervision and control of the State Department. Goods and technologies subject to ITAR are listed in the U.S. Munitions Lists (USML) and therefore, the export of all goods listed in the USML is presumed to threaten national security if exported to certain countries.

While ITAR is the export control regime referred for defence goods, export of dual use items falls within the jurisdiction of the department of Commerce and is therefore controlled by the Export Administration Act



(EAA). Goods falling within this regime enjoy the presumption that they are not harmful for national security interests unless they are exported to countries under embargo or countries defined under international agreements as countries that represent a threat for international political stability and peace.

Despite the dual-use nature of space items and technologies, most of them have been subject to ITAR since 1999. The application of ITAR to space items and technologies responds to the aim of maintaining autonomy and political leadership in space as well as the preservation of national security objectives.

Consequences and U.S. Space Policy

The omnipresence of ITAR in the export of space technologies has been subject to some questioning in recent years. ITAR was aimed preserving unconditional access to strategic technologies, U.S. autonomy in the space sector and U.S. leadership in space technologies. However, the emergence of new space faring countries and new space powers is questioning the capacity of ITAR to meet its purposes.

In fact, data on determining the effect of ITAR on preserving U.S. leadership in space technologies is not conclusive but the reactions of other space players can be meaningful. One of the most significant phenomena attributed to ITAR has been the development of the so-called "ITAR free" technologies. In an attempt to overcome the difficulties caused by the use of U.S. technologies, other space faring countries have developed competing technologies. With this, they have not only avoided cumbersome business relations with U.S. companies but have also gained positions in markets where previously only U.S. space technologies were active. Scientific and academic cooperation has suffered the consequences of the ITAR constraints too.

In general ITAR is seen as imposing unilateral hurdles to U.S. manufacturers and suppliers while it creates significant dissatisfaction among foreign customers.

The launch of the new U.S. space policy comes with language energising the competitiveness of U.S. space industries and invigorating the participation of U.S. space industries in global markets while expanding international cooperation and strengthening international partnerships. Special attention is also drawn to reducing as much as possible the regulatory burden for commercial space activities.

In parallel to the inclusion of this language in the space policy, there has also been activity in the U.S. Congress seeking a change in the U.S. export control regime relative to space technologies. The changes aim at administrative modifications that may not bring a complete overturn of the negative effects of ITAR unless the major part of space technologies is moved to EAR or subjected to a more flexible regime.

Data Management

Earth Observation activities have considerably increased in the last decades with an equally considerable variety of purposes, from public services on meteorological forecasts through high resolution imagery to academic small satellites. Space agencies and commercial operators are exploiting EO satellites and the data output is being distributed on a commercial basis or for commercial purposes.

The variety of purposes for which EO data is collected is matched by the varied nature of rules governing its distribution. UN Resolution 41/65, WMO Resolution 40 (Cg-XII) and the Aarhus convention on environmental data are among the international regulations applying to space based EO data that establish principles of unrestricted and non-discriminatory access to such data.

National legislators, however, have often adopted a security based approach to high resolution EO data. National legislation has been passed in France (French Space Operations Act) and Germany (the Satellite Data Security Act, Sat-DSiG) establishing licensing obligations for the exploitation of high resolution EO satellites.

However, further to the obtaining of satellite data, the exploitation and delivery of that data at any level of elaboration creates commercial opportunities while no regulation exists that is specific to EO data. Intellectual property regulation has provided the umbrella for operators to protect their rights over the collected data. Under this umbrella they have created their own data policies governing contractual relations while trying to conform to international principles and general Intellectual property laws. The interpretation of international principles and applicability of intellectual property rights varies also according in the data policies of the different operators. In this sense ENVISAT or EUMETSAT data policies vary from each other even in the categorisation of data to regulate their contractual relations on ownership and distribution of EO data and imagery. Commercial operators have also developed data policies regulating contractual relations on EO

data imagery and data ownership and distribution.

The type of applicable principles and obligations is relevant as this conditions access to data for commercial imagery developers. Given that the investment to operate satellites is high, access to raw data is limited to operators. The regulatory framework applicable to access that data has a high impact on the development of commercial imagery generated from such data. A regulatory framework allowing for IP rights on the delivery of raw data benefits commercial operators who may not deliver such data in raw form or charge for raw data thus allowing them to reap benefits directly from the extraction of data. Such regulatory frameworks allow for competitive advantages in the imagery market for satellite operators.

On the contrary, open access to raw data by imagery developers who do not have the investment capacity to operate satellites may facilitate development of imagery, services and IT applications creating business opportunities.

The protection of such interests through legal instruments varies according to the legal personality and status of the data distributors as well as their distribution channels. In this sense space agencies and governmental distributors (such as National Meteorological Agencies) are bound by international obligations to provide for unrestricted, non-discriminatory and even free data to users while commercial operators can only be bound by such obligations through national law. All agencies have devised their own mechanisms for the commercial distribution of data and only subject essential data to the fulfilment of international obligations, or only open access to all types of data in very specific cases (e.g. under the disasters charter). The question now rests on the status of commercial data distributors and the adequacy of existing legislation on intellectual property rights and on national authorisation to operate such data.

Conclusions on the Way towards a Competitive Space Based Market

As space evolves, the penetration of space technologies and space based services into other sector markets increases too. Commercial operators and service providers are exposed to the regulatory frameworks of those sectors that usually regulate the market of services disregarding the technology they are based on.

This study has demonstrated that non space specific regulations may affect the development of commercial space in two ways:

- On the one hand, non-space specific regulations affect the development of downstream markets.
- On the other hand, non-space specific regulations can affect the competitiveness of the space industrial and technological base.

Such regulations have an impact on the competitiveness of space based services and technologies that can be turned into positive effects by introducing the necessary adaptations. In this sense, the study has demonstrated that there is no overwhelming need to adopt space specific regulations but to introduce appropriate qualifications and guidelines. The three regulatory fields analysed indicate the following three potential instruments:

- Introduction of exceptions, as showcased by the case of radio-spectrum management in the context of telecommunications
- Development of guidelines, as in the case of RS data management or export control in the case of the development of common practice, where adequate binding rules already exist but their application can be optimised.
- Harmonisation, with regards to export control rules, where rules already exist but the disparities among them restrain competitiveness.

Conclusions and Recommendations per Regulatory Field

Radio-Spectrum Management, the Glasshouse Scenario

Regulation of radio-spectrum managements affects both downstream and upstream segments of satellite communications. While liberalisation of the telecommunications sector occurs at downstream level, regulatory changes also affect radio-spectrum management with consequential effects upstream.

The application of liberalisation mechanisms to SatComs has the potential to endanger signal security for satellite operations and, therefore, their access to the telecommunications market.

The endangering of Satellite signal not only affects the competitive capacity of SatComs in the telecommunications market but also the capacity to deliver services where Sat-



Coms are most competitive such as civil protection or crisis management..

Spectrum allocation regulations are vital in securing satellite signals and need to be taken into account by national as well as European telecommunications regulators. Such regulatory effort, on the other hand, must be supported by the space sector with guidance on the specific regulatory needs of SatComs.

Upstream and downstream components must be dissociated. In this sense there must be vertical discrimination in order to secure signal.

Exemption must be allowed from technology neutrality while allowing for service neutrality. The latter should be able to enable the development of new competitive services.

Export Control Regulations; the "Fortress Scenario"

Despite the differences, between the export control regimes in Europe and in the U.S., in both cases, the zealous pursuit of national security interests has generated similar consequences.

Global competitiveness of space technologies has been compromised in both cases and dependence on public demand strengthened, causing difficulties in the development of a self-standing industry.

Equally, both regimes have created considerable administrative burdens for exporters and high requirements on exporters to self-assess the nature of their exports.

An additional obstacle is created by the broad interpretation of "technology" and its transfer. A too broad interpretation could render all verbal interaction as a "technology transfer". This would constitute an obstacle to scientific and academic cooperation.

It is important that the market approach in Europe gains more weight in order to facilitate measures that balance the administrative burdens and legal uncertainty.

Measures in that direction should be envisaged in the current reform of the European regime and should incorporate the following:

- A higher degree of harmonisation.
- Higher responsibility from national authorities before European Authorities.
- Adoption of enforcement mechanisms.
- Compulsory set up of a database.
- Facilitation of guidelines for exporters.

Data Policy; the "Wild West Scenario"

In this sense, regulating delivery of satellite based data has the potential of facilitating the creation of downstream markets. Access to and use of this type of data is currently affected by rules and principles of a wide nature.

The result is a non-regulated situation that is subject to contractual relations based on a variety of data policies. While appropriate for upstream data providers, it does not adapt equally well to the development of downstream markets where the creation of business depends on how accessible RS data is.

While it is essential to ensure sustainable access and acquisition of RS data through mechanisms that allow operators to reap benefits from their investment, it is necessary to create mechanisms to allow the entrance of new actors into downstream markets.

It is necessary to develop guidelines to bring together the heterogeneous landscape of data policy practices whereby protection of acquisition of RS data is protected to the minimum level and access to such data by downstream markets facilitated.

1. Introduction

This study is the second part of a set of two studies aimed at providing an overview of the impact that legislation and regulations have on the development of commercial space activities.

While the first part of the study entitled "Economic and Policy Aspects of Space Regulations in Europe. Part 1: The Case of National Space Legislation- Finding the Way between Common and Coordinated Action" was dedicated to the systematic analysis of existing space legislation in Europe and drew conclusions on the consequences of the existence of such different legislations this second Part looks into a set of three adjacent regulatory areas that are tightly linked to space activities and have an impact on the development of commercial activities.

The study looks at regulations affecting EO data management, Radio Regulations and Export Control regulations. The approach taken by this study differs from the approach

to the first part in that it selects the most representative case studies and showcases the impact that such regulations have on the development of space activities through the analysis of cases such as the Export Control Reform in the U.S. and the adoption of the telecommunications package in Europe.

However, space activities have expanded into a large variety of applications and services supporting economic activities in other areas like telecommunications, security or environment. Although some attention has been dedicated by legal scholars to the effect of non-space specific regulations on the development of the commercial space sector, there is little awareness of the capacity of non-space specific regulation to support the development of the space sector.

The aim of this second part of the study is, therefore, to raise awareness of the relevance of those regulations to support competitiveness through the space sector.



2. Radio-Regulations and Frequency Allocation

2.1 Rationale and Need of Radio Regulations

Whether it is a remote sensing, navigation or telecommunications satellite, the design and operation of these spacecrafts depends strongly on the bandwidth allocated to their services. The construction and technical design of a satellite will depend on the bandwidth allocated to its signal and, most importantly, the services provided will depend on the safe use of the allocated frequency band. Once in orbit a satellite cannot be redesigned to transmit in a new bandwidth. Any eventual interference may irreparably jeopardise the delivery of the service the satellite was intended for.

Radio frequency spectrum is vital to all kinds of telecommunications regardless of their nature, however it is a limited natural resource that needs to be managed if effective functioning of telecommunication services around the world is to be ensured. The task of managing radio frequency spectrum globally has been taken up by the International Telecommunications Union (ITU), the United Nations agency for information and communication technology issues.

Management of radio frequency spectrum together with the management of satellite orbits is among the most significant tasks of the ITU. Because of this, the ITU dedicates one of its four sectors to "radiocommunications" (ITU-R). This sector has been entrusted with the "mission to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radio-communication services, including those using satellite orbits"¹, and its main objective is to ensure interference free operations of radiocommunication systems. With that aim the ITU-R adopts the so called Radio Regulations.

The Radio Regulations are the international treaty governing the use of the radio fre-

quency spectrum as well as satellite orbits. Radio Regulations are reviewed and revised by the World Radiocommunication Conferences (WRC)², which are held every three years to discuss topics of concern regarding the allocation of radio frequency spectrum and satellite orbits. The agenda of the WRC is set by the ITU Council following the recommendations of the previous WRCs and is set with the concurrence of the majority of the Member States.

Radio Regulations comprise the first regulatory level affecting management of the radio spectrum. They must be implemented at national level. The second regulatory step therefore pertains to national authorities who may then licence operators to operate in certain radio frequency bands, respecting the general allocation provided for by the Radio Regulations. Licensing at national level is usually regulated through the national legislation on telecommunications and the licensing task usually rests with the national telecommunications authority³.

The allocation of spectrum at national level varies according to national policy and market considerations in each country. In general, the national regulator chooses a licensing system that fits one of the following three patterns⁴:

- "Exclusive use" model. In this model the licensee has exclusive and transferable flexible use rights for specified spectrum within a defined geographic area, with flexible use rights that are governed primarily by technical rules to protect spectrum users against interference.
- "Commons" model. This model allows unlimited numbers of users to share frequencies. Users own usage rights are governed by technical standards but with no right to protection from interference.

¹ "Space-related Activities" ITU Presentation. 28th United Nations Inter-Agency Meeting on Outer Space Activities, Geneva, 16-18 January 2008; ITU portal: <http://www.itu.int/ITU-R/index.asp?category=information&link=itur-welcome&lang=en>

² Regulation of radio-communications is recognised as one of the functions of the ITU by Art.12 of the ITU Convention while WRC are recognised as the working tool of the ITU Radiocommunication sector. The workings of the WRC are laid down by Art. 24 of the ITU Convention.

³ La Regina, Veronica, "SatCom Policy in Europe", ESPI Report 32, Vienna: May 2011. 13-23

⁴ Thomas W. Hazlett, "Market allocation of radio spectrum", ITU Workshop Geneva January 22-23, 2007

- “Command-and-control” model. Traditionally the system in the U.S. and Europe, spectrum use is limited and based on regulatory judgements.

2.2 Sticking to Regulation or Keeping up with Competition? The European Case

Until recently, frequency management in telecommunications markets in Europe and the U.S. corresponded to the “command and control” model where the rights of use of certain frequencies were awarded exclusively to specific operators who would not be able to share such rights. Licensing enables applications that need guaranteed quality of service to be given exclusive access to spectrum.

Satellite operators have benefited from a highly regulated landscape that allowed them to preserve their bandwidths for the entire lifetime of their satellites thus squeezing new applications into frequencies that had not previously been used. This practice allows satellite operators reserve parts of the spectrum for future eventual services despite not being in use currently.

However, telecommunications are rapidly evolving towards the anytime-anywhere model. They are not only becoming more and more ubiquitous but also more powerful by combining different applications. The result is a big increase in spectrum demand and a growing need for flexibility. While the telecommunications market is liberalising and generating competition, the natural resources that sustain it are limited and highly regulated⁵.

In addition, the development of highly demanding telecommunications technologies is supported by public policies. In 1997 the EU launched the initiative for Universal Mobile Telecommunication (UMTS) advancing the introduction of wireless information technology. Currently the EU is also launching its initiative to achieve access to information and telecommunication services anytime anywhere through Electronic Communication Services (ECS). This initiative relies strongly on mobile broadband and mobile satellite technology (MSS). Mobile broadband will allow services such as WiMax and UMTS/LTE, while MSS is expected to improve the availability and reliability of services in the places

where satellite signals may be shadowed, such as urban areas.

2.2.1 Technical and Regulatory Solutions towards More Efficient Exploitation of Spectrum

Regulators around the world are faced with a flood of technologies demanding more frequencies. New ways of efficient and better use of spectrum have been developed. Spread spectrum technologies, dynamic technologies, mesh and ad hoc networks and low power devices provide for an array of technological options suited to different user needs that allow for a more efficient and full use of spectrum.

However efficient and convenient they might be, these technologies may not be well adapted to the command-and-control type of licensing. In particular, two of the most favoured technologies, Ultra Wide Band (a spread access technology) and Cognitive Radio (a dynamic spectrum access technology) are considered disruptive technologies as the current licensing schemes are not adapted to their application.

New technologies for spectrum access coupled with highly competitive markets require also regulatory adaptations and a market oriented policy approach. Policy initiatives pursuing broad access to information technologies in Europe, such as the above mentioned ECS, are accompanied by wide regulatory reforms as embodied in the adoption of the EU telecommunications package and the related set of decisions and initiatives on spectrum access⁶.

The telecommunications package⁷ has reformed and gathered three major directives providing for the regulatory framework that seek to meet the policy objectives of access to information anytime anywhere and attempt to attain a liberalised market for telecommunications. This regulatory initiative incorporates many measures related to radio frequency management. At its cornerstone is Art. 9 of the framework Directive. This is specifically dedicated to “Management of radio frequencies for electronic communications services” and sets the basic regime for

⁶ Frédéric Pujol, “Regulatory and Policy Implications of Emerging Technologies to Spectrum Management”, ITU Workshop Geneva January 22-23, 2007

⁷ Directive 2009/140 EC of the European Parliament and the European Council of 25 November 2009 amending Directives 2002/21/ on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and services, and 2002/20/EC on the authorisation of electronic communications networks and services.

