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# Outer Space Law Principles and Privacy

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## Chapter Ten

# Outer Space Law Principles and Privacy

Frans G. von der Dunk

## I. Outer Space Law and Privacy

When the space law era was ushered in during the late 1950s, it was already clear to some observers that, sooner or later, life on Earth would be monitored from a distance without those living on it necessarily knowing about it—Big Brother in *optima forma*.

At the same time, with space activities primarily being undertaken by the two superpowers and their acolytes for military/strategic/political purposes (and secondarily for scientific ones), such concerns largely focused on spying in the context of the Cold War. Satellites clearly were excellent tools for finding the whereabouts of the opponent's tanks, troops, aircraft, warships, and (perhaps) missiles. By extension, satellites could monitor compliance with international agreements, and try to curb the arms race and/or the potential evolvment thereof into real war.

Obviously, any such satellite data were kept highly secret by the few governments involved in generating them, which meant that details on individual persons or companies revealed by such data were not accessible to anyone outside of an inner circle of security experts. Even the *extent* to which satellite data were able to generate relevant details was, at least officially, a secret. Rumors consequently abounded that military remote sensing capabilities would actually allow for the reading of car license plates from space.

This situation started to fundamentally change only when satellite data of very high resolution became widely accessible, as a consequence of both the waning of the Cold War and the increased interest and entry of private enterprise in outer space. The resolution of such very high resolution (VHR) data freely available on the commercial markets has recently dipped below the 0.5 m mark, and continues to evolve “downwards.”

By these tokens, it is clear that satellite data may already interfere, in a number of instances, with issues normally considered under the heading of “privacy.”<sup>1</sup> This is even

truer since the concept is no longer confined to human individuals, but may also apply to legal persons such as companies.<sup>2</sup> “Privacy” here is taken very broadly to mean personal autonomy and (physical and psychological) integrity, including relevant physical and social identity. Any intrusion in the personal domain, whether actual and physical, or virtual and psychological, would consequently, in principle, interfere with such a concept.<sup>3</sup>

The current contribution tries to analyze what international space law, as it stands today, might already provide in terms of relevant rules, rights, and obligations, or at least legal principles, pertinent to issues of privacy. These issues will, sooner or later, arise in a more down-to-Earth context.

## II. The Outer Space Treaty

The legal situation pertinent to outer space and space activities reflects the focus on state activities and state interests in the realm of politics (and science). The 1967 Outer Space Treaty,<sup>4</sup> the first global treaty on space activities and the rules relevant thereto, focused on such state behavior, even as it—being a “Treaty on *Principles*”—did not provide much detailed guidance on what states precisely were allowed, or not allowed, to do in terms of military space activities. A few years later, the bilateral superpower ABM Treaty<sup>5</sup> specifically referred to the beneficial role of satellites as one form of “national technical means of verification.”<sup>6</sup> The purpose of this was to ascertain whether parties would keep to their promises in terms of anti-satellite missile deployment—and thereby contribute to the non-violent stalemate of the Cold War.

The baseline of the general legal framework for outer space activities, which the Outer Space Treaty provides, concerns the freedom of activities in outer space in conjunction with the inability of individual states to exercise jurisdiction in outer space on a territorial basis.<sup>7</sup>

Consequently, this freedom can only be limited in the first instance by the international community of states as a whole, essentially through international treaties and/or the establishment of customary international law obligations by means of accumulating state practice and *opinio juris*.<sup>8</sup> Such limitations need not only stem from specific space treaties or customary international space law. Notably, Article III of the Outer Space Treaty provides that general “international law, including the Charter of the United Nations, in the interest of maintaining international peace and security, and promoting international cooperation and understanding” applies to outer space as well.<sup>9</sup>

In principle, the aforementioned freedom also includes the right to use outer space for satellite remote sensing of Earth, or any part thereof, for whatever purpose. Such a freedom is underpinned by the freedom under general international law “to seek, receive and impart information and ideas,”<sup>10</sup> and, more specifically, by the right to conduct space-based remote sensing activities recognized in the 1986 UN Resolution on remote sensing.<sup>11</sup>

Of course, seen in contrast to the (quasi-)territorial sovereignty which states are entitled to exercise over their national airspace,<sup>12</sup> and which allows them to prohibit, and even forcefully preclude, remote sensing from their own airspace,<sup>13</sup> such a freedom to conduct remote sensing from outer space begs the question as to where outer space starts (and airspace ends), vertically speaking.

