

HOSTING GALILEO GROUND STATIONS Liability and Responsibility Issues under Space Law

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Abstract

At this moment, the European GNSS Supervisory Authority, the public agency-half of the Public-Private Partnership principally in charge of the Galileo system, is built up, and the first full-fledged operations on a global scale are currently envisaged by 2010 or shortly thereafter. Thus, one set of legal questions which now becomes of interest concerns those surrounding the possibility for third countries to host Galileo ground stations.

The present paper seeks to analyse these issues from the perspective of space law, in particular as regards issues of international responsibility and liability under the Outer Space Treaty and the Liability Convention, and how they would or might impact upon the specific context of operating ground stations for the Galileo satellite system.

In doing so, it will include a brief update as to the institutional structure being developed for Galileo, as well as a summary comparison with existing precedents of third states hosting ground stations for a satellite system principally operating outside of their control, such as the Land Earth Station Operator Agreements in the context of INMARSAT/Inmarsat and the bilateral agreements between the United States and third countries on the hosting of ground stations for the LANDSAT system.

1. Update on Galileo

Few people in the world of space will have failed to notice that Galileo, the European satellite navigation-system-to-be, has landed in rough weather. Or, as the latest official Communication from the European Commission on the issue, of 16 May 2007, clearly indicates already by its title: Galileo is at a cross-road.¹ Not so much in terms of actual development (although further delays have occurred also in that area), but primarily in terms of the institutional structure envisaged for Galileo.

Ever since the Commission announced its plans to develop European satellites for positioning, navigation and timing in conjunction with the European Space Agency (ESA) and the member states in 1998,² the main idea was to create a Public-Private Partnership (PPP) with a private consortium as co-financier and operator of the system on a concession basis. That approach has been reiterated throughout the series of official documents which followed in later years to further develop what was first termed GNSS-2, then Galileo.³

The Communication of 16 May, however, reflects the continuing problems with contracting a concessionaire to build and operate the system as such on a commercial basis, and it is clear that the ideas on establishing a private Galileo Operating Company (GOC)⁴ currently are no longer presumed to apply. The Council in a Resolution of 8 June 2007 unequivocally concludes in this regard

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“that the current concession negotiations have failed and should be ended”.⁵ The same Resolution also states that the deployment of the system should now be feasible by 2012.⁶

Let there be no mistake, however: Galileo is a major success already prior to its proper deployment from many other perspectives, such as the geopolitical one. Ever since the People’s Republic of China (PRC) became the first non-European partner to join the project at the highest level,⁷ many such states have expressed their interest in doing so and some have already concluded similar agreements.⁸

Also the Resolution of 8 June 2007, as well as ensuing political discussions within Europe at the highest level, leave little doubt that the European stakeholders are determined to ‘make Galileo happen’, and to replace the private investments which are now no longer expected with public investments one way or another.⁹ This also means, likely, that the European GNSS Supervisory Authority (EGSA) will either ‘supervise’ another, public or hybrid entity operating the system or end up operating the system itself.

Thus, while Galileo may not happen as originally envisaged in terms of a PPP, it will happen *somehow*, and that makes the questions posed in the Abstract above regarding the hosting of Galileo ground stations from the perspective of international space law responsibility and liability still worthy of attention.

2. Galileo and ground stations

The global scope of Galileo operations will require a number of ground stations for tracking and control as well as for other purposes around the world. Whilst to some extent the existence of overseas dependencies of European states could help out, in a number of

cases other states will have to be approached.

Of course, this applies to GPS and GLONASS as well, but in those cases of single-state-systems the situation is fairly straightforward. National authorities can negotiate the deals required, and these can remain simple as neither the United States nor Russia accept legal obligations for their own activities and operations beyond the bare minimum resulting from general tort law-principles, good neighbourliness and suchlike.