⁵ Sims, Martin. “WRC-07: The technological and Market Pressures for Flexible Spectrum Access”. Communications & Strategies, 67/2007.



spectrum management in the EU, taking ITU allocations as the basis and establishing that Member States must ensure that licences issued by the competent national authorities are granted on non-discriminatory and proportionate criteria which are in line with the internal market principles and the idea of a liberalised telecommunications market.

The spectrum access regime provided by this keystone article includes two basic principles that have been held at the support of all liberalising tendencies. Art. 9 of the framework directive establishes that Member States shall ensure that all types of technologies used for electronic communications services as well as all types of electronic communications services shall be granted access to the frequencies available and shall be provided respectively in accordance with the national plans.

Other regulations have also been adopted in the attempt to facilitate access to frequencies. The initiative on mobile broadband is accompanied by two decisions on the harmonisation of the conditions for the availability and efficient use of the 3400 to 3800 MHz frequency band and the 2500 to 2690 MHz frequency band for terrestrial systems. These decisions oblige Member States to provide access to those frequency bands on a non-exclusive basis. In the same vein, decisions have been adopted to harmonise access to frequencies in the bands 1 980 to 2 010 MHz and 2 170 to 2 200 MHz⁸ and in the selection of operators for the provision of Mobile Satellite Services⁹.

Policy measures have also been taken regarding WAPECS, which prepares the way for a new approach to more flexible spectrum management. The WAPECS initiative establishes steps towards identifying particular spectrum bands in which regulatory restrictions can be lifted, thereby introducing more competition. It also establishes measures towards agreeing a Community-wide set of proportionate rights and authorisation conditions that should apply in selected spectrum bands thus allowing flexible and more efficient usage and avoiding harmful interference. The WAPECS initiative also gives more power to spectrum right holders to determine how they use their spectrum rights.

⁸ Decision 2007/98/EC of the Commission on the harmonised use of radio spectrum in the 2GHz frequency bands for the implementation of systems providing mobile satellite services

⁹ Decision No. 626/2008/EC of the European Parliament and the Council on the selection and authorisation of systems providing mobile satellite services (MSS)

2.2.2 The "Telecoms" Package, Technology Neutrality and Service Neutrality

The current setting of regulations on telecommunications at European level has not been without conflicts. A command-and-control licensing system guarantees exclusive access to operators whose services strongly rely on a given bandwidth. This is the case for fixed satellite operators who do not have the flexibility of other terrestrial technologies and face competitive disadvantages due to the natural limitations that are not shared by their competitors. These concerns were reflected throughout the negotiation of the telecommunications package.

In 2005 the European Commission initiated a process to review the existing regulatory framework for electronic communication networks and services (e-Communications)¹⁰. After a consultation period, on 13 November 2007 the European Commission submitted a proposal to the European Parliament and the Council for the amendment of the existing directives relevant to electronic communications¹¹.

The European Commission proposal aimed to harmonise the e-Communications market in the European Union on the basis of the principles of non-discrimination and fair competition. Accordingly, all types of radio network or wireless access would be allowed access in the radio-bands open to electronic communication services (the so-called technology and service neutrality).

To that aim, the former system of individual authorizations would be substituted by a system of general authorizations, only to be waived for reasons of public interest. In addition, primary right holders would be allowed to transfer or lease their rights to secondary service providers and, finally, radio frequency allocations would be reviewed every 5 years.

¹⁰ The European Commission Communication on the WRC-07 recalls that EU Member States are bound by the *Acquis Communautaire* and therefore their position before the ITU must be complemented by considerations of European interest, COM (2007) 371, Brussels, 2 Jul 2007. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on the Review of the EU Regulatory Framework for electronic communications networks and services. COM(2006) 334 final Brussels 29 Jun 2006.

¹¹ European Commission. Proposal for a Directive of the European Parliament and of the Council amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and services, and 2002/20/EC on the authorisation of electronic communications networks and services. COM (2007) 697 final. Brussels 13 Nov. 2007.

The proposal designed a highly unregulated market with little influence by international regulations as no reference was made to specific international regulations. The primacy of EU law over national legislation – also over international rules assimilated into national legal systems – together with the fact that as an ITU sector member the EU is not directly bound by ITU regulations, threatened to open the radio-spectrum to supply and demand forces with little consideration for its natural limitations (i.e. radio-spectrum is a limited natural resource, exploitation technologies may interfere with each other)¹².

European Satellite Operators reacted to the proposal. According to ESOA, far from favouring equal conditions, by disregarding the particularities of satellite technologies, the European Commission proposal would place satellite operators at a competitive disadvantage¹³. While terrestrial technologies can be flexible in the use of different radio-frequencies, satellite services are limited to the frequencies their in-orbit technologies have been designed for. Therefore, satellite services strongly rely on a secure radio-frequency allocation system, which is currently provided by the ITU regulations.

ESOA insisted that it is essential to secure consistency of EC rules with the ITU framework. ITU principles must be the framework for EU legislation, to be complemented by EC definitions on electronic communications and an exemption for satellite operators on the basis of compliance with international rules.

The European Parliament (EP) considered this position and on 24 September 2008¹⁴ proposed amendments to the European Commission proposal. The European Commission reviewed the proposal on the basis of the parliamentary amendments and submitted a new proposal to the Council on 6 November 2008¹⁵. On 27 November 2008 the Council

adopted a common position, which is currently under parliamentary review¹⁶.

The following are the main points of the common position relevant to radio-spectrum management:

- Increase of references to the ITU authority on radio-allocation competences, stressing ITU regulations will be applied unless contrary to the interests of the EU.
- The 5 yearly rotating allocation system has been dropped.
- Satellite services have been granted exclusive exploitation of C-band on the basis that serious interferences could render services void.
- The principles of technology and service neutrality are maintained.
- The rights of free transfer and lease of radio-frequency rights are maintained.

The final telecommunications package was adopted on 25 Nov 2009. The principles of non-discriminatory and proportionate criteria have been kept in line with the internal market principles. The framework directive has also maintained the service neutrality and technology neutrality criteria by stating that all types of services and technologies may be used in the radio frequency bands allocated according to National Frequency Allocation Plans in accordance with Community Law and on the basis of the ITU Radio Regulations. Despite the neutrality criteria, non-discriminatory restrictions are allowed if these are, *inter alia*, necessary to avoid harmful interference, ensure technical quality of service, safeguard efficient use of spectrum or ensure fulfilment of a general interest objective.

The directive keeps the provisions on transfer or lease of individual rights to use frequencies in the bands.

2.3 Conclusions on Frequency Management

The days when different communication services enjoyed exclusive rights on their frequency bands seem to be gone. The prolifer-

authorisation of electronic communications networks and services.

¹⁶Under the co-decision procedure the text must be submitted for Parliamentary amendment before a second Reading in Council. The Council is expected to conduct second reading before the end of March 2009. (2007/0247/COD)

http://ec.europa.eu/prelex/detail_dossier_real.cfm?CL=en&DosId=196418#396609

¹² Council preparatory position for the WRC-07. The Council underlines EU member states must respect the *acquis communautaire* before negotiating any other rule.

¹³ ESOA letter on C-band to European High-level Officials, 18 May 2007.

¹⁴ Report on the proposal for a directive of the European Parliament and of the Council amending Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services, Directive 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, and Directive 2002/20/EC on the authorisation of electronic communications networks and services (COM(2007)0697 – C6-0427/2007 – 2007/0247(COD))

¹⁵ Amended proposal for a Directive of the European Parliament and of the Council amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and services, and 2002/20/EC on the



eration of all sorts and combinations of telecommunication services and technologies has put pressure on regulators to provide for more efficient access to spectrum. "Flexibility" seems the word for efficiency in a market that seeks access to information anytime anywhere.

All levels of regulators have picked up the call and have tried to adapt the use of a limited natural resource to market demands and competition. The ITU incorporates the release of bandwidth and management of the digital divide while the EU tries to accommodate high levels of international regulation to its own open market principles and policies of information access for all.

Satellite communications have been caught by the increasing influence of competitors in bands that used to be reserved for them. While mobile satellite operators seem to have caught the attention and favour of regulators for their capacity to fulfil the "anytime anywhere" criteria, fixed satellite operators have

had to fight strongly for exceptions that would allow them exclusive frequency bands.

Despite all efforts to liberalise the use of radio frequencies, the opposition from satellite operators has been strong and the authoritative nature of Radio Regulations is still a heavy burden on any intention for liberalisation. It is doubtful that the consequent mixture of regimes will offer the benefits that it promises towards an achieving a liberalised market. In fact it could even close some markets and make market access more difficult for new entrants. This is well illustrated by the fact that a concession has been granted for the provision of mobile satellite services. The concession has gone to two operators while setting aside any other potential competitors. On the other hand, the setting up of infrastructure in the telecommunications sector requires high start-up investment that was already expended during the period of high regulation. Whether the new scenario is going to be able to change that is still to be seen.

3. Export Control Regimes. The Battle between Security and Trade Interests

Export control regulations occupy a relevant and unavoidable position in the conduct of space activities as they directly define the level of international trade that national space industries are allowed to engage in, thus also determining their position in the international arena while as also affecting national space industrial policies.

Export control regimes respond to national strategic interests as well as international commitments on the non-proliferation of weapons of mass destruction, and are applicable to both armament and dual use good items. Falling in this second category, space items are directly subject to export controls despite being destined for commercial activities.

Having grown largely for commercial purposes in the post cold war era, space activities not only benefit from international trade but also provide key infrastructure and services to the globalised markets. However, given the intrinsic military nature of space technologies, their free trade is restricted for defence and international security reasons. As a consequence, commercial space industries may be restricted by national authorisation mechanisms.

This chapter gives an overview of the international export control regimes that are relevant to space to then analyse the controversial case of the U.S. as well as the specificities in the EU of export controls applicable to space.

3.1 Space and its Dual-Use Nature

Armament and military equipment producers wanting to open their markets to customers over national borders need to apply for authorisation and go through the scrutiny of national authorities. The same is applicable to all goods for civil purposes using technologies that can be also used for military capabilities, the so called "dual use items." In simple terms, technologies and goods are dual use items when they can be used both for civil and military uses. In more detail, the Wassenaar Arrangement on Export Control for Conventional Arms and Dual-Use Goods and

Technologies (WA) defines dual-use goods as "those which are major or key elements for the indigenous development, production, use or enhancement of military capabilities"¹⁷

This definition is not an absolute one and allows for different degrees of dual use items. In addition the dual nature of items can be qualified by other criteria such as the actual aim of a certain item, or its destination. In this sense the WA as well as the MTCR classify dual-use goods items into "sensitive" or "very sensitive"; sensitive items being those which are directly related to the indigenous development of conventional military capabilities whereas very sensitive items are directly linked to the development of the most advanced conventional military capabilities. The U.S. export control regulations, the ITAR regulations, subject dual-use goods to different authorities according to their actual nature.

The dual-use nature of space technologies has been recognised by national and international regulators thus subjecting them to export authorisations. Space technologies fall in the scope of this definition and have been included in international and national export control regimes. There is no specific space export control regime applicable to space technologies as a whole, but space technologies of dual use are listed one by one in categories dedicated to aerospace and propulsion, and the coverage of space technologies depends on the understanding of the legislator of what the potential military use of space technology may mean.

In this sense, most international export control regimes seem to take the view that space items requiring to be controlled are those which are related to missile technology, more specifically those which may be used as delivery systems for weapons of mass destruction, therefore, rockets and launch services. However, according to the broad definition above, space dual-use items also include all other space technologies that can be used for military purposes, including all kinds of spacecrafts. In fact it is estimated that al-

¹⁷ Criteria for the selection of dual-use goods including sensitive and very sensitive items. Wassenaar Arrangement on export controls and conventional arms and dual use goods and technologies.



most 95% of space technologies are of dual-use.¹⁸

3.2 International Regimes on Control of Arms Proliferation

Despite being of national competence, export control has received much attention from the international community. Export controls have been incorporated into non-proliferation regimes as a mechanism to avoid storage of armaments and access to weapons of mass destruction both by countries and most recently by terrorists. Space technologies have been incorporated in such international regimes for their capacity to deliver weapons of mass destruction. International regimes are aimed at implementation at national level, and inspire national export control regulations using lists of munitions and dual-use items. However, the spirit may differ in that international arms controls aim at peace keeping and confidence building whereas national export control regimes also seek to maintain national interests.

3.2.1 The Wassenaar Arrangement for Conventional Arms and Dual-Use Goods and Technologies (WA)

The Wassenaar Arrangement began in 1996 with the aim of promoting transparency and greater responsibility in transfers of conventional arms and dual use goods and technologies WA is the successor to the Coordinated Committee CoCom, which was the dual-use control regime during the Cold War era. After the Cold War it became evident that Cocom was not applicable to the new geopolitical scenario and that there was a need to establish a new arrangement to deal with international security and stability.

The WA is a political instrument rather than a legal instrument to enhance cooperation among States to prevent the acquisition of armaments and dual-use items. States must seek international security and stability through their national policies. To that end the WA works as a forum to develop common understandings and to co-ordinate national policies to combat the risks of arms and dual-use items. The WA works on the basis of notifications and agreements and denials. It establishes procedures for exchange of information on licensing of dual-use items and technology exports.

Although the WA aims at coordinating national policies and is based on the exchange of information and common communication of export licences granted and refused at national level, it incorporates a compulsory munitions list. States Parties to the Arrangements list. While implementing the munitions list, States are not precluded from incorporating other items into national munitions lists. The obligations foreseen by the WA are without prejudice to national legislation on exports and the legitimate aim of nations to defend their interests.

Furthermore, in response to emerging international concerns and the development of technologies, through soft law the WA covers upcoming areas of concern. In this regard, the WA incorporates non-listed dual-use items as well as intangible technology transfers (ITT). Those areas are addressed by the Statement of Understanding on Control of Non-listed Dual-Use Items and the Best Practices for Implementing Intangible Transfers of Technology Control, respectively.¹⁹ While the former ensures that all goods which are or may be intended for military use, even if not listed, are subject to export controls, the latter ensures that non tangible transfers of technology in the form of intellectual property are also subject to control. In both cases it is up to participating States to define terms such as "military end use" and what constitutes an ITT export as well as to determine when this occurs. In addition participating States may reserve the right to adopt national measures to restrict exports for reasons of public policy.

The approach taken by the WA focuses on the end use of the exported items. In this regard whether listed or not, dual-use items must follow case-by-case scrutiny for each individual export licence based on the sensitivity of the item. The evaluation of sensitivity is entirely within national responsibility. Against this background, apart from the listed dual-use items, the WA includes additional criteria for the selection of dual-use items. In this sense export controls must be exercised over non-listed items if their export would undermine the objectives of the WA. To that aim the WA differentiates between sensitive and very sensitive items by giving a definition for each.

Finally, the WA also establishes that participating States must promote self-regulation by industry. To that end the WA establishes that participating States impose on industry

¹⁸ Joan Johnson-Freese "Space as a strategic asset." Columbia University Press. New York 2007.

¹⁹ Among the soft law instruments, WA also incorporates guidelines on MANPADS and arms brokering.

practices such as keeping records of exports, investigations and appropriate monitoring.

3.2.2 The Missile Technology Control Regime (MTCR)

The MTCR ranks among the international mechanisms for the prevention of proliferation of weapons of mass destruction. The goal of this informal and voluntary association of countries is to protect against the proliferation of unmanned delivery systems capable of delivering weapons of mass destruction. In order to attain that aim, the MTCR seeks to coordinate national export licensing efforts aimed at preventing proliferation.

The MTCR was established in 1987 in response to the increasing proliferation of weapons of mass destruction. Although States were initially the addressees of the MTCR, the growing relevance of terrorism widened the scope of MTCR to also cover the prevention of certain goods and technologies reaching the hands of terrorists. To that end the MTCR rests on adherence to common export policy guidelines for a list of controlled items comprising military items as well as dual-use items. The MTCR group does not take export licensing decisions, the competence to grant export licences remains with participant States, who must implement the guidelines according to their national legislation.

