European Satellite Earth Observation: Law, Regulations, Policies, Projects, and Programmes

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EUROPEAN SATELLITE EARTH OBSERVATION: LAW, REGULATIONS, POLICIES, PROJECTS, AND PROGRAMMES

FRANS G. VON DER DUNK†

I. INTRODUCTION

Outer space is no longer the exclusive domain of the two Cold War superpowers, the United States and the Soviet Union. In fact, many states now understand the potential benefits that outer space activities can bring and have become active in outer space activities in their own ways. Amongst the major players in outer space, specifically the area of satellite earth observation, one area stands out: Europe. Europe is not a single state, such as the United States, Russia, Japan, China, India, or Brazil; rather, Europe is comprised of a number of sovereign member states. The term Europe as used in the previous sentence usually refers to some institutional version of Europe, not to the geographically defined continent.1 Europe as an institution, moreover, is not even the complete picture because there are several versions of Europe which are of importance when it comes to space activities generally or to the more specific sector of satellite earth observation and downstream distribution of data resulting from satellite earth observation.

Vice versa, satellite earth observation is also a major issue for Europe whether it concerns the use of satellites for ecological and climate monitoring purposes, for commercial or other economic purposes, or even for security-oriented applications. Indeed, as will be seen, a number of laws and regulations addressing satellite earth observation have been drafted in Europe during the last few decades as a consequence of certain policies or policy approaches. Additionally, these policies or policy approaches then affect new policies or new policy approaches. In particular, the aforementioned policies or policy approaches make certain options less interesting, less feasible, or even plainly illegal. Furthermore, as will be addressed infra in this Article, within such policies and legal regimes, actual space projects and programmes are developed, agreed upon, financed, and executed.

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1. Europe, geographically defined, runs from the Atlantic Ocean to the Ural mountain range, and from the Arctic Ocean to the Caucasus mountain range.
This Article represents an effort to analyse, or at least map, some of the consequences of the rather complicated European *spacescape* on the development of law, regulations, and policies in the area of satellite earth observation. Further, this Article will examine some distinct results of laws, regulations, and policies which are concerned with satellite earth observation. Specifically, this Article will examine satellite earth observation-related projects and programmes that try to project some *European* presence in outer space. One of those projects and programmes is the Global Monitoring for Environmental Security project which has recently been renamed Kopernikus; Kopernikus serves in several respects as the standard bearer for European involvement in satellite earth observation in the service of various terrestrial applications for the years to come.

From the perspective of earth observation by means of satellites, observers may discern no less than three *Europes* in space that are of major importance: the European Space Agency ("ESA"), the European Meteorological Satellite Organisation ("EUMETSAT"), and the European Union ("EU")/European Community ("EC"). The ESA, EUMETSAT, and EU/EC each play roles, sometimes in cooperation with each other, in shaping the laws and policies, and in developing and executing the projects and programmes, that try to maximize the benefits that satellite earth observation can bring to Europe. However, as this Article shall establish, analysis should not neglect the individual member states of the ESA, EUMETSAT, and EU/EC or the important fact that the memberships of these three organisations are far from identical.

II. THE EUROPEAN SPACE AGENCY

The European Space Agency ("ESA"), the first of the *Europes* to be analysed, was established as a successor to two earlier European efforts to cooperate in space matters, the European Launcher Development Organisation ("ELDO") and the European Space Research Organization ("ESRO"). Furthermore, ESA is based upon a convention that was drafted in 1975 and entered into force in 1980. ESA is headquartered in Paris, France. Additionally, ESA has major estab-
lishments in the Netherlands (the European Space Research and Technology Centre in Noordwijk ("ESTEC")), Germany (the European Space Operations Centre in Darmstadt ("ESOC") and the European Astronaut Centre in Cologne ("EAC")), and Italy (the ESA Centre for Earth Observation ("ESRIN") that also acts as the information and database center in Frascati near Rome). Currently, eighteen individual member states comprise ESA.5

ESA has two main organs dealing with relevant policy issues. First, there is ESA's Council which consists of representatives from ESA's individual member states (often at the Ministerial level) and acts as the supreme body of ESA. The Council from this perspective is, inter alia, to:

(d) adopt the annual work plans of the Agency;
(e) . . .
   (i) adopt the annual general budget of the Agency . . . ;
   (ii) adopt each programme budget . . . ;
(f) adopt . . . the Financial Regulations and all other financial arrangements of the Agency; . . .
   (i) adopt the Staff Regulations . . . ;
(j) adopt . . . rules under which authorisation will be given, bearing in mind the peaceful purposes of the Agency, for the transfer outside the territories of the Member States of technology and products developed under the activities of the Agency or with its help;
(k) decide on the admission of new Member States in accordance with Article XXII; . . . [and]
(m) take all other measures necessary for the fulfilment of the purpose of the Agency within the framework of this Convention.6

In using such competencies, the Council also effectively determines the policies to be pursued by and in the context of ESA. Specifically, the Council decides on the high-level programmes and projects that give substance and shape to any ESA policy.

The second main organ of ESA that deals with relevant policy issues consists of the Director General together with other ESA staff. ESA staff, in this respect, are charged with carrying out the Director General's responsibilities and competencies as provided for by the

5. The list of member states comprises Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. Of these, it may already be noted, Norway and Switzerland are not members of the European Union. In addition, non-European Canada is a long-standing cooperating partner under a special agreement, whereas Hungary, Romania and Poland qualify as European Cooperating States under another special agreement.

6. ESA Convention, supra note 4, art. XI(5); MADDERS, supra note 2, at 195.
Convention. The ESA Convention sets forth the main tasks of the Director General as follows:

(b) The Director General shall be the chief executive officer of the Agency and its legal representative. He shall take all measures necessary for the management of the Agency, the execution of its programmes, the implementation of its policy and the fulfilment of its purpose, in accordance with the directives issued by the Council. He shall have authority over the establishments of the Agency. He shall, in regard to the financial administration of the Agency, act in accordance with the provisions of Annex II. He shall make an annual report to the Council, and this report shall be published. He may also submit proposals concerning activities and programmes as well as measures designed to ensure the fulfilment of the Agency’s purpose. He attends meetings of the Agency without the right to vote. 7

The actual impact the Director General may have on the formulation of ESA policies depends upon a number of interlocking factors essentially of a non-legal nature and may, consequently, vary considerably. However, at the end of the day, the Director General’s actions are always subject to confirmation and a form of high-level control by the Council as enshrined in the ESA Convention.

A final key point to be noted when trying to understand the proper role of ESA in shaping European policies and regulations in the realm of satellite earth observation concerns the way in which the ESA space programmes are developed and run. While both ESA’s individual member states, through the Council, and the Director General, as assisted by his or her staff, can propose that ESA engage in certain space programmes, such programmes generally need to be one of three kinds.

The first kind of programme that can be proposed to ESA’s Council are the so-called mandatory activities. Mandatory activities are those programmes that every ESA member state is obliged to participate in. These programmes concern “... the execution of basic activities, such as education, documentation, studies of future work projects and technological research work; ... [and] the elaboration and execution of a scientific programme including satellites and other space systems” to the extent follow-up activities on the ground are concerned. ESA should also “collect relevant information and disseminate it to Member States, draw attention to gaps and duplication, and provide advice and assistance for the harmonisation of international and na-

7. ESA Convention, supra note 4, art. XII(1); Madders, supra note 2, at 203-05.
tional programmes." Regarding financing the mandatory activities, which are essentially scientific, non-space activities, all ESA member states must finance the mandatory activities, once properly agreed upon, through a pre-determined scale of respective contributions.

Secondly, ESA may agree to conduct optional activities. Optional activities concern, in particular, space programmes as opposed to programmes concerned with the preparation for the space programmes or programmes concerned with after-mission space programme issues. The ESA Convention in this regard refers to "the design, development, construction, launching, placing in orbit, and control of satellites and other space systems; [and] the design, development, construction, and operation of launch facilities and space transport systems." In percentage terms, ESA's optional activities have made up eighty to eighty-five percent of ESA's activities, as opposed to fifteen to twenty percent of those being mandatory in nature.

The optional character of these activities manifests itself by way of an opt-out clause as the ESA Convention provides that "all Member States participate apart from those that formally declare themselves not interested in participating therein." Optional ESA activities are also financed in a different manner than are mandatory ESA activities. Specifically, the financial contribution formula, as applied to ESA's optional activities, is an opt-out from the standard rule that individual member states contribute financing as a proportion of each individual member state's national income averaged over the most recent three years. Here, individual member state contributions are decided, as it were, from the ground up. That is, each individual member state promises, as following from its own particular measure of interest in such optional activities, to contribute a certain percentage to the proposed programme budget for the activity in question. Once the proposed programme reaches a certain threshold in terms of promised financing, for example eighty-five percent of the agreed total budget, it is formally accepted as an ESA optional activity.

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8. ESA Convention, supra note 4, art. V(1.a), sub. (i)-(iii); Madders, supra note 2, at 223-35.
9. ESA Convention, supra note 4, art. XIII(1). Essentially, a particular member state's contribution to a mandatory programme is determined relative to the total budget apportioned to that programme, in proportion as based upon the average national income of that member state over the three most recent years.
10. ESA Convention, supra note 4, art. V(1.b) (emphasis added); Madders, supra note 2, at 189-95, 235.
11. Madders, supra note 2, at 189. The third category of ESA activities formally speaking is not part of the ESA budget; see infra notes 16-18 and accompanying text,
12. ESA Convention, supra note 4, art. V(1).
13. See ESA Convention, supra note 4, art. XIII(2).
Furthermore, it should be noted that the aforementioned cornerstones of ESA's general—including in particular industrial—policy are implemented by means of the so-called geographical distribution approach in order to "ensure that all Member States participate in an equitable manner, having regard to their financial contribution . . ."\(^{14}\) The result of the geographical distribution approach, further elaborated in Annex V to the ESA Convention, is often labelled fair return, industrial return or juste retour. Under fair return, each individual member state should roughly receive its own investment in a particular programme returned to the individual member state in the form of orders for its space industry, preferably for the very programme at issue or alternatively as compensation derived from orders for other programmes.\(^{15}\)

Over the past several decades, ESA's success has shown that the dichotomy between mandatory and optional activities is remarkably pragmatic. Specifically, it has demonstrated that this was a workable compromise to balance an individual member state's need to maintain their sovereign independence in choosing to contribute to, and participate in, actual space programmes (on an à la carte-basis as it were) and their need for some coherence in ESA's programmes. Such a balance is needed in order for ESA to provide any added value to individual member states in terms of real cooperation and an efficient pooling of resources between them.

The ESA Convention also mentions a third category of activities: operational activities.\(^{16}\) Operational activities are undertaken upon the specific request of a third party rather than being conjured up by ESA itself. As a consequence, such operational activities are not financed by the budget of ESA; rather they are paid for in principle on a

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14. ESA Convention, supra note 4, art. VII(1.c).

15. ESA Convention, supra note 4, arts. II, IV, Annex V; MADDERS, supra note 2, at 384-88. While the ideal "overall return coefficient" (art. IV(3)) is 1, meaning every euro contributed by a member state should be matched exactly by a euro's worth of contract value for a company from that Member State under a contract by the Agency, there are a number of complicated arrangements in place to allow for considerable flexibility. Moreover, due to pressure from the European Union in recent years (which views this system with some suspicion, as it may easily have anti-competitive effects), the general application of the concept has become more relaxed still.

16. ESA Convention, supra note 4, art. V(2).
full-cost, not-for-profit, basis by the individual member state, organisation, or entity requesting such services.