Galileo is crucially different on two counts. Firstly, it does intend to fundamentally accept certain liabilities, in order to entice potential customers to pay for certain of its services. Secondly, in this case at least two international organisations (the EU and ESA) and at least twenty-nine European states are involved.¹⁰ On their behalf, EGSA as the main representative of Galileo here would be the demanding party, being interested in establishing ground stations for Galileo across the world as necessary to operate the system and provide the services. This will unavoidably involve some territories not under the sovereignty of a member state of the European Union or ESA, although perhaps third state-accessions to EGSA could allow for sufficient global coverage in that sense. In view of security concerns however, even with such states elaborate agreements would be required to ensure proper implementation. As of yet it is both possible that in some cases EGSA may end up owning and/or operating such a ground station, and that the host state itself might be interested in doing so.

In any case, such operations will entail questions of state responsibility and liability under space law – which is what this paper will then in particular focus on.

3. Possible precedents: INMARSAT and LANDSAT

For international agreements between an entity running a satellite system and a state requested to host ground stations interesting precedents exist. Many such systems, whether belonging to a state or to its entities, require ground stations situated in territories not subject to the sovereignty of the operating state(s). As an example, the case of the US LANDSAT system may be relevant and helpful.

While such cases simply required the states concerned to negotiate relevant arrangements in the form of agreements between legal equals, the issue equally arose in the more complicated context concerning intergovernmental organisations. Both INTELSAT¹¹ and INMARSAT¹², prior to their being privatised in the late 90's, had to conclude such agreements also with states not being members of the organisations themselves.

Starting with the latter case and taking INMARSAT as an example thereof, operating a communication satellite system in orbit to serve users all across the globe required that organisation to maintain a dedicated set of ground stations spread around the world. For that purpose, a number of Land Earth Station Operator Agreements (LESO Agreements) had been concluded. Those LESO Agreements prominently included also rights of access of the LES Operators to the INMARSAT segment; evidently a mutual benefit was seen to arise from any such Agreement.¹³ It remains to be seen, of course, to what extent that would be true also for Galileo ground stations outside of Europe, but at any rate a further study of these agreements might be enlightening.

From this perspective it is interesting to note that also after privatisation, that is the take-over of actual operation of the space system as well as marketing and sales of its services by the new private entity Inmarsat, for some time the LESO Agreements took care of the resulting complications. Under them, Inmarsat continued to act as a wholesaler to the LES Operators of satellite capacity, who could in turn provide the relevant services to users so interested. These agreements consequently limited Inmarsat's ability to do business itself to a certain extent, but provided the company in return with a well-rooted distribution network. Most LES Operators, it may be noted, were signatories to the 'old' INMARSAT Operating Agreement, in most cases still public national telecom operators – as mentioned, a possible construction with respect to ground stations in the case of Galileo would also be for the host state itself to own and operate those.

Whilst now the LESO Agreements have been replaced by a Common Framework Agreement, this basically achieved a unified approach; it does not do away with the need to deal with all the problems of a satellite operator requiring ground stations in foreign states. Hence it might usefully serve as a precedent once these issues start to be dealt with in the Galileo context.

The LANDSAT example is illustrative especially from the perspective of substance. This US national remote sensing satellite system, developed from the early 70's onwards, from its inception required ground stations strategically situated around the world to ensure telemetry, tracking and control with respect to the satellite (the technical/operational part) as well as, in the absence of data relay satellites, direct caption of remote sensing data on the ground (the content part).¹⁴

In the case of Galileo ground stations, apart from the apparent need to continuously track and control the satellites, the need to arrange (direct) capture of data has more to do with the relevance of the area where those data are needed (obviously, one needs positioning and navigation information especially in the geographical area where one is positioned or navigating) than with a need for relay satellites (Galileo itself crucially maintaining inter-satellite communications for relaying any relevant information), but the effects would largely be the same. It would thus be quite helpful for the Galileo stakeholders also to investigate the precedent of LANDSAT to analyse the legal and institutional problems to be solved and to indicate possible solutions to them. Such issues are, amongst others: the distribution of responsibilities for maintaining and operating the ground station to the extent that the host state is interested in, or insisting on, being involved therein; concerns as to the security of the facilities both legally and factually; intellectual property rights and data protection issues both in accordance with European law-norms and in conformity with domestic laws and regulations; and the possibilities for the ground station host state to itself take part in the commercial use and/or dissemination of Galileo services in its own territory, read market. This last point was crucial in the case of LANDSAT as a remote sensing system, but may also turn out to be of interest as a negotiating and bargaining tool for Galileo to induce third states to host ground stations.

