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von der Dunk, Frans G., "The International Law of Outer Space and Consequences at the National Level for India: Towards an Indian National Space Law?" (2009). *Space, Cyber, and Telecommunications Law Program Faculty Publications*. 71.
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von der Dunk in Indian Yearbook of International Law and Policy (2009), section II: Articles, chapter 5.
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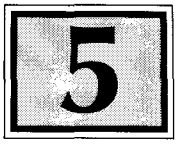

THE INTERNATIONAL LAW OF OUTER SPACE AND CONSEQUENCES AT THE NATIONAL LEVEL FOR INDIA: TOWARDS AN INDIAN NATIONAL SPACE LAW?

*Frans G. von der Dunk**

The discussion on a forum on the famous web-based LinkedIn networking site has already taken off: should India, as party to the four most important international space treaties, also develop a national space law, as other states increasingly are doing? That India is currently one of the leading spacefaring nations in the world is beyond discussion. In itself, however, that does not necessarily necessitate going through the trouble of drafting and implementing a national space law.

This article, however, argues that indeed, following the examples of a growing number of spacefaring states around the world discussed in some detail as far as, in particular, liability and attendant insurance issues are concerned, India should also develop such a national space law. On the one hand, it is shown to allow states to implement their international obligations under space law in a comprehensive fashion, and for example properly deal with the liability they may incur for private space activities. On the other hand, it would create a considerable measure of clarity for private parties interested in contributing to the general space effort in terms of the rights and obligations they would take upon themselves in doing so.

The main conclusion drawn for India following the extended analysis by the present article is that, unless it would insist on precluding any private sector

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involvement in space activities, both by Indian companies and by foreign companies operating in or from India and, going decidedly against the global trends, would attempt to roll back any such existing developments in this respect, there can be little doubt that India needs some sort of national legal framework dealing with private activities in outer space by means essentially of a licensing system.

At the least, this would be necessary for the compliance with key obligations resting upon India under the international space law treaties, pertaining to such issues as responsibility, liability and registration of space objects. From a more positive and proactive perspective, moreover, it would also be desirable to ensure that private efforts and money might be harnessed for the broader public cause of the peoples and economy of India: if properly guided by a regulatory framework, this would be the proverbial win-win situation.

I. INTRODUCTION: INDIA, INTERNATIONAL SPACE TREATIES AND A NATIONAL SPACE LAW?

The discussion on a forum on the famous web-based LinkedIn networking site has already taken off: should India, as party to the four most important international space treaties (the Outer Space Treaty,[1] the Rescue Agreement,[2] the Liability Convention[3] and the Registration Convention[4]) and signatory of the last such treaty (the Moon Agreement[5]), also develop a *national* space law, as other states increasingly are doing exactly that?

That India is, by all accounts, currently one of the leading spacefaring nations in the world (and has already been for a few decades) is beyond discussion. It operates its own comprehensive fleets of telecommunication and remote sensing satellites, further develops its own independent launch capabilities and is even working now towards sending its own first 'vyomanauts' into outer space by 2015. In itself, however, that does not necessarily necessitate going through the trouble of drafting and implementing a national space law.

After all, law in the abstract is always supposed to take care of an issue, a potential issue or an area where issues are present or expected to arise and existing law is not deemed sufficient to properly deal with them. Do the five space treaties mentioned (or at least the first four[6]), widely acknowledged and respected as providing a comprehensive legal framework for all activities in outer space, not sufficiently take care, then, of actual and prospective issues in such a manner that *national* law, rather than more *international* law,[7] pertaining to this 'global commons'[8] would be necessary?

In this respect it is important to recall that space law did not develop in a standard fashion. Usually, legal regulation of any sort of human activity starts at the national level, then – sometimes only after centuries – when international aspects of the field at issue are becoming apparent or important, international law may get developed to deal with such international aspects and perhaps achieve some measure of international harmonisation.