III. THE EUROPEAN METEOROLOGICAL SATELLITE ORGANISATION

The European Meteorological Satellite Organisation ("EUMETSAT"), the second Europe to be scrutinised in this Article, can be qualified as a daughter entity of the European Space Agency ("ESA"). ESA, under the ESA Convention, is tasked only to undertake activities "to provide for and to promote, for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications systems." Although this clause is generally interpreted quite broadly, such use and operations themselves, in particular if on a more or less routine basis, are not considered to be the proper domain of ESA. Consequently when ESA has developed a satellite system ready for operational activities, the ESA Council decided to establish separate entities for the purpose of overseeing such operations after the satellite system was developed. For example once the experimental European Communication Satellite had proven its operational capabilities, a new intergovernmental organization, EUTELSAT, was created to operate and expand the satellite system.

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17. Such a monetary reimbursement could of course be partially or completely waived to the extent ESA considers other interests to merit the provision of such service without full reimbursement, and/or ESA considers itself de facto reimbursed by in-kind compensation. For example in the context of the International Space Station ("ISS"), it is common practice that the partners exchange services and goods as much as possible on a closed-purse, no-exchange-of-funds basis. Agreement among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station, art. 15(5), Jan. 29, 1998 (entered into force Mar. 27, 2001); Space Law, supra note 4, § D.II.4.

18. In the past indeed ESA has provided such services for individual states, other international organisations, such as EUMETSAT, and private companies such as Arianespace.


21. Madders, supra note 19, at 504; Convention Establishing the European Telecommunications Satellite Organization, cmdn. 9069, July 15, 1982 [hereinafter EUTELSAT Convention]; Space Law – Basic Legal Documents §§ C.II.1, C.II.2 (Karl-Heinz Bockstiegel & Marietta Benko eds., 2008); Operating Agreement Relating to the European Telecommunications Satellite Organization (EUTELSAT), cmdn. 9154, July 15, 1982. In the late 1990s, when satellite communications evolved from a public-service operation to a commercial, competitive environment, the intergovernmental organisation was privatised, the satellite system henceforth being run by the France-based private company, Eutelsat.
In a similar manner, ESA developed and launched an experimental European weather-monitoring satellite named Meteosat-1 in late 1977. Because Meteosat-1 did not fail until completing two years of successful orbital operations, the satellite proved the viability of the technical and operational concepts underlying it as well as the benefits that could be derived from such meteorological monitoring. At the same time, Meteosat-1 established that similar operations need to be conducted on a more permanent basis by an organisation specifically dedicated to meteorological monitoring.

Therefore, the European States concerned drafted a Convention in 1983, which entered into force in 1986, to establish EUMETSAT. EUMETSAT is headquartered in Darmstadt, Germany. Specifically, EUMETSAT's headquarters are situated next door to ESA's Space Operations Centre ("ESOC"), testifying to the continuing close cooperation of ESA with its new daughter entity EUMETSAT.

At the same time, the formally independent character of EUMETSAT also resulted in the organisation now having several more individual member states as compared to ESA. To be precise, EUMETSAT has twenty-two individual member states as members including one European state member who is neither a member of ESA nor of the European Union (Croatia), two further European non-European Union members (Norway and Switzerland), and even a state normally not considered European altogether (Turkey).

Since its inception, EUMETSAT's main purpose is to serve the national meteorological services of its members and – at a secondary level – other entities active in the field of weather monitoring and forecast. Particularly, EUMETSAT's aim was:

to establish, maintain and exploit European systems of operational meteorological satellites [currently numbering six], taking into account as far as possible the recommendations of the World Meteorological Organization . . . . A further objective of EUMETSAT is to contribute to the operational monitoring of the climate and the detection of global climatic changes.

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23. The full list of member states comprises Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. In addition, Bulgaria, the Czech Republic, Estonia, Iceland, Latvia, Lithuania, Poland and Romania are Cooperating States.

24. EUMETSAT Convention, supra note 22, art. 2(1). The references to operational monitoring of the climate and detection of global climatic changes followed from the
More generally, EUMETSAT should continue the Meteosat programme and develop, as relevant, new programmes in the field.\textsuperscript{25}

As indicated, ESA continues to provide particular support to EUMETSAT's activities in the area of telemetry, tracking, and control through the European Space Operations Centre ("ESOC").\textsuperscript{26} Additionally, ESA provides support for EUMETSAT's activities in the form of research and development in new generation meteorological and environmental satellites – which are operational activities for ESA.\textsuperscript{27} However, EUMETSAT remains responsible for satellites after the satellites are developed and function as an operational prototype. Additionally, EUMETSAT remains responsible for the development of the attendant ground infrastructure needed to operate the satellites.

The Council of EUMETSAT, comprised of representatives from its member states, is the governing organ of the organisation. The Council decides key issues such as the accession of new member states to EUMETSAT and issues relating to the development, launch, and operation of new satellites and systems. Additionally, the Council of EUMETSAT decides on an annual budget and other main financial parameters related to the organisation's activities. In other words, the Council of EUMETSAT is the key policy-setting/overseeing body of EUMETSAT.\textsuperscript{28}

Next in line to the Council of EUMETSAT, a EUMETSAT Secretariat,\textsuperscript{29} headed by a director, is responsible for the implementation and execution of the programmes and the day-to-day running of the organisation in addition to his or her responsibilities as the legal representative of EUMETSAT.\textsuperscript{30}

With a view to the financing and procurement policies that are key to ESA's structure as discussed previously, it is interesting to compare ESA's financing and procurement policies with those of EUMETSAT. Generally speaking, the:

\begin{quote}

expenditure[s] of EUMETSAT shall be covered by the financial contributions of the Member States and by any other EUMETSAT income, [which contributions shall be based] on the basis of the average Gross National Product (GNP) of
\end{quote}

\begin{footnotesize}

\textsuperscript{25} EUMETSAT Convention, \textit{supra} note 22, preamble.

\textsuperscript{26} ESA Convention, \textit{supra} note 20, art. V(2); Balogh & Valabrega, \textit{supra} note 24, at 191.

\textsuperscript{27} ESA Convention, \textit{supra} note 20, art. V(2); Balogh & Valabrega, \textit{supra} note 24, at 191.

\textsuperscript{28} EUMETSAT Convention, \textit{supra} note 22, arts. 4, 5.

\textsuperscript{29} \textit{Id.} art. 7.

\textsuperscript{30} \textit{Id.} art. 6.
\end{footnotesize}
Thus, EUMETSAT's financing policies are roughly equivalent to those of ESA, even if the formula is slightly different.

In terms of the procurement policy, however, the cornerstone is open competition with fixed price contracts. Whilst taking into account European expertise, the contract will be awarded on a best-value-for-money basis, as based upon price and running costs, quality and schedule, as well as performance and guarantees. In other words, there is no guarantee for member states to see their contributions somehow returned to their industries as would have been the case under geographical distribution or fair return.

Finally, since the EUMETSAT Convention was amended in 2000, EUMETSAT recognizes optional activities, essentially on an opt-in (as opposed to ESA's opt-out) basis. Regarding optional activities, the EUMETSAT Convention itself explicitly provides that: "[o]ptional programmes take effect once at least one third of all EUMETSAT Member States have declared their participation by signing the Declaration within the time frame set out and the subscriptions of these Participating States have reached ninety percent of the total financial envelope." Logically, the financing of EUMETSAT's optional programmes follows the à la carte-approach.

IV. THE EUROPEAN COMMUNITY AND THE EUROPEAN UNION

The involvement of the European Union, as the successor at a political if not completely at the legal level of the European Community, stems from a completely different background than do the involvements of the European Space Agency ("ESA") and the European Meteorological Satellite Organisation ("EUMETSAT") as discussed above. Therefore, it is appropriate to clarify the background of the European Community and European Union's involvement in outer space activities because they represent a unique feature in the field of space activities and satellite earth observation in more ways than one. Thus, the European Community and the European Union represent the third Europe to be discussed in this Article.

31. Id. art. 10(1), resp. (2).
32. Id. art. 2(3).
33. Id. art. 2(6). As indicated, however, in practice the difference between the respective ESA and EUMETSAT approaches is not that large. ESA's formal opt-out basis effectively results in an opt-in approach through the financing process. Id.
34. Id. art. 3(2).
35. Id. arts. 5(3.b), 10(5).
In stark contrast with ESA and EUMETSAT, the European Community, and later the European Union, became involved in the European spacescape primarily as a regulator and has only recently become active in a more operational context. However, that role very much remains a secondary one. In particular, the European Community effectively pools together the regulatory efforts of the still-sovereign Member States while establishing its own distinct legal order, a *sui generis*-construction, which may be referred to as a supranational half-way house between an international organization and a federation-like structure.

At present, twenty-seven European states have subjected themselves to the framework of the European Community where each individual member state has a very extensive set of rights and owes a very extensive set of obligations toward each other individual member states. The framework of the European Community was achieved through each individual member state's ratification of the European Coal and Steel Community ("ECSC") Treaty, the Treaty Establishing the European Atomic Energy Community ("EAEC") or Euratom Treaty, and the Treaty Establishing the European Economic Community ("EEC") in the 1950s. Such treaties included, in addition to the various accession treaties allowing for new member states to join the European Community, the Single European Act of 1986, the Treaty on European Union of 1992, the Treaty of Amsterdam of 1997, and the Treaty of Nice of 2001.

Of the aforementioned treaties, the Treaty on European Union of 1992 is the most important. It effectively extended the scope of Euro-

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36. The list of member states comprises Austria, Belgium, Bulgaria, the Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.
pean integration as it had arisen on the basis of the three treaties of the 1950s while re-christening the EEC Treaty as the European Community ("EC") Treaty. Also, the Treaty on European Union provided two more pillars to base the European Union upon in addition to the single pillar encompassing the EC Treaty, ECSC Treaty, and the EAEC Treaty. However, these two additional pillars remained purely intergovernmental and almost completely outside the established legal structure of the European Community with its many supranational features. For that reason, reference should still be made to the European Community, rather than to the European Union, as long as the reference concerns the legal framework based on the EC Treaty.

Though ultimately still based on a number of treaties between sovereign states, a distinct and partly supranational legal order has now emerged. In many instances, the European Community can now, by law, override the interests, policies, and legislation of individual member states. Together, the aforementioned treaties form a body of primary European Community law, inter alia, creating the main European Community organs, to wit the Council of Ministers, the European Commission, the European Parliament, and the European Court of Justice. The treaties also provided these organs with extensive legal competences. The main European Community organ then used, and continues to use, the legal competences to jointly extend the scope of European Community law in that the organs draft and enunciate what is commonly called secondary EC law.

Secondary European Community law is basically composed of Regulations, Directives, and Decisions. Regulations are essentially laws on a European level; they are phrased in general terms and apply comprehensively, at least as far as indicated or expressly provided for by the Regulations themselves. Additionally, Directives are also laws

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44. Following a major renumbering exercise through the Treaty of Amsterdam and some further amendments by means of the Treaty of Nice, the present version of the EC Treaty, as part of the Treaty on European Union, dates from 2002. Treaty Establishing the European Community (Consolidated Version), O.J. 325/33 (2002) [hereinafter EC Treaty].

45. The first pillar was now that of the European Community, based not only on the EC Treaty (Title II, Treaty on European Union), but also on the ECSC Treaty and EAEC Treaty (Titles III, resp. IV, Treaty on European Union). Currently, these additional two "pillars" are labeled Common Foreign and Security Policy ("CFSP") and Police and Judicial Cooperation in Criminal Matters ("PJCCM"). Treaty on European Union, tit. V, resp. VI.

47. Id. arts. 211-19.
48. Id. arts. 189-201.
49. Id. arts. 220-45.
50. Id. art. 249.
in that they require individual member states to reach a required end result. However, each individual member state is free to reach a Directive’s end result in a manner it sees fit so long as the end result is reached prior to the Directive’s deadline. Finally, Decisions also provide binding law, but only upon those entities to which they are explicitly or implicitly directed. In each case, Decisions override an individual member state’s national law or regulation if the latter is contrary to the Decision.