The MTCR is based on "Guidelines for Sensitive Missile-Relevant Transfers" and the annex listing the equipment, software and technology subject to export control. The annex groups items into 2 categories that are each subject to a different level of restraint. Category I items are subject to the greatest restraint while category II items are subject to less restrictive control. Both categories comprise complete rocket systems and space launch vehicles. The guidelines add that non-listed items must also be subject to export control licensing if items might be intended for use in connection with delivery systems for WMDs. Given that the scope of the MTCR is focused on missile technology, the coverage of space goods by the MTCR is limited to launch vehicles and systems leaving aside other spacecrafts or technologies.

In addition to the guidelines and the list, the MTCR also aims at raising awareness and common understanding through seminars and other activities related to legislation and export control.

3.2.3 International Code of Conduct Against Ballistic Missile Proliferation (The Hague Code of Conduct, HCOC)

The Hague Code of Conduct can be considered as a spin off of the MTCR as a forum for discussion on the prevention of the proliferation of Ballistic Missile systems capable of delivering weapons of mass destruction, as well as adherence to multilateral disarmament and non-proliferation mechanisms. It is intended to supplement, not supplant the MTCR. It consists of a set of general principles, modest commitments and limited confidence-building measures.

Among the international mechanisms on non-proliferation, the HCOC is perhaps the mechanism that most clearly takes space into consideration. Its text includes the commitment to the Outer Space Treaty, the Liability Convention and the Registration Convention while stating that cooperation in space as well as its utilisation must not contribute to the proliferation of ballistic missiles capable of delivering WMD and must exercise the maximum restraint possible in the development of ballistic missiles. The HCOC expressly addresses expendable SLV by describing a set of information and surveillance obligations as well as notifications.

3.2.4 UN Resolution 1540

UN Resolution 1540 was adopted to prevent the manufacturing and acquisition of WMD by non-State entities and imposes upon States the obligation to establish controls to prevent the proliferation and delivery of WMD. National export controls are included as a key element to that purpose. The resolution calls upon States to promote universal adoption and full implementation of multilateral treaties for non-proliferation.

3.3 The European Export Control Regime

In Europe the trade-security dichotomy is characterised by its impact on the internal market and the intricacies of complex institutional setting and decision making. While trade and, therefore, export of goods is an exclusive EU competence subject to codecision procedures, security has traditionally been a competence of the Member States, decisions being taken at Council²⁰. This set-

²⁰ Suzuki, Kazuto. "Between Trade and Security: EU's Export Control Regime and Its Global Role". EUSA Tenth Biennial International Conference 17-19 May 2007, Montreal, Canada.



ting has created an export control regime that relies on multiple layers of regulation and a complex web of legal instruments adopted at different times i.e. a regime based on Council decisions referring to Community Regulations being implemented by several different national legislations.

Despite exports being primarily a trade issue, the fact that export controls regulations implement international non-proliferation agreements has shifted the focus to preserving security interests and compliance by MS with their non-proliferation commitments. This has strongly contributed to an unclear and complex export control regime that has been subjected to reform and recast with the intention of clarifying the export control regulatory framework.

European export-control regulation has been recast in parallel with the initiation of negotiations on its ongoing reform process. In the meantime, the Lisbon Treaty has incorporated changes that are relevant for both trade and security policies in Europe, as on the one hand the trade competence has been clarified and on the other security has been brought closer to Community action. Consequently, law making in related issues has also been simplified.

3.3.1 EU regulation. Its Evolution towards Harmonisation

The EU export control regime relies on a complex combination of EU regulation on export controls of dual-use items, EU soft law for military goods and MS legislation and practices on authorisation of dual-use item exports. The balance between the different regulatory levels and their relevance has evolved with time in the direction of a more coordinated approach regarding international obligations and towards achieving better harmonised practices within the internal market.

While initially ensuring implementation of international agreements was the prevailing aim of export controls in Europe, the consequences of prioritising security over commercial interests had negative consequences for the completion of the internal market inside the EU. In fact, it created a regime that relied mostly on national authorities and their discretion for granting export authorisations. The regime has evolved and its current status reflects the intention to transition towards a more harmonised regime.

3.3.2 Preceding Regulations

The initial regulation of dual use export controls in the EU was based on a complex set of legal instruments with different binding powers adopted under different legislative procedures. In this regard the general conditions for export control were laid down by two different instruments, a Council Regulation adopted in the context of the Community (therefore, legally binding and directly applicable) which set up a Community regime for the control of exports of dual-use goods, and a Council Decision adopted in the context of the Common Foreign and Security Policy (CFSP and therefore of intergovernmental character) establishing the list of dual use goods subject to authorisation²¹.

The aim of this set of rules was the assurance under EU law that MS complied with international arrangements on non-proliferation. This initial regime did not go further than requiring MS to comply with international non-proliferation agreements. The regime relied fully on the competence of MS to require individual authorisations for listed items and non-listed items if the exporter came to know (by himself or by being informed by the national authorities) that the items in question were to be used in relation to or as part of WMD as covered by the corresponding non-proliferation arrangements²². It was fully up to MS to lay down the required conditions for authorisation.

3.3.3 The Current Regime: Reg. 1334/2000 and the Recast Regulation

Regulation 1334/2000²³ was adopted in 2000 in view of the need for harmonisation to guarantee the effective application of controls. The regulation aimed at incorporating common lists of dual use items destinations and guidelines that had been created by different instruments in the previous regime. The new regulation strived for more harmonised and effective export control by incorporating the dual-use items list into the regulation as well as all subsequent changes. While acknowledging that the competence for issuing authorisation lies with national authorities, Reg. 1334/2000 acknowledges that na-

²¹ Council Regulation (EC) No 3381/94 of 19 December 1994 setting up a Community regime for the control of exports of dual-use goods. OJ [1994] L 361/1 and 94/942/CFSP: Council Decision of 19 December 1994 on the joint action adopted by the Council on the basis of Article J.3 of the Treaty on European Union concerning the control of exports of dual-use goods. OJ [1994] L 367/8

²² Art 4.3 Council Regulation (EC) No 3381/94

²³ Council Regulation (EC) No 1334/2000 of 22 June 2000 setting up a Community regime for the control of exports of dual-use items and technology. OJ [2000] L159/1

tional provisions and decisions affecting export of dual-use items must be taken in the framework of the Common Customs Policy and the corresponding regulation therein. It falls on national authorities to ensure that this regulation is properly applied. In addition MS were responsible for carrying out to carry out intra-community controls.

Reg 1334/2000 did not succeed in harmonising national regulation and practices. In fact, the regulation created a Community General Export Authorisation that is applicable to most dual-use goods on the list, which are destined for any of a number of destinations. Other than that, the regulation did not specify what kind of authorisations national authorities were to grant, thus leaving rather open the scope of the regulation. MS authorities were to apply authorisations according to their own practices and with regards to national security interests. A unified list and the creation of a template as well as other practices did little else than accord a harmonised position towards the international arena with little regard to facilitating the internal market. Annexes to the regulation have been modified several times in order to incorporate changes to the Wassenaar Arrangement²⁴.

The current regime after the Recast Regulation

Reg. 428/2009²⁵ was adopted by Council and Parliament in 2009 with the aim of bringing together the different pieces of regulation forming the European Export Control. This recast did not aim at modifying Reg. 1334/2000 and other existing legal instruments. In fact, a reform process had started in parallel to the recasting efforts but is currently at a stand still²⁶. Instead the Recast Regulation not only gathered the different pieces of legislation but also incorporated some substantial changes such as the clearer regulation of the conditions for granting National General Authorisations and the introduction of a more elaborate consultation process.

The regime as it now stands aims at furthering harmonisation. Among others, it defines

export control and dual use items, provides for a clear catalogue of types of authorisation, sets the general conditions for granting general authorisations and provides the legal basis to facilitate the flow of information and coordination between MS such as the creation of a database and a consultation mechanism. In addition, the Recast Regulation contains five annexes with the European list of dual-use items and templates for the application forms of CGEA.

The European regime works on the basis of a complex reference to the lists in the different annexes for given situations described in the main body of the regulation and relies strongly on its implementation by MS.

Authorisation

In an attempt to facilitate a more harmonised and coherent export control regime the Community General Export Authorisation (CGEA) was created. The CGEA is granted by the European Commission, can be applied for by any exporter anywhere within the Common Customs Union and is valid for exports from any of the MS. The CGEA is applicable to goods listed in Annex II of Reg. 428/2009. Those are all goods on the European dual-use item list with the exception of a short-list of sensitive goods.

One of the most substantial changes brought by the Recast Regulation to the European regime is the establishment of conditions for the grant of National General Export Authorisations (NGEA), which used to be mainly subject to national discretion. The Recast Regulation brings the NGEAs closer to CGEAs by extending the conditions and exceptions of the regime also to NGEAs. In this fashion, NGEAs are applicable to the same item list as CGEAs. NGEAs are defined by national authorities and are granted by them but are valid for exports throughout the Union.

For all other items on the EU dual-use item list, national authorities may grant individual and global authorisations, which are defined by the Recast Regulation but subject to national regulation and practice.

Authorisations for non-listed items and the catch-all clause

Despite laying down general conditions for granting general authorisations and harmonising practices, the EU export control regime makes an effort to respect the obligations entered into by MS towards the international community in the context of non-proliferation agreements and their security interests. To that aim the regime foresees that also goods not listed as dual use items shall be subject

²⁴ For the full list of amendments see the consolidated version of 2 January 2009 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2000R1334:20090102:EN:PDF>.

²⁵ 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. OJ [2009] L134/1

²⁶ Committee on International Trade European Parliament. Draft Report on the proposal for a regulation of the European Parliament and of the Council amending Regulation (EC) No 1334/2000 setting up a Community regime for the control of exports of dual-use items and technology (COM(2008)0854 – C7-0062/2010 – 2008/0249(COD)). Rapporteur: Jörg Leichtfried. PE 443.007v05-00



to authorisation if the exporter has been informed that:

The item or technology in question is destined to form part of or deliver WMD

The purchasing country is subject to an arms embargo and the item might be intended for military end use as defined by national legislation

Exporters must notify national authorities when they learn that the non-listed item might be destined for any of these aims.

In addition, Art 8 of the Recast Regulation allows MS to require authorisation for non-listed goods on grounds of public security or human rights. Despite all harmonisation efforts, this “catch-all clause” brings the eventual decision making capacity to the remit of MS who enjoy wide discretion in deciding what refers to their own public security²⁷.

The “catch-all clause” casts legal uncertainty over the export control regime as exporters may be uncertain or even unaware of the sensitive nature of their exports. In addition, exporters must be aware of the end use of their exports, which puts an extra burden on the export activity. Given that on the same public security grounds other MS may request the cancellation or refusal of an export, exporters are faced with the need to be aware of constraints imposed by national regulations of other MS.

Intra-community trade

Traditionally the purpose of harmonisation has been the abolition of trade barriers between MS²⁸. The EU export control regime also follows this purpose, however, on the grounds explained above national authorities may require authorisation for the export of certain dual-use items between MS (Art.22). Those items from the EU dual-use item list are listed in Annex IV of the Recast Regulation.

Communication and consultation tools

In an effort to overcome the above legal uncertainty the regulation provides for the creation of information sharing mechanisms. Art. 19 of the recast regulation lays down the basis for administrative cooperation between

national authorities whereby it is recommended that details of exporters and data on sensitive end users be shared. The possibility of creating a database protected by an encryption code is also foreseen (Ar. 23), however, such share of information is not compulsory and is left to the will of the implementing MS.

The creation of a dual-use coordination group for questions that may arise from the application of the Regulation (Art. 23), as well as the Consultation procedure for cases where a MS may request the denial of licence (Art. 11), aim also at facilitating coordination.

The broad definition of technology

A further element to highlight is the broad scope of the word “technology”. The EU export control regime defines “dual-use items” as including software and technology and considers export the transmission of such software and technology in electronic format or even orally when this is done over the telephone. The intangible transfer of technology entails complex considerations as if all oral transmission of knowledge could be considered a technology transfer²⁹. Such complex considerations were subject to consideration for the drafting of the Regulation. The apparently odd formula of transfers by telephone narrows down the scope of the regulation to a case where indeed exporter and user are in different places and does not cover in situ communications. This facilitates scientific cooperation activities not being hampered by regulatory burdens.

Space dual-use items and the regulation

The dual-use item list has been adopted following international regimes on non-proliferation. It is divided into nine categories that follow the common pattern of international agreements on non-proliferation. Technologies applied in space activities can be found in several categories of the dual-use item list. In broad terms, space items are listed as follows.

Cat. 5 Telecommunications and Information Security:

- special physical protection against interference and encryption technologies

Cat. 6 Sensors and Lasers

- imaging sensors designed for remote sensing applications

²⁷ However there are limits to this as expressed by the jurisprudence of the European Court of Justice (ECJ). ECJ Judgment of 17 October 1995, *Werner v Bundesrepublik Deutschland* (C-70/94, ECR 1995 p. I-3189) and ECJ Judgment of 17 October 1995, *Leifer and others* (C-83/94, ECR 1995 p. I-3231)

²⁸ Lenaerts, Koen and Piet Van Nuffel. *Constitutional Law of the European Union*. London: Sweet and Maxwell, 2006. 267-271

²⁹ von der Dunk, Frans. “A European Equivalent to the United States Export Controls: European Law on the Control of International Trade in Dual-Use Space Technologies”. *Astropolitics* 7:101-134, 2009

- SAR and LIDAR radar systems and ground equipment

Cat. 7 Navigation and Avionics

- GNSS receiving equipment is specifically listed³⁰
- Items in subcategories destined for spacecraft or satellite tracking

Cat. 9 Aerospace and Propulsion

The bulk of space dual-use items is listed in this category most likely due the connection to missile technology. This category mirrors the MTCR and the Wassenaar Arrangement.

- Liquid, Hybrid and solid propulsion systems
- Specially designed component system structures for launch vehicles, propulsion systems or "Spacecrafts"
- Ramjet, scramjet, combined cycle vehicles and combined cycle engines
- Turbojet, turbofan turboprop engines
- Sounding rockets
- Composite structures
- Launch support equipment
- Reentry vehicles usable in missiles and individual rocket stages

On a more generic level, this category also includes "space crafts", these being defined as "active and passive satellites" and space probes.

Taking also into account the broad definition of technology transfers adopted by the regime, one could conclude that only a very marginal amount of space technologies escape the EU export control regime. Most space items are subject to general export controls, however, staging mechanisms usable in missiles and hybrid rocket propulsion systems with total impulse capacity exceeding 1.1 MNs are excluded from Annex II and, therefore, subject to other national authorisations.

A number of space items are also to be found in the list of intra-community controls. These are launch vehicles, sounding rockets and propulsion systems (liquid, solid or hybrid) capable of delivering at least 500 Kg payload to a range of 300 Km as well as software specially designed for their use and technology for their development and production. Equally, systems and components usable in missiles capable of delivering at least 500 Kg to a range of 300 Km and reentry vehicles usable in missiles are subject to intra-community authorisation. However, these

³⁰ the list includes other items such as inertial systems and their components and gyro-astro compasses and similar devices include specifying language that including those items of such subcategories destined for space-craft or for tracking satellites.

items are exempted from intra-community authorisation when their transfer is required under contractual relationships placed by ESA, national space organisations or in connection with the development of an EU programme.

3.3.4 The Vega Case and Other Consequences

The EU Export Control Regime is victim of the competential uncertainty in matters bordering trade and security. Despite trade being an exclusive competence of the EU, the Recast Regulation tries to preserve the international interests of MS. In an effort to strike the balance between commercial and security interests, the EU Export Control Regime relies strongly on its implementation by MS according to their own regulatory practices. As a consequence, the EU Export Control regime is not homogeneous but a patchwork of different definitions, procedures and rules seasoned with wide discretionary powers for MS to decide when to require authorisation.

Consequently, the EU export control regime constitutes a weak regulatory framework to support a competitive industry in sensitive civilian technologies. The preliminary work for the proposal to renew Reg. 1334/2000 reflects some of the concerns of the industry, which claims that the current regime is unfriendly to business because of the lack of transparency on the applicable law and the high divergence between national practices for granting authorisation. The obligations laid down by the regulation are vague and the existing procedures unclear to exporters. Allegedly, national authorities have been allowed too much flexibility in deciding on the requirement of export authorisations. The "catch-all clause" is a good example as it allows exemptions to the general obligations laid down by the EU Regulation on the basis of national considerations.