In outer space however, with the exception of the United States as it promulgated its first act to establish the National Aeronautics and Space Administration[9] as early as 1958, precisely because of its 'global commons' character international law preceded national space-dedicated legislation. The aforementioned Outer Space Treaty dates from 1967, after a UN Declaration[10] had already in 1963 provided for most of its key legal principles, whereas the first non-US national space law was a Norwegian Act[11] of only three Articles and barely a page in size, enacted in 1969.

So the question remains: why should of all times *now*, after India's space programme has matured for over four decades, the question of a possible desirability or even need for a national Indian space law become a matter of serious debate – and this, perhaps, not only on LinkedIn? Is there also a need, after all, for domestic implementation in India of international space law, as the latter has developed through the same four decades?

II. THE GENERAL OUTLINES OF INTERNATIONAL SPACE LAW: THE OUTER SPACE TREATY

Before reverting to the key questions posed above, it would firstly be appropriate to briefly outline the main outlines, principles, rights and obligations pertaining to space activities established at the international level by the treaties mentioned before.

The most fundamental clause of the most fundamental treaty has already been alluded to: the one determining the 'global commons' character of outer space, including all celestial bodies, under the Outer Space Treaty.[12] More precisely, Article II reads in full: "Outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."

This principled negation of any exercise of territorial sovereignty over outer space or any part thereof is further reinforced by the provisions that "[o]uter space, including the Moon and other celestial bodies, shall be free for

exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, ... [that] there shall be free access to all areas of celestial bodies" and that "[t]here shall be freedom of scientific investigation in outer space, including the Moon and other celestial bodies."[13]

Whilst some have tried to argue in the past that the reference to the 'province of all mankind,' unique to space law, should essentially equate with the 'common heritage of mankind' principle that was later developed for the law of the sea[14] and the Moon Agreement, it is important to stress that this argument cannot be upheld. The Moon Agreement itself, though indeed calling for the "Moon and its natural resources [to be considered] ... the common heritage of mankind,"[15] at the same time also reiterated the older term from the Outer Space Treaty in declaring "the exploration and use of the Moon ...[to] be the province of all mankind."[16] The use of both terminologies in the same international treaty should already testify to their fundamental difference.[17] Moreover, the reason for most of the important spacefaring states *not* to adhere to the Moon Agreement was precisely the use (and expected further implementation) of that 'common heritage of mankind' clause – whereas none of those states had a problem with the Outer Space Treaty's application of the phrase 'province of all mankind' as evidenced by the latter's widespread ratification.

A further point of note is that, of course, the absence of applicability of territorial sovereignty over outer space as a consequence of Article II of the Outer Space Treaty begs the question of where outer space begins, in view of the *a contrario* sovereignty over national airspace of every individual state.[18] The fact that this issue has so far not been solved in legal terms in any generally authoritative manner – and that this in turn was not essentially much of a problem so far[19] – should not lead to any automatic conclusion that the absence of such a boundary may not become an issue following certain developments in space activities. Notably this concerns private commercial spaceflight,[20] where the exercise of territorial jurisdiction in national airspace may well become a primary tool for controlling those flights in law.

Other general principles applicable to space activities following from the Outer Space Treaty concern the aforementioned essential freedom of exploration and use as generally perceived to include exploitation of outer space for states,[21] state responsibility for acts in violation of outer space law, including those of private entities,[22] and state liability for damage caused by space objects, including once more those of private entities.[23]Registration of a space object

provides the attendant state with the opportunity to retain its jurisdiction on board of such space objects.[24] Space activities, generally speaking, should be conducted in the interest of all countries, with special attention being paid to the interests of the developing countries.[25] This includes a specific requirement to use the Moon and other celestial bodies "exclusively for peaceful purposes," and a prohibition "to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner."[26]

A final clause of note concerns the legal status and role of intergovernmental organisations, as vehicles for groups of states to be active in outer space, where it is provided that "[a]ny practical questions arising in connection with activities carried on by international intergovernmental organizations in the exploration and use of outer space... shall be resolved by the States Partiesto the Treaty either with the appropriate international organization or with one or more States members of that international organization, which are Parties to this Treaty."[27]Whilst this clause, amongst others, does recognise an appropriate role for intergovernmental organisations to play in the space arena, notably no such recognition can be found regarding a role for private enterprise, beyond the general provision that any space activities conducted by private enterprise, being "national activities carried out ... by non-governmental entities," are subsumed under the state responsibility of the state concerned, which is to authorise and continuously supervise those activities.[28]