The European Community’s legal order presents the European Community with its own measure of jurisdiction over a wide range of economic or economy-related activities. Moreover, the European Community’s jurisdiction can be directly applied to individual member states and to private persons and entities who are under the domestic jurisdictions of the individual member states of the European Community. In addition, private persons and entities who are under the domestic jurisdictions of the individual member states of the European Community can directly claim the rights and obligations that are imposed upon them by the European Community. Thus, those concerned can call upon the European Court of Justice in a number of instances to judge upon the legality of the European Community’s actions, as well as national actions. The existence of the European Court of Justice as the centre of the European Community’s legal order represents an essential measure of supranational adjudication.

On economic issues, the power of an individual member state to legislate has largely been transferred to – or at least circumscribed at – the European Community level. Essentially, the European Community’s organs have partially taken over the law-creating role of the individual member states. To that extent, a distinct and partly supranational jurisdiction of the European Community has replaced the individual jurisdiction of the individual member states.

As a consequence, the European Community (and later also the European Union), once again in contrast to ESA and EUMETSAT, is involved with all the economic activities of the individual member states in the widest sense of the word. Space activities only constitute one of the economic areas the European Community is currently concerned with. However, only recently have space activities achieved some prominent status with the European Community as exemplified
with European Community projects such as Galileo and GMES/Kopernikus.\textsuperscript{51}

Limitations to the European Community's competence, \textit{vis-à-vis} outer space and space-related activities, such as those activities that concern satellite earth observation, would largely arise on the level of general substance. The European Community's limited competence in space-related activities emanate from European Community law as interpreted in accordance with the notion of \textit{subsidiarity}.\textsuperscript{53} If doubt arises whether an issue could be regulated more effectively and logically at the European level or at individual member state's national level, the presumption under \textit{subsidiarity} is that the national level should prevail.

As a result, unless the European Community's organs have unequivocally (even if only implicitly) been provided with the competence to legislate on a certain issue, the power to legislate on such an issue should be deemed to rest with the particular individual member state and its national governmental authorities. In other words, the European Community's organs can legislate with respect to earth observation-related activities only to the extent that those activities are clearly covered by provisions in primary or secondary European Community law. This applies, broadly speaking, to all economic activities proper (that is without overriding public interests, such as those relating to military, social, or cultural issues, behind those activities). Therefore, satellite earth observation-related activities fall within the European Community legal order only to the extent that these activities may be considered to constitute a category of economic activities proper.

In a substantive sense, the central and most comprehensive aim of the European Community's integration efforts remains the creation and maintenance of a common market.\textsuperscript{54} Effectively, only the internal


\textsuperscript{53} EC Treaty, supra note 44, art. 5.

\textsuperscript{54} Id. arts. 2, 3.
market, being one side of the common market, was established as of 1993. The internal market regime is based upon four freedoms (the freedoms of movement of goods, persons, services, and capital), an anti-trust regime combating anti-competitive behaviour of governments (read: state aid) and companies (read: collusive conduct and abuses of dominant positions) alike, and harmonisation of relevant national legislation.

Turning now to the specific issue of satellite earth observation and the way policies take shape within the European Community/European Union, the European Community organs (in particular the European Commission, as the European Community body acting most directly in the common European interest) have obtained considerable freedom to draft, or at least prepare, European policies through varying non-binding instruments such as resolutions, White Papers, and Green Papers. Yet, the boundaries of the freedom afforded to the European Community's organs to draft European policies are always provided by the body of European Community law and the political will of the totality of European Union member states. With regard to the political will of the totality of the European Union's member states, they use their prerogatives (in particular through the Council) to: (i) allow the European Community's organs to engage in any policy initiatives; (ii) condition or control the European Community's organs' policy initiatives; or (iii) obstruct the European Community's organs' policy initiatives. Additionally, once a policy initiative has to be translated into new European Community law, the Council of Ministers in its interplay with the European Commission, the European Parliament, and the European Court of Justice will be able to exercise some degree of control over the European Community's organs' policy initiatives.

57. Id. arts. 81-89.
58. Id. arts. 94, 95.
60. See, e.g., EC Treaty, supra note 44, arts. 250-52 (providing the basis for the complicated decision-making processes formally applicable to the development of European Community law).
V. EARTH OBSERVATION POLICIES IN EUROPE – THE EXAMPLE OF FRANCE

This Article previously established that when it comes to the development, drafting, and execution of regulations and policies pertinent to satellite earth observation, there is no single Europe or European entity which is in the driver's seat. Major parts of policy and law-making in the area of satellite earth observation remain at an individual member state's national level. In spite of the major advances in international integration achieved over the last decades in Europe with regard to European space activities, the individual member states, who are also members of the relevant space-related organisations, remain sovereign in the determination of their own nation's policies, laws, and regulations if not otherwise agreed to in the context of the European Space Agency (“ESA”), the European Meteorological Satellite Organisation (“EUMETSAT”), or conflicting and applicable European Community law. In other words, these states determine first and foremost their own policies, policy directions, and approaches, and may also determine whether such a policy or policy direction is better served by implementing it on a domestic level, including enunciating legislation, using any of the various international platforms available, or probably both.

When it comes to ESA and EUMETSAT platforms, involving either platform would largely amount to the development and elaboration of policies by means of specific projects. In contrast, when the European Community platform is involved, it would predominantly include working towards international regulation as international regulation is still the main thrust of the European Community's existence.

It is then only at a second level that the existence of these platforms, due to the specific expertise developed in their context, may lead to some input in the policy and law-making processes, essentially autonomous, or at least separate from the sum of inputs, of the individual member states. Particularly in ESA, the independent competence of the Director General has resulted in the proposition of many mandatory or optional activities.61 In the European Union context, it is the mandate of the European Commission to execute policies, and to often initiate policies, and to initiate specific European Community legislation to further such policies which takes care of such input separate from that of the sovereign member states. In both cases, the caretakers of the common interests of the member states ultimately

still depend upon individual member states to the extent that any separate input can effectively result in space programmes (in the cases of ESA and EUMETSAT), respectively new legislation (in the case of the European Community). 62

A good illustration of the working of these mechanisms in regard to satellite earth observation programmes is represented by France, the European state generally considered to be first amongst equals in European space activities (excluding, obviously, the special case of Russia). It must be noted that France was a leading factor in establishing ESA as a means to help establish a measure of independence in outer space from the United States. It is not by accident that ESA’s headquarters are in Paris, France. 63 Additionally, France was key in establishing the first European Communities as a means, inter alia, to preclude any possible belligerent resurgence of West-Germany and to harness the latter’s industrial potential for European and French causes. 64 France remained the leading nation in the European Community until two things occurred. First, reunified Germany finally shed its moral heritage from the Second World War. Second, the United Kingdom had become a member of the European Community after overcoming its relative outsider position due to its late entry.

Although France played a leading role in establishing both ESA and the European Community, it always retained its right to decide whether or not to involve any of those platforms in its policy objectives as a sovereign state. France could, and did, propose space projects to be undertaken as an ESA programme when France likely considered it key to be able to make use of other states’ financial, technical, and political contributions. A good example is a programme initiated by France to develop an independent European launcher, namely the Ariane, that France proposed as an optional programme to ESA’s Council.

Once the Ariane programme had delivered a launcher prototype, a specific entity, rather than ESA, was established to operate and offer launch services on a commercial basis. 65 The entity created to operate and offer launch services on a commercial basis was named Arianespace. 66

62. Cf. id. art. 249-52 (providing the competences of the Commission from this perspective).
64. RALPH A. FOLSOM, PRINCIPLES OF EUROPEAN UNION LAW 2-5 (2005).
65. See supra note 20 and accompanying text.
Arianespace is a consortium incorporated as a private firm under French law and established at Evry, France. Therefore, Arianespace is of French nationality. In addition, 58.48 percent of the ownership shares of Arianespace belonged, at least under the original arrangements, to French entities (the French space agency Centre National d'Études Spatiales ("CNES") was the largest single shareholder and owned thirty-four percent of all Arianespace ownership shares). Additionally, Arianespace itself is a Groupement d'Interet Economique ("GIE") subsidiary to CNES. The remainder of Arianespace's shares were divided over public and private entities in ten other individual member states of ESA. Also, apart from its formal characterisation as a GIE, Arianespace is still dependent upon ESA and CNES. Arianespace builds, markets, and operates the Ariane launchers, as developed largely by ESA and CNES, in addition to exploiting and maintaining the launching pads and related installations at the Centre Spatial Guyanais ("CSG") at Kourou, in French Guyana.

However, France, by contrast, decided to work towards maximum independence in the earth observation area. Specifically, France developed the Satellite Pour l'Observation de Terre ("SPOT") programme and satellite system as an essentially national project with only the minor participation of a few other European states on a bilateral basis. Notably, France did not develop SPOT through ESA (or EUMETSAT).

In 1986, CNES launched the SPOT-1 satellite that undertook earth observation by capturing pictures with twenty and ten meter-resolutions for colour and black-and-white pictures respectively. The SPOT-1 satellite earth observations were done essentially on France's own behalf. The SPOT system involved, apart from the SPOT satellites, two primary ground stations in Europe (at Toulouse, France and Kiruna, Sweden) and an international network of twelve receiving stations that gradually expanded to twenty receiving stations. The other

67. *Id.* arts. 1, 3, 4, 6.

68. The figures concerning the shares held by entities outside France, grouped by country, are as follows: Germany 19.6%; Belgium 4.4%; Italy 3.6%; United Kingdom 3.17%; Switzerland 2.7%; Spain 2.5%; Sweden 2.4%; Netherlands 2.2%; Denmark 0.7%; and Ireland 0.25%.


states involved, whether European or not, were never taken on board of the governance structure established for SPOT.\textsuperscript{72}

It was also a purely French policy decision to privatise the downstream marketing activities with regard to the data collected by the SPOT programme. Thus, the private company SPOTImage was incorporated under French law in 1982, like Arianespace, as a GIE subsidiary to CNES. SPOTImage was headquartered in Toulouse, France. Additionally, SPOTImage's purpose was to market and sell the remote sensing data collected by the SPOT satellites which, at that time, had not been launched.\textsuperscript{73} Shareholders in SPOTImage came from France, Belgium, Italy, and Sweden. Notably, Belgium, Italy and Sweden were the other states involved in financing the SPOT program.\textsuperscript{74}

Satellite earth observation was a matter intricately linked with military and security issues. In terms of a data access policy, the French government limited the precision of SPOT data that was to be made available on the open market to a resolution of ten meters when the first SPOT satellites had just been launched. However, the French government's policy of limiting the precision of SPOT data later changed when a similar United States policy was changed to allow for very high resolution data to be sold on the open market.\textsuperscript{75}

Similarly, France entered into some bilateral agreements with several other states, European states in particular, on joint satellite operations without using the option to involve ESA or EUMETSAT. France's agreements even included a military satellite project, the Helios satellite, with Italy where the option of using ESA or EUMETSAT would not even have been available. The reason that France could not have used ESA for the Helios satellite programme is because ESA's Convention requires it "to provide for and to promote, for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications."\textsuperscript{76} The phrase exclusively peaceful purposes has been interpreted, at least until fairly recently, to exclude any involvement with military operations. Whilst EUMETSAT has no such reference in its Convention, the reason that France could not have used that organisation as a platform for the Helios satellite programme stems from the understanding that, as

\textsuperscript{72} Id. at 178.
\textsuperscript{73} MEREDITH & ROBINSON, supra note 70, at 26; BRACHET, supra note 70, at 176.
\textsuperscript{74} Kevin Madders, European Commercial Space: An Overview, 8 ECSL NEWS 1-2 (1991). CNES, as the largest single shareholder, holds 34.468%. See also MICHAEL HARR & RAJIV KOHLI, COMMERCIAL UTILIZATION OF SPACE 39 (1990) (referring to the older figure of CNES holding 39%; French entities altogether accounted for 87.8%, Sweden's SSC held 6%, the Belgian government 4.4% and other entities the remaining shares).
\textsuperscript{75} Michel Bourbly, Legal Problems Posed by the Commercialization of Data Collected by the European Remote Sensing Satellite ERS-1, 16 J. SPACE L. 130 (1988).
\textsuperscript{76} ESA Convention, supra note 61, art. II (emphasis added).
such, meteorological data presumably cannot be used for anything else but peaceful purposes. To the marginal extent that a countervailing argument could be made, EUMETSAT's status as a daughter entity of ESA would be expected to mean that the former would also be subject to the latter's obligation to not be involved with military operations.