It may be added for comparison's sake, that the international customary obligation (reflected moreover in the US acts applicable to LANDSAT) to provide at least raw data to a "sensed state" "on a non-discriminatory basis

and on reasonable cost terms" also results in an obligation upon a ground station host state limiting the commercial options.¹⁵

And yet, with LANDSAT host states were sufficiently interested in being part of the system to pay annual fees in the range of 600,000 to 1,000,000 US\$ for access to such data, in addition to 'contributing' a ground station. A final verdict on whether Galileo will be able to incite a similar level of commercial excitement in potential host states will likely only be possible once the system is close to full operational capability, but the interests of states like the PRC and India in investing hundreds of millions of US\$ in Galileo signify that this is at least feasible.

At the same time, the intention is for the Galileo operator to undertake all the commercial activities involved in marketing and selling Galileo services: how would that square with any host state itself entering the business? How to deal with product and service liability, intellectual rights and data protection, and the need for dispute resolution mechanisms, in cases where a host state (or any domestic private company) would be keen on conducting commercial Galileo business with a ground station? Solid agreements would be requisite here.

It may be noted finally, that for a considerable period of LANDSAT operations a private US company EOSAT was at the heart of the dissemination structure, somewhat comparable to the envisaged role of the Galileo concessionaire; marketing and selling data generated by the LANDSAT systems. As we all know, EOSAT failed after a few years of operations: the market for full-fledged commercial earth observations operations turned out to have been immature, to say the least – yet, this did not prevent LANDSAT as such from

continuing to be rather fruitful and beneficial for US interests.

4. International responsibility and liability issues

Not to look too far ahead, at this point there would be a few aspects as regards Galileo and its ground stations worthy of discussing under international law. One concerns the powers necessary or desirable to conclude relevant treaties with third countries envisaged to host ground stations. Here, EGSA would seem to be the most appropriate body to conclude such agreements, but currently does not seem to have any such competence.¹⁶

The main difference between Galileo and existing satellite navigation systems, as already indicated, concerns the need in the present case for the European stakeholders to make participation by third states in the Galileo system through the hosting of ground stations attractive enough to overcome any possibly present hesitation or disinterest on the part of such third states.

This is where the aspects of responsibility and liability will play a rather important role. Perhaps a host state which is a formal partner of Galileo, operating ground stations as part of its active involvement in Galileo operations for its own well-defined benefit, would be open to accepting attendant responsibility and liability. Without any higher-level involvement, however, a state might only be convinced to come to an agreement on hosting ground stations if it can incur no more than a minimum of responsibility and liability.

As for the general form of international accountability, states are responsible in broad terms for ensuring that activities conducted on their territory or within

their jurisdiction do not violate the rights of other states.¹⁷ Operating a ground station for Galileo, or even allowing it to be operated by EGSA or another Galileo operator, does not take away such obligations, and any agreement might have to include guarantees that such operations will not be conducted in such a way that the host state's international responsibility might be invoked by another state.

In addition to state responsibility as it arises under general international law, Article VI of the Outer Space Treaty has caused a specific version thereof to be applicable to space activities.¹⁸ "Space activities", or more precisely "activities in outer space" (the term Article VI uses), as such have not been defined. The operation of a ground station controlling (part of) a satellite system or its operations however would generally be considered to fall within the scope of that term.