This leads to the main conclusion emanating from the Outer Space Treaty *vis-à-vis* national space law: once the involvement of private entities is a real probability, perhaps even desirability, and is not principally outlawed under the general legal system of a particular state, that state should establish a national legal system for authorising and supervising these activities. Whilst, in theory, there are several means to achieve that, clearly the most comprehensive and transparent way consists in drafting a national space law including prominently a system for licensing private space operators.[29]

In other words: to the extent it is to be envisaged, perhaps even stimulated for general economic reasons, that Indian companies in the short or middle term will start launching space objects, operating satellites for communications, navigation or remote sensing activities or even transporting humans into outer space and back, there would be a need to establish a national law in India to properly license and control those activities if only with a view to Indian state responsibility for those activities on the international plane. A further key

element in this context is derived from the liability provision in the Outer Space Treaty, as the liability issue will be dealt with in more detail below.

III. THE GENERAL OUTLINES OF INTERNATIONAL SPACE LAW: BEYOND THE OUTER SPACE TREATY

In the years following the Outer Space Treaty, several of its key clauses were found to require further elaboration, by means essentially of the three space treaties referred to before (the Moon Agreement being hardly relevant from this perspective). In addition, a few UN Resolutions were drafted which have become part of the international space law framework,[30] and also the special regime developed with respect to the allocation and allotment of satellite frequencies and orbital slots/orbits in the context of the International Telecommunication Union (ITU) should be mentioned.[31] These last two elements, however, will not further be discussed in the present contribution.

A. THE RESCUE AGREEMENT

Firstly, the Rescue Agreement was drafted to elaborate Articles V and VIII of the Outer Space Treaty with respect to assistance to astronauts in distress and their safe return home, as well as the rapid return of space objects to the launching authority.[32] Assuming that private parties of Indian nationality or operating from Indian territory would, for the time being, only be interested in unmanned spaceflight, it is first and foremost the latter set of provisions which might have to be dealt with in the course of drafting any Indian national space law.

For example, the return of a space object launched from Indian territory but somehow ending up within the jurisdiction of another state, has to be returned to India – yet, any expenses for the state returning that object have to be paid, in principle, by the Indian government.[33]The private company might indeed be interested in seeing the remnants of its satellite returned, for example for insurance-related purposes, for retrieving certain valuable component parts that survived re-entry or for analysing the causes of the accident causing the satellite to re-enter. Thus, preferably in the context of a national law and/or licensing system to be developed, arrangements between the Indian government and the licensee might be desirable with a view to dealing with such costs.

B. THE LIABILITY CONVENTION

Considerably more important, however, for the purpose of national legislation and licensing, is the Liability Convention elaborating Article VII of the Outer

Space Treaty.[34] As indicated, the latter already provided for state liability also in case of privately-launched or -operated space objects, a system of allocation of liability formalised by the Liability Convention through a fourfold definition of the "launching State" as the liable entity for damage caused by a space object.[35]

As a consequence of this definition, a state would become liable for such damage in case it launched or procured the launch of that space object, or allowed its territory and/or facility to be used for the launch of that space object. Obviously, the cumulative application of these four criteria might well lead to more than one state being liable for the damage caused by the space object at issue. The Liability Convention thus provides for joint and several liability: the claimant state may assert its claim for the total amount of damage against any of the liable states it choose to address, and leave it to these states to further arrange distribution of that claim amongst themselves.[36]

The territorial criterion is the most unequivocal one: every launch conducted from the territory of a state (including its territorial waters[37] and airspace[38]) gives rise to liability for damage caused by the space objects so launched. Consequently, a number of states with launch sites on their territory have indeed established national space laws, including licensing systems, to ensure *inter alia* proper derogation and reimbursement mechanisms *vis-à-vis* the licensees.[39] Further to the aforementioned case of Norway, this concerns such states as the United States,[40] Sweden,[41] Russia[42] and Australia.[43]