The space field has provided an interesting case that showcases the effects of all these concerns. The Vega case is a good example of the pernicious effects of such discretionary power on the development of space activities in Europe. Although cooperation agreements are exempt from intra-community authorisation, national discretionary powers played a relevant role in the development of the Vega launch vehicle in 2010. The Vega Launcher is to integrate the fleet of Arianespace launchers by providing for a small vehicle destined for 300 to 2000 Kg satellites. Vega is the outcome of an agreement signed by ESA, ELV Spa from Italy and Arianespace from France, and has involved the participation of 7 ESA



MS of which 6 are also EU MS³¹. According to the EU Export Control Regime, technology transfers in this context should not be subject to authorisations and all technology should freely flow between parties. However, late in 2010 French export control authorities denied transfer of the flight control software for Vega. With the support of ESA, ELV Spa. was forced to develop its own flight control system. This refusal created important constraints on the timely development of the launch vehicle, which was to perform its first flight in early 2011. Exemption for a first flight was eventually granted by French authorities while keeping the details of the make up of the French technology secret³²

3.3.5 Conclusions on the EU Regime

The high reliance on differing national authorities together with the discretion allowed to national authorities to assess when their public security interests or human rights protection are engaged, are the reason for a highly nationalised and fragmented European regulatory framework where operators need to become familiar with many different national procedures and conditions. The effects of the EU Export Control Regime have a double dimension: intra-community and extra-community.

Within the EU, the aim to extend the benefits of the internal market and the common customs union to dual-use items as civilian items should facilitate a more cost efficient European industry in this type of goods. Space should particularly be able to benefit from the internal market in dual use items and a common position internationally as this would facilitate transfer of technologies within the EU between commercial industries that find it too cost-inefficient to develop technologies anew. The Vega case provides a good example of the inefficiencies caused by internal barriers, and the granting of too much discretion to national authorities as industry needed once again to be backed by the public sector, ESA, to develop from scratch technology which already existed in Europe. Foreseeably, less burdensome technology transfers could facilitate private investment.

In this sense, the intra-community provisions do not facilitate technology transfers for space either. Launchers are heavily affected by the possibility of intra-community authorisation requirements and the only exemption

allowed relates to cooperation under public contract which, in turn, reinforces the dependence of the development of European space technologies on the public sector.

Outside the EU, the efforts of the EU Export Control Regime to favour the granting of general licences and the introduction of the CGEA together with the creation of information sharing mechanisms is intended to ease procedural burdens and provide some homogeneity. However, the failure to provide for compulsory information sharing mechanisms leads to the opposite result. Exporters are loaded with excessive burdens by being obliged to themselves assess if their products are caught by any of the national military export regimes or might harm national political interests in any of the other 26 MS. In addition an extremely comprehensive list with broad phrasings such as "technology" or "space craft" widely covers the largest part of the space sector.

Finally, the competitiveness of European space industry, and with it its global position, is compromised. Technological autonomy is at the core of the European space policy, however, too stringent and burdensome export control regulation in the EU causes overlaps and cost inefficiencies for the European space industry that hamper investment in new space technologies and the development of private initiatives, compromising eventually the role of Europe in global markets.

3.4 The Case of the U.S.: ITAR and Its Reform

3.4.1 Basic Concepts and Rationale of the U.S. ITAR Regime

Export of space goods and technologies in the U.S. is currently regulated by the International Traffic in Arm Regulations (ITAR) that subject all defence related goods to the supervision and control of the State Department. Goods and technologies subject to ITAR are listed in the U.S. Munitions Lists (USML) and therefore, the export of all goods listed in the USML is presumed to threaten national security if exported to certain countries.

While ITAR is the export control regime for defence goods, export of dual use items falls within the jurisdiction of the department of Commerce and is therefore controlled by the Export Administration Act (EAA). Goods falling within this regime enjoy the presumption that they are not harmful to national security interests unless they are exported to coun-

³¹

http://www.esa.int/SPECIALS/Launchers_Access_to_Space/ASEKMUOTCNC_0.html

<http://www.elv.it/en/>

³² Selding, Peter B. " French Export Restrictions Spare Vega Flight Software". Space News 6 November 2010

tries under embargo or countries defined under international agreements as countries which represent a threat to international political stability and peace.

The nature of space goods and technologies including materials and components and satellites can be regarded as dual use in nature as to a great extent they are developed for civilian purposes and under civilian programmes. However, the line between civilian uses and dual uses of is especially thin in the space sector. The clearest example is given by the launching sector where, as Prof. von der Dunk puts it, "the technical differentiation between a missile capable of delivering weapons –including weapons of mass destruction - to terrestrial targets and a launch vehicle capable of delivering a payload in orbit, has been negligible."³³ From the beginning, this small difference put space technologies within the scope of the Arms Export Control Act (AECA) as the high technology component of space goods made them highly likely to impact national defence interests. However, as the commercial development of space goods and technologies developed they experienced a shift towards control by the Department of Commerce and space goods fell under the commercial regime which allowed export as a means to boost the competitiveness of the U.S. commercial space industry in the international arena.

However, in 1998 the Strom Thurmond National Defence Authorization Act (the Strom Thurmond Act) placed all space goods, including commercial satellites, back under the Scope of ITAR. Space goods and technologies were not going to be covered by ITAR only for their dual nature or potential to be transformed into weapons but also for their capacity to be used for security purposes. The inclusion of satellite technologies in ITAR has a significant impact. While other countries have been controlling exports through adherence to the international regimes on non-proliferation of weapons of mass destruction, ITAR adds an extra layer of control with the incorporation of items not of dual nature but of dual use. This way ITAR controls technologies that, not being tightly controlled by other governments, are widely available from foreign sources.

The rationale for this type of control is one based on maintaining technological leadership and securing unimpeded access to technologies needed for national security space

systems³⁴. Space is of critical importance to U.S. national security especially for the interdependence between the defence, intelligence, civil and commercial sectors of space. Prudent export control in all those areas is seen as necessary to secure autonomy in a sector directly linked to national security³⁵.

3.4.2 Definition of ITAR and Its Workings

Currently, export controls in the U.S. are governed by two different sets of regulations, ITAR of a military nature and the Export Administration Regulations (EAR) which are of a commercial nature.

ITAR has been developed under the jurisdiction of the Department of State (DoS) and is administered by the Directorate of Defense Trade Controls (DDTC). ITAR supports the control of items, information, or activities that could be used for threatening foreign military purposes. Actual goods technical data and support are both covered. ITAR applies to all items included in the U.S. Munitions List (USML).

EAR, on the contrary, is under the jurisdiction of the Department of Commerce (DoC) and applies to dual use technologies or technologies that could be used for either military or commercial purposes. It is administered by the Bureau of Industry and Security (BIS). Items subject to EAR are listed in the Commerce Control List (CCL).

Due to their dual nature, the export of space items can be licensed by BIS. However, although the CCL still covers space related items, these are only to cover items that might be tangentially part of a space endeavour. After 1999 virtually all space items, including commercial satellites, fell under ITAR instead of EAR. The USML covers 21 categories of defence items (goods and services). The most relevant categories for the space industry are Category IV entitled "Launch Vehicles, Guided Missiles, Ballistic Missiles, Rockets" and category XV, entitled "Spacecraft And Associated Equipment." On its part, the CCL covers a total of 10 categories with Category 9 which covers Aerospace and Propulsion Systems Equipment and Components relevant to space.

The major difference between the two sets is in the presumptions regarding an applicant's right to export. While the EAR works on the basis of "presumption of approval", ITAR works under the "presumption of denial".

³³ Frans von Der Dunk. "A European Equivalent to United States Export Controls: European Law on the Control of International Trade in Dual-Use Space Technologies". *Astropolitics*, 7:101-134, 2009.103

³⁴ Michael J. Noble. "Export Controls and United States Space Power". *Astropolitics* 6:25

³⁵ "Briefing of the working group on the Health of the U.S. Space Industrial Base and the Impact of Export Controls" February 2008



While under EAR, BIS only requires an export licence for certain goods and countries of destination, ITAR obliges application and approval of licences for all items in the USML; exporters must prove that their item does not pose significant risk to national security in order to be exempted from the licensing process³⁶.

The higher burden imposed by ITAR is also reflected in the licensing process. This starts with a self-assessment, as the company planning on exporting must assess if such export activity falls within the competence of EAR or ITAR. If the exporter is not able to determine if the export falls under ITAR or EAR he can request a Commodity Jurisdiction (CJ) determination from the DDTC which determines whether an item is covered by the USML and who the appropriate authorising authority is. This procedure requires involvement of other agencies and may take up to 95 days, catching in the ITAR bureaucracy all industries even those that are not strictly speaking 'space industries' but may have the capacity to provide services and technology critical to U.S. defence interests.

Companies carrying out activities that fall under the USML must register with the DDTC (3 to 4 weeks). Under ITAR, space items are given the same treatment as defence goods. All unclassified items apply via the D-Trade procedure which may involve forwarding to other agencies such as the DoD or the DoC, and requires the screening of names and of parties in the application against a watch list of parties who are known or suspected to be export violators. In certain cases the export may even be subject to Congressional Notification where the president and DoD must notify Congress before approving the licensing. The average timeline is 30 to 60 days (30-90 days if Congressional notification is required).

One peculiarity of ITAR is that it also applies to services defined by ITAR § 120.9 (a) as assisting foreign persons in such things as the design, development, manufacture, testing, maintenance, modification, operation, and even the destruction of items. Even giving technical data or training of foreign units or forces (ITAR §120.10) needs authorisation from the DDTC. "Technical Assistance Agreements" (TAA) are awarded when the service in question is based on the disclosure of technical data. If the service is an authorisation to manufacture items abroad a "Manufacturing Licence Agreement" (MLA) is required, and if the service takes the form of

establishment of a warehouse or distribution from abroad, a Distribution Agreement (DA) is required.

In addition, if the export is related to the launch of a satellite and the launch is to take place in a non-NATO country, the manufacturer needs to include in the application process a "Technology Transfer Control Plan" (TTPC). The latter needs to be approved by the "Defense Technology Security Administration" of the Department of Defense. The TTPC provides details of how the exporter plans to maintain appropriate controls during the export. The company must also arrange that DTSA can monitor all aspects of the launch in order to ensure that no unauthorised transfer of technology occurs.

ITAR affects all interactions throughout the life cycle of satellite development extending to all services prior to contract as well post-launch services.

If an item falling within the CCL is peripherally connected to a space endeavour but cannot be catalogued as a defence item, the CJ may determine that EAR applies and authorisation must be given by BIS. When an item is listed in the CCL the exporter must check that item against the Commerce Country Chart, which lists the countries for which a licence is required. A licence will be needed only if the item is being exported to a country under embargo for such items. Even in that case the item might be eligible for exemption as specified by EAR §40.

3.4.3 Consequences and Space Policy

The consequence of the omnipresence of ITAR in space exports has allegedly had a strong impact on the development of the U.S. space industry. Conceived to preserve unconditional full access to strategic technologies, in the case of space ITAR relies on the autonomy of the U.S. space sector. Equally, it aims at serving as the key instrument to preserve global leadership in space technologies. The apparent benefits of these regimes are being contested currently as new countries appear in the space arena and new space powers emerge.

Although it is still difficult to assess if the U.S. retains its global leadership, it is clear that far from supporting the competitiveness of the space sector, the ITAR approach has facilitated the development of competing technologies in other countries to the detriment of U.S. global leadership, thus questioning the validity of protectionist policies in a global landscape of rising competition.

³⁶ Department of Commerce, Federal Aviation Administration "Introductory to the U.S. Export Controls for the Commercial Space Industry"

A study conducted by the Institute for Defense Analyses concludes³⁷ that market trends do not prove a major detrimental impact of ITAR on U.S. satellite manufacturing. The aggressive entry in the satellite market of European manufacturers such as EADS and Alcatel in the mid 1990's drove the U.S. revenue from satellite making to a low in 2005, which was followed by a recovery of revenues in 2006. The satellite market is quite inflexible as customers tend to be tied to certain regions. In this sense, among the international consortia Intelsat and Inmarsat tend to purchase from the U.S. while Eutelsat purchases from Europe. Equally, contracts from European primes tend to go to European subcontractors as contracts from U.S. primes tend to go to U.S. subprimes. After the switch to ITAR, however, although it did not seem to affect the behaviour of major international consortia, some other traditional U.S. customers did change their market behaviour.

The global landscape has changed however. New operators have emerged within new space faring countries, which are not space powers and lack a technological basis. These create a new demand without established behaviour where regulatory constraint may count as a relevant factor in the choice of suppliers.

ITAR is seen as imposing unilateral hurdles to U.S. manufacturers and suppliers while it creates great dissatisfaction among foreign customers. ITAR is present at every step of the manufacturing process. Given that the transfer of data or any kind of knowledge may qualify as an export, consortia and international cooperation projects may constantly be faced with unexpected halts and delays due to the need of licences. Satellite development requires a number of licences and agreements which need to be substituted by new licences and agreements every time there is an emerging change or new requirement. This makes it extremely difficult for the producer to meet his contract obligations, thus impairing business activities and damaging relationships with customers. Although export controls are not the only cause of loss of business, they add additional competitive disadvantage. The cascading effect of ITAR has been said to affect more severely small subcontractors as they do not own the personnel and the resources to manage the complex regulations³⁸.

³⁷ Van Atta, Richard p.I..Export Controls and the U.S. Defense Industrial Base. Summary Report and Appendix A. Alexandria: Institute for Defense Analyses 2007

³⁸ Supra note 35; Marion C. Blakey, Written Testimony before the House of Foreign Affairs Committee, Subcommittee on Terrorism, Nonproliferation and Trade. Washington D.C. 2 Apr. 2009

What American dominance in essential technologies could have once achieved in terms of dependence on U.S. technologies has been dismantled by export controls. Other strong manufacturers have been able to create competing technologies while making a business case of it. The initiative of Alenia in with marketing its products as "ITAR free" products, has developed into a trend as European manufacturers are using the "trade mark" ITAR free to appeal customers. The development of alternative technologies, however, in some cases is not seen so much as a business opportunity but as an obliged burden. One example concerns CASA in Spain who from having limited capability as a supplier of reflectors has become a global competitor in this market.³⁹

In addition, ITAR encourages reticence on the part of foreign companies to participate in U.S. projects since once they have contributed their technologies to an U.S. project, they might find it difficult to again use those technologies in other projects due to export control restrictions. Not only European primes have followed the ITAR free trend, also ESA has launched the EEE, the European Components Initiative to develop components that are critical to satellites but only available from U.S. producers. In this vein, the European Space Policy identifies autonomy as a keystone for the European space sector and states that independent access to space capabilities is a strategic asset for Europe. Yet U.S. propulsion technology cannot be obtained from non-U.S. customers, which makes access to information unobtainable even in crucial cases of failure⁴⁰.

Similar consequences have also been observed at agency level and academia. Although NASA does not need to apply for export licences, contractors who work for NASA do. Therefore NASA faces challenges collaborating with foreign governments who argue that export controls have already been implemented by the government-to-government agreements establishing collaboration and refuse to sign the TAA. Equally, universities have experienced general processing delays in State Department. In addition, ITAR can also bar access of talented foreign graduates while halting innovation.

The general position of the U.S. has been compromised. ITAR has not only not prevented the rise of foreign space capabilities but has even challenged it. According to CSIS

³⁹ Supra note 35; Bini, Antonella. "Export control of space items: Preserving Europe's advantage". Space Policy 23.2 (2007): 70-72

⁴⁰ de Selding, Peter B. "European Space Agency Seeks to Lessen Its Dependence on U.S. Propulsion Providers." SpaceNews 28 May 2010



"where the U.S. was once part of a very exclusive club, the number of nations active in space continues to grow and the sophistication of overseas and commercial capabilities continues to increase"⁴¹.

A Renewed Space Policy, A Renewed Export Control Regime?

The U.S. space industry among others has triggered consideration of reform of the U.S. export control regime. April 2010 witnessed hearings at the House of Representatives emphasising the key role of export control reform for maintaining U.S. competitive edge in the global economy while providing credible arguments that the application of military export controls satellite technologies has harmed U.S. space technologies⁴².

These declarations go hand in hand with the relaunched U.S. Space Policy, which lists a

series of goals aimed at energising competitive U.S. industries. The aim is to invigorate the participation of U.S. space industries in global markets while expanding international cooperation and strengthening international partnerships. Special attention is also drawn to reducing as much as possible the regulatory burden for commercial space activities.