In short, as the above analysis of the case of France establishes, both ESA and EUMETSAT present possible channels for individual member states' space policies to be taken to a higher level, even if sometimes considerably changed in the process. Specifically, ESA and EUMETSAT could possibly benefit individual member states' space policies due to the contributions of other individual member states. As this Article will further establish, a similar conclusion can be drawn in the area of legislation and regulation with regard to the European Community's legal framework to the extent, as far as the subject matter of this Article is concerned, that European Community law can deal with satellite earth observation issues.

VI. THE INTERNATIONAL GUIDELINES ON EARTH OBSERVATION POLICIES

Before actually moving into the realm of policy making at an European level on satellite earth observation, this Article's analysis will next establish that such policy making is guided by one document of international, even global, application: the United Nations General Assembly containing the Principles Relating to Remote Sensing of the Earth from Outer Space of 1986 ("Resolution 41/65"). While a United Nations General Assembly Resolution is not binding, the contents and principles of Resolution 41/65 have been accepted with consensus by most states operating earth observation systems as evidenced by their policies and practices. Additionally, domestic


EUROPEAN SATELLITE OBSERVATION

laws have regularly deferred to Resolution 41/65.\textsuperscript{79} Thus, Resolution 41/65's principles are generally perceived to constitute customary international law.\textsuperscript{80} At the same time, Resolution 41/65 was largely drafted as broad legal principles rather than clear-cut rules, rights, and/or obligations that could be directly implemented.

Therefore, it was in terms of (national as much as European) policies that Resolution 41/65 found its most widespread application.\textsuperscript{81} From such a perspective, the parts of Resolution 41/65 that deal with downstream access to, and dissemination of, earth observation data presented the most directly important principles. The key principle here provides:

As soon as the primary data and the processed data concerning the territory under its jurisdiction are produced, the sensed State shall have access to them on a non-discriminatory basis and on reasonable cost terms. The sensed State shall also have access to the available analysed information concerning the territory under its jurisdiction in the possession of any State participating in remote sensing activities on the same basis and terms, taking particularly into account the needs and interests of the developing countries.\textsuperscript{82}

By way of explanation, the following may be added: the concept of the sensed State and its opposite part refer to the dichotomy underlying much of Resolution 41/65. This dichotomy was largely between the developed states and the developing states which feared that other states' remote sensing operations might encroach upon their permanent sovereignty, particularly encroachment upon a developing state's sovereignty over its natural resources.\textsuperscript{83} This sovereignty can become almost meaningless if other states obtain superior-quality information regarding the developing state's territory and the resources therein.

\textsuperscript{79} Smith & Doldirina, supra note 78, at 254-55; Williams, supra note 78, at 3; Christol, supra note 78, at 73; Kopal, supra note 78, at 14-20.

\textsuperscript{80} Smith & Doldirina, supra note 78, at 254-55; Williams, supra note 78, at 3; Christol, supra note 78, at 73; Kopal, supra note 78, at 14-20.


\textsuperscript{82} Resolution 41/65, supra note 77, princ. XII.

Essentially, the other states could use such superior-quality information to obtain exploitation rights regarding the area concerned so easily and cheaply that the developing state at issue may not be able to gauge the true value of such rights. As the developed states were largely fundamentally opposed to any restriction on their freedom to conduct space activities, including earth observation, and to generate information in the broadest sense of the word, this issue was hotly debated.

Furthermore, regarding a key phrase found within Principle XII of Resolution 41/65, primary data were defined as "[those] raw data that are acquired by remote sensors borne by a space object and that are transmitted or delivered to the ground from space by telemetry in the form of electromagnetic signals, by photographic film, magnetic tape or any other means." Additionally, Resolution 41/65 defined the phrase processed data as "the products resulting from the processing of the primary data[] needed to make such data usable." Resolution 41/65 also defined the phrase analysed information as "the information resulting from the interpretation of processed data, inputs of data and knowledge from other sources."

Finally, regarding the increasing potential of satellite earth observation data for use in the context of disaster mitigation, the two principles regarding man-made threats and natural disasters should be discussed. Such threats and disasters interfere with the basic right, as recognised in certain broad parameters in Principle XII as quoted above, for satellite operators to disseminate data under conditions and with fees they would deem appropriate. On the one hand, Resolution 41/65, dealing with man-made threats to the environment belonging to the category of disasters, provides the following: "[r]emote sensing shall promote the protection of the Earth's natural environment. To this end, States participating in remote sensing activities that have identified information in their possession that can be used to avert any phenomenon harmful to the Earth's natural environment shall disclose such information to States concerned." On the other hand, Resolution 41/65 deals with natural disasters in a similar manner in that it provides:

85. Resolution 41/65, supra note 77, princ. I(b).
86. Id. princ. I(c).
87. Id. princ. I(d).
88. Id. princ. X.
Remote sensing shall promote the protection of mankind from natural disasters. To this end, States participating in remote sensing activities that have identified processed data and analysed information in their possession that may be useful to States affected by natural disasters, or likely to be affected by impending natural disasters, shall transmit such data and information to States concerned as promptly as possible.\textsuperscript{89}

Pursuant to these two aforementioned principles, the Charter on Space and Major Disasters has, as of 1999, established an institutional structure for the relevant space agencies and satellite operators in hopes of ensuring that data helpful in disaster prevention, mitigation, and rehabilitation activities are expedited to the relevant disaster agencies as quickly, efficiently, and inexpensively as possible.\textsuperscript{90} As part of generally recognized policy concerns and interests at all European and individual state levels, European states, the European Union, the European Meteorological Satellite Organisation ("EUMETSAT"), and, in particular, the European Space Agency ("ESA") play a major role in ensuring that data helpful in disaster prevention, mitigation, and rehabilitation activities are quickly disseminated to disaster agencies.

Finally, as far as international legal principles regarding the dissemination of satellite earth observation data is concerned, Resolution 40(Cg-XII) ("Resolution 40"), which was enunciated by the World Meteorological Organisation ("WMO") in 1995, becomes important.\textsuperscript{91} Resolution 40, entitled "WMO policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities," \textit{inter alia} provided the following:

(1) Members shall provide \textit{on a free and unrestricted basis} essential data and products which are necessary for the provision of services in support of the protection of life and property and the well-being of all nations, particularly those basic data and products, as, at a minimum, described in an-

\textsuperscript{89} Id. princ. XI.
nex 1 to this resolution, required to describe and forecast accurately weather and climate, and support WMO Programmes;
(2) Members should also provide the additional data and products which are required to sustain WMO Programmes at the global, regional, and national levels and, further, as agreed, to assist other Members in the provision of meteorological services in their countries. While increasing the volume of data and products available to all Members by providing these additional data and products, it is understood that WMO Members may be justified in placing conditions on their re-export for commercial purposes outside of the receiving country or group of countries forming a single economic group, for reasons such as national laws or costs of production;
(3) Members should provide to the research and education communities, for their non-commercial activities, free and unrestricted access to all data and products exchanged under the auspices of WMO with the understanding that their commercial activities are subject to the same conditions identified in ADOPTS (2) above. . . .92
Such major international commitments, even though strictly speaking not of a binding legal nature, constituted the backbone of the major policy documents drafted in the European context on access to, and dissemination of, earth observation data generated by satellites.

VII. EUROPEAN EARTH OBSERVATION DATA POLICIES: ESA, EUMETSAT, AND SPOT

Indeed, the need to draft data access policies for earth observation data arose with the launch of the first European earth observation satellites. The principles found in the United Nations General Assembly containing the Principles Relating to Remote Sensing of the Earth from Outer Space of 1986 ("Resolution 41/65"), in particular with regard to free and non-discriminatory access, sovereign rights, general international law, and the World Meteorological Organisation's ("WMO") Resolution 40(Cg-XII) ("Resolution 40"), were key elements of early European data access policies for earth observation data.

At the same time, the proof of the pudding was in the eating. For example, formal adherence to the Principles of Resolution 41/65 was one thing. However, some of the Principles of Resolution 41/65, at least at a theoretical level, easily give rise to conflicting application with other Principles of Resolution 41/65. Specifically, one question which arose out of Resolution 41/65's conflicting principles was how

92. WMO Resolution 40, supra note 91.
the principles were amalgamated at the policy level with the more practically oriented interests of the organisations (principally the European Space Agency ("ESA") and the European Meteorological Satellite Organisation ("EUMETSAT")) involved and the individual member states of such organisations.93

Already, the early history of data access policies in Europe shows some interesting examples as the present succinct survey will attempt to show. It also shows that the broad sweep of the principles of Resolution 41/65, for better or worse, allow individual states considerable leeway with regard to satellite earth observation operators in interpreting and implementing data access policies.

The major issue here concerns the exact and authoritative interpretation and implementation of the central concept of Resolution 41/65's Principle XII ("Principle XII"), namely the "access [to remote sensing data] on a non-discriminatory basis." First, Principle XII references data access on a non-discriminatory basis which suggests that discriminatory elements may still come into play if sufficiently justified by ulterior reasons. Thus, non-discrimination apparently is not an absolute principle of Principle XII. Also, Principle XII's phrase "and on reasonable cost terms" is noteworthy because it allows for considerations of costs in regard to collecting, processing, and analysing data access where such considerations would otherwise constitute discrimination.94

Secondly, discrimination essentially entails making distinctions between equal cases. That is, discrimination involves cases which are not different from each other on those points which matter.95 However, this still begs for a question, or rather several questions.96 Is it discrimination to allow developing states better terms of satellite data access than developed states? Is it discrimination to allow satellite data access to befriended states while refusing it to inimical ones? Is it discrimination to allow satellite data access to states who co-fund your satellites on better terms than those which do not? What is equal? Which points matter and which points do not matter? Perhaps

95. See, e.g., BLACK'S LAW DICTIONARY 500 (8th ed. 2004) (defining "discrimination" as "[a] failure to treat all persons equally when no reasonable distinction can be found between those favored and those not favored.").
most importantly, is there a uniform answer to the aforementioned questions or does everyone have their own interpretation and does everyone implement Resolution 41/65 accordingly?

Thirdly, the focus of Principle XII on the sensed State might also allow for fundamentally different applications of its contents in the broader context. This focus of Principle XII is obviously a consequence of the then-prevailing dichotomy between advocates who believe in free remote satellite sensing and the freedom of information gathering and advocates of permanent sovereignty over territory and natural resources. The latter claimed either preferential or exclusive rights to the data concerning their own territory. Sometimes the latter even claimed the right to prohibit the collection of data by remote sensing satellites altogether.

Indeed, the principle of non-discrimination as provided by Resolution 41/65 focuses on not discriminating between sensed states and third states interested in a particular set of satellite earth observation data. In addition, in view of the fact that developing countries would be most likely to find themselves only in the role of a sensed state, positive discrimination of developing states in a sense is actually recommended. This Article will now analyze how the two principal European organizations involved in satellite data gathering have interpreted Resolution 41/65's principle of non-discrimination using what limited legal instruments they have available if the case arises.