With regard to the other three criteria, the issue is more complicated, however. The launch may actually be conducted by a private launch service provider (such as the French company Arianespace), procured by a private satellite operator (such as the US company Intelsat) or conducted from a private launch facility (such as the international consortium Sea Launch). In each case, the question arises as to whether this causes France, respectively the United States, respectively the states whose companies comprise the international consortium and/or where the movable launching platform is registered,[44] to be qualified as (a) "launching State(s)," in view of private entities being the real actors.

As these issues have not been authoritatively solved on the international level yet, individual states drafting national space laws are faced with making their own choice as to whether to include such private activities in the scope of their licensing regimes for the purpose of liability possibly arising on the international level, as perceived. Thus, for example the United Kingdom has chosen to impose the licensing obligation also upon private entities interested in procuring a launch of their space object.[45]

The Liability Convention is rather more clear on the issue of type of liability applicable: absolute liability applies "for damagecaused by its space object on the surface of the Earth or to aircraft in flight," whereas fault liability applies to "damage being caused elsewhere than on the surface of the Earthto a space object of one launching State or to persons or property on board such aspace object."[46]

Damage compensable under the Convention is defined as "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural orjuridical, or property of international intergovernmental organizations."[47] By and large, this clause is interpreted as being limited to direct damage,[48] as well as further being limited to such damage only as caused by physical impact as part of a collision.[49] As we shall see, a final important point with a view to national laws and licensing regimes concerns the fact that compensation under the Liability Convention is essentially unlimited.[50]

C. *THE REGISTRATION CONVENTION*

The third international treaty of concern here is the Registration Convention, as it elaborates the summary reference to registration of space objects in Article VIII(and to some extent Article XI) of the Outer Space Treaty.[51] The Registration Convention adds to this reference firstly the obligation for the launching state to register its space objects, whereby the "launching State" is identified following the exact same terms as under the Liability Convention.[52] As this definition has already been seen to allow for more than one state to qualify as launching state in respect of a particular space object, the Registration Convention furthermore provides that in such cases these launching states should together determine which state should act as the registration state for the purpose of the Convention: there can only be one such state for each individual space object.[53]

This obligation effectively concerns the establishment of a *national* registry, where the details of how to establish the registry, what type of information should be included and who is to handle further registration is left to the discretion of the state of registry.[54]

Next, however, the Registration Convention requires the state of registry to comply with some international obligations in this context. The first one is inform the United Nations Secretary-General (effectively, the Office for Outer Space Affairs (OOSA) in Vienna) of the establishment of the national register.[55]

More importantly, it is to provide OOSA with a set of specified minimum details regarding the space object so registered, for the purpose of inclusion in the *international* register maintained by OOSA. Those data are listed as "(*a*) Name of launching State or States;(*b*) An appropriate designator of the space object or its registration number;(*c*) Date and territory or location of launch;(*d*) Basic orbital parameters, including:(i) Nodal period;(ii) Inclination;(iii) Apogee;(iv) Perigee;(*e*) General function of the space object."[56] On a voluntary basis the state of registry may furnish additional information, and is furthermore required to "notify the Secretary-General of the United Nations, to the greatest extent feasible and as soon as practicable, of space objects concerning which it has previously transmitted information, and which have been but no longer are in Earth orbit."[57]

From the perspective of national space laws and licensing regimes dealing with private space operators and their space activities, the main importance of the Registration Convention lies in requiring as well as allowing launching states to establish a specific mechanism conducive to controlling the relevant private space activities.[58] Whilst the details of the national registry, actually allowing such control, remain at the discretion of the registration state, the information required for the international register, resulting in a certain measure of transparency regarding responsibility and liability on the international level, is determined by the Convention; hence it would only be logical to take that information as the point of departure for determining the information due for the purpose of the national register.