It remains to be seen to what extent EGSA, alternatively the Commission, could provide guarantees that ground station operations would be conducted in such a manner as to exclude the possibility of a host state's responsibility being invoked by a third state. Regulation 1321/2004 provides that EGSA should "manage the public interests" and act as "regulatory authority" for Galileo, at best suggesting this should encompass ensuring the legality of its own activities or any conducted under its sway under international law.¹⁹

Also the specific version of accountability triggered by the incurrance of damage, that of liability, addresses states. The causation of direct physical damage caused by space activities is ruled by Article VII of the Outer Space Treaty as further elaborated by the 1972 Liability Convention.²⁰ This regime provides for liability for damage caused by a

space object resting upon the “launching State(s)” of that space object; the concept of “launching State” being defined in a fourfold fashion.²¹

In particular the criterion of “procuring” a launch is subject to uncertainties relevant here. Arguably the hosting of a ground station, the activity of which causes a satellite to become involved in a major accident causing damage, could be seen as making the host state a liable state under space law for such damage.

At the level of the international space treaties or UN resolutions, it has not been possible so far to arrive at any generally agreed interpretation or definition of the term “procurement”. In the absence thereof it becomes of interest to see how individual states in their national efforts at relevant legislation have tried to deal with this issue, as this may lead to an authoritative interpretation based on customary law-principles. This also applies, incidentally, to any interpretation of the key term of Article VI of the Outer Space Treaty, “national activities in outer space”, as relevant for international responsibility.

5. Some national examples

Some national space laws implementing the international responsibility and liability provisions at a domestic level indeed explicitly or implicitly require a license also for ground station operations including arrangements on reimbursement of any state liability incurred.

For example, in the United States a license is required to “use or operate any apparatus for the transmission of energy or communications or signals by radio” from anywhere in the United States.²² The attendant liability has to

be dealt with in that context as well.²³ Clearly, operations of a ground station using radio signals to control navigation satellites would fall under these requirements.

Similar conclusions might be drawn in respect of some of the other states with an operative national space law. In the case of Sweden, member state of both ESA and the European Union and hence of importance for any official ‘European’ interpretation and definition of “procurement”, a license is required for “all measures to manoeuvre or in any other way affect objects launched into outer space”, if conducted from Swedish soil and/or by a Swedish national or national company, and licensees “shall reimburse the State what has been disbursed on account of the above-mentioned undertakings, unless special reasons tell against this”.²⁴ Linking the licensing obligation to one to reimburse the government for any international liability claims is also common in the other national space laws of Western-European states.

The United Kingdom, the second ESA and EU member state so far having a full-fledged national framework law on space activities in outer space, whilst limiting its licensing obligation to UK nationals and national companies, does also explicitly include in the scope of its licensing regime anything causing a space activity “to occur” or being “responsible for its continuing”.²⁵ A licensed activity automatically includes the obligation to indemnify the UK government in relevant cases.²⁶

The next EU- and ESA-member state to enact a proper national space law, Belgium, defines the “operator”, as the person on whom the obligation rests to obtain an authorisation to conduct space activities, as “the person that carries out or undertakes to carry out the activities referred to in this law, by

ensuring, alone or jointly, the effective control of the space object".²⁷ The consequence is *inter alia* the right of the Belgian government to address a counterclaim to the licensee for any international liability claim that it has to honour.²⁸

Belgium's neighbour, the Netherlands, similarly includes the operation of ground stations at least to a substantial extent in the licensing obligation under its new 2007 law: "space activities", as the activities triggering the application of the law and its licensing obligation, is defined as including "the guidance of space objects in outer space".²⁹ Also the Dutch law consequently provides for reimbursement of liability claims addressed to the Netherlands.³⁰

For comparison's sake furthermore, the Russian space law includes in its scope "the use of navigation (...) systems" and "other kinds of activities performed with the aid of space technologies" by anyone falling under Russian jurisdiction, calling for reimbursement in principle of the Russian government of liability claims paid by the latter under international space law.³¹

A final example concerns South Africa, where "space activities" as leading to a license requirement under the relevant Act are defined as "activities directly contributing to the launching of spacecraft and the operation of such craft in outer space", which activities require a license if conducted from South Africa, which may in turn give rise to a reimbursement obligation.³²

6. Concluding remarks

Whatever the level of national detail in implementing the relevant international obligations pertaining to responsibility and (especially) liability, it is obvious that in the arrangements allowing Galileo ground stations to operate on

their respective territories the intended host states would want to shift the burden of any such liability onto the shoulders of Galileo, that is EGSA and/or any (other) Galileo operator.