For the present purpose, it should suffice to state here that, while a tentative convergence of agreement on a boundary between airspace and outer space in the range of 100 km altitude may be seen to arise, this has not yet reached a status of customary international law.<sup>14</sup> The satellites which would currently be at issue in terms of their possible use for remote sensing, without a doubt, would all be considered to be orbiting in outer space so as to enjoy the freedoms referred to.

When it comes to any possible further limitations to those freedoms, for example, with a view to addressing possible privacy concerns, the Outer Space Treaty does not provide much specific guidance. The clause of Article III referring to general international law has been mentioned but does not fundamentally change the paradigms much. This is precisely because, in general international law, the freedom of seeking, receiving, and imparting information is also a mainstay of the regime.<sup>15</sup> Any limitation to such freedoms consequently should be sought primarily at the level of *national* law of individual states—and is, by definition, only applicable to national territories and actors with the nationality of the relevant state.<sup>16</sup>

The UN Charter,<sup>17</sup> the one specific instrument of general international law mentioned in Article III of the Outer Space Treaty, also limits the freedom of state activity in the international arena. It prohibits aggression and the use of force against other states, as well as other threats to international peace and security,<sup>18</sup> gross-scale violations of human rights,<sup>19</sup> and requires “obligations of effort” in terms of international cooperation, development, and the like.<sup>20</sup> Furthermore, no general international law agreements or customary international law addressing privacy concerns can be discerned which would then be included in the Outer Space Treaty’s scope, by virtue of Article III.

As a consequence, the international responsibility which states bear under the Outer Space Treaty for the legality of their own activities, as well as those qualified as “national activities in outer space” when “carried on . . . by non-governmental entities”<sup>21</sup> does not result in any fundamental, direct legal prohibition of, or even qualification of, the use of space for potentially interfering with privacy concerns on Earth.

At the same time, these clauses reflect and respect the sovereignty of individual states to regulate private space activities, including the right to completely prohibit them—or to require them to respect certain national laws, such as those protecting the privacy of individual persons or entities. On the other hand, Article VI of the Outer Space Treaty expressly requires “the appropriate State” to authorize and continuously supervise such activities to effectively take care of state responsibility at the international level for such private activities—as long as they qualify as “national activities in outer space” of the state in question.<sup>22</sup>

In other words, with respect to space-generated data and information, privacy is very much a *national* matter, to be regulated by domestic laws and regulations, and, by definition, limited in scope *ratione geographiae* and *ratione personae*.

### III. The Other UN Space Treaties

The Outer Space Treaty, being a framework agreement, essentially covers all of man’s endeavor in this specific realm. More detail is contained and elaborated upon in subsequent

treaties, equally agreed upon firstly in the bosom of the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS), and then ratified by individual states, usually quite broadly. In order to properly complement the above analysis of the Outer Space Treaty itself, it is also appropriate to briefly assess those follow-up treaties.

The first of these follow-up agreements is the 1968 Rescue Agreement,<sup>23</sup> which essentially elaborates upon Articles V and VIII of the Outer Space Treaty. These Articles deal with the obligations of states vis-à-vis astronauts and spacecraft that inadvertently end up in their respective jurisdiction or sphere of control. The Rescue Agreement elaborates those obligations in considerably more detail. It does not, however, include any reference, direct or indirect, to the current issue of “privacy.” At most, the protection of the privacy of astronauts concerned could be considered to be implied as part of their general rights to be treated as “envoys of mankind” and to be repatriated as soon and as safely as possible.<sup>24</sup>

The second such international agreement, the 1972 Liability Convention,<sup>25</sup> elaborated the liabilities which states were subject to when undertaking space activities. These liabilities are further to the generic positing of the concept in Article VII of the Outer Space Treaty. Key to an analysis of the potential relevance of the Liability Convention, in the context of this chapter, is the concept of “damage” under its terms, as it is the occurrence of such damage which would trigger the various relevant obligations to compensate such damage.