The envisaged reform would involve measures towards the adoption of a single list and a single licensing agency with an integrated enforcement centre as well as a single information technology structure for processing all licensing requests. While the measures announced by Secretary of Defense Robert Gates could be conducted through executive action and would represent substantial progress, they would still be insufficient⁴³.

⁴¹ Briefing of the Working Group on the Health of the U.S. Space Industrial Base and the Impact of Export Controls. Center for Strategic & International Studies. February 2008.

http://csis.org/files/media/isis/pubs/021908_csis_spaceindustryfinal.pdf

⁴² Secretary of Defense Robert Gates' address to members of "Business Executives for National Security" on 20 April and Rep. Ruppertsberger on 29 April.

⁴³ Klamper, A.. "Obama Repeats Call for Export Control Reform in State of Union." SpaceNews 29 Jan. 2010; Fact sheet on the President's Export Control Reform Initiative, The White House. 20 Apr. 2010.

4. Data Regulations

As environmental concerns grow and natural catastrophes become more acute, Earth Observation is gaining major relevance in the fight against climate change and in crisis management. Although Earth observation has become known to the wide public for its application in Earth mapping, the opportunities it offers are big in areas such as land management and maritime surveillance. Earth observation services are user driven and often addressed to governmental users such as civil safety services. However, their market potential has led to the development of downstream service providers with products based on EO data.

The aim of this chapter is to provide the reader with an overview of the most relevant regulatory instruments on EO data while contextualising them according to their objectives. The chapter will then draw observations on the relevance of the regulatory context for the development of the commercial EO market and will finish with recommendations on how to approach the main challenges in this regulatory area.

4.1 Defining the Concept of Space Related Data

This subchapter will be dedicated to the definition of the basic concepts relevant to EO data, such as the material scope of EO data and the boundary between EO data and EO information.

4.1.1 Which Data?

With over one hundred satellites in orbit collecting and constantly sending out environmental data back to Earth, data management has become an issue of discussion at governmental level as well as commercial level. Due to the nature of EO data, regulation is mainly linked to this field of application in space. Earth Observation or Remote Sensing of the Earth is the monitoring or observation of the Earth's features and systems. By definition, EO is the collection of data on the dynamics of the Earth by different sensing technologies either on Earth (in situ) or in orbit (Remote Sensing Earth Observation).

While public awareness of the applications of Earth observation tends to focus on imagery, one major component of EO is meteorology and a growing number of missions is dedicated to research, operational and commercial activities. Many satellites are dedicated to climate and environmental studies, assisting decision-making in strategic planning and management of industrial, economic and natural resources. New missions dedicated to serving operational needs are related to land, ocean and atmospheric composition. In addition, new priorities may be taken up such as disaster management and the study of Key Earth systems⁴⁴.

All data collected by in situ and in orbit sensors is fused in information that is then available for decision making on questions such as energy resource management, water security or crisis management. Commercial operators have also developed their catalogues of products combining information originated by different missions. EO information may be derived from satellites belonging to different missions, different governmental or commercial owners and under different jurisdictions.

In sum, the main area of concern of space related data is EO generated data in a broad sense, comprising meteorological and other environmental imagery data generated in situ or in orbit before any blending.

4.1.2 Data Versus Information, Definition of the Boundary and Its Relevance

Definition of the type of data is not sufficient. Users of EO products work with end products that have gone through certain degrees of processing. Often value is added in the form of graphic design or by making the data available through one or other computer programme. That is the end product where data has been integrated, thus constituting information rather than mere data. The distinction between data and the end product or information is relevant as customers for each are

⁴⁴ The Earth Observation Handbook. Climate Change Special Edition 2008. CEOS, ESA. June 2008 European Space Agency, the Netherlands



different as well as the legal means to protect such data⁴⁵.

Data according to its degree of processing has been categorised in several ways. UN Resolution 41/65⁴⁶ on the principles relating to remote sensing of the Earth from space provides for three categories of data according to the degree of processing they have been subject to. The resolution distinguishes between primary data, processed data and analysed information. According to the resolution "primary data" is the raw data acquired by remote sensors and transmitted to the ground by telemetry while "processed data" refers to the products resulting from the processing of such data in order to make it usable. A third degree of processing is identified as "analysed information", which refers to the final product resulting from the interpretation of the processed data. The European INSPIRE directive⁴⁷ goes further in detailing the categories of data according to their degree of elaboration, INSPIRE also defines "metadata", "spatial data sets" and "spatial data services." According to INSPIRE, metadata refers to all information describing data and enabling it to be compiled and inventoried. On the other hand, data are compiled in the form of data sets or data collections while spatial data services are the operations that might be performed on the spatial data or on the metadata⁴⁸.

The differences in the definitions of data in both legal instruments are due to the aim and context of each of them. Resolution 41/65 sets international principles aimed at encouraging international cooperation in remote sensing activities. The resolution does not aim to set any concrete mechanism regulating the shape of such cooperation; the definitions however serve as a general reference for other UN activities in the field of remote sensing for EO. INSPIRE, on the other hand, aims at setting a European wide network of environmental data sharing. The INSPIRE directive constitutes the legal basis of a factual initiative involving technical requirements for interoperability.

⁴⁵ Smith and Doldirina elaborate in the difference between raw data and information in Smith, Lesley Jane and Catherine Doldirina. "Remote sensing: A case for moving space data towards the public good". Space Policy 24 (2008): 22-32

⁴⁶ A/RES/41/65 Principles relating to remote sensing of the Earth from space

⁴⁷ Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE). OJ [2007] L108/1

⁴⁸ Doldirina, Catherine, "INSPIRE: A Real Step Forward in Building an Interoperable and Unified Spatial Information Structure for Europe?" ESPI Perspective 20, Vienna: European Space Policy Institute, 2009

However, a common idea lies behind both legal instruments, that is the difference between data which is collected by sensors and is not usable in raw state and data that has been compiled and collected by means of additional information and a final product that has been shaped to be used by final users or consumers. The question however seems to be where to draw the line between data and information and whether it is relevant that the transformation occurs in orbit or at the ground station. The distinction is relevant as it determines if data is protected by IPRs, and thus whether rights and price can be claimed for the mere provision of data or not.

4.1.3 Rules for Data Management: Principles, Policies and Regulation

International Rules

The definitions above are a clear example of the heterogeneity of rules applicable to EO data. Those definitions stem from international law where the main principles governing EO data have been laid down. Principles such as the "free and unrestricted" and "non-discriminatory" access to EO data have been adopted by instruments such as the WMO Resolution 40 (Cg-XII) and UN Resolution 41/65 respectively⁴⁹. A third relevant international instrument is the "International Charter: Space and Major Disasters" (the disasters charter) which establishes open access to EO data during crisis.

All international rules provide for unrestricted and non-discriminatory access to data, however, their applicability is limited to meteorological forecast, environmental purposes or crisis management. The definition of data and the delimitation between data and information is sketched but not clearly delimited. Furthermore, the binding capacity of these rules is also an open question.

Data Policies at Agency Level

Data policies of EO missions constitute a second level of regulation of space-born data. The two major examples in Europe are ESA and EUMETSAT. In both cases EO data is also delivered on a commercial basis. Both organisations have adopted data policies balancing the international obligations their members are subject to and the delivery of data on a commercial basis. In this sense, the ENVISAT

⁴⁹ ADOPTS 1 WMO Resolution 40 (Cg- XII) establishes that all essential data shall be made available on a free and unrestricted basis which according to (Resolution 23 (EC.XLII)) shall be interpreted as non-discriminatory and at no more cost than the production and delivery cost, without charge of the data and the products themselves.

data policy establishes on the one hand that ENVISAT data shall be protected "through applicable legislation" including law on databases, copyright and other forms of intellectual property rights" but adds that ENVISAT data will be made available in an "open and non-discriminatory way" in consistency with UN Resolution 41/65.

According to the ENVISAT data policy (EDP), the use of ENVISAT data is divided into Category-1 and Category-2. Category-1 use refers to the use of ENVISAT data for the purposes of the mission or for other research purposes as part of ESA functions or other internal uses. All other uses, including commercial and operational uses, qualify as Category-2 data. Category-1 data is directly provided by ESA while Category-2 data is provided by licensed distributors. In both cases ESA retains the intellectual property of the data and will deliver data only at marginal cost (not charging for the data but only for the delivery and additional services) on a non-discriminatory basis. Licences to Category-2 data distributors are non-exclusive licences. In addition licensees may charge for the distribution of data and data products according to their own commercial criteria⁵⁰.

On the other hand EUMETSAT also categorises data from its Meteosat satellites as essential or non-essential⁵¹ data and applies different licensing rules to each category. In general EUMETSAT keeps full ownership and intellectual property rights over the data generated by Meteosat satellites, while such rights are shared between the service provider generating images based on Meteosat data and EUMETSAT. All other value adding services and products are owned by the distributor. "Essential data" is made available through the Internet to all users worldwide in an unrestricted manner and free of charge. By contrast, non-essential data is distributed through National Meteorological Services who are licensed on an exclusive basis over their national territory and must apply EUMETSAT fees and conditions. Such fees vary depending on whether the distribution by national meteorological services is for commercial purposes or not. If it is, the fee charged by national meteorological agencies equals the fee charged by EUMETSAT to other commercial operators located outside its member states. In all cases, all EUMETSAT data is immediately available in cases of environmental disasters⁵².

⁵⁰ EDP. 3.2.2 and 3.2.3.

⁵¹ According to EUMETSAT data policy, essential data comprises the six hourly meteorological forecast.

⁵² EUMETSAT data policy.

National Legislation and National Programmes

With Spot-Image and Infoterra commercially operating Spot and Terrasar satellites respectively, the regulatory framework in France and Italy goes a step further than non-discriminatory access to data and protection under intellectual property rights. In both cases legislation has been passed, imposing the obligation on commercial operators to obtain governmental licences both for the operation of the satellites and for the delivery of data.

France

In France, SPOT satellites' (Satellite Pour l'Observation de la Terre) mission has been developed by the French space agency CNES. SPOT is a high-resolution optical imaging system equipped with optical imaging technology for environmental monitoring with a resolution up to 2.5m. Whereas the development and launch of satellites is performed by CNES, the daily work schedule has been tasked to Spot Image, a private company constituted under French Law. After collection and archiving at the ground stations in Toulouse and Kiruna, Spot image distributes data and data based products on a commercial basis according to its customers' demands worldwide. The company owns a catalogue of commercial products that are supplied against fixed costs⁵³ and licences customers on a non-exclusive⁵⁴ basis to make use of spot data according to the applicable French Law on intellectual property rights⁵⁵.

Therefore, the licensing of EO data and data products in France is not only subject to international principles but also to national law. A priori, the applicable law to data licences is Title VII of the French Space Operations Act (FSOA)⁵⁶ and Chapter I and II of the French Intellectual Property Code.

Arts. 23 to 25 of the French Space Operations Act establish that any primary space data operator conducting activities of certain technical characteristics must first declare such activity before the administrative authorities. If the administrative authority is not satisfied that the activities are not prejudicial to the fundamental interests of the nation (defence and foreign policy and international undertakings) it may at any time recommend restric-

⁵³ <http://www.spotimage.com/web/en/194-solutions.php>

⁵⁴ Art. 8 Spot image standard licence and Spot image multi-licence.

⁵⁵ Ibid. Art. 3

⁵⁶ Loi no 2008-518 du 3 juin 2008 relative aux opérations spatiales. JORF [2008] 128, Schmidt-Tedd, Bernhard and Isabelle Arnold. The French Act relating to space activities. From international law idealism to national industrial pragmatism. ESPI Perspectives 11. Vienna :2009



tions on the activity of primary space data. The Act establishes that the technical requirements be adopted by decree.

Arts. 23 and 25 of the FSOA are further implemented by the French Decree on Access to space based data⁵⁷ According to this decree all operators seeking to carry out primary exploitation of the RS data described in Art 1 of the decree must declare such exploitation before the secretary general for national defence ("secrétaire général de la défense nationale"). Such declaration must be accompanied by proof of authorisation to exploit such data which needs to be obtained in accordance with the decree on national defence secrets protection⁵⁸. The secretary general for national defence is empowered to exercise shutter control if required by urgent needs of national security (Art.5 of the French Decree on Access to space based data).

In addition, Arts. L341-1 to L343-4 of the French Intellectual Property Code regulate the protection of databases as implementation of the European data directive whereby databases showing substantial financial, technical or human investment are protected by the sui generis right allowing the owner of such rights to reap benefits from, or even prevent the extraction and reutilisation of, the database.

Finally, the EO data delivery system adopted in France through a commercial entity which charges commercial costs on an equal basis to all customers may conflict with the principle of open access and non-discriminatory treatment, which is not warranted by the data share policy of Spot Image as commercial distributors are not bound by international obligations. Allegedly the French authorities have opted for external compensation mechanisms as the means to balance access to EO data by research entities that may not afford the established prices.

Germany

With the launch of TerraSAR-X in 2007 and TanDEM-X in early 2010, Germany currently has two RS EO satellite equipped with radar technology capable of images up to a resolution of 2 m. In similar fashion to France, data from this satellite system is distributed by a commercial company incorporated under German Law, Infoterra. Infoterra is the sole distributor of TerraSAR-X and TanDEM-X data and data products. Infoterra licences custom-

ers for the use of data on a non-exclusive basis. The data delivered is the property of the German Space Agency DLR, but such rights do not refer to any IPR legislation.⁵⁹

In addition, German RS data delivery is subject to the Satellite Data Security Act (SatDSiG)⁶⁰, which establishes that operators of high-degree remote sensing systems require an operator licence. The licence is granted if the operator possesses the requisite degree of reliability, the sequences of instructions are protected against alterations by third parties, the transmission of data is protected from becoming known to unauthorised third parties, and the operator has taken measures to prevent unauthorised persons from gaining access to the command installations. The Act not only states the obligation to acquire a licence for operation but also requires that dissemination of data is licensed. Sensitive requests are dealt with by permits and will only be granted if the dissemination of data does not harm the vital security of the State⁶¹.

In conclusion, the regulatory framework for satellite data is heterogeneous and unclear. On the one hand international obligations call for unrestricted and non-discriminatory data access while they allow for an open interpretation of such terms. This open interpretation has led to a variety of data policies that combine the principles of unrestricted and non-discriminatory access with commercial interests and other applicable law. What seems clear is that licensing arrangements and data selling are not considered restrictive or discriminatory practices per se as long as data is available in equitable conditions to all customers⁶².

⁵⁹ General Terms and Conditions (GT&C) for TerraSAR-X Data Supply.

⁶⁰ Gesetz zum Schutz vor Gefährdung der Sicherheit der Bundesrepublik Deutschland durch das Verbreiten von hochwertigen Erdfernerkundungsdaten, Vom 23. November 2007.

⁶¹ National Data security Policy for Space-Based Earth Remote Sensing Systems. Background Information for the Act on Satellite Data Security. German Federal Ministry of Economics and Technology. Bonn, 15 Apr. 2008; Gerhard, Michael, Max Kroyman and Bernhard Schmidt-Tedd. "Ein Gesetz Für die Raumfahrt: Das neue Satellitendatensicherheitsgesetz". Zeitschrift für Luft- und Weltraumrecht ZLW.57 Jg.1/2008: 40-54; Wins-Seemann, Elmar, "Das Satellitendatensicherheitsgesetz aus industrieller Sicht-Angemessener Rahmen für die kommerzielle Nutzung von weltraumgestützten Fernerkundungssystemen?". Zeitschrift für Luft- und Weltraumrecht ZLW57 Jg.1/2008: 55-66

⁶² Frans von der Dunk elaborates on the different interpretation by EUMETSAT and ESA of these principles. Frans G. von der Dunk. European Satellite Earth Observation: Law, regulations, policies, projects, and programmes. Creighton Law Review. Volume 41. No.3, April 2009.

⁵⁷ Décret n° 2009-640 du 9 juin 2009 portant application des dispositions prévues au titre VII de la loi n° 2008-518 du 3 juin 2008 relative aux opérations spatiales. JORF [2009]132 / 9387

⁵⁸ Décret n°98-608 du 17 juillet 1998 relatif à la protection des secrets de la défense nationale

The main interests in EO data are related to international environmental commitments, protection of intellectual property over data and national security. The protection of such interests through legal instruments varies according to the legal personality and status of the data distributors as well as their distribution channels. In this sense space agencies and governmental distributors (such as National Meteorological Agencies) are bound by international obligations to provide for unrestricted, non-discriminatory and even free data to users while commercial operators can only be bound by such obligations through national law. All agencies have devised their own mechanisms for the commercial distribution of data and only subject essential data to the fulfilment of international obligations or only open access to all types of data in very specific cases (e.g. under the disasters charter). The question now hangs on the status of commercial data distributors and the adequacy of existing legislation on intellectual property rights and on national authorisation to operate such data.

