



## Briefing Paper 3

### Remote Sensing: Legal and Policy Challenges

By Anne-Sophie Martin

#### Historic Overview

Since the beginning of space activities, States have utilized satellites for Earth observation.<sup>1</sup> Nowadays, with the technological advances, the dual-use nature of the systems,<sup>2</sup> and the increased number of space actors, remote sensing activity finds application in various areas<sup>3</sup> such as mapping, meteorology, natural resource management, land use, urban planning, protection of the environment, delimitation of boundaries, reconnaissance and support for military operations on Earth.

The legal framework regulating the remote sensing activities is composed by international laws, national regulations and data policies.<sup>4</sup> It is also important to take into account the practice of remote sensing operators and the new challenges that the activity has to face.

Until the mid-1980s spacefaring States conceived remote sensing as a governmental activity mainly to meet domestic requirements.<sup>5</sup> Towards the end of the 1980s and until the mid-1990s, this situation changed with the early stage of the commercializing of remote sensing activities mostly through data sales from governmental remote sensing satellites. Through the years, the era of commercial remote sensing has seen the enhancement of the product's quality available on the market with the improvement of spatial resolution, as well as the participation of the private sector to governmental programs.<sup>6</sup>

The current environment for remote sensing activities reveals the diversity of actors involved in the process of data's generation and distribution. The number of satellite operators has greatly increased with international intergovernmental organizations and private entities operating Earth Observation (EO) satellites. Consequently, a large amount of data and products are now available to users.

---

<sup>1</sup> K.U. Schrogl and J. Neumann, *Article IV*, in CoCoSL, Vol. I, 2009, 70.

<sup>2</sup> Dual-use nature means that space systems can perform both civil and military functions.

<sup>3</sup> S. Marchisio, *Le régime juridique de la télédétection*, in P. Achilleas, *Droit de l'espace*, Larcier, 2009, 144-163.

<sup>4</sup> F. Tronchetti, *Legal aspects of satellite remote sensing*, in F. Von der Dunk, F. Tronchetti (eds.), *Handbook of Space Law*, Edward Elgar Publishing, 2015, 501-553.

<sup>5</sup> In 1972, the U.S. launched LandSat-1 (U.S. Earth Resource Technology Satellites) providing data in land use, natural resources management, agriculture, and environmental monitoring. Another example is the case of France in 1986 which launched SPOT (*Satellite Pour l'Observation de la Terre*). Japan followed in 1987 with the launch of MOS-1. India followed in 1988 with IRS-IA developed by the Indian Space Research Organization (ISRO). Canada launched its first remote sensing satellite, RadarSat-1, in 1995.

<sup>6</sup> RadarSat-2 (Canada) or TerraSAR-X (financed by both the German Space Agency and EADS-Astrium); see also M. Gerhard & B. Schmidt-Tedd, *Germany Enacts Legislation on the Distribution of Remote Sensing Satellite Data*, in *Proceedings of the Fiftieth Colloquium on the Law of Outer Space* (2008), 411-6.



## The United Nations Remote Sensing Principles

The United Nations Remote Sensing Principles<sup>7</sup> represent the only international legal instrument expressly addressing EO from space. In particular, they outline the rights and duties of the actors involved in such activities establishing rules linked to access to and distribution of data at international level. The key elements of the UN Remote Sensing Principles can be divided as following: (i) those referring to the freedom of remote sensing, (ii) those dealing with respect for the rights and interests of the sensed states, and (iii) some specific data rules. The Principles have found a widespread application by States and private entities.<sup>8</sup>

However, they have major issues related to the ambiguous meaning of some key terms such as the expression ‘*reasonable cost terms*’,<sup>9</sup> and the inadequate regulation of questions such as availability,<sup>10</sup> accuracy, supply, ownership, and use of remote sensing data. They are relevant to a limited number of civil remote sensing applications, specifically natural resource management, land use and protection of the environment.<sup>11</sup> From this, one can argue that military applications of remote sensing are not included within the scope of the Principles. It is also questionable the case of dual-use satellites.