As for ESA, the first comprehensive satellite remote programme started in the early 1980s. Specifically, ESA's first comprehensive satellite remote programme, inclusive of satellite operations, data handling, and data distribution, concerned the two European Remote Sensing Satellites. These two European Remote Sensing Satellites were known as ERS-1 and ERS-2. On the one hand, the data policies for both European Remote Sensing missions were based on the idea that states should have free access to the data on an open and non-discriminatory basis. Such data policies reflected at least the spirit of Resolution 41/65. On the other hand, ESA's ownership and full title to

97. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, U.S.-U.K.-Russ., arts. I, III, Jan. 27, 1967, 18 U.S.T. 2410 (hereinafter Outer Space Treaty); see also supra note 81. It should be reiterated here the latter freedom would be but one specific manifestation of the more general freedom of conducting space activities, as long as the space activity fell within the rather loose parameters of the regime of outer space law, including general international law, as applicable.

98. Outer Space Treaty, supra note 97, arts. I, III.

the data, using the legal instrument of copyright, was used to restrict access to the data wherever and whenever free access to them was not deemed to be reasonable and desirable by ESA. Free access to the data apparently was not considered to be an absolute principle.

Upon closer inspection, it appears that ESA considered the core element of non-discrimination to lie in freedom of access to ERS data for everyone, in a principled way, through a non-exclusive licensing system. Essentially, ESA must have reasoned that so long as the ERS data was not the exclusive property of an individual state who could restrict its availability to any other state, Resolution 41/65's non-discrimination principle was met. Thus, ESA used an extensive licensing scheme, either through so-called Principal Investigators or directly to users, as an extension of its ownership and full title to the data for the purpose of providing public availability through recognised channels and licenses. Finally, it should be noted that ESA's imposition of fees on states wanting the data formed an important aspect of the licensing system.

Even as the text of Resolution 41/65 has remained the same, ESA's relevant interpretations and implementation of Resolution 41/65 has changed considerably in terms of drafting appropriate data access policies for the second comprehensive satellite earth observation programme, Envisat. ESA's Earth Observation Programme Board approved the Envisat Data Policy ("EDP") in February 1998 after three revisions. The EDP "defines an overall set of policies and rules for access to all Envisat data and the associated products and services." Registration of Envisat with the United Nations Secretary-General, in conformity with the Registration Convention, has the purpose of confirming ESA's unequivocal ownership and title to use intellectual property rights mechanisms as the major data policy tool. Again, further implementation of ESA's property rights in the satellite earth observation data sector takes place through a non-exclusive licensing system.

100. See Convention for the Establishment of a European Space Agency art. III(2)-(4), May 30, 1975, 14 I.L.M. 864 [hereinafter ESA Convention] (regarding the handling of intellectual property rights, including copyrights, in the context of products developed by, or within the framework of, ESA).


103. ENVISAT DATA POLICY, supra note 102, § 1.1.

104. See ESA Convention, supra note 100, arts. II, VII(1); SPACE LAW - BASIC LEGAL DOCUMENTS § A.IV.4.2. (Karl-Heinz Bockstiegel & Marietta Benko eds., 2008). ESA has accepted all rights and obligations of the Convention so as to become a de facto party to it by its Declaration of January 2, 1979.
Envisat data are to be "available in an open and non-discriminatory way" and in explicit conformity with Resolution 41/65.\textsuperscript{105} Additionally, "Envisat distributing entities shall provide services to users in a fair and non-discriminatory way."\textsuperscript{106} The relativity of Resolution 41/65's non-discrimination principle immediately becomes clear when further details are provided regarding the system of distributing Envisat data. For instance, the EDP states that "[n]ationally registered . . . entities from Participating States shall have a higher priority than those from non-Participating States in the selection process for distributing entities, in absence of other elements of discrimination."\textsuperscript{107} Thus, it is recognised that some sort of discrimination is already involved in selecting national distributing entities for the purpose of Envisat data dissemination. Furthermore, it is recognised that other forms of discrimination might also be allowed regardless of Resolution 41/65's non-discrimination principle.

From the further details of the Envisat data distribution scheme, two such forms of discrimination come to the forefront quite prominently. The two forms of discrimination found within the Envisat data distribution scheme relate to the two fundamental forms of data dissemination that arise in cases where remote sensing satellites are run by operational entities that also control the dissemination of the satellite data. The first form of discrimination concerns distribution on Earth, that is, dissemination of satellite data after the satellite data has been received, and where appropriate, processed. The second form of discrimination concerns distribution from space, in other words the direct reception of data by other entities authorised by the relevant operational entity.

For the first form of discrimination, a distinction is made between Category 1 use, use for research and applications development support, and Category 2 use, use comprising all uses other than uses for research and applications development support.\textsuperscript{108} Category 2 uses include operational and commercial uses.\textsuperscript{109} The distinction between Category 1 uses and Category 2 uses is normally realized through the pricing structure of the data. For Category 1 uses, users will only pay the price "at or near the cost of reproduction of the data."\textsuperscript{110} However, the fee for Category 1 uses is waived if the applicable project is either

\textsuperscript{105} \textit{Envisat Data Policy}, supra note 102, § 2.
\textsuperscript{106} \textit{Id.}
\textsuperscript{107} \textit{Id.} § 1.6.
\textsuperscript{108} \textit{Id.} § 2.2.
\textsuperscript{109} \textit{Id.}
\textsuperscript{110} \textit{Id.} § 3.2. Obviously, such waivers would be at issue, \textit{inter alia}, where in kind exchange of data with other operators is concerned, subject to determination that such cooperation justified the waivers concerned. \textit{Id.}
approved in the framework of the Envisat programme or by the Earth Observation Programme Board.\textsuperscript{111} With respect to Category 2 uses, ESA will fix the price of data at which it will be sold to distributing entities who are then allowed to set their own (higher) prices when selling the data further on in order to make a profit.\textsuperscript{112}

The extent to which distributing entities will, in law or in fact, be forced to implement any non-discrimination principle is difficult to distil from the texts. Distributing entities are explicitly allowed to define their own pricing policies, but any further distribution of the data by other entities must take place in accordance with the EDP. Thus, the distribution of the data by entities other than the distributing entities must adhere to the non-discrimination principle of Resolution 41/65. However, ESA maintains some control over the pricing of the data through its right to fix a ceiling level for the market price. This rather rough tool is the only means to force distributing entities to adhere to Resolution 41/65’s non-discrimination principle in terms of pricing.\textsuperscript{113} The major justification for this limited level of control seems to be the non-exclusive character of any license, similarly to what was the case with the ERS data, and the limited time-span for any license.

The second form of discrimination arises where there is a possibility that ground stations could receive data directly from the Envisat satellite. The national ground receiving stations of the states participating in the Envisat programme have the right to receive Envisat data without having to pay a fee, but these states have an obligation to implement the EDP in their respective territories in good faith.\textsuperscript{114} Additionally, states receiving Envisat data without paying a fee have an obligation not to compete with commercial distribution mechanisms involving the data outside their respective territories.\textsuperscript{115} Conversely, stations in states not participating in the Envisat programme, referred to in the texts as foreign stations, are charged an access fee as a matter of principle.\textsuperscript{116}

In short, ESA adheres in name to Resolution 41/65’s Principle XII’s non-discrimination principle. Furthermore, ESA can justify any discrimination in its data access policy by pointing at the fundamentally different cases underlying such acts of discrimination. Moreover, no reference has been made to the special interests of either sensed states or developing states. In fact, the possibility even remains to re-

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{111} Id.
\item \textsuperscript{112} Id. § 3.3.
\item \textsuperscript{113} Id. § 3.3.
\item \textsuperscript{114} Id. §§ 1.6, 6.3.2.
\item \textsuperscript{115} Id.
\item \textsuperscript{116} Id. §§ 3.5, 6.3.3.
\end{itemize}
\end{footnotesize}
spect, in any particular case, the special rights and interests of sensed states or developing states. Next, this Article's analysis will look at the other European organisation principally involved in satellite earth observation activities, EUMETSAT. Additionally, this Article's analysis will establish that the data access policies developed for the first satellite system and the data access policies developed for the second satellite system are similar.

The first fundamental and comprehensive EUMETSAT Data Policy of June 1991 focused on categories of users with different rights of access, as opposed to uses, while continuing to adhere to the principle of free exchange of certain data amongst the members of the WMO.\(^{117}\) EUMETSAT's Data Policy distinguished between three types of users: the national meteorological services of the member states (who were entitled to free full use and distribution, as long as within the national territory), the national meteorological services of non-member states (who were offered restricted free use of relevant data for internal purposes only), and all other users (who could obtain relevant data at negotiable, presumably more or less commercial, prices). Similar to ESA, EUMETSAT held the copyright to the data. EUMETSAT's copyright protection was used as the principal tool to implement its policies and to achieve the desired balance between its responsibility for global research and the character of Meteosat data as a special resource. Specifically, EUMETSAT applied encryption to the data since 1994 to help prevent any circumvention of the copyright.\(^{118}\)

However, a new EUMETSAT data policy resolution was adopted in July 1998.\(^{119}\) Since 1991, perhaps the most important quasi-legislative event at the global level of meteorological satellite remote sensing data policies was the promulgation of WMO's Resolution 40. The dichotomy between scientific data of public value and commercial use of satellite data had increased in importance. WMO's Resolution 40 had the effect of strengthening EUMETSAT in its resolve to continue to apply a data distribution system reflecting this dichotomy. Thus, the "need to preserve the benefits of EUMETSAT membership" was now explicitly mentioned.\(^{120}\)

Therefore, under EUMETSAT's new data policy as per the 1998 resolution, the national meteorological services of the member states were to receive all Meteosat data for free, but only "for their Official Duty use."\(^{121}\) Principle I of those data policy principles, further de- 

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\(^{117}\) Kevin Madders, A New Force at a New Frontier 519-20 (1997).
\(^{118}\) Jakhu, supra note 94, at 84-85.
\(^{120}\) Id. pmbl., para. 8.
\(^{121}\) Id. princ. I.
fines "[o]fficial [d]uty' as encompassing all internal activities of the national meteorological service as well as those "external activities... resulting from legal, governmental or intergovernmental requirements relating to defence, civil aviation[,] and the safety of life and property." In other words, a national meteorological service may no longer avail itself of EUMETSAT data for free if the data is to be used in its commercial activities. Furthermore, Principle III of that same EUMETSAT resolution provides that the national meteorological services' commercial activities are to be treated in an equivalent way to other commercially operating entities.

Principles IV through VII of EUMETSAT's data policy resolution provides that certain sets of data are to be provided for free, namely to all WMO members as following from WMO's Resolution 40, to national meteorological services of non-EUMETSAT member states if the data is used for official duty business, for research and educational projects per se, and to the European Centre for Medium-Range Weather Forecasts ("ECMWF") for ECMWF's own use. All other users of EUMETSAT data can receive the data, products, and services for a fee which may be waived under conditions defined by the EUMETSAT Council. EUMETSAT's ownership over the relevant data, including the intellectual property rights, was the key tool the organisation used to implement Resolution 40. Specifically, EUMETSAT's intellectual property rights were used to implement a licensing scheme with respect to all other data and products.

Most interesting from the perspective of Resolution 41/65, and its emphasis on the needs and interests of developing countries in the framework of data distribution on a non-discriminatory basis, is the third Annex. The third Annex deals with the various fees wherever applicable. Specifically, a twofold fee structure is applied to national meteorological services of non-EUMETSAT member states who want EUMETSAT data. For those states with a per-capita gross national product below or equal to US $3,500, data for official duty usage are provided to the national meteorological services for free. In 2007-2008, states with higher per-capita gross national products would be required to pay 60,000 € annually for hourly Meteosat data, 80,000 € for half-hourly Meteosat data, and 100,000 € for quarter-hourly Meteosat data. Thus, the payment scheme placed upon non-EUMETSAT

122. Id.
124. Resolution EUMETSAT, supra note 119, princ. VIII.
125. Id. ¶ 3.
126. Id.
member states presents a clear picture of positive discrimination of developing states, albeit only as far as official duty usage is concerned. However, positive discrimination applies regardless of whether the national meteorological service is that of a sensed state or not.