The Liability Convention defines such damage as “loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations.”<sup>26</sup> In particular, the reference to “property” in combination with the general thrust of the Liability Convention—which speaks of damage “caused by a space object” and often also of damage “caused to a space object”<sup>27</sup>—has led most commentators to conclude that compensable damage is limited (exclusively) to direct, *physical* damage.<sup>28</sup> Damage caused by radio-interference, damage caused by wrongful satellite navigation signals or other forms of non-physical and/or indirect damage, have generally *not* been accepted to lead to liability under the Convention.<sup>29</sup> Consequently, the majority opinion would also be that “damage” caused by the *contents* of satellite data, for example, damage caused by an intrusion of privacy, should not be held compensable under the Liability Convention.<sup>30</sup>

These assumptions, it should be said, have never been tested in judicial proceedings. In case a relevant dispute cannot be solved by diplomatic means under the Liability Convention, a Claims Commission is to be installed.<sup>31</sup> Only on one occasion have documents referring to such a dispute *mentioned* the Liability Convention, but ultimately, the dispute was settled by diplomatic means without actually *invoking* it.<sup>32</sup>

Thus, inclusion of privacy-related damage as compensable damage under the Liability Convention cannot be completely ruled out. The Convention’s clause that allocated “compensation . . . should restore the person . . . , State or international organization on whose behalf the claim is presented to the condition *which would have existed if the damage had not occurred*”<sup>33</sup> would not, in itself, exclude any indirect and/or non-physical damage from being compensable under the Convention. The ultimate determination of such inclusion or

exclusion, therefore, would have to wait either for an authoritative international interpretation of these clauses in one direction or another (presumably through COPUOS), or for a decision or award of a Claims Commission to be installed for a particular dispute.

The next international space treaty, the 1975 Registration Convention,<sup>34</sup> focused on Article VIII of the Outer Space Treaty and developed a regime of registration of space objects. Apart from the generic focus of the Convention on enhancing the possibilities of identification of certain space objects, *inter alia* in case those would be violating international obligations, there is only one clause which appears to be in part relevant for the present subject. In the context of the obligations to register space objects launched, or intended to be launched, into outer space, both in a national register and through an international one, the launching state has to register what the “general function of the space object” will be.<sup>35</sup> Although the obligation is almost as vague as it can be, obviously a reference to high-resolution “remote sensing” or even remote sensing for specific purposes, as a “general function,” might at least alert anyone concerned with privacy to the existence of another potentially privacy-infringing satellite. The rather general lack of requirements regarding details and timeliness of the registration, however, appear to provide loopholes (“as soon as practicable,” “to the greatest extent feasible”<sup>36</sup>) of such size that this clause is often neglected, and for that reason alone, is of little practical relevance.<sup>37</sup>

The final international treaty elaborating certain aspects of the Outer Space Treaty is the 1979 Moon Agreement,<sup>38</sup> which expands upon details relating to the moon and celestial bodies with a view to potential resource exploitation. Thus, it does not provide any clauses of further relevance for the present topic—unless one would consider the clauses mandating free access to all areas of the moon and the facilities, stations, and installations of others<sup>39</sup> as constituting a principled absence of any privacy on the moon. In addition, the general lack of ratification of the Moon Agreement by space faring nations causes any further analysis to be of fairly limited importance.<sup>40</sup>

In summary, there is a lack of relevant and precise guidance in the Outer Space Treaty on issues of privacy related to VHR satellite data, particularly in the area of privacy in its classical sense, referring to private individuals (and subsidiary legal entities such as companies). The four follow-on treaties on space could be described, at best, as tangentially relevant in such a context. They confirm that, at the time these major space treaties were drafted (during the 1960s and 1970s), no serious consideration was given to real privacy protection.

#### **IV. The UN Principles on Remote Sensing**

The final space law document of potential general relevance to the issue of privacy is the UN Principles on Remote Sensing, accepted by consensus in 1986. Although the Principles as a Declaration of the UN General Assembly do not constitute binding law, they are generally accepted as having customary legal value.<sup>41</sup>

From this perspective, it is regrettable that the Principles offer only fairly minimal guidance on the topic of privacy of individual persons and entities. To start with, the Principles effectively limit themselves in scope of application to remote sensing “for the purpose of

improving natural resources management, land use and the protection of the environment.”<sup>42</sup> This is not normally an area where privacy concerns might be expected. Most importantly, the Principles are very much focused on *state* interests. This includes states interested in conducting remote sensing operations around the world, states interested in access to data generated with respect to their own respective territories, and the proper balance between these two sets of interests.<sup>43</sup> To the extent that this dichotomy could, perhaps, be viewed as a discussion relating to the “privacy of states,” if the second group of states were seeking to control the generation and, more importantly, distribution of satellite data regarding their own territory, any outcomes on the proper balance of this, as per the Resolution, might be of interest to the current debate.