This is, however, not the whole story when it comes to liability for Galileo operations. The international space law regime for liability mentioned above, and its national ramifications and implementation are, in view of the scope of that international regime, only relevant for physical damages caused by a Galileo satellite to another space object or on earth – arguably even restricted to such damage caused by physical *impact*, that is a crash.

In the case of Galileo, while the above is by no means a negligible issue, at least equal attention needs to be paid to the possible damage caused by the user of Galileo for example when that user, wrongfully trusting the signals and services provided to him, navigates incorrectly – into a wayside tree, a harbour facility, or a mountainside adjacent to an aircraft landing strip. This type of indirect damage results in triggering other liability regimes applicable – for road accidents, maritime accidents or aviation accidents – normally making such user (and not Galileo itself) liable for the damage.³³

But where it is Galileo's intention to attract (commercial) transport users to some of its services and make them pay for it, there is a clear interest for EGSA and any operator to somehow allow derogation of such liability claims in case it can be proven the cause of the damage was a wrongful or absent Galileo signal.

As of yet this is far from established however. Regulation 1321/2004 itself does not go further than accepting non-contractual liability to the extent "in accordance with the general principles common to the laws of the Member

States” and thus to “make good any damage caused by its departments or by its servants in the performance of their duties”.³⁴ It would be difficult, to say the least, to read this as including the operations of the system by a distinct operator – certainly not a “department” or “servant” in the normal sense of the word – especially if occurring in non-member states.

To the extent that such a system for derogation of liability to Galileo would arise, agreements between EGSA or the Commission and host states would also have to deal with this aspect of liability, arranging for procedures and rules once the question arises whether an activity conducted at the relevant ground station might have been partially or wholly responsible for a Galileo failure causing relevant damage.

In sum: regardless of the precise institutional version under which Galileo would finally see the light of day, issues of international (space) law responsibility and liability will have to be properly approached and solved if Galileo is to become the major contribution to “the benefit and (...) interests of all countries”³⁵ which it is destined to become.

Endnotes

1. Communication from the Commission to the European Parliament and the Council – Galileo at a Cross-Road: The Implementation of the European GNSS Programmes, COM(2007) 261 final, of 16 May 2007.

2. See Communication from the Commission to the Council and the European Parliament – Towards a Trans-European Positioning and Navigation Network: including A

European Strategy for Global Navigation Satellite Systems (GNSS), COM(1998) 29 final, of 21 January 1998.

3. See, e.g., Council Resolution on the involvement of Europe in a new generation of satellite navigation services – Galileo-Definition phase, of 19 July 1999; OJ C 221/01 (1999); Council Regulation setting up the Galileo Joint Undertaking, No. 876/2002/EC, of 21 May 2002; OJ L 138/1 (2002); Communication from the Commission to the European Parliament and the Council – Integration of the EGNOS programme in the Galileo programme, COM(2003) 123 final, of 19 March 2003; Communication from the Commission to the European Parliament and the Council – Progress report on the GALILEO research programme as at the beginning of 2004, COM(2004) 112 final, of 18 February 2004; Council Regulation on the establishment of structures for the management of the European satellite radio-navigation programmes, No. 1321/2004/EC, of 12 July 2004 (hereafter Regulation 1321/2004); OJ L 246/1 (2004); and Green Paper on Satellite Navigation Applications, COM(2006) 769 final, of 8 December 2006.