4.2 Reflections on Data Licensing. Enabler or Spoiler in the Development of Space Based Commercial Services?

As defined above, the material scope of data regulation is the so called raw EO data collected and transmitted to the ground station in a degree which ranges from absolutely untreated data (which cannot be read by itself) to data which has been processed by means of other metadata and arranged in data sets that can be read and interpreted but which do not have any added value. This stage of processing stays at ground stations and in the hands of commercial or non-commercial (governmental or intergovernmental) agencies. While there is no dedicated legislation for this type of data, its operation and distribution already poses the following questions:

- Data is not subject to material appropriation and constitutes a public good.
- Collection, arrangement and distribution of data involves financial and technical effort which must be compensated.
- Data can be turned into sensitive information. The use of such information may affect national security interests as well as international relations. Therefore, data needs to be secured.

At regulatory level the reaction to those questions has been reflected in the application of existing law such as the European directive on environmental data, the directive on the availability of information for administrative purposes, and intellectual property laws. It has also triggered the creation of governmental authorisation for the operation of EO systems and distribution of data with the purpose of safeguarding national security interests. Now, what is the consequence of this legislation?

Starting with national authorisation regulations such as the German law on space generated data or Chapter VII of the French Space Operations Act, these laws directly control access to the data distribution and satellite operation market. Initially, it might be assumed that such controls would affect the entry of new operators into national markets or the creation of new business in the distribution of space generated data. However, looking more closely at the market, currently commercial operators of earth observation satellites are the commercial branch of national space agencies operating satellites which are developed by the agencies and publicly funded. They are licensed by the space agencies and act as sole distributors of the space generated data. In this setting it is difficult to imagine any new entrant in national territory who would exploit the same satellites. Those national acts not only regulate the operation of satellites but also provide for authorisation to distribute sensitive data which can be restricted depending on the addressee.

A second tier of impacts is related to licensing under intellectual property rights. The doctrinal discussion has mainly focused on the type of intellectual property right capable of effectively protecting data and the adequacy of such intellectual property rights. Although doctrinal, the discussion is relevant as it defines the policy rationale for protection as well as the scope of protection. Whereas intellectual property rights such as patents and copyrights find justification in the need to compensate the material effort invested in the creation of a new work or a new invention, the civil law tradition has conceived intellectual property as moral rights which recognise intellectual ingenuity. Novelty is, therefore, key to the latter. Therefore a mere collection of EO data could not be protected under any intellectual property right according to civil law.

However, in 1996 the "data directive" was adopted by the Council and the Parliament. The directive protects databases and creates a sui generis right that is applicable to EO



databases⁶³. The rationale is that the economic efforts put into creating the database need to be compensated.

Regardless of whether EO data is protected by copyright or by the sui generis right, such protection allows commercial actors to recover the costs generated by the operation of the satellites and the collection and primary processing of data. In addition, commercial actors can reap benefits which may allow them to develop further EO data based products on downstream lines. The immediate consequence is that primary data collectors are placed in an advantageous position with regards to other commercial developers of EO data products who must add the cost of raw data to their fixed costs. EO data product developers may then tend to purchase from non-commercial operators worldwide.

All in all, there are three areas to consider: the public nature of data, the strategic nature of data and the economic effort to collect data. The interrelation of these three elements defines the impact of the diffuse regulatory framework on the development of the EO services sector. In this sense the public-good nature of data determines that part of the data available on the market is provided for free or on a quasi-free (i.e. Envisat data) basis. On the other hand the economic effort put into generating and collecting the data justifies the commercial use of them while putting that data in direct competition with the data provided for free. And finally there is the strategic character of EO data that is protected by national laws on authorisation.

Currently, the market for high resolution data is limited by the fact that their distribution is allocated to single commercial entities who act along the entire vertical line of production and distribution of imagery. Entry into the data distribution market is only possible by distribution of public access data or by the launch and operation of new commercial satellites, as purchasers of commercial data are only allowed to distribute derivative products but not the sole data or database due to intellectual property rights.

In conclusion, whether the applicable rules by themselves have neutral effects, such as the authorisation rules, or positive effects by allowing companies to reap the benefits from invested effort, the overall composition of the market and the interrelation between the different interests and actors in the market determines the inaccessible nature of the market.

⁶³ Catherine Doldirina. "Are Intellectual Property laws an impediment to the development of collaborative Earth observation missions?" International Astronautical Congress IAC -09 Daejeon

Until now legislators have been focused on the security aspects and public policy benefits of space based data neglecting a high potential to create downstream services and the need to nurture their creation through appropriate regulation.

4.3 General Conclusions on Data Regulations

Originally the development of Earth observation remote sensing activities responded to the demands of government functions. National security needs are widely served by remote sensing activities; meteorological forecasts, environmental monitoring, disaster response and mitigation as well as land management are also growing uses of satellite remote sensing which feed governmental uses. In particular, high resolution remote sensing activities are highly strategic and have therefore, led to the adoption of national legislation providing for the control and authorisation of remote sensing activities and the delivery of space-based data in countries which own such technologies.

However, EO activities are subject to a wider range of regulation than only authorisation measures. The capacity of this technology to serve societal needs has elevated remote sensing activities (remote sensing data in particular) to the level of a public good and has been subject to international principles calling for unrestricted access to data. At the same time, the distribution of EO data and the development of derivative EO products contains high commercial potential with an important capacity to generate EO products. In this regard, space agencies have quickly developed channels to commercialise EO data and derivative products adopting data policies that try to balance both the public interest and the commercial potential of their technologies. As a consequence, EO operators and space agencies have added another level of regulation that is diffuse and unclear by developing data policies which regulate the distribution of their data against cost.⁶⁴ Neither authorisation laws nor data policies make reference to intellectual property rights or concrete intellectual property legislation, but by regulating the distribution of such data they imply a property right over that data which entitles them to curtail its extraction and use.

⁶⁴ Gabrynowicz, Joanne Irene, *The Land Remote Sensing Laws and Policies of National Governments: A Global Survey*. National Center for Remote Sensing, Air and Space Law, University of Mississippi. 2007

This adds a third level of regulation relating to intellectual property rights and the legitimacy to exercise control over that data. Data *per se* is not subject to appropriation and is considered a public good as stated by the Universal Convention of Human Rights among others. More concretely, the Aarhus Convention on environmental information provides for the right of access to environmental data. Some other examples of the recognition of such rights are the European Directive on reutilisation of public data and the European Directive on access to environmental data. On the other hand, the collection and initial processing of raw data, which occurs in orbit, requires a considerable initial investment by the operator who develops the EO satellite system as well as the subsequent smaller effort of maintaining operations. Although it is not clear if copyrights are capable of adequately covering such data originated in orbit and sent to ground stations for lack of novelty in the creation of the database (it could be covered in a further step of database creation), it has been mentioned that the European database directive would be able to cover that data and therefore provide the legal basis sustaining any distribution right claimed by operators.

Overall, access to data represented by international principles is the presumed norm with

national authorisation laws representing the exception to the general rule. However, in practice the number and kind of exceptions are growing and the principle of unrestricted access to data is being narrowly interpreted. This narrow interpretation is probably encouraged by the lack of specific national regulation over EO data drawing clear limits between data openly available and data over which intellectual property rights can be exercised.

In parallel the encouragement of EO activities has shifted from the regulatory discussion on how to protect or manage EO data to the utility of regulation over EO activities to support the development of the latter. In this sense the commercialisation of EO operators is increasing as State-owned entities organised like private corporations are becoming more usual. Such organisations are often established as private companies in which the government owns part of the shares and who are usually assigned the exclusive distribution of EO data. If coupled with rights over data, such private companies may be the only commercial distributors of data and data sets on the grounds of investment recovery while they are placed in a dominant position in the market of RS EO data and derivative products.



5. Conclusions on the Way towards a Competitive Space Based Market

As the space sector evolves, the penetration of space technologies and space based services into other sector markets increases too. Commercial operators and service providers are exposed to the regulatory frameworks of those sectors which usually regulate the marketing of services disregarding the technology they are based on. Although in principle this should not affect space based services any differently than it affects other services, the specific nature of space may need some special attention from regulators as the lack of adaptation of such regulations to the specificities of space technologies may have severe consequences for the subsistence sustenance of commercial space technologies and space based services and their competitiveness.

As seen in the cases of spectrum policy, export control and data policy, each case is different and causes has different consequences.

This study has demonstrated that non space specific regulations may affect the development of commercial space in two ways:

- On the one hand, non space specific regulations affect the development of downstream markets either because they can facilitate or impede the entrance of new players, as in the case of data policies and regulations, or because they can ensure or endanger the survival of space based services in those markets, as seen in the case of radio-regulation.
- On the other hand, non space specific regulations can affect the competitiveness of the space industrial and technological base as is the case of export controls or technical standards.

Such regulations have an impact on the competitiveness of space based services and technologies that can be turned into positive effects by introducing the necessary adaptations. In this sense, the study has demonstrated that there is not forcefully need to adopt space specific regulations but to introduce appropriate qualifications and guidelines. In this sense, the three regulatory fields analysed indicate the following three instruments:

- Introduction of exceptions, as showcased by the case of radio-spectrum management in the context of telecommunications
- Development of guidelines, as in the case of RS data management or export control in the case of the development of common practice, where adequate binding rules already exist but their application can be optimised.
- Harmonisation, as for export control rules, where rules already exist but the disparities among them restrain competitiveness.

Conclusions per Regulatory Field

Radio-Spectrum Management, the “Glasshouse Scenario”

The case of radio-spectrum deregulation has demonstrated that commercial space based services are subject to competition in highly competitive markets like telecommunications. However, while deregulation may go hand in hand with the flexibility allowed by technological developments and allow for a more efficient use of spectrum facilitating competitive solutions, it may even endanger the subsistence of satellite communications precisely because of technological differences.

Regulation of Radio-spectrum managements both downstream and upstream segments of Satellite communications. While liberalisation of the telecommunications sector occurs at downstream level, regulatory changes also affect radio-spectrum management with the consequential effects upstream.

Previous sections of this report have explained the different nature of upstream operations and the consequences of applying liberalised mechanisms of spectrum management on the upstream segment. The application of those mechanisms to SatComs has the capacity to endanger signal security for satellite operations and, therefore, their access to the telecommunications market.

The endangering of Satellite signal does not only affect the competitive capacity of SatComs in the telecommunications market but also the capacity to deliver services where SatComs are most competitive such as civil protection or crisis managements cases.

Recommendations

Satellite communications do play an important role in the competitive delivery of certain services where other telecommunication technologies do not deliver competitive solutions.

Spectrum allocation regulations are vital in securing satellite signal and need to be foreseen by national as well as the European telecommunications regulator. Such regulatory effort, on the other hand, must be supported by the space sector with guidance on the specific regulatory needs of SatComs.

Upstream and downstream components must be dissociated. In this sense there must be vertical discrimination in order to secure signal.

Exemption must be allowed from technology neutrality while allowing for service neutrality. The latter should be able to allow the development of new competitive services.

Export Control Regulations; the "Fortress Scenario"

The attention and interest that export control regimes have attracted from the space sector show the scale of the impact security related considerations may have in the competitiveness of space technologies. Despite the differences, between the export control regimes in Europe and in the U.S., in both cases, the zealous pursuit of national security interests have generated similar consequences.

Global competitiveness of space technologies has been compromised in both cases. While ITAR in the U.S. has prompted the development of competing technologies elsewhere in the EU internal constraints have caused investment inefficiencies that have deviated investment from developing new technologies.

Due to the difficulty in exiting the national markets, space technologies depend mainly in national public demand. This dependence puts obstacles to facilitating the development of a self-standing industry.

Red tape is common ground to both cases, while in the U.S. it is the cumbersome ITAR procedure and high requirements on exporters to self-assess the nature of their exports, the EU regime cast legal uncertainty and

additional burdens as exporters are subject to the potential objections of all other MS.

An additional obstacle is created by the broad interpretation of "technology" and its transfer. A too broad interpretation may render all verbal interaction a technology transfer. This constitutes an obstacle for scientific and academic cooperation.

Recommendations Concerning Europe

It is important that the market approach in Europe gains more relevance in order to facilitate measures that balance the administrative burdens and legal uncertainty.

Measures in that direction should be envisaged by the current reform of the European regime and should incorporate the following:

- A higher degree of harmonisation between national practices with guidelines on best practices to be adopted and the CGEA being extended as primary/preferential type of licence for all listed goods with no exception list.
- Higher responsibility from national authorities to justify and reason licence requirements for non-listed goods and intra-European authorization requirements.
- Adoption of enforcement mechanisms to ensure compliance with the harmonised regime.
- Set up of a database with compulsory contribution on destinations and companies under prohibition.
- Facilitation of guidelines for companies to be able to assess their goods and destinations and the need to apply for a licence.

Data Policy; the "Wild West Scenario"

The importance of space applications relies mostly on their potential to generate downstream service markets. As with radio-spectrum, the regulation of those downstream markets has a direct effect on the upstream market and vice versa.

In this sense, regulating delivery of satellite based data has the potential of facilitating the creation of downstream markets. Open access to data facilitates creation of business in the satellite imagery area. Access and use to this type of data is currently affected by rules and principles of a wide nature. Principles on the right to information, the right to access environmental data, privacy issues or compromises on crisis management modulate open access to data. Side to side with the open access to data are national authorisa-



tions for high resolution data as well as Intellectual property rights which make up for the lack of specific regulation on the delivery and distribution of data.

While focusing on security aspects and public policy considerations, regulators have neglected the commercial potential of remote sensing information services. The resulting scenario is a non-regulated scenario that is subject to contractual relations based on a variety of data policies. Where operators are space agencies or international organisations, open access to data for imagery developers is guaranteed. However, commercialisation is bound to extend in the RS sector further than the current state controlled cases for high resolution data exploitation.

Recommendations

The unleashing of the RS imagery potential depends on a balanced safeguard of the different interests of security, public interest and commercial development. This balance can only be attained through adequate regulation.

In a first step, it is essential to reflect on the desired business model. The question being do we aim at vertical integration model where satellite operators control the entire data processing chain from collection to delivery of final imagery or do we foresee access by other imagery developers or service providers at an earlier stage of processing?

If the vertical model is opted for, specific IPR protection of space data would favour protection of the interests of operators. This model would facilitate state control over sensitive data and would support a scenario with a low number of operators.

On the other hand, nothing avoids the idea that the vertical model will develop into distribution contracts with downstream providers. Data regulation ensuring access to data

at earlier stages of processing would facilitate entry of new players in the market, a higher competition and a more flexible market to a wider customer public.

The later scenario responds better to the unleashing of RS imagery potential and would require a more active role in designing a data model by public authorities. The key to this model is based on the dissociation of upstream and downstream services and a categorisation of data. Sensitive and raw data being exclusive for operators while allowing open access based on added value on other data.

Closing Remarks

An appropriate regulatory framework is an essential tool of the space policy as it ensures and supports commercial development of space technologies and services.

It is widely admitted that the current public investments in space infrastructures must be sustainable in the future if those infrastructures are going to support the creation of new economic activity through developers of services. Commercialisation of operations and technological development alleviates public investment which can turn into more costly an innovative initiatives.

Balancing public security and interests with a supportive environment for business development is the mission of an adequate industrial policy, which can only be achieved if adequate regulatory measures are adopted.

This study has demonstrated the effects of non space specific regulations on the space sector and has highlighted their potential to shape space. It aims at drawing the attention of decision makers in the space field towards those other areas of regulations where space may merit special attention.