Finally, a few words on the national satellite earth observation system briefly discussed before: the French SPOT system entailed marketing and distribution that were controlled by the private French company SPOTImage. Also for SPOT and SPOTImage, the key tool used in the implementation of data policies is the use of intellectual property rights, specifically copyrights, to control the reservation of data where required or desired and to control downstream distribution of the data where allowable.

Interestingly, SPOTImage considered adopting different rates for different user categories of data to be unfeasible because such a policy could result in leakage of data and potentially come into conflict with the Principles of Resolution 41/65. Instead, SPOTImage considered external compensation mechanisms more appropriate in balancing the justified need of scientific communities to obtain relevant data with the fact that not all scientific communities were in a position to afford the commercial prices of the data. At the same time, differentiating between use for distribution and final use took care of the commercial interests of SPOTImage in that its own markets should not be undercut by its own downstream clients re-selling data.

VIII. EUROPEAN EARTH OBSERVATION DATA LEGISLATION: THE EUROPEAN COMMUNITY/UNION

As indicated, both from the point of substance (general economics as opposed to space) and from the point of structure (law dominant over policies), the European Community, then European Union, approaches satellite earth observation fundamentally differently from the European Space Agency ("ESA"), the European Meteorological Satellite Organisation ("EUMETSAT"), and the member states (which so far, with the exception of Germany as discussed later, have not established specific national laws dealing with remote sensing).

The European Community's involvement started in the late 1980s when the major project of finalising the Internal Market required envisaging the monitoring of a number of specific parameters. Most notably, some of the parameters monitored as part of finalising the Internal Market included fraudulent claims to obtain unjustified agricultural subsidies, the quotas on the fishing of certain stocks in order

to prevent over-fishing, and violations of environmental legislation. Original plans for the European Community to become more involved in space included launching its own monitoring satellite, under the project name Green Eye in the Sky, to monitor violations of environmental legislation were quickly downsized to leasing an instrument on the French SPOT-4 satellite. Later, developments in international environment treaties, such as the Convention on Climate Change and the Kyoto Protocol, continued to emphasize the need for monitoring through the use of satellites. However, the European Community never followed through on this particular venture.

The European Community then became involved in a specific aspect of earth observation which was starting to cause some concern in Europe. This aspect required a legal approach. Within Europe (and beyond the specific context of SPOT and SPOTImage), the initial topic of copyrights in the context of satellite earth observation was considered a matter for ESA and perhaps EUMETSAT. Specifically, the ESA Convention stated that ESA "shall, with regard to the resulting inventions and technical data, secure such rights as may be appropriate for the protection of its interests, of those of the Member States participating in the relevant programme, and of those of persons and bodies under their jurisdiction." However, it rapidly became clear that ESA's own competencies were too limited for establishment of a more comprehensive legal regime. Specifically, it was clear that ESA could only effectuate relevant protection of satellite earth observation data through, and as far as could be provided by, individual contracts.

When potential applications of earth observation data became more known, the European Commission also became interested in such potential applications. Specifically, the European Commission became interested in the possibility that intellectual property rights over the satellite earth observation data could be used as anti-competitive tools. For example, individual companies could use copyrights to sell licenses for exclusive access or usage in specific satellite earth observation data in national territories. Thus, individual companies could artificially carve up the Internal Market into nationally separated markets in contravention of relevant European Union princ-

Therefore, the European Commission initiated a study that resulted in the recommendation that the then-drafted European Community Directive on the protection of databases be made applicable to satellite earth observation data.133

However, satellite earth observation data was hard to legally protect due to the way in which the concept of copyrights had been developed historically. One of the main problems with raw data, in the context of copyright law, is that it does not easily satisfy the originality criterion required to qualify for copyright protection in many jurisdictions. Specifically, there usually is no creative human intervention involved in producing raw data. The lack of creative human intervention involved in producing raw data is especially prevalent if the data are generated automatically or in a pre-programmed fashion. Collections of raw, corrected, or treated data also fail to satisfy the originality criterion required for copyright protection if there is no creative human intervention involved in producing collections of such data.

Still, for want of better legal tools, most operators in Europe used copyright protection to protect the data that resulted from activities in outer space. Of course, in the absence of any specific European Community legislation on the matter, risks abounded that protection could differ between European states due to varying national copyright laws and/or varying interpretations of such copyright laws.134

Duly amending the European Community Directive, which was then being drafted, offered a solution; the result was Directive 96/9.135 Directive 96/9 established a sui generis-right of data base protection.136 Directive 96/9 obliges the member states of the European Union to include databases in their national intellectual property rights regimes in conformity with the parameters Directive 96/9 provides. Directive 96/9 applies both to nationals (including companies)

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134. The existing international treaties on copyrights, often of near-global scope, were also ill-equipped to deal with the specific requirements of satellite earth observation data providers. This concerned treaties such as the Berne Convention For the Protection of Literary and Artistic Works, Sept. 9, 1886, 126 A.T.S. 1901, The Universal Copyright Convention cmd. 8912, Sept. 6, 1952, 216 U.N.T.S. 132, and the Copyright Treaty, Dec. 20, 1996, 36 I.L.M. 65 (entered into force Mar. 6, 2002).
136. Id.
from European Union member states undertaking such activities and to such activities if undertaken from the territory of any of the European Union member states.\textsuperscript{137}

In terms of substance, Directive 96/9 protects creative databases under copyright law and creates a unique protection (the \textit{sui generis}-right) for those databases which do not meet the requirement of originality as long as they are individually accessible and require a substantial investment to be generated. In other words, the \textit{sui generis}-right extends protection to databases containing material not otherwise protected by copyright. As a result, data derived from activities in outer space and assembled in an original database are protected within the territory of the European Union member states. As Directive 96/9's terms require, all European Union member states have transposed Directive 96/9 into national legislation.

The protection offered by Directive 96/9 consists of two sets of rights, the \textit{extraction right} and the \textit{re-utilisation right}.\textsuperscript{138} Both the extraction right and the re-utilisation right principally rest with the creator/owner of the database.\textsuperscript{139} The extraction right refers to the right to permanently or temporarily transfer all, or a substantial part, of the contents of a database to another medium by any means or in any form. Likewise, the re-utilisation right refers to the right to make available to the public all, or a substantial part, of the contents of a database by: (i) distributing copies of the data; (ii) renting the data; (iii) transmitting the data on-line; (iv) or transmitting the data in any other manner.

The first time a right holder sells, or consents to sell, a copy of a database within the European Union, the right holder exhausts the right to control resale of that copy. However, this idea might raise some special questions. The idea would mean in principle that the owner of satellite data could only sell the information to one user because he or she could not prevent that user from making the satellite data freely available to everyone else. This question is highly relevant as the commercial model for many earth observation activities of course relies on preventing resale in principle because the commercial operator wishes to profit himself from such resale, rather than his first-in-line customer.

The first-time-exhaustion referred to, however, means exactly that; the point-of-departure is that the law itself does not protect further than the first sale. If one does not want to accept that, one should simply, by contract, preclude any licensee from reselling the data by

\begin{itemize}
  \item \textsuperscript{137} Id. arts. 11(1), (2).
  \item \textsuperscript{138} Id. art. 7(2).
  \item \textsuperscript{139} Id.
allowing data usage only for internal purposes. This is, as a matter of fact, a rather common phenomenon.

The European Community/European Union, with its policy-driven focus on liberalising markets and establishing a level playing field within Europe, addressed this piece of harmonising legislation to an issue of particular relevance for commercial operators. Intellectual property rights protect commercial operators, allowing satellite earth observation to possibly become a profitable business. The European Community/European Union addressed the intellectual property rights of commercial operators by trying to preclude a situation where operators from different member states would receive different levels of protection in different national markets.

IX. EARTH OBSERVATION DATA LEGISLATION IN EUROPE – THE EXAMPLE OF GERMANY

As mentioned, Germany is the only member state of the European Union (and the European Space Agency (“ESA”)) possessing its own national law on remote sensing. Germany’s law, however, focuses on one particular aspect of earth observation data: the downstream potential of such data becoming sensitive from a security perspective. Germany’s focus on the protective aspect of observation data is not an accident. This area is relevant for earth observation because the European Union, so far, has made little inroads into the sovereignty of member states to regulate such issues on a domestic level.

In 2000, Germany faced the security relevance of radar data for the first time when it participated in the bilateral Shuttle Radar Topography Mission (“SRTM”) project with the United States. At that time, Germany opted for a unique non-transferable license for the data in question to enable the German Space Agency (Deutsches Zentrum für Luft- und Raumfahrt (“DLR”)) to exercise oversight over all users for security purposes. The law prevents users from further distributing the data without authorisation.

This non-transferable license system, however, was found to be incompatible with large-scale commercial dissemination. Such dissemination was envisaged when preparing for the launch and operations of the first German earth observation satellite with fundamental


141. The main exception, so far, concerns the issue of exports of dual-use sensitive goods, where since 2000 a rudimentary regime exists on the European level, partly overlaying the individual export controls of the member states. Council Regulation Setting Up a Community Regime for the Control of Exports of Dual-Use Items and Technology, June 22, 2000, No. 1334/2000/EC, O.J. 159/1.
private participation through a Public-Private Partnership ("PPP"), the TerraSAR-X. At the same time, Germany developed TerraSAR-X, in part, with U.S. technology. In using U.S. technology, Germany had to comply with U.S. security interests as part of broader German security, international legal, and foreign policy concerns.  

Because TerraSAR-X is a PPP project based on joint investments by the public sector (DLR) and the private sector (Infoterra, a company of the EADS Astrium consortium), Germany adopted an approach where DLR retained ownership of the satellite and was the first organisation to receive and handle all data TerraSAR-X generated. After DLR received the data, Infoterra received comprehensive copies of the data so both partners have a complete set of data in their archives. Next, DLR held the exclusive rights to scientific use of the TerraSAR-X data, whereas Infoterra held the exclusive commercialisation rights. The latter included both private and public sector data requests.

This somewhat sweeping classification (of commercialisation rights) was based on the idea that the commercial sector would need a broad potential clientele to grow into a healthy economic sector. Presumably, Infoterra would be more efficient in providing such data than any public sector stakeholder because of the commercial astuteness of a proper commercial operator and the economies of scale and scope which widely permitted use would allow. Because a substantial market for earth observation data should arise, a legal regime that precluded the data provider from accessing sensitive data at the outset would not be suitable.

While the German ministries responsible for defence and security took no share in such investment, but reserved the right to purchase data as required for their specific purposes upon completion of the system, these ministries insisted on maintaining a measure of control to ensure Germany’s national security and to ensure related international obligations would not be compromised by TerraSAR-X’s operations or downstream data distribution activities.

Both policy concerns, applied in an ad hoc-manner to TerraSAR-X, were transformed into proper law by means of the German Act on

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143. In the United States the same approach has led even the military at various points to use civil/commercial satellite services providers for their purposes, such as for in satellite communications and earth observation. The same philosophy was behind the United States decision in 1984 to commercialize satellites by means of the private data marketing and sales company EOSat. The same applies to several United Kingdom PPPs in military satellite communications.