4. On the ‘original’ institutional set-up for Galileo, see e.g. the author’s *Quis vadit cum vobis, Galileo?* – Institutional Aspects Of Europe’s Own Satellite Navigation System, in *Proceedings of the Forty-Sixth Colloquium on the Law of Outer Space* (2004), 360-70; and *Towards Monitoring Galileo: the European GNSS Supervisory Authority in statu nascendi*, 55 *Zeitschrift für Luft- und Weltraumrecht* (2006), 100-17.

5. Item 2, Council Resolution on GALILEO, 2805th Transport, Telecommunications and Energy Council Meeting, Luxembourg, 6-8 June 2007.

6. See item 5, Council Resolution on GALILEO, 2805th Transport, Telecommunications and Energy Council Meeting, Luxembourg, 6-8 June 2007.

7. By becoming a member of the Galileo Joint Undertaking (GJU), the precursor to EGSA; see Cooperation Agreement on a Civil Global Navigation Satellite System (GNSS) – Galileo between the European Community and its Member States and the People’s Republic of China, of 30 October 2003; Doc. Council of the European Union, 13324/03.

8. E.g., Israel; see Cooperation Agreement on a Civil Global Navigation Satellite System (GNSS) between the European Community and its Member States and the State of Israel, of 2 June 2005; Doc. Council of the European Union, 9482/04.

9. Cf. items 4-7, Council Resolution on GALILEO, 2805th Transport, Telecommunications and Energy Council Meeting, Luxembourg, 6-8 June 2007.

10. The European Union now counts 27 member states: *Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom*. Amongst those, the ones indicated in *italics* are

also member states of ESA; in addition, non-EU member states Norway and Switzerland are involved as ESA member states.

11. The ‘old’ INTELSAT was established by means of the Agreement Relating to the International Telecommunications Satellite Organization (INTELSAT), Washington, done 20 August 1971, entered into force 12 February 1973; 1220 UNTS 21; TIAS 7532; 23 UST 3813; UKTS 1973 No. 80; Cmnd. 4799; ATS 1973 No. 6; 10 ILM 909 (1971); and the Operating Agreement Relating to the International Telecommunications Satellite Organization (INTELSAT), Washington, done 20 August 1971, entered into force 12 February 1973; 1220 UNTS 149; TIAS 7532; 23 UST 4091; UKTS 1973 No. 80; Cmnd. 4799; ATS 1973 No. 6; 10 ILM 946 (1971).

12. The ‘old’ INMARSAT was established by means of the Convention on the International Maritime Satellite Organization (INMARSAT), London, done 3 September 1976, entered into force 16 July 1979; 1143 UNTS 105; TIAS 9605; 31 UST 1; UKTS 1979 No. 94; Cmnd. 6822; ATS 1979 No. 10; 15 ILM 1052 (1976); and the Operating Agreement on the International Maritime Satellite Organization (INMARSAT), London, done 3 September 1976, entered into force 16 July 1979; 1143 UNTS 213; TIAS 9605; 31 UST 1; UKTS 1979 No. 94; Cmnd. 6822; ATS 1979 No. 10; 15 ILM 233, 1075 (1976).

13. See e.g. D. Sagar, *The Privatisation of Regulated Industries: Lessons Learned from the Telecommunications*

and Satellite Sectors, 7-1 *Newsletter Outer Space* (2005), 6-10.

14. See e.g. P.A. Salin, LANDSAT Contracts Signed by US Agencies with Foreign Ground-Stations: Commercial Remote Sensing from NASA Scientific Experiments to EOSAT Private Endeavours, 41 *Zeitschrift für Luft- und Weltraumrecht* (1992), pp. 165-75.

15. Princ. XII, Principles Relating to Remote Sensing of the Earth from Outer Space, UNGA Res. 41/65, of 3 December 1986; UN Doc. A/AC.105/572/Rev.1, at 43; 25 ILM 1334 (1986); cf. further Sec. 202(a)(3), 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; Sec. 5615(a)(1), 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.