IV. A CASE STUDY: LIABILITY AND INSURANCE UNDER EXISTING NATIONAL SPACE LAW

It is hardly an exaggeration that the most immediately visible and quantifiable consequence of the international framework for national space law sketched above concerns the issue of liability. Essentially, an unlimited liability rests upon the launching state(s) of a certain space object for any damage as defined by the Liability Convention caused by that space object – including cases where the damage was wholly or partially due to private activities involving that space object. Before having a closer look at the extent to which it may be desirable or even required for India to consequently establish its own national space law, it would be illustrative therefore to analyse in some detail, in view of the rather general character of the international regime provided by the Liability Convention, how the various states that have so far dealt with these issues on a national level in a fundamental, legislative manner have chosen to approach them.

Thus, the national space laws providing for licensing requirements applicable to launch activities will be briefly scrutinised along the following lines: (1) what is the scope of application *ratione personae*, of the license obligation with a view to the above discussion of whether the reference to states in Article I(c) of the Liability Convention includes private entities of that state if actually performing the launch, procuring it or rendering their facility for it; (2) to what extent is the liability, unlimited as it is under the Liability Convention, transformed into an unlimited reimbursement obligation for a licensee, or in the alternative, to what extent is a national limit provided for; and (3) to what extent does the licensing state require third party liability insurance on the part of the licensee to actually cover such reimbursement obligations.[59] Since the aforementioned Norwegian Act[60] was established in 1969, three years before the Liability Convention, it does not contain any specifics in that respect and it will therefore not be taken into consideration here.

A. *SWEDEN*

Chronologically, then, the first Act of relevance here is the Swedish Act on Space Activities of 1982.[61] In terms of the Act's scope *ratione personae*, the licensing obligation was summarily imposed both upon those private operators undertaking space activities, explicitly including launch activities[62], from Swedish soil and upon those with the Swedish nationality doing so elsewhere.[63] With a view to the Liability Convention, therefore, apparently Sweden considers itself *not* to be liable in case a Swedish company *procures* a launch elsewhere.

As to the issue of liability reimbursement, the Swedish Act in principle entitles the Swedish government to full reimbursement of any international liability claim, but on the other hand no obligation to take out insurance against such an event is provided for.[64] Hence in an actual case of a space object launched from Sweden – where the launch site at Kiruna has been operational since decades, and will soon be opened up to private spaceflights from Virgin Galactic[65] – and causing damage leading to another state invoking the Liability Convention, the Swedish government may end up with less than full reimbursement, simply because the licensee has run out of funds to compensate from and/or is not (sufficiently) insured.

B. *THE UNITED STATES*

Secondly, the United States in 1984 enunciated the first version of its Commercial Space Launch Act, later codified as part of the United States Code.[66] In terms of scope *ratione personae*, the licensing obligation under the

Commercial Space Launch Act applies to anyone wishing "to launch a launch vehicle or to operate a launch site ... in the United States," as well as any "citizen of the United States ... [wishing] to launch a launch vehicle or to operate a launch site ...outside the United States."[67] Once more, for example, *procurement* of a launch elsewhere than in the United States itself by a US national, whether company or natural person, does not seem to carry the obligation of receiving a US license under the Act.

As to the liability and insurance obligations, the 1984 Act was substantially amended in 1988, so that as of then any licensee "shall obtain liability insurance or demonstrate financial responsibility in amounts to compensate for the maximum probable loss from claims by ...a third party for death, bodily injury, or property damage or loss resulting from an activity carried out under the license."[68] That insurance is to cover *inter alia* the US government against such claims as may arise under the Liability Convention.[69]

The 'maximum probable loss' referred to in this key clause as the principal cap on liability reimbursement is to be determined by the Secretary of Transportation (read the Office of the Associate Administrator for Commercial Space Transportation as mandated by the former). Essentially, the maximum probable loss for any individual launch will be the result of a complicated statistical analysis and calculation, taking into account such variables as the size of the launcher, its track record and the trajectory of the launch (over populated or less-populated areas) arriving at a statistical figure of the minimum size of loss for which the chance of it occurring will not exceed a certain acceptable minimal level of risk, such as 1 in 10,000,000.