In conclusion, the Remote Sensing Principles constitute an important contribution to international space law. They establish the primary conditions for operating remote sensing satellites and formulate the general responsibilities coming from sensing States. However, the Principles make use of a language that does not adequately address key issues taking into consideration the modern EO activities.<sup>12</sup>

## National space regulations related to remote sensing activity

In the last two decades an increasing number of States have adopted national space laws and regulations in order to ensure implementation of and compliance with their international obligations outlined in the space treaties, as well as to organize, supervise and control the space activities of the subjects under their jurisdiction.<sup>13</sup>

Specifically, national regulations impose restrictions on commercial remote sensing satellites, in particular in terms of data collection and dissemination. There are two main aspects to take

---

<sup>7</sup> UNGA Res. 41/65, *Principles relating to remote sensing of the Earth from outer space*, 3 December 1986.

<sup>8</sup> F. Lyall, P.B. Larsen, *Space Law A Treatise*, Routledge, 2018, 365-371.

<sup>9</sup> Principle XII.

<sup>10</sup> J.I. Gabrynowicz, *Defining Data Availability for Commercial Remote Sensing Systems under United States Federal Law*, 23 *Annals of Air and Space Law* 93.

<sup>11</sup> Principle I.

<sup>12</sup> S. Marchisio, *The 1986 United Nations Principles on Remote Sensing: A critical Assessment*, in *Studi di Diritto Internazionale in onore di G. Arangio-Riuz*, Editoriale scientifica, 2004, 1314-15.

<sup>13</sup> Article VI of the Outer Space Treaty makes States internationally responsible for national space activities carried out either by governmental agencies or by non-governmental entities, and requires them to authorize and continuously supervise the activities of non-governmental actors. Although national space laws differ from each other, normally they contain provisions addressing the following issues: (1) authorization and licensing of national; (2) supervision and control over the authorized activities; (3) launching of space objects and operation of launching facilities; (4) operation of objects in space; (5) conduct of activities in outer space; (6) liability for damage caused by space objects; (7) registration of space objects.



into account: the safeguarding of national security by denying or restricting access to information through a form of ‘*shutter control*’ and priority access;<sup>14</sup> the second is to guarantee the government priority access to the system’s capabilities during times of crisis. Nevertheless, there is no uniformity in the way States have set up national regulations. While some States, such as the United States, Canada, Germany and France, have specific and transparent remote sensing legislation, or at least some provisions related to remote sensing, others, such as Australia and Argentina have general space laws that include remote sensing activities. Yet other states, such as China and India, have adopted certain policies with regard to data collection and dissemination. Other States, while not having specific laws governing remote sensing activities, have adopted policies regulating data dissemination.<sup>15</sup>

## Data policy

Nowadays, access, distribution and use of remote sensing data occur through the policies’ supplier and license agreements in order to maintain control over the data and products after distribution for suppliers.<sup>16</sup> In other words, unilateral decisions are made by data suppliers on how data are going to be handled and managed, using their intellectual property rights over the data as the legal basis. Existing data policies can be distinguished especially in terms of access and pricing. Moreover, entities operating EO systems need to adhere strictly to the obligations imposed upon them by their respective States by way of legislation or regulation. Other states have implemented constraints concerning the distribution of data based on the criteria of spatial resolution.<sup>17</sup> Hence, users found diverse restrictions in accessing remote sensing data. This phenomenon will grow in the coming as a consequence of the launch of high-resolution satellites.

## New Challenges regarding Earth observation

Important achievements have been achieved in EO with the development of small satellite technologies, allowing the reduction of costs and giving the possibility to more actors to participate to the activity, and artificial intelligence (AI).<sup>18</sup>

Small satellites and AI are the new challenges for EO. The European Space Agency is working on these new possibilities.<sup>19</sup> While satellite data leads to new scientific discoveries, AI can

---

<sup>14</sup> U. Bohlmann, A. Soucek, *From ‘Shutter Control’ to ‘Big Data’: Trends in the Legal Treatment of Earth Observation Data*, in C. Brünner, G. Königsberger, H. Mayer, A. Rinner (eds.), *Satellite-Based Earth Observation*, Springer, 2018, 185.