Firstly, the UNGA Resolution 41/65 reiterates some of the general principles of the Outer Space Treaty in the more specific context of satellite remote sensing. For example, it provides for the obligation that remote sensing activities should be carried out “for the benefit and in the interests of all countries,”<sup>44</sup> “in accordance with international law” (including once more a reference to the UN Charter)<sup>45</sup> and in promotion of international cooperation in this context.<sup>46</sup>

Secondly, remote sensing “shall be conducted on the basis of respect for the principle of full and permanent sovereignty of all States and peoples over their own wealth and natural resources” and “shall not be conducted in a manner detrimental to the legitimate rights and interests of the sensed State.”<sup>47</sup>

It is this last clause which effectively results in a principled protection of “privacy of states,” but also limits such protection, rather fundamentally, to issues of natural wealth and resources. The insertion of this clause stemmed from the fear at the time, in particular among many developing countries, that knowledge on the whereabouts of valuable mineral resources in their territories stemming from satellite remote sensing would almost by definition only be accessible to (one) developed state(s). They feared this would place developed states in an advantageous position with regard to international negotiations on the development of such resources. As a consequence, those sensed states tried to establish a regime for remote sensing which gave them control over such activities. Ideally, under such a regime, the sensing of the territory of a state by any other state would only be allowed subject to explicit consent of the sensed state. Or, barring realization of such a “prior consent” requirement, access to the data thus generated would only be made available (outside the sensing state itself) to the sensed state unless the latter would allow for more widespread distribution.

The aforementioned clause stipulating respect for the concern of the “privacy of states” would have to be elaborated by means of more detailed requirements and obligations to actually give the sensed states what they were looking for—but this never transpired. This is due to the fact that, in addition to the above, Principle IV *also* stipulated that such activities had to be conducted in accordance with the “freedom of exploration and use of outer space” already stipulated by Article I of the Outer Space Treaty, effectively counteracting any effort to allow a single state to limit such freedoms.<sup>48</sup>

Even more to the point, Principle XII of UNGA Resolution 41/65 provided neither for a “prior consent” requirement nor for a “controlled access” requirement; it only provided that, as for “primary data” and “processed data,” “the sensed State shall have access to

them *on a nondiscriminatory basis and on reasonable cost terms*,"<sup>49</sup> and "shall also have access to the available analyzed information concerning the territory under its jurisdiction in the possession of any State participating in remote sensing activities on the same basis and terms."<sup>50</sup> The italicized phrasing clarifies that the sensed state effectively does not even have a "prior right" to data concerning its own territory, let alone semi-exclusive rights, rights of access for free, or the right to prohibit generation of the data at all.

The only unequivocal exceptions provided by the Resolution itself at the international level to full discretion of the sensing state to handle data generation and distribution as it wishes, provided by the Resolution itself at the international level, concerns data which would be important in the context of "protection of the Earth's natural environment" or the "protection of mankind from natural disasters."<sup>51</sup> Even here, there is no preferential or exclusive position for the sensed state(s) as such. Relevant information should simply be disclosed; respectively relevant data and information should be transmitted "to States concerned" as promptly as possible, at (presumably) no cost.<sup>52</sup>

In summary, it would appear that the outcome of any debate on the proper balance between the interests of the sensing states and those of the sensed states, as outlined in the Resolution, essentially ignored any such "state privacy" interests. In turn that means that privacy-like interests at the *non-state* level, the core theme of this book and chapter, are even less impacted by the Resolution.