List of Acronyms

| Acronym | Explanation |
|----------------|---|
| AECA | Arms Export Control Act |
| CCL | Commerce Control List |
| CFSP | Common Foreign and Security Policy |
| CGEA | Community General Export Authorisation |
| CSIS | Center for Strategic and International Studies |
| DDTC | Directorate of Defense Trade Controls |
| DoD | Department of Defense |
| DoS | Department of State |
| EAA | Export Administration Act |
| EAR | Export Administration Regulation |
| ECS | Electronic Communication Service |
| ELV | European Launch Vehicle |
| EO | Earth Observation |
| ESA | European Space agency |
| ESOA | European Satellite Operators Association |
| HCOC | Hague Code of Conduct Against Ballistic Missile Proliferation |
| ITAR | International Traffic in Arms Regulations |
| ITT | Intangible Technology Transfer |
| ITU | International Telecommunications Union |
| ITU-R | International Telecommunications Union – Radiocommunications |
| LIDAR | Light Detection and Ranging |
| MS | Member State |
| MSS | Mobile Satellite Service |
| MTCR | Missile Technology Control Regime |
| NASA | National Aeronautics and Space Administration |
| NGEA | National General Export Authorisation |
| SAR | Synthetic Aperture Radar |
| Sat-DSiG | Satellite Data Security Act |
| U.S. | United States |
| UMTS | Universal Mobile Telecommunication |
| UN | United States |
| USML | United States Munitions List |
| WA | Wassenaar Arrangement |
| WAPECS | Wireless Access Policy for Electronic Communications Services |



| Acronym | Explanation |
|----------------|-------------------------------------|
| WMD | Weapon of Mass Destruction |
| WMO | World Meteorological Organisation |
| WRC | World Radiocommunication Conference |

Annex

A.1 Table of International and European Organisations and Bodies Involved in Spectrum Management

| Nature | Role | Structure | Procedure | Decisions |
|--|---|---|---|-----------|
| International Telecommunication Union (ITU) | | | | |
| Intergovernmental Organisation, UN specialised Agency. | Responsible for the regulation of international radio communications (terrestrial and in outer space) and for registering the orbital locations of satellites. Essential element in the international legal framework for all space activities. | <p>The structure is set up by several bodies since it comprises advisory groups and study groups for each sector. Can be divided in three different levels,</p> <p>Plenipotentiary Conference It is the Supreme and the primary organ of ITU. It sets the Union's general policies adopts four-year strategic and financial plans and elects the senior management team of the organization, the members of Council and the members of the Radio Regulations Board.</p> <p>The Council framed by Member States and elected by the Plenipotentiary Conference is an inter-session administrative body guiding the work of the organization in the four-year intervals between conferences. It implements the ITU policy and provisions coming from the ITU Constitution, the ITU Convention, the Administrative Regulations.</p> <p>The Regional and World Radio Conferences (WRCs) are responsible for adopting new or amending Radio Regulations and frequency allocations.</p> <p>The conferences take place every two to three years with the purpose of reviewing, updating and emending the Radio Regulations, binding instruments according to art.12- and art.16 of ITU Constitution.</p> <p>The Radio Regulations Board is qualified in assignment and use of frequencies.</p> <p>The General Secretariat prepares strategic policies and plans for the Union and implements administrative and financial aspects of its activities.</p> <p><u>Sectors</u> The Radio Communications Sector (ITU-R); The Telecommunications Standardisation Sector (ITU-T); Telecommunications Development Sector (ITU-D)</p> | <p>Decisions are taken during the Plenipotentiary Conference according to majority.</p> <p>Through ITU-R the organisation regulates equitably and efficiently the use of the radio-frequency spectrum and the geostationary satellite orbits.</p> <p>The ITU-R ensures the development of legally binding worldwide agreements and standards (regulations and recommendations) and will continue frequency coordination activity for satellite systems providing positioning and location capabilities.</p> <p>In the field of emergency radio communications, ITU-R conduct studies including identification of suitable frequency bands to be used on a global/regional basis for public protection and disaster relief, facilitating cross-border circulation of equipment to use during emergency and disaster relief situations.</p> | BINDING |



| Conference of European post and telecommunications Administrations (CEPT) | | | | |
|--|---|--|---|---|
| <p>Intergovernmental Conference, organisation which cooperates inter alia with the EU.</p> | <p>Plays a key role in the spectrum management. It is a voluntary type of cooperation between Administrations which provides guidelines and tools for harmonised European frequency management in a framework reflecting the ITU Regulations.</p> | <p>It comprises 47 countries of Western, Central and Eastern Europe. Only EU administrations members of ITU can be member of CEPT. The CEPT Assembly meets twice a year and it comprises: -ECC, the Electronic Communications Committee is the highest body that develops policy on spectrum management issues. It is helped by several working groups. Basically, it harmonise the efficient use of radio spectrum, satellite orbits and numbering resources across Europe. Active role in international level, preparing common European proposals to represent interests at ITU level. -COM-ITU organise the coordination of CEPT actions for the preparation for and during the course of the following ITU activities: Meetings of the Council, Plenipotentiary Conferences, World Telecommunication Development Conferences, World Telecommunication Standardisation Assemblies and other meetings as appropriate -ERO, the European Radio Communication Office is the Secretariat of CEPT. It provides expertises and supports and works with national frequency management authorities in: -conducting consultations on specific topics or parts of the frequency spectrum; -publishing ECC decisions and recommendations; -keeping a record of the implementation; -identifying and promote best practices in Administrations of national numbering schemes and number assignment procedures; -overseeing the register service for the European Telephony Numbering Space; -managing the One-Stop-Shopping procedure (OSS) for satellite licences and authorisations. The management function for ERO is performed by the ERO Council (ERC). It consists in representatives from the contracting administrations. The decisions agreed by consensus specify the service and the technical standards to be used to reach a fair harmonisation in the use of spectrum.</p> | <p>Being a voluntary cooperation that makes political agreements, and recommendations, decisions and directives are binding only for Administrations that chose to adopt them. Frequency regulatory issues has been delegated, through a MoU, by the EC to CEPT and this structural difference implies a difference also in the legal status of regulatory issues coming from CEPT. The EC issues CEPT with mandates, setting out tasks to be performed and the timetable therefore, with a view to the adoption of technical implementing measures addressing the harmonisation of radio frequency allocation and of information availability. However, within European Economic Area, EC decisions are prevailing on those of CEPT. Due to the different mandate having both that EC and CEPT, their views on radio-spectrum and policy visions are rather different despite CEPT is a body depending from EC. Decisions prepared by the ECC are binding agreements between the administrations and can therefore play a major role in the harmonisation of radio regulatory regimes within the CEPT countries. Consultation mechanisms have been introduced in order that bodies with an interest in European electronic communications can express their views in the decision-making process of the ECC.</p> | <p>BINDING (consensus) for CEPT members</p> |

| Radio Spectrum Committee (RSC) | | | | |
|--|--|---|--|---|
| EC related body. | The Committee has been established by the Radio Spectrum Decision (RSD). It ensures harmonised availability and efficient use of radio spectrum and the information related to the use of radio spectrum as well. | The Committee has been established by the Radio Spectrum Decision (RSD). It is a recommendation external group set up by the European Commission to assist the Community in technical radio spectrum issues. Cooperation between ETSI and RSC: ETSI Technical committee Electro Magnetic Compatibility and Radio Spectrum Matters (ERM) work in close cooperation with the Committee to secure appropriate spectrum allocations in the CEPT countries for standardised systems, in order to ensure co-existence between different communications systems standardised by ETSI. | RSC identifies measures that must be taken by the European Commission at a technical level, to ensure harmonised availability of the spectrum, instructing the ECC (Electronic and Communication Committee) of CEPT to undertake any necessary technical study concerning the issue and then develops a draft EC decision that will reflect the ECC deliberation. | Implements NOT BINDING decisions |
| Radio Spectrum Policy Group (RSPG) | | | | |
| High-level and governmental advisory group | The RSPG shall assist and advise the EC on high level policy matters related to radio spectrum policy issues (radio spectrum availability, allocation, methods for granting rights to use spectrum, protection of human health...), on coordination of policy approaches and, where appropriate, on harmonised conditions. The European Parliament and the Council can also request advices by the RSPG. | The RSPG comprises experts of the 27 EU Member States and one high level representative of the EC (without any right of vote). The Secretariat is provided by the European Commission RSC is the working body of the Group. It assists the EC Commission elaboration of binding implementing measures addressing harmonised conditions for the availability and efficient use of radio spectrum. | The Group adopts opinions addressed to the Commission and it may invite observers to attend its meetings, including from the States of the European Economic Area, the States which are candidates for accession, the European Parliament, the European Conference of Postal and Telecommunications Administrations (CEPT) and the European Telecommunications Standards Institute (ETSI). | NOT BINDING |
| Advisory Bodies | | | | |
| Electronic Communication Office- merging ERO and ETO- (ECO) | | | | |
| Secretariat of CEPT. | It conducts consultation and provides recommendations on specific issues related frequency spectrum issues through groups of expertises. Plus, it is the <i>liason</i> with the National frequency management authorities, supporting and working together with | Give support to the CEPT Assembly, depending from a Council. | The body provides expertises and supports and works with national frequency management authorities in: -conducting consultations on specific topics or parts of the frequency spectrum; -publishing ECC decisions and recommendations; -keeping a record of the implementation; -identifying and promote best practices in Administrations of national numbering schemes and number assignment procedures; -overseeing the register | NOT BINDING |



| | | | | |
|--|---|---|---|-------------|
| | | | service for the European Telephony Numbering Space; -managing the One-Stop-Shopping procedure (OSS) for satellite licences and authorisations. | |
| Body of European Regulators for Electronic Communications (BEREC) | | | | |
| Intergovernmental institution replacing the previous European Regulators Group | A soft coordination model has been set up through this Body where are represented all the EU National Regulatory Authorities. It does not have any relevant competence on spectrum issues, provides consultancy to the Commission on telecom regulatory issues. | Board of 27 national regulators with advisory powers but without legal personality. Office with a Management Committee which provide the professional and administrative support services required by BEREC to fulfil its tasks. An administrative Manager would have a support role when the Body will have legal personality. | After taking in account BEREC opinions on certain issues, the European Commission adopts a recommendation, asking to the concerned National Regulatory Authority to withdraw or amend the remedy. If this authority is not agreeing on the recommendation, would be able to proceed with the former proposal. | NOT BINDING |

A.2 Table on National Authorities and Regulation

| National Law | Authorities | Roles |
|--|---|---|
| Germany | | |
| Interstate Treaty on Broadcasting Agreement (RSTV) Telemedia Act " Telemediengesetz " Telecommunication Act (TKG) | Federal Network Agency-Bundesnetzagentur (BNetzA) Ministry of Economy and Technology | There is a strict distinction between telecommunications and media acts. BNetzA is the spectrum authority responsible for frequency management in both telecommunication and broadband access. It ensures the efficient, interference-free use of frequencies, taking in account the interests of broadcasting. (Art. 57.1 TKG). Ministry of Economy and Technology is the main Authority to which the Federal Network Agency is linked to. |
| Spain | | |
| Ley 32/2003 General de Telecomunicaciones de Espana Ley 7/2010 General de la Comunicación Audiovisual Cuadro Nacional de Atribución de Frecuencias (CNAF) | Ministry of Science and of Technology Ministro de ciencia y tecnología –SETSI Comisión del Mercado de las Telecomunicaciones Agencia Estatal de Radiocomunicaciones General Secretariat of State for Telecommunications and for the Society – Secretario de Estado de Telecomunicaciones | SETSI Establishes the right policy to facilitate the development of the rules about the spectrum while the Commission for Telecommunication Market supervises the frequency rules established. The Radiocommunication National Agency is the competent authority in issuing licences and the General Secretariat of State for Telecommunications and for the Society sets up of the instructions to enforce the National Framework for frequency Assignment, Cuadro Nacional de Atribución de Frecuencias (CNAF) |
| Italy | | |
| Decreto ministeriale n° 146 del 8 luglio 2002 - G.U. n. 169 del 20 luglio 2002 , which sets up the National Frequency Register Plan (PNRF) Decreto ministeriale del 13 novembre 2008 e pubblicato | Ministry of Communications National Regulatory Authority (AGCOM) General Direction for radio spectrum planning and managing | AGCOM is in charge of Radio frequency assignment and registers assignments of frequency in the National Frequency Register plus submits the related information to the ITU Radio Regulation Board. General Direction for radio spectrum planning and managing ensures the effi- |

| | | |
|---|---|--|
| nella GU n. 273 del 21-11-2008 - Suppl. Ordinario n.255 | | cient use of or radio electric spectrum as such public resource |
| France | | |
| Act No. 2004-669 of 9 July 2004 on electronic communications and audiovisual communication services, Official Journal of 10 July 2004 | National Frequency Agency (ANFR) | Telecommunications and the media are treated separately but the media regulator is specifically responsible for spectrum management. The Agency regulates electronic communications (GSM, UMTS, Wimax, satellite communications, Wifi...) within the 2002 EC framework. On one hand, requests for the use of frequency must be submitted to the Agency which will communicate the corresponding frequency assignment to the ITU; on the other hand, the higher council for the audiovisual sector regulates audiovisual issues taking into account pluralism. The exploitation of a frequency assignment must be authorised by the Ministry of electronic communication as well. |
| Act. No.86/1067 of 30 September 1986 on freedom of communication | Higher council for the audiovisual sector | |
| | Ministry of electronic communications General Direction for Post and Telecommunications, Information an Technology | |
| The Netherlands | | |
| Telecommunications Act 2004 Media Act | Radio communications Agency National Authority of regulation of telecommunications (OPTA) Ministry of Economic Affairs, Directorate General Telecommunications and Post (Telecom Agency). | OPTA, the Independent Post and Telecommunications Authority, is the national regulatory agency which supervises all rules laid down in the Telecommunications Act or based on it. A branch of the Ministry of Economic Affairs, the Telecom Agency (a non-independent agency) is in charge of licensing and supervises issues regarding frequencies- issues licences- and interception obligations. |
| United Kingdom | | |
| Communications Act 2003 Wireless Telegraphy Act 2006 National Radio Frequency Plan | Office of Communication (Ofcom) -Ofcom Spectrum Advisory Board (OSAB) -National Frequency Planning Group (NFPG) | The system has a combined system for telecommunication and media supervision. Ofcom is the unique body in charge of regulation of communication and broadcasting services. In charge of frequency assignments, the authority is supported by an advisory board (OSAB) for spectrum management issues while the national table of frequency allocation is set up the NFPG |
| Belgium | | |
| Royal Decree of 26 January 2007 regarding the police of the waves for frequency modulation | Belgisch Instituut voor Post-diensten en Telecommunicatie - Institut belge des Services Postaux et des Télécommunications (IBPT) Belgium Institute for Postal and Telecommunication Services (BIPT) | Institut belge des Services Postaux et des Télécommunications (IBPT) is the supreme authority in specific technical fields (electromagnetic spectrum, numbering space...). The Institute assigns frequencies, delivers the licenses, and establishes a long-term policy. It also monitors the correct application of the various international agreements by Belgium with respect to the use of the electromagnetic spectrum. |
| Royal Decree of 15 October 1979 on private radiocommunications. | | |
| Flemish Decree on radio broadcasting and television 27 march 2009 | | |
| Sweden | | |
| Frequentiebesluit (Frequency Decree) | National Post and Telecom Agency – Post & Telestyrelsen (PTD) Minister of Economic Affairs – Telecom Agency | National Post and Telecom Agency – Post & Telestyrelsen (PTD) is the Authority in charge of radio spectrum management that comprises individual frequency assignments and frequency use enforcing. |