144. This would refer in particular to the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies, Dec. 19, 1995.
Satellite Data Security ("GASDS") of 23 November 2007. The GASDS became effective 1 December 2007. The GASDS distinguished between the relatively minor amount of earth observation data potentially detrimental to national security or foreign policy interests and all remaining earth observation data, the distribution and/or commercialisation of which that could be allowed without risk and hence should be allowed. The GASDS enabled German operators to develop satellite earth observation applications into a commercially viable sector by providing transparency and certainty to concerned companies.

Ratione materiae, the German Act on Satellite Data Security (hereinafter the "Act") covers so-called high-grade space-based earth observation systems. These high-grade space-based earth observation systems are technically able to generate data that may be detrimental to national security or to foreign policy interests. The criteria for what constitutes a high-grade space-based earth observation system, therefore, are provided in the Act itself while the precise limits of these criteria are to be provided by means of a statutory ordinance yet to be drafted.

The backbone of the Act is the establishment of a control procedure for the dissemination of satellite data from the high-grade earth observation systems. The license structure is tuned to the key issue of controlling or directly accessing the relevant data as the satellites generate the data. The Act requires a license from the operator of the system as well as a license from the data provider desiring to disseminate such data, whether he acts as the operator or not, as long as the data is received more or less directly from the satellite. The license obligation consequently pertains to primary data providers such as Infoterra or the German Remote Sensing Data Center (part of DLR), but the license obligation generally does not pertain to typical earth observation service providers further downstream such as value-adding firms or data resellers. The Act effectively controls security interests at the source by regulating only the first level of dissemination by data providers either controlling the satellites (hence qualifying as operators) or directly accessing the relevant data themselves.

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146. The German term is hochwertig.
147. German Act on Satellite Data Security, art. 2(1)(6).
148. Id. arts. 3-10. Article 3 provides for the license obligation, as such.
149. Id. arts. 11-20. Article 11 provides for the license obligation as such. Article 2(1)(3) defines the data provider as any person who disseminates data generated by a high-grade earth observation system.
150. The definition of operator is "the person who has the control of the earth remote sensing system under his own responsibility." Id. art. 2(1)(1).
As for the operator, if a space-based earth remote sensing system is a high-grade system under the Act, Article 3 of the Act requires the operator to acquire a license from the Federal Office of Economics and Export Control. Article 3's requirement that an operator must acquire a license from the Federal Office of Economics and Export Control applies to German nationals and legal persons or associations of persons under German law, to foreign legal persons or foreign associations of persons with their head office in Germany, and to cases where inalterable sequences of instructions to command the orbital system are transmitted from within Germany.\footnote{151}

Following from similar security-related purposes, any relevant acquisition of data by foreign nationals, by legal persons or associations of persons under foreign law, or by legal persons or associations of persons under German law in which foreign nationals or legal persons or associations of persons under foreign law hold at least twenty-five percent of the voting rights specifically requires notification and requires a permit if such a take-over would otherwise dispense with the need for an operator license under Article 3(1) of the Act.\footnote{152} This a priori-form of control is necessary to achieve the security objectives of the Act because foreign persons or entities could more easily avoid supervision, access, and possibly criminal prosecution by German authorities – even if simply because they may be abroad by the time any suspicion as to their activities arises.

The main thrust of the Act's regulatory regime, however, may be that the primary data provider actually disseminates earth observation data subject to security-interest related controls of the German authorities. By definition the Act could be made applicable only to operations somehow falling within German jurisdiction, essentially to the extent those operations occurred in Germany itself. Thus, the Act covers all German citizens and organizations under German law, those foreign companies either domiciled in, or essentially exercising effective control over their operations within Germany, and all companies disseminating data from within German territory. In other words, the Act includes all companies for which the Act can be effectively enforced.\footnote{153}

\footnote{151. Id. art. 1(1)(1). In addition to the operator, the persons who have access to the essential operational elements of the system must be considered "reliable" for the purposes of the Act. To allow a better assessment of such reliability, a basic security check is carried out in accordance with the German Security Clearance Check Act. The operational premises must be adequately secured to prevent unauthorized entry and the transmission of commands to the satellite must be safeguarded by means of high-level encryption. In this connection, procedures certified by the Federal Office for Information Security are used. Id. art. 4(1)(3), (4)(2).

152. Id. art. 10(1), (2).

153. Id. art. 1(1)(2).}
Next, under its license, a primary data provider is obliged to review requests for data transactions on a case-by-case basis by means of a so-called *sensitivity check*.\textsuperscript{154} The data provider must carry out this sensitivity check in accordance with fixed procedures and clearly defined criteria. These fixed procedures and defined criteria leave little room for the data provider's discretionary assessment of whether any potential endangerment of German security interests exists.\textsuperscript{155}

Where the sensitivity check classifies the specific data request as non-sensitive, the data provider can provide the requested data products without additional consideration by the Federal Office of Economics and Export Control. Additionally, where the sensitivity check classifies the specific data request as non-sensitive, the data provider may allow the customer's receiving station to download the data.

If the security check classifies the customer's data request as sensitive, the Act initially prohibits the provider from complying with the customer's request. If that occurs, the Federal Office of Economics and Export Control examines the documentation the data provider provides in accordance with Article 18.\textsuperscript{156} Subsequently, the Federal Office of Economics and Export Control decides whether to issue or deny a permit in conformity with Article 19 within one month\textsuperscript{157} based upon whether compliance with the customer request would endanger relevant German security interests.\textsuperscript{158}

The Federal Office of Economics and Export Control might also rule out risks to German security interests by granting a permit that allows the data provider to alter the original plans for data delivery

\textsuperscript{154} Id. art. 17.

\textsuperscript{155} Id. art. 17(3). The criteria for the sensitivity check take account of the relevant technical parameters and factors such as the information content, form of processing used observed target area, the customer requesting the data and the ground stations to which data are to be transmitted, and the length of time between data acquisition and the processing of the data request. Id. art. 17(2).

\textsuperscript{156} Article 18(1) provides for an extensive list of documents covering the actual request: (1) the persons who prospectively comes into contact with the data as provided for in the request and their usual places of residence; (2) checking the identity of the requesting party; (3) the procedure and the results of the check of the sensitivity of the request under Article 17(1) in conjunction with the provisions of a legal ordinance under Article 17(3); (4) the data generation order placed with the operator of the high-grade earth remote sensing system; (5) the receiving logs of ground segments; (6) the details of encryption processes, including codes used and code management; (7) reports of the processing sequences of the ground segment; (8) metadata on the data, in particular, target area, time of generation of the data, sensor operating mode and data-processing parameters; (9) transfer logs or delivery notes including delivery confirmations with regard to compliance with the request; and (10) invoices.

\textsuperscript{157} German Act on Satellite Data Security, art. 19(3).

\textsuperscript{158} Article 19(2) provides the permit shall be granted if the dissemination of data in the case at hand does not harm the vital security interests of Germany, does not disturb the peaceful co-existence of states, and does not substantially impair German foreign relations.
following the request. For example, the data provider could alter the plans by applying lowered resolution, time delay, reduced processing quality of the data, or the omission of certain target areas.\textsuperscript{159} In such cases, the authorities would authorize the permit contingent upon the required changes to the data delivery plan.

The Act further protects fundamental government interests by reserving a right of prior tasking for governmental purposes as well as a right of prior dissemination of data to the government. However, using such priority rights is restricted to rare cases of national crisis, cases spelled out precisely by Article 21.\textsuperscript{160} In both cases, authorities may offer to remunerate the data provider based on relevant average market prices for the costs incurred to comply with these priority requirements.\textsuperscript{161}

In any event, military and intelligence satellites do not fall within the scope of application of the Act. Government authorities, who operate the satellites concerned, appropriately keep the satellite data secret. Moreover, the Act does, or may, exempt satellite systems if they are subject to comparable foreign security arrangements.\textsuperscript{162} This specifically includes cases where the applicable law of another member state of the European Union permits operations of a high-grade satellite earth observation system when the other member state's law imposes obligations related to the interests protected by Germany's Act.

In terms of implementation, TerraSAR-X encompasses more than 2000 sensitive data requests which seems relatively high given that the TerraSAR-X satellite only became ready for operation in 2008. The Federal Office of Economics and Export Control was able to grant permits for about ninety-nine percent of applications. The Federal Office of Economics and Export Control will use its experience gathered thus far in determining the criteria of the sensitivity check in the forthcoming statutory ordinance so that the criteria continue to support the dissemination of data.

\textsuperscript{159} German Act on Satellite Data Security, arts. 11(2), 16.
\textsuperscript{160} This concerns the events of collective military actions under the auspices of the North Atlantic Treaty Organization (NATO), of national defense urgencies following the German Constitution, of an internal state of emergency or other tensions conforming to the German Constitution, and of danger arising to the German military or civil forces deployed in a foreign state or to employees of the diplomatic service employed at German embassies abroad working to counter a concrete impairment to the external security of Germany.
\textsuperscript{161} German Act on Satellite Data Security, art. 23.
\textsuperscript{162} Id. art. 1(2).
X. MORE EUROPEAN POLICY THAN LAW: TOWARDS GMES/KOPERNIKUS

In 2001, the European Community/European Union decided upon the Global Monitoring for Environment and Security ("GMES") project, the second major European space project undertaken jointly by the European Space Agency ("ESA") and the European Commission. 163 The European Commission concluded that public purposes and the likely benefits and spin-offs for the private sector necessitated an independent European capability in earth observation. 164 From a global perspective, while GMES's aims were ambitious both in substantial and institutional terms, GMES could allow Europe to contribute to the Global Earth Observation System of Systems ("GEOSS").

The GMES project, recently re-christened Kopernikus, resulted in a decision-support system optimising the integrated use of terrestrial and airborne data collection, existent satellite earth observation systems, such as those of ESA and the European Meteorological Satellite Organisation ("EUMETSAT"), and where appropriate, new instruments and satellite systems to fill in any gaps detected. 165 The GMES project is focused on practical downstream applications primarily of a public interest-nature, but GMES has inherent possibilities for more commercially-oriented applications.

ESA and the European Union will jointly finance and run, through a daughter entity, this complex project. 166 Beyond that, while the contours of GMES may be gradually emerging, many key aspects of the institutional and operational structure of GMES are not yet defined.

The Council Resolution of November 2001 called for the European Commission to coordinate with ESA to achieve "an operational and autonomous European capability for global monitoring for environment and security" by 2008, crucially involving a satellite system. 167 Such a capability will, in substance, take the form of databases to be


filled with relevant data (partly self-generated by the key GMES players, partly generated by other satellite operators, and distributed, under contracts, to those key GMES players). Whenever and to whomever GMES's purposes and aims require, this data should be made available.

In this context, the Council Resolution of November 2001 provided the underlying general policy as the point of departure for all further action. A Communication of February 2004\(^{168}\) built further on this underlying general policy by extolling a grand scheme for GMES's implementation. A third policy document, a Communication of November 2005 aptly entitled From Concept to Reality,\(^{169}\) saw the first practical-level implementation, although still remaining at a policy level. While the GMES website refers to an actual Decision of the European Commission, a real piece of European Commission legislation, dated 8 March 2006 pertaining to the establishment of a core team on GMES labelled the GMES Bureau; that Decision has not been possible to locate and access.\(^{170}\)

The Communication of 10 November 2005 first recites the general thrust and approach to the GMES project. The Communication of 10 November 2005 states, “the need for reliable and timely information has been underlined by increased demand. Natural and manmade catastrophes in Europe, America, Asia and Africa, coupled with increased security needs, have further reinforced the case for improved monitoring systems. Global to local levels of requirements have now been identified.”\(^72\) This includes the need to ensure users “that the services will be available on a long-term basis. This requires action to guarantee the availability of the space-based, in-situ and data management infrastructures.”\(^72\)

GMES is tasked to support a range of European Union policies and the 10 November 2005 Communication refers to specific, concrete examples like the European Union’s involvement in agriculture, environmental and fisheries monitoring, external relations such as disaster and emergency response action, and development policies.\(^{173}\) The


\(^{170}\) GMES Advisory Council and GMES Bureau, http://www.gmes.info/72.0.html (last visited Jan. 27, 2009) (containing all applicable E.C. legislation as well as many related and/or preparatory documents, but does not offer a relevant result on using applicable search terms).