This, consequently, also applies to the implementation of the UN Principles in various jurisdictions. For instance the United States by means of national legislation,<sup>53</sup> and the European Space Agency<sup>54</sup> (for example with respect to ERS-1 and ERS-2 in 1991 and to Envisat in 1998), EUMETSAT<sup>55</sup> (in its first version as of 1991), Canada (with respect to Radarsat as of 1996) and the Committee on Earth Observation Satellites (CEOS) (with its own Satellite Data Exchange Principles in Support of Global Change Research dated 1991), by means of various data policies, have indeed implemented the UN Principles in their specific respective contexts, at least to some extent.<sup>56</sup>

However, nominal reference to the UN Principles and the principle of "non-discriminatory access for the sensed state" turned out to be scanty in fact; and closer analysis also unveiled that individual authorities simply interpreted them at their own discretion, without much coherence or even regard for the original intentions behind the UN Principles and the aforementioned key principle in particular—and would be doing so even more substantially as time passed by. Hence, it was also obvious that such data policy documents had little to say regarding privacy issues properly speaking.

It should be added, moreover, that only recently has satellite remote sensing data reached such levels of resolution that "true" privacy issues become involved. Consequently, documents predating that development will certainly not have had any reason to address privacy in the context of remote sensing, and even those of later dates would effectively, at best, reference existing privacy laws which remain applicable, without addressing in any detail the specifics that space data may bring with them from this perspective. In any event, whatever implementation took place of the UN Principles regarding "access on a nondiscriminatory basis," specifically for a "sensed state" regarding data on its territory or in general terms, is of very little help or guidance here: it could

hardly serve as a possible model or precedent to handle the true privacy issues on the international level.

## V. Concluding Remarks

Relevant international space law—essentially the Outer Space Treaty, its follow-on treaties developed through COPUOS, and the UNGA Resolution 41/65, containing the Principles on Remote Sensing—currently does not provide for any limitations to, or conditions upon, the generation and distribution of satellite data, including VHR satellite data, specifically addressing possible privacy concerns of individuals (or companies). Partly as a consequence thereof, the data policies developed by key remote sensing satellite operators similarly do not pay any attention to privacy issues so as to serve as a blueprint for an appropriate legal regime.

Any possibilities for such individuals to defend their interests in upholding privacy are consequently to be found only at national level—and, therefore, are limited in scope to the jurisdiction of the particular state(s) concerned, in terms of territorial and personal jurisdiction. No international regime has yet emerged whereby the privacy protection afforded by one national legal regime to a specific individual would be generally recognized. This has occurred by contrast, for example, in the case of international treaties recognizing and applying patent or copyright protection granted by one state party to other states parties. Until that occurs, such an individual might only be able to protect his/her privacy in his/her direct environment, in their own state of citizenship and/or residence. A problem with this is that satellite data is very often generated and distributed outside of that environment. Thus, there arises an imbalance between, on the one hand, cosmic generation and principled global availability of VHR data, and, on the other, localized privacy concerns and national means of protecting them. It remains to be seen, of course, to what extent this imbalance will be broadly considered as justifying and requiring international measures such as treaties recognizing privacy rights at a fundamentally international level—it may well be that Big Brother will remain with us for some time to come.

## Notes

1. See chapter 11 of this book: G. Cho, “Privacy and EO: An Overview of Legal Issues”; cf. R. Purdy, “Legal and Privacy Implications of ‘Spy in the Sky’ Satellites,” 3 *Mountbatten Journal of Legal Studies* (1999), 63 ff.
2. Cf. the European Court of Human Rights-case *Colas Est v. France* (Application nr. 37971/97, Judgment of 16 April 2002); further, e.g., R. Macrory and R. Purdy, The use of satellite images as evidence in environmental actions in Great Britain, 51 *Droit et ville* (2001), 73 ff.
3. See further on this issue the author’s *The European Convention on Human Rights and EU law—Two European Legal Approaches to Privacy, As Relevant to High Resolution Imaging*, in *Current Legal Issues for Satellite Earth Observation* (2010), ESPI Report 25, 56–57.

4. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (hereafter, Outer Space Treaty), London/Moscow/Washington, done 27 January 1967, entered into force 10 October 1967; 610 UNTS 205; TIAS 6347; 18 UST 2410; UKTS 1968 No. 10; Cmnd. 3198; ATS 1967 No. 24; 6 ILM 386 (1967).
5. Agreement between the United States of America and the Union of Socialist Soviet Republics on the Limitation of Anti-Ballistic Missile Systems (hereafter ABM Treaty), Moscow, done 26 May 1972, entered into force 3 October 1972, no longer in effect from 13 June 2002; 944 UNTS 13; TIAS 7503; 23 UST 3435.
6. As per Art. XII(2), ABM Treaty, "Each Party undertakes not to interfere with the national technical means of verification of the other Party" for the purpose of monitoring the arms agreement and, effectively, the peace resting upon it.
7. See Art. I, II, Outer Space Treaty. See further, e.g., S. Hobe, "Article I," in S. Hobe, B. Schmidt-Tedd, and K. U. Schrogl (Eds.), *Cologne Commentary on Space Law*, Vol. I, The Outer Space Treaty (2009), esp. 34–36; S. Freeland and R. Jakhu, "Article II," in S. Hobe, B. Schmidt-Tedd, and K. U. Schrogl (Eds.), *Cologne Commentary on Space Law*, Vol. I, The Outer Space Treaty (2009), esp. 53–58.
8. Cf., e.g., P. G. Dembling and D. M. Arons, "The Evolution of the Outer Space Treaty," 33 *Journal of Air Law and Commerce* (1967), 429–32; also V. Vereshchetin and G. Danilenko, "Custom as a Source of International Law of Outer Space," 13 *Journal of Space Law* (1985), 22–35; F. Tronchetti, *The Exploitation of Natural Resources of the Moon and Other Celestial Bodies* (2009), 10–29.
9. This clause is usually interpreted as a "safety-net clause," i.e., allowing general international law to provide legal answers as the *lex generalis* in cases where space law, as a *lex specialis*, is absent, too vague, or too much subject to conflicting interpretations to be of help in this regard.
10. Art. 19, Universal Declaration of Human Rights, Paris, UN GA Res. 217 A (III) of 10 December 1948; A/RES/217.; cf. further, e.g., Art. 19(2), International Covenant on Civil and Political Rights, New York, done 19 December 1966, entered into force 23 March 1976; 6 ILM 368 (1967).
11. Principles Relating to Remote Sensing of the Earth from Outer Space, UNGA Res. 41/65 (hereafter UNGA Resolution 41/65), of 3 December 1986; UN Doc. A/AC.105/572/Rev. 1, at 43; 25 ILM 1334 (1986). Cf., esp. by inference, Principles. II, III, IV, V, and XII. See further *infra*, section 4.
12. See esp. Art. 1, Convention on International Civil Aviation (hereafter Chicago Convention), Chicago, done 7 December 1944, entered into force 4 April 1947; 15 UNTS 295; TIAS 1591; 61 Stat. 1180; Cmd. 6614; UKTS 1953 No. 8; ATS 1957 No. 5; ICAO Doc. 7300.
13. Witness, e.g., the shooting down of the famous U-2 spy plane of US pilot Francis Gary Powers over the Soviet Union in 1960, where the United States tacitly recognized the international wrongfulness of that unauthorized intrusion of Soviet airspace and the consequent legality of the shooting down itself.
14. Cf., e.g., the author's "The Sky Is the Limit—But Where Does It End?" in *Proceedings of the Forty-Eighth Colloquium on the Law of Outer Space* (2006), 84–94.
15. Cf. also, e.g., M. Ferrazzani, "The Status of Satellite Remote Sensing in International Treaties," in K. H. Böckstiegel (Ed.), 'Project 2001'—*Legal Framework for the Commercial Use of Outer Space* (2002), 181; W. van Kries and I. Polley, "Report of the 'Project 2001' Working Group on Remote Sensing," in K. H. Böckstiegel (Ed.), 'Project 2001'—*Legal Framework for the Commercial Use of Outer Space* (2002), 147.
16. See, in general, e.g., R. M. M. Wallace, *International Law* (1997), esp. 111–15.