A.3 Country Export Control Tables

| Belgium | | National level | Coordination with the European Level | Coordination with the International Level |
|--|------|---|--|--|
| National authorities and licensing process | Role | <p>Ministerial Orders of 28 September 2000 regulating the export and transit of dual-use items and technology, incorporating national implementation.</p> <p>The Act of 11 September 1962 relating to the import, export and transit of goods, as amended</p> | <p>Applicable Law</p> <p>Council Regulation (EC) No. 1236/2005. It contains the EU Human Rights List</p> <p>Council Regulation (EC) No. 428/2009. It contains the EU Dual-Use List</p> <p>Organisations/Institutions</p> <p><i>Council Working Party on Non-proliferation (CONOP)</i> coordinates work carried out in Brussels which deals with non-proliferation issues.</p> <p><i>Council Working Party on Dual-use Goods (WPDU)</i> coordinates work which deals with dual use products, in particular the group updates the control lists provided for EC Regulation n 428/2009</p> | <p>Missile technology control Regime (MTCR)</p> <p>Wassenaar Arrangement (WA)</p> <p>The Hague Code of Conduct (HCC)</p> <p>UN Resolution 1540</p> |

| France | | National level | Coordination with the European Level | Coordination with the International Level |
|--|---|---|---|--|
| National authorities and licensing process | Role | National level | Coordination with the European Level | Coordination with the International Level |
| <p>Dual-use Goods Control Office - Service des biens à double usage- Direction générale de la compétitivité, de l'industrie et des services – Ministère de l'Economie, de l'Industrie et de l'Emploi (SBDU)</p> <p>General Direction of Customs – Direction Générale des Douanes et Droits Indirects</p> <p>Inter Agency Committee on Dual use items- Commission Interministérielle des Biens à Double Usage (CIBDU)</p> <p>Ministry of Foreign Affairs (MOFA)</p> <p>The Secretary of the State for Industry</p> | <p>Is the authority in charge of deciding on licences applications. After the review in cooperation with the CIBDU and the minister of customs, SBDU has the right to decide if the licence is granted or not.</p> <p>It examines the application for the licence and could require further documents and information to grant it.</p> <p>The SBDU channels the most sensitive files through the Inter Agency Committee on Dual Use Items CIBDU evaluates this kind of applications.</p> <p>It evaluates the geostrategic impact of planned exports, and the extent to which they coincide with French foreign policy aims.</p> <p>Receives reports and dossiers concerning the nature of the exports from the applicant.</p> | <p>Décret n° 2001-1192 du 13 décembre 2001 relatif au contrôle à l'exportation, à l'importation et au transfert de biens et technologies à double usage modifié par le décret n°2010-292 du 18 mars 2010 (JORF du 20 mars)</p> <p>Arrêté du 13 décembre 2001 relatif à la délivrance d'un certificat international d'importation et d'un certificat de vérification de livraison pour l'importation de biens et technologies à double usage modifié par l'arrêté du 18 mars 2010 (JORF du 20 mars)</p> <p>Arrêtés du 18 juillet 2002 (JORF du 30 juillet 2002) modifiés par les arrêtés du 21 juin 2004 définissant les licences générales « biens industriels », « produits chimiques » et « graphite » modifiés par l'arrêté du 18 mars 2010 (JORF du 20 mars)</p> | <p>Applicable Law</p> <p>Framework Agreement (Letter of Intent LoI) signed by defence ministries in 1998 among France, Italy, Spain, United Kingdom, Sweden and Germany. It applies only to the signatories Countries.</p> <p>Council Regulation (EC) No. 1236/2005.</p> <p>Council Regulation (EC) No. 428/2009.</p> <p>Organisations/Institutions</p> <p><i>Council Working Party on Non-proliferation (CONOP)</i> coordinates work carried out in Brussels which deals with non-proliferation issues.</p> <p><i>Council Working Party on Dual-use Goods (WPDU)</i> coordinates work which deals with dual use products, in particular the group updates the control lists provided for EC Regulation n 428/2009</p> | <p>Missile technology control Regime (MTCR)</p> <p>Wassenaar Arrangement (WA)</p> <p>The Hague Code of Conduct (HCC)</p> <p>UN Resolution 1540</p> |



| Germany | | National level | Coordination with the European Level | Coordination with the International Level |
|---|--|--|---|--|
| National authorities and licensing process | Role | | | |
| <p>Federal Office of Economics and Export Control-German Supervisory Board for Export Control. (BAFA)</p> <p>Federal Ministry of Economics and Technology and Federal Foreign Office</p> <p>Federal Ministry of Economics and Labour</p> | <p>Is the central licensing authority, responsible for implementing the Federal Government's export control policy</p> <p>Ministries are involved in the process of consultation with BAFA for granting licences.</p> <p>Is responsible for the administration of the War Weapons Control Act</p> <p>It keeps the special register where exporters must sign in for military and dual use goods export and transfer.</p> | <p>Act implementing Article 26 (2) of the War Weapons Control Act</p> <p>1961 War Weapons Control Act Kriegswaffenkontrollgesetz, KWKG</p> <p>1961 Foreign Trade and Payments Act</p> <p>Regulation Implementing the Foreign trade and payments Act. (AWV of 18 December 1986)</p> | <p>Applicable Law</p> <p>Framework Agreement (Letter of Intent LoI) signed by defence ministries in 1998 among France, Italy, Spain, United Kingdom, Sweden and Germany. It applies only to the signatories countries.</p> <p>Council Regulation (EC) No.1236/2005.</p> <p>Council Regulation (EC) No. 428/2009.</p> <p>Organisations/Institutions</p> <p><i>Council Working Party on Non-proliferation (CONOP)</i> coordinates work carried out in Brussels which deals with non-proliferation issues.</p> <p><i>Council Working Party on Dual-use Goods (WPDU)</i> coordinates work which deals with dual use products, in particular the group updates the control lists provided for EC Regulation n 428/2009</p> | <p>Missile technology control Regime (MTCR)</p> <p>Wassenaar Arrangement (WA)</p> <p>The Hague Code of Conduct (HCC)</p> <p>UN Resolution 1540</p> |

| Italy | | National level | Coordination with the European Level | Coordination with the International Level |
|---|---|---|---|--|
| <p>National authorities and licensing process</p> <p>Directorate General for Trade Policy of the Department of internationalisation of the Ministry of Productive Activities Ministro delle Attività Produttive, Dipartimento per l'internazionalizzazione (MAP)</p> <p>Advisory and Consultative Council for dual-use goods export - Comitato Consultivo per l'esportazione di beni a duplice uso.</p> <p>Ministry of Foreign Affairs, Office of General Secretary – Direttore nazionale degli armamenti</p> | <p>Role</p> <p>Is the body designated to apply controls and issue authorisation for the export of dual use goods.</p> <p>Is the authority engaged for providing reports and for advising in some issues. It grants transparency in issues related to military and dual use goods and is the consulting branch of the Directorate General for Trade Policy of the Department. It is made up of representatives from the Ministry of Foreign Affairs, Productive Activities, Economic Affairs and Finance, Defence, Interior, Communications, Education-University Research The chairman is the chief person of the Ministry of Foreign Affairs.</p> | <p>National level</p> <p>Law of 9 July 1990, No 185 – regulating the armaments movements.</p> <p>Legislative Decree April 2003 No 96 which replaces Law of 27 February 1992, No 222, regulating high technology materials suitable for both civil and military purposes.</p> <p>Ministerial decree 4 August 2003 (list of dual-use goods not subject to a General Authorisation foresees for exporting goods listed in 1334/2000</p> | <p>Coordination with the European Level</p> <p>Applicable Law</p> <p>Framework Agreement (Letter of Intent LoI) signed by defence ministries in 1998 among France, Italy, Spain, United Kingdom, Sweden and Germany. It applies only to the signatories Countries.</p> <p>EC Regulation n 428/2009</p> <p>Council Regulation (EC) No. 1236/2005.</p> <p>Organisations/Institutions</p> <p><i>Council Working Party on Non-proliferation (CONOP)</i> coordinates work carried out in Brussels which deals with non-proliferation issues.</p> <p><i>Council Working Party on Dual-use Goods (WPDU)</i> coordinates work which deals with dual use products, in particular the group updates the control lists provided for</p> <p>EC Regulation n 428/2009</p> | <p>Coordination with the International Level</p> <p>Missile technology control regime</p> <p>Wassenaar Arrangement</p> <p>The Hague Code of Conduct</p> <p>UN Resolution 1540</p> |



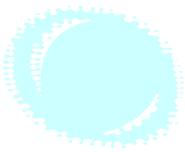
| Spain | | National level | Coordination with the European Level | Coordination with the International Level |
|---|--|---|---|--|
| National authorities and licensing process | Role | National level | Coordination with the European Level | Coordination with the International Level |
| <p>The Ministry of Industry, Tourism and Trade</p> <p>Inter-Ministerial Regulatory Board on External Trade in Defence and Dual Use Material (JIMDDU)</p> <p>General Secretariat for Foreign Trade- Secretaria General de Comercio Exterior</p> | <p>The authority is responsible for granting (or denying) authorisation requests.</p> <p>It is required to report, on a compulsory and binding basis, on the administrative authorisations. It is engaged on inspections in the Special Register of External Trade in Defence and Dual Use material plus rectification, suspension or nullification of these.</p> <p>It keeps the special register where exporters must sign in for military and dual use goods export and transfer.</p> | <p>Law 53/2007 of 28 December, on the control of foreign trade in defence and dual use material.</p> <p>Royal Decree 2061/2008 of 12 December which implement the Regulation CE 1334/2000</p> <p>Organic law 12/1995 of 12 December on the repression of smuggling, it includes the Military Goods Control List</p> | <p>Applicable Law</p> <p>Framework Agreement (Letter of Intent LoI) signed by defence ministries in 1998 among France, Italy, Spain, United Kingdom, Sweden and Germany. It applies only to the signatories countries.</p> <p>Council Regulation (EC) No.1236/2005.</p> <p>Council Regulation (EC) No. 428/2009.</p> <p>Organisations/Institutions</p> <p><i>Council Working Party on Non-proliferation (CONOP)</i> coordinates work carried out in Brussels which deals with non-proliferation issues.</p> <p><i>Council Working Party on Dual-use Goods (WPDU)</i> coordinates work which deals with dual use products, in particular the group updates the control lists provided for EC Regulation n 428/2009</p> | <p>Missile technology control Regime (MTCR)</p> <p>Wassenaar Arrangement (WA)</p> <p>The Hague Code of Conduct (HCC)</p> <p>UN Resolution 1540</p> |

| Sweden | | National level | Coordination with the European Level | Coordination with the International Level |
|--|--|--|---|--|
| <p>National authorities and licensing process</p> <p>Department for Disarmament and Non-Proliferation at the Ministry for Foreign Affairs</p> <p>Swedish Inspectorate of Strategic Products (ISP)</p> <p>Export Control Council (ECC)</p> <p>Swedish Radiation Safety Authority (SSM)</p> <p>Ministry of Trade and Ministry of Foreign Affairs</p> | <p>Role</p> <p>It is responsible for export control issues representing Swedish legislation and policy during international negotiation forum</p> <p>It controls the export of military equipment and other products that may have both a civilian and a military use (dual use goods). Following rules coming from the Swedish regulatory framework (being the central authority engaged for supervision of it), ISP considers application for export licences.</p> <p>It grants transparency in issues related to military and dual use goods and is the consulting branch of ISP representing all parliamentary parties. Its chairman is the director general of ISP.</p> <p>Is the Authority under the Ministry of the Environment in charge of granting licences to export in EU outside countries or transfer of nuclear material and products within EU. Moreover it is commissioned to obtain assurances from the recipient Country's recipient for nuclear export and sets requirements for activities involving radiation (i.e. use of laser and x-ray equipment) Licensing Authority plus Regulatory Authority for activities involving radiation and nuclear power sources.</p> <p>They handle together issues regarding ISP's operations and shall obtain the assurance for nuclear material and products export.</p> | <p>National level</p> <p><i>Military Equipment Act (SFS1992:1300)</i></p> <p><i>Military Equipment Inquiry (KRUT)</i></p> <p><i>Dual-Use Products and Technical Assistance Act (2000:1064)</i></p> <p>1991/92:174 p.41 f., Gov.Bill 1995/93:31 p.23 f., and Report 1992/93:UU1</p> <p>Ordinance on Control of products with dual-use and of technical assistance (2000:1217)</p> | <p>Coordination with the European Level</p> <p>Applicable Law</p> <p>Framework Agreement (Letter of Intent LoI) signed by defence ministries in 1998 among France, Italy, Spain, United Kingdom, Sweden and Germany. It applies only to the signatories Countries.</p> <p>EC Regulation n 428/2009 (amendments to EC Regulation 1334/2000 introduced by EC Regulation n. 1167/2008). It applies to all European Community States.</p> <p>Organisations/Institutions</p> <p><i>Council Working Party on Non-proliferation (CONOP)</i> coordinates work carried out in Brussels which deals with non-proliferation issues.</p> <p><i>Council Working Party on Dual-use Goods (WPDU)</i> coordinates work which deals with dual use products, in particular the group updates the control lists provided for EC Regulation n 428/2009</p> | <p>Coordination with the International Level</p> <p>Missile technology control Regime (MTCR)</p> <p>Wassenaar Arrangement (WA)</p> <p>The Hague Code of Conduct (HCC)</p> <p>UN Resolution 1540</p> |



| The Netherlands | | National level | Coordination with the European Level | Coordination with the International Level |
|--|---|--|---|--|
| <p>National authorities and licensing process</p> <p>Minister of Finance Fiscal and Economic Investigation Services (FIOD-ECD)</p> <p>Minister of Foreign Trade -Staatssecretaris van Economische Zaken-</p> <p>Central import-export licensing agency under the Tax and Custom Department of the Ministry of Finance- Dients voor In-entvoer (CDIU)</p> <p>Section TVOO- Surveillance, Security and Public Order-</p> | <p>Role</p> <p>It issues licences in cases of financial involvement concerning third party transactions in strategic goods on condition that they are either outside the EU or are in the EU but have not been formally imported into the EU</p> <p>The authority grants export licences for import and export of strategic goods which are mentioned in the Annex of Strategic Goods Import and Export Order.</p> <p>It processes licence applications for both military and dual-use goods export. The Agency grants and refuses licences for the export of strategic goods on behalf of the Ministry of Economic Affairs</p> <p>The section helps the export company if it has doubts concerning the nature of the good channelled to export.</p> | <p>Import and Export Act (Stb 1962,295)</p> <p>Strategic Goods Import and Export Order (1999,516)</p> <p>Decree on Financial Involvement concerning Strategic Goods</p> <p>Decree on Issuing of certificates for Strategic Goods (Stb. 1986,417)</p> | <p>Applicable Law</p> <p>Framework Agreement (Letter of Intent LoI) signed by defence ministries in 1998 among France, Italy, Spain, United Kingdom, Sweden and Germany. It applies only to the signatories Countries.</p> <p>EC Regulation n 428/2009 (amendments to EC Regulation 1334/2000 introduced by EC Regulation n. 1167/2008). It applies to all European Community States.</p> <p>Organisations/Institutions</p> <p><i>Council Working Party on Non-proliferation (CONOP)</i> coordinates work carried out in Brussels which deals with non-proliferation issues.</p> <p><i>Council Working Party on Dual-use Goods(WPDU)</i> coordinates work which deals with dual use products, in particular the group updates the control lists provided for EC Regulation n 428/2009</p> | <p>Missile technology control Regime (MTCR)</p> <p>Wassenaar Arrangement (WA)</p> <p>The Hague Code of Conduct (HCC)</p> <p>UN Resolution 1540</p> |

| United Kingdom | | National level | Coordination with the European Level | Coordination with the International Level |
|--|---|---|---|--|
| <p>National authorities and licensing process</p> <p>Export Control Organisation (ECO)</p> <p>Department of Trade and Industry (DTI)</p> <p>Department for Business, Innovation and Skills (BIS)</p> <p>Foreign and Commonwealth Office (FCO)</p> <p>Ministry of Defence (MoD)</p> <p>Department for International Development (DFID)</p> | <p>Role</p> <p>The Export Control Organisation (ECO) within the Department of Trade and Industry (DTI) is the licensing authority for strategic goods (Note: only for strategic goods) ECO works as a part of the Department for Business, Innovation and Skills (BIS). DTI takes decisions by consensus</p> <p>The Department issues export licences for strategic goods from the UK which are made via SPIRE website.</p> <p>Provide opinions on most of the consolidated national, EU and international criteria</p> | <p>National level</p> <p>Import and Export Act (Stb 1962,295)</p> <p>Strategic Goods Import and Export Order (1999,516)</p> <p>Decree on Financial Involvement concerning Strategic Goods</p> <p>Decree on Issuing of certificates for Strategic Goods (Stb. 1986,417)</p> | <p>Coordination with the European Level</p> <p>Applicable Law</p> <p>Framework Agreement (Letter of Intent LoI) signed by defence ministries in 1998 among France, Italy, Spain, United Kingdom, Sweden and Germany. It applies only to the signatories Countries.</p> <p>EC Regulation n 428/2009 (amendments to EC Regulation 1334/2000 introduced by EC Regulation n. 1167/2008). It applies to all European Community States.</p> <p>Organisations/Institutions</p> <p><i>Council Working Party on Non-proliferation (CONOP)</i> coordinates work carried out in Brussels which deals with non-proliferation issues.</p> <p><i>Council Working Party on Dual-use Goods (WPDU)</i> coordinates work which deals with dual use products, in particular the group updates the control lists provided for EC Regulation n 428/2009</p> | <p>Coordination with the International Level</p> <p>Missile technology control Regime (MTCR)</p> <p>Wassenaar Arrangement (WA)</p> <p>The Hague Code of Conduct (HCC)</p> <p>UN Resolution 1540</p> |



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