\(^{171}\) See COM(2005), supra note 169, at 5.

\(^{172}\) Id. at 7 (emphasis added).

\(^{173}\) Id. at 6-7.
10 November 2005 Communication further paves the way forward by defining the concepts of pilot operational services and Fast Track introduction.

XI. THE INSPIRE DIRECTIVE AND ITS RELEVANCE FOR GMES/KOPERNIKUS

Global Monitoring for Environment and Security ("GMES")/Kopernikus is not mature enough to move from the policy area to the legal area. That is not to say that there is no European Community law relevant for, and actually even explicitly taking into account, this second European space project. However, the law concerned a Directive dealing with just one aspect of the broader picture. In early 2007, the European Community enunciated the INSPIRE Directive\(^{174}\) to help establish an infrastructure for all spatial information within the European Union.\(^{175}\) Spatial information essentially means geographical information integrated from a variety of disciplines for a number of uses, most notably uses relating to environmental protection and the formulation and implementation of European Union policies in that area.

While this initiative did not specifically take into account GMES, the possibility of application of the legal parameters and consequences the initiative established remains in existence. There is no automatic carve-out for GMES-related data operations and activities from such application. As a matter of fact, the Directive itself posits that it will add value to European Union initiatives such as GMES, as "Member States should consider using the data and services resulting from GMES as these services become available . . ..\(^{176}\)

In the context of the INSPIRE Directive, no specific reference can be found to space-borne data or satellites as part of the Infrastructure for Spatial Information. The lack of a specific reference to space-borne data and satellites is largely due to the fact that space-borne data and satellites are still considered of a special nature and therefore, to a quite fundamental extent, outside of the scope of European Community law and relevant European Union competences.


\(^{176}\) INSPIRE Directive, supra note 174, § 10.
Nevertheless, such space-borne data needs to make use of such an infrastructure – websites, web-based, or other computerised databases or archives, as well as interpretation processes, mechanisms, and institutions – to become distributed and accessible. As soon as that would happen, the INSPIRE Directive would likely have an impact here as well. Under the INSPIRE Directive, "infrastructure for spatial information" means metadata, spatial data sets and spatial data services; network services and technologies; agreements on sharing, access and use; and coordination and monitoring mechanisms, processes and procedures." The INSPIRE Directive defines "spatial data" as any data with a direct or indirect reference to a specific location or geographical area." A whole range of GMES data and services would fall within such definitions – basically all data related to the environment or security issues which specifically refer to, and identify, a specific area.

The INSPIRE Directive focuses on environmental policy but may extend to other sectors such as agriculture, transport, and energy. The INSPIRE Directive is designed to optimise the ability to utilize data that are already available by requiring the documentation of existing spatial data, the implementation of services rendering the spatial data more accessible and interoperable, and by dealing with obstacles to the use of the spatial data. The INSPIRE Directive's major drive is to maximise access to relevant data by all concerned individuals. The legal rules and obligations developed on the basis of the INSPIRE Directive are principally drafted to underpin that drive.

The European Community had already designed several law instruments to promote the availability of public sector information, such as the Directive on public access to environmental information and the Directive on the re-use of public sector information. Nevertheless, European Union member states would find it difficult to make their existing systems interoperable, accessible, and useable across borders without the INSPIRE Directive as there would not be an European-level drive to push for the inevitable changes at the national level. The lack of interoperable systems between member states would lead to more duplication and inefficient data collection. The INSPIRE Directive attempts to facilitate formulation, implementation,
monitoring, and evaluation of national and European Union policies.\(^{181}\)

The INSPIRE Directive lays down general rules for the establishment of an infrastructure for spatial information in the European Union. The component elements of those infrastructures shall include the following:

1. metadata (information describing spatial data sets and spatial data services and making it possible to discover, inventory and use them);\(^{182}\)
2. spatial data sets (any data with a direct or indirect reference to a specific location or geographical area) as long as in an electronic format;\(^{183}\)
3. spatial data services;\(^{184}\)
4. network services and technologies;\(^{185}\)
5. agreements on sharing;\(^{186}\)
6. access and use coordination;\(^{187}\) and
7. monitoring mechanisms, processes, and procedures.\(^{188}\)

These elements have a direct impact on GMES. For example, European Union member states “shall provide the institutions and bodies of the European Community with access to spatial data sets and services in accordance with harmonised conditions.”\(^{189}\) If the GMES Authority becomes an institution or body of the European Community, GMES could benefit from data collected by national authorities of the European Union member states.

The INSPIRE Directive provides further requirements, resting upon European Union member states. First, metadata shall be created and kept up to date for spatial data sets and services falling under the scope of the INSPIRE Directive in a manner harmonised in accordance with the Directive itself as well as with further rules of implementation that were to be adopted by May 15, 2008.\(^{190}\)

Second, as to the spatial data sets and services, Articles 7 and 8 of the INSPIRE Directive create a detailed implementation procedure and process to address interoperability between member states.\(^{191}\)

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\(^{181}\) INSPIRE Directive, supra note 174, art. 1(1). Article 1(2) further provides that INSPIRE “shall build upon infrastructures for spatial information established and operated by the Member States.” Id. art. 1(2).

\(^{182}\) Id. arts. 3(6), 5, 6.

\(^{183}\) Id. arts. 3(3), 4(1.b), (2), 7-10.

\(^{184}\) Id. arts. 3(4), 4(3), 7-10.

\(^{185}\) Id. arts. 11-16.

\(^{186}\) Id. art. 17.

\(^{187}\) Id.

\(^{188}\) Id. arts. 18, 19.

\(^{189}\) Id. art. 17(8).

\(^{190}\) Id. arts. 5,6.

\(^{191}\) Id. art. 9(a).
The INSPIRE Directive already provides detailed categorisation of spatial data themes by means of three Annexes listing respectively such spatial data themes.\textsuperscript{192}

Third, the requirements underlying access to, and distribution of, data sets and services are imposed on the network services. European Union member states shall establish and operate upload services to make metadata and spatial data sets and services accessible, including the following:

1. search and discovery services;\textsuperscript{193}
2. view services “to display, navigate, zoom in/out, pan, or overlay viewable spatial data sets, and to display legend information and any relevant content of metadata;”\textsuperscript{194}
3. download services enabling copies of spatial data sets, or of parts of such sets, to be downloaded;\textsuperscript{195}
4. transformation services, enabling spatial data sets to be transformed;\textsuperscript{196} and
5. meta services, that is services enabling the data services properly speaking to be invoked.\textsuperscript{197}

Fourth, European Union member states shall make certain that at least the services referred to under numbers 1 and 2 above are available free of charge.\textsuperscript{198} “Where public authorities levy charges for the services, referred to [in 3, 4, and 5,] member states shall ensure that e-commerce services are available.”\textsuperscript{199}

There are exceptions to the obligations of European Union member states to make data available. The exceptions relate to data that would adversely affect member states’ “international relations, public security or national defence,” “confidentiality of the proceedings of public authorities [as long as that] confidentiality is provided for by law,” the course of justice, the confidentiality of commercial, industrial, or personal privacy-sensitive information (including intellectual property rights), or the protection of the environment.\textsuperscript{200}

In sum, while this piece of European Community law will greatly impact (amongst others) GMES/Kopernikus, it does so only in a specific downstream area of GMES. Namely, the INSPIRE Directive will impact GMES’s data distribution on a technical/operational level because it focuses on levelling the playing field within the European

\textsuperscript{192} Id. art. 4(1.d).
\textsuperscript{193} Id. art. 11(1.a), 11(2).
\textsuperscript{194} Id. art. 11(1.b).
\textsuperscript{195} Id. art. 11(1.c).
\textsuperscript{196} Id. art. 11(1.d).
\textsuperscript{197} Id. art. 11(1.e).
\textsuperscript{198} Id. art. 14(1).
\textsuperscript{199} Id. art. 14(4).
\textsuperscript{200} Id. arts. 13(1), 17(7).
Union's Internal Market. It shows, firstly, the limits to the likelihood of European Community law underpinning broader policy initiatives such as GMES/Kopernikus, meaning that it by default leaves the remainder of legal instruments to be developed at the national level. It shows, secondly, the possibility that European Community law may have to lay down a regulatory framework harmonising member state laws on a key aspect of earth observation data distribution. Thereby, it may limit national sovereign discretion of the member states to that extent.

XII. CONCLUSION

The most fundamental conclusion derived from the foregoing of key aspects of the European spacescape for satellite earth observation activities and data distribution is that the laws, regulations, and policies shaping that particular spacescape arise at various levels, national, European, or global – and in some cases at a combination of those.

The best approach to understand this complicated process is still to use the individual European states as starting points for analysis. The national level is the first to develop policies dealing with earth observation and the resulting data; only then the European levels may come into play. Often, the European states understand that sharing funds, know-how, and resources may greatly enhance the chances of a certain policy or policy initiative’s success, including actual earth observation projects and programmes. A European state’s national involvement depends upon many factors such as choosing the European Union, the European Space Agency (“ESA”), the European Meteorological Satellite Organisation (“EUMETSAT”), or even (as with SPOT) a more classical intergovernmental arrangement as the favoured instrument or platform.

But the story does not end there. The historically-grown expertise and experience with European platforms and statutorily-determined competences of the organisations involved, namely ESA and increasingly also EUMETSAT, means that these organizations can take the initiative or play a major role in shaping others’ initiatives to create feasible policies and programmes. While the European Union may come from a different angle, the European Commission’s competences to initiate and drive policies and programmes (such as GMES/Kopernikus) are even more integrally shaping the European spacescape.

The above leads the analysis back to the concrete elaboration and implementation of policies concerning laws and regulations. The legal tools used by ESA and EUMETSAT to implement certain policies are
restricted to a number of internal competences and the possibility to impact downstream data access by contracts and licenses (such as in the area of copyright protection). By contrast, the European Union avails itself of a wide array of legislative measures – notably Regulations, Directives, and Decisions – to follow up on policy initiatives, whether they concern Green or White Papers on general space policy issues or joint space projects such as GMES/Kopernikus and Galileo. While the individual member states, through the indispensable role of the Council, ultimately control legislative development, the European Union has established some legal regimes of European-wide applicability such as the Directive on database protection and the INSPIRE Directive.

At the same time, European Community law still focuses on general issues of market liberalisation and harmonisation of national laws to that end. Therefore, the role of the individual European states is still of major importance. The German Act on Satellite Data Security is a case in point. In an area where European competence has not moved beyond some general initial efforts which are focused on transparency rather than real substance as exemplified by Regulation 1334/2000 and the regime built on it, the German Act on Satellite Data Security ("GASDS") focuses on real substance. Even where European Community law rules supreme, practically, it is often necessary for national jurisdictions to implement and enforce those rules. This causes national jurisdictions to exert a major influence on the actual playing field.

Finally, for the non-initiated in European history, all this may present an unnecessarily complicated legal and policy spacescape. I am reminded of General Charles de Gaulle, erstwhile French Second World War-hero and later President, who was grilled by a journalist for refusing to even contemplate reunifying East and West Germany back in the 1960s. When the reporter mused that De Gaulle's hate of Germany must remain really intense as illustrated by that refusal, De Gaulle famously is said to have answered: "No, on the contrary, I love Germany so much that I rather see two of them." Maybe DeGaulle's quote, somehow, applies to the European spacescape and satellite earth observation. If so, the fact that Germany was ultimately reunited offers some hope that the various Europes might eventually be able to sort things out properly.