17. Charter of the United Nations (hereafter UN Charter), San Francisco, done 26 June 1945, entered into force 24 October 1945; USTS 993; 24 UST 2225; 59 Stat. 1031; 145 UKTS 805; UKTS 1946 No. 67; Cmd. 6666 and 6711; CTS 1945 No. 7; ATS 1945 No. 1.
18. Cf. esp. Art. 1(1) and (2), 2(4), 39–51, UN Charter.
19. Cf. Art. 1(3), 13, 73, UN Charter.
20. Cf., e.g., Art. 1(2), (3), and (4), 13, 55 ff., 73 ff., UN Charter.
21. Art. VI, Outer Space Treaty.
22. For the debate on what this last phrase actually means, see, e.g., *in extenso* M. Gerhard, “Article VI,” in S. Hobe, B. Schmidt-Tedd, and K. U. Schrogl (Eds.), *Cologne Commentary on Space Law*, Vol. I, The Outer Space Treaty (2009), 107–16.
23. Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space (hereafter, Rescue Agreement), London/Moscow/Washington, done 22 April 1968, entered into force 3 December 1968; 672 UNTS 119; TIAS 6599; 19 UST 7570; UKTS 1969 No. 56; Cmnd. 3786; ATS 1986 No. 8; 7 ILM 151 (1968).
24. Cf. Art. V, Outer Space Treaty, resp. Artt. 2–4, Rescue Agreement; for a more detailed analysis, e.g., J. M. de Faramiñán Gilbert and M. del Carmen Muñoz Rodríguez, “The Return of Objects Launched into Outer Space: Some Legal Questions,” in G. Lafferranderie and S. Marchisio (Eds.), *The Astronauts and Rescue Agreement—Lessons Learned* (2011), 36; P. G. Dembling and D. Arons, “The Treaty on Rescue and Return of Astronauts and Space Objects,” 9 *William and Mary Law Review* (1968), 637, 641 ff.
25. Convention on International Liability for Damage Caused by Space Objects (hereafter, Liability Convention), London/Moscow/Washington, done 29 March 1972, entered into force 1 September 1972; 961 UNTS 187; TIAS 7762; 24 UST 2389; UKTS 1974 No. 16; Cmnd. 5068; ATS 1975 No. 5; 10 ILM 965 (1971).
26. Art. I(a), Liability Convention.
27. Art. II, III, IV, Liability Convention (emphasis added).
28. See extensively on this discussion C. Q. Christal, “International Liability for Damage Caused by Space Objects,” 74 *American Journal of International Law* (1980), 351 ff., esp. 354–55.
29. One notable exception concerns Henaku, who contends that damage resulting from incorrect or unexpectedly absent satellite navigation signals should be considered compensable under the Liability Convention; B. D. K. Henaku, *The Law on Global Air Navigation by Satellite: An Analysis of Legal Aspects of the ICAO CNS/ATM System* (1998), 221. It should be added that the Liability Convention expressly does not exclude the possibility for any party concerned to pursue claims in a national court; see Art. XI(2). Thus, the possible lack of inclusion of certain types of damage in the compensable damage under the Convention does not *ipso facto* preclude recovery under other (national) regimes of liability.
30. One may also refer here to the failure of claims by several foreign entities against the US National Oceanic and Atmospheric Administration (NOAA) for not issuing warnings of the 2004 Indian Ocean tsunami which was argued to give rise to liability for damage that might have been averted by relevant warnings; see further, e.g., W. C. Nicholson, *Legal Issues: Warning Systems*, Public Entity Risk Institute (2005), available at [https://www.riskinstitute.org/peri/component?option=com\\_bookmarks/Itemid,99999999/catid,-1/navstart,0/task,detail/mode,3/id,756/search/](https://www.riskinstitute.org/peri/component?option=com_bookmarks/Itemid,99999999/catid,-1/navstart,0/task,detail/mode,3/id,756/search/).
31. See Art. XIV–XX, Liability Convention.
32. This concerned the Cosmos 954-incident, of a Soviet nuclear powered satellite disintegrating over a stretch of uninhabited Canadian territory in 1978, where the Canadian statement of claim referred to the Liability Convention (see Statement of Claim by Canada, *Space Law—Basic Legal*