16. E.g., in Art. 2, Regulation 1321/2004, rather exhaustively listing the Tasks of EGSA, no reference to such a competence can be found; and the legal personality of EGSA as established under Art. 4 is far removed from full-fledged *international* legal personality. Even the Commission itself requires explicit mandates from the Council to negotiate international agreements on GNSS and Galileo issues; cf. e.g. Council of the European Union, 2589th Council Meeting, Transport, Telecommunications and Energy, Luxembourg, 10-11 June 2004, 9865/04 (Presse 176), 19.

17. See for a general abstract treatise of state responsibility in the context of space activities already the author's

Private Enterprise and Public Interest in the European 'Spacescape' (1998), pp. 17-22, and literature referred to.

18. See Art. VI, 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).

19. Art. 1, Regulation 1321/2004.

20. 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).

21. Art. I(c), Liability Convention, reads: "The term "launching State" means: (i) a state which launches or procures the launching of a space object; (ii) a State from whose territory or facility a space object is launched."

22. Sec. 301, Communications Act, 19 June 1934; 47 U.S.C. 151 (1988); 48 Stat. 106.

23. See Sec. 206, Communications Act.

24. Secc. 1, 2, 6, Act on Space Activities, 1982: 963, 18 November 1982; National Space Legislation of the World, Vol. I (2001), at 398; Space

Law – Basic Legal Documents, E.II.1; 36 *ZLW* (1987), at 11.

25. Sec. 13(2), cf. further Secc. 1, 2, 3, Outer Space Act, 18 July 1986, 1986 Chapter 38; National Space Legislation of the World, Vol. I (2001), at 293; Space Law – Basic Legal Documents, E.I; 36 *ZLW* (1987), at 12.

26. See Sec. 10(1), Outer Space Act.

27. Artt. 3(2), 4, Law on the Activities of Launching, Flight Operations or Guidance of Space Objects. Art. 3(3) furthermore defines “effective control” for the purpose of § 1 as including “remote control”, as “necessary for the implementation of the activities of launching, the flight operations and guidance of one or more space objects”.

28. See Art. 15(1), Law on the Activities of Launching, Flight Operations or Guidance of Space Objects.

29. Sec. 1(b), Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects; 80 *Staatsblad* (2007), at 1. The English translation used for the purposes of this article, which is on file with the author, is as yet an unofficial one; an official translation into English is expected later in the course of 2007. Sec. 2 of the Rules establish the licensing obligation.

30. See Sec. 12(1), Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects.

31. Art. 2(1), see further Artt. 1, 25, 30, Law of the Russian Federation on Space Activities, No. 5663-1, 20

August 1993, effective 6 October 1993; National Space Legislation of the World, Vol. I (2001), at 101.

32. Sec. 1, see further Secc. 11, 14, Space Affairs Act, 6 September 1993, assented to on 23 June 1993, No. 84 of 1993; Statutes of the Republic of South Africa – Trade and Industry, Issue No. 27, 21-44; National Space Legislation of the World, Vol. I (2001), at 413.

33. Cf. e.g. for aviation the international contractual liability system developed ever since the Convention for the Unification of Certain Rules Relating to International Transportation by Air, Warsaw, done 12 October 1929, entered into force 13 February 1933; 137 LNTS 11; USTS 876; UKTS 1933 No. 11; ATS 1963 No. 18; and culminating in the Convention for the Unification of Certain Rules for International Carriage by Air, Montreal, done 28 May 1999, entered into force 4 November 2003; ICAO Doc. 9740; 48 *ZLW* 326 (1999); and the third-party liability conventions of 1933 and 1952: International Convention for the Unification of Certain Rules Relating to Damage Caused by Aircraft to Third Parties on the Surface, Rome, done 29 May 1933, entered into force 11 November 1942; 5 *JAL* 312 (1937), respectively Rome Convention on Damage Caused by Foreign Aircraft to Third Parties on the Surface, Rome, done 7 October 1952, entered into force 4 February 1958; 310 UNTS 181; ATS 1959 No. 1; ICAO Doc. 7364.

34. Art. 17(2), Regulation 1321/2004.

35. Art. I, Outer Space Treaty.