<sup>15</sup> F. Tronchetti, *Legal aspects... op. cit.*

<sup>16</sup> L.J. Smith, C. Doldirina, *Law relating to remote sensing – Earth observation*, in R.S. Jakhu, P.S. Dempsey, *Routledge Handbook of Space Law*, Routledge, 2017, 249-264.

<sup>17</sup> F. Tronchetti, *Legal aspects... op. cit.* For instance, India and China.

<sup>18</sup> *Ibid.*

<sup>19</sup> Towards an European Artificial Intelligence for Earth Observation (AI4EO) R&I Agenda: [https://eo4society.esa.int/wp-content/uploads/2018/09/ai4eo\\_v1.0.pdf](https://eo4society.esa.int/wp-content/uploads/2018/09/ai4eo_v1.0.pdf): “There is an increasing need to mine the large amount of data generated by the new generation of satellites coming online, including for example the Copernicus system and New Space. Artificial Intelligence (AI) is certainly one important part of the full solution, enabling exploration of big data and bringing new insight and predictive capabilities. However, it is important to note that AI remains just a tool that need to be used together with physical principles and scientific interpretation”.



# Centre for a Spacefaring Civilization

+44 (0) 7561864231 info@spacefaringcivilization.space [www.spacefaringcivilization.space](http://www.spacefaringcivilization.space)

create pathways to new Earth observation. Satellites provide us a considerable quantity of data which is not always easy to process in an efficient way.<sup>20</sup>

There is a necessity to find a proper way to extract information and use it in an ever-growing variety of applications and services. This is where AI is fundamental and might play a crucial role, as well as to respond to the UN Sustainable Development Goals.<sup>21</sup> AI has great potential in terms of obtaining a detailed understanding of Earth observation, specifically supporting climate change and other global issues. For instance, an AI processor will allow to make independent decisions regarding image collection such as with Copernicus.<sup>22</sup> Furthermore, AI could help to translate critical EO data by accurately extracting and processing satellite data.<sup>23</sup> For humans, it can be very challenging to locate the most relevant information in these massive datasets, which are transmitted from over 700 Earth observation satellites.<sup>24</sup>

## Recommendations

- To update the 1986 UN Principles on Remote Sensing taking into account new actors and the dual-use nature of the technology.
- To implement legal instrument to ensure the integrity and authenticity of data as well as the reliability of the information.
- Support AI research and innovation through small satellites in order to increase growth and competitiveness for societies and industries worldwide.
- To facilitate the sharing of space resources and allowing the free distribution of these products to those in need, particularly from the less-developed States, but also to respect to the UN Sustainable Development Goals.

*If you found this paper useful or interesting, please consider supporting our work:*

<https://www.spacefaringcivilization.space/support-us>

or

<https://www.patreon.com/spacefaringcivilization>

Released under a Creative Commons Attribution, Non-Commercial, No Derivatives 4.0 International License - <https://creativecommons.org/licenses/by-nc-nd/4.0/>

---

<sup>20</sup>[http://www.esa.int/Applications/Observing\\_the\\_Earth/Working\\_towards\\_AI\\_and\\_Earth\\_observation](http://www.esa.int/Applications/Observing_the_Earth/Working_towards_AI_and_Earth_observation).

<sup>21</sup><https://www.un.org/sustainabledevelopment/sustainable-development-goals/>.

<sup>22</sup>[https://www.esa.int/Applications/Observing\\_the\\_Earth/First\\_Earth\\_observation\\_satellite\\_with\\_AI\\_ready\\_for\\_launch](https://www.esa.int/Applications/Observing_the_Earth/First_Earth_observation_satellite_with_AI_ready_for_launch).

<sup>23</sup><https://www.earth.com/news/artificial-intelligence-earth-data/>.

<sup>24</sup>*Ibid.*