- Documents*, A.IX.2.2) but the final settlement document did *not* (see Protocol Between the government of Canada and the government of the Union of Soviet Socialist Republics of 2 April 1981; *Space Law—Basic Legal Documents*, A.IX.2.2) as the Soviet Union agreed to pay compensation of some 3 million Canadian dollars only *ex gratia*. See further, e.g., B. A. Hurwitz, “Reflections on the Cosmos 954 Incident,” in *Proceedings of the Thirty-Second Colloquium on the Law of Outer Space* (1990), 350–53; C. Q. Christol, “International Liability for Damage Caused by Space Objects,” 74 *American Journal of International Law* (1980), 346–47.
33. Art. XII, Liability Convention (emphasis added).
  34. Convention on Registration of Objects Launched into Outer Space (hereafter, Registration Convention), New York, done 14 January 1975, entered into force 15 September 1976; 1023 UNTS 15; TIAS 8480; 28 UST 695; UKTS 1978 No. 70; Cmnd. 6256; ATS 1986 No. 5; 14 ILM 43 (1975).
  35. Art. IV(1)(e), Registration Convention.
  36. Art. IV(1), (3), Registration Convention.
  37. Cf., e.g., Y. Lee, “Registration of space objects; ESA member states’ practice,” 22 *Space Policy* (2006), 44.
  38. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (hereafter Moon Agreement), New York, done 18 December 1979, entered into force 11 July 1984; 1363 UNTS 3; ATS 1986 No. 14; 18 ILM 1434 (1979).
  39. Cf. Art. 9(2), 15, Moon Agreement.
  40. The Moon Agreement at the date of writing has thirteen states parties, none of which are major spacefaring nations, plus four states (including France and India) having signed the treaty long ago but never taken the steps to ratify; see <http://www.unoosa.org/oosatdb/showTreatySignatures.do>. Also, e.g., J. I. Gabrynowicz, “Space Law: Its Cold War Origins and Challenges in the Era of Globalization,” 37 *Suffolk University Law Review* (2004), 1046.
  41. See, e.g., P. Gaudrat and P. H. Tuinder, “The Legal Status of Remote Sensing Data: Issues of Access and Distribution,” in G. Lafferranderie (Ed.), *Outlook on Space Law over the Next 30 Years* (1997), 353; M. Ferrazzani, “The Status of Satellite Remote Sensing in International Treaties,” in K. H. Böckstiegel (Ed.), *‘Project 2001’—Legal Framework for the Commercial Use of Outer Space* (2002), 182.
  42. Princ. I(a), UNGA Resolution 41/65.
  43. See, e.g., H. A. Wassenbergh, *Principles of Outer Space Law in Hindsight* (1991), 88–90; G. Catalano Sgrosso, “International Legal Framework of Remote Sensing,” in *Legal Framework for Commercial Remote Sensing Activities* (1998), 5–6.
  44. Princ. II, UNGA Resolution 41/65.
  45. Princ. III, UNGA Resolution 41/65.
  46. See Princ. V, UNGA Resolution 41/65, which furthermore requires states to make available opportunities for participation in their own remote sensing activities to other states “on equitable and mutually acceptable terms.”
  47. Princ. IV, UNGA Resolution 41/65.
  48. Princ. IV, UNGA Resolution 41/65.
  49. Emphasis added. “Primary data” are defined as “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,” “processed data” as “products resulting from the processing of the primary data, needed to make such data usable”; Princ. I, resp. (b) and (c), UNGA Resolution 41/65.

50. “Analyzed information” is defined as “information resulting from the interpretation of processed data, inputs of data and knowledge from other sources”; Princ. I(d), UNGA Resolution 41/65.
51. Princ. X, resp. XI, UNGA Resolution 41/65.
52. Princ. X, XI, UNGA Resolution 41/65.
53. Notably, this concerns the Land Remote-Sensing Commercialization Act, Public Law 98-365, 98th Congress, H.R. 5155, 17 July 1984; 98 Stat. 451; *Space Law—Basic Legal Documents*, E.III.4; and the Land Remote Sensing Policy Act, Public Law 102-555, 102nd Congress, H.R. 6133, 28 October 1992; 15 U.S.C. 5601; 106 Stat. 4163.
54. ESA was established by means of the Convention for the Establishment of a European Space Agency, Paris, done 30 May 1975, entered into force 30 October 1980; 14 ILM 864 (1975); *Space Law—Basic Legal Documents*, C.I.1.
55. EUMETSAT was established by means of the Convention for the Establishment of a European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), Geneva, done 24 May 1983, entered into force 19 June 1986; as amended 14 July 1994, entered into force 27 July 1994; Cmnd. 9483; *Space Law—Basic Legal Documents*, C.III.1; 44 *Zeitschrift für Luft- und Weltraumrecht* 68 (1995).
56. For a more extended analysis of the data policy documents referred to already, see the author’s “Non-discriminatory data dissemination in practice:’ in R. Harris (ed.), *Earth Observation Data Policy and Europe* (2002), 43–48; for the two US acts, look briefly at the author’s paper “*Private Enterprise and Public Interest in the European ‘Spacescape’*” (1998) 127.