Any cap determined as a consequence of a calculation of the maximum probable loss, however, will be lowered in turn to either "the maximum liability insurance available on the world market at reasonable cost" or US$ 500,000,000, whichever is the lower.[70] As a consequence, the US authorities formally accept the (remote) possibility that in the case of an international accident leading to catastrophic-size damage they will not be able to derogate the full consequences of international claims under the Liability Convention to the licensee.

C. THE UNITED KINGDOM

The third act to be considered here is the UK Outer Space Act of 1986.[71] The explicit reference to "procuring the launch of a space object" as being included in the licensing obligation has already been noted.[72]More generally the Act

applies a broad definition of its scope, referring to "any activity in outer space" where a person is considered to conduct such an activity as soon as he "causes it to occur or is responsible for its continuing" as already, in principle, leading to an obligation to obtain a license for the purpose.[73]*Ratione personae* the scope of the Act is considerably less comprehensive however: the license obligation only extends to nationals, including companies, undertaking the relevant activities, not for example to foreigners conducting them from British territory.[74]

Like in the case of Sweden, in principle full indemnification of the UK government is called for in case of an international third party liability claim addressed at the latter – but this time, contrary to the Swedish case, the licensing authority is expressly authorised to require insurance to cover such liability.[75] As to such insurance, the general policy was to oblige the licensee to take out an insurance policy covering reimbursement of the UK government up to £ 100,000,000 – some US$ 160,000,000 under current exchange rates. In other words: whilst in principle the UK government would be able to obtain full reimbursement from the licensee in relevant cases, it would be certain that at least to that amount such a reimbursement obligation could actually be implemented.

D. THE RUSSIAN FEDERATION

Fourth in line is the Russian Law on Space Activities of 1993.[76]The Law is characterised by its general and broad scope, with its license obligation *ratione personae* extending to all private activities "under the jurisdiction of the Russian Federation," further detailed as "the space activities of organizations and citizens of the Russian Federation or the space activities of foreign organizations and citizens under the jurisdiction of the Russian Federation, if such activities include ... launching and launching of space objects."[77]In other words: both launch activities conducted by private entities from Russian soil, and such activities conducted by Russian companies elsewhere require a license under the Law. In view of the extended scope of the activities *rationemateriae* covered by the Law, it can not be excluded moreover that the mere procurement of launches elsewhere would also trigger the relevant license obligations. In addition, it should be noted, jurisdiction is expressly extended to space objects duly carried on the Russian registry, presuming that even in the unlikely event a non-Russian entity would be interested in launching from outside Russia a satellite to be registered in Russia, a license would be required for the purpose.[78] Apparently, playing it safe the Russian authorities would like to cast their net,

in principle, as wide as possible in order to be able to handle any domestic consequences of involvement of private entities with a Russian connection in space activities as relevant under international space law.

The precise arrangements on handling liability and reimbursement issues are yet to be clarified, but as far as the Law itself is concerned, the indemnification of the Russian government is in principle unlimited, coupled to compulsory insurance coverage up to a level to be decided – so far, presumably, on a case-by-case basis.[79] While not many details are readily available on insurance obligations either, already a number of years ago a major insurance company, Megaruss, could report on having been involved in over 60 contracts in the decade or so following 1992, having worked with a rough schedule for the limits to *de facto* reimbursement of liability claims which in terms of US$ ran between 80,000,000 for a Start launch vehicle and 300,000,000 for a Proton (the heaviest launch vehicle in the Russian market).

E. SOUTH AFRICA

Of the same year as the Russian law, the South African Space Affairs Act[80] will be discussed next. This Act and its licensing system focuses on "space activities," including such "activities directly contributing to the launching of spacecraft."[81] In this respect, both South Africa's territorial jurisdiction and its national jurisdiction have been asserted with respect to the activities of launching itself and – presumably, as the terms of the Act are not unequivocal – operating a launch facility.[82]Like the Russian Law, also the South African Act does leave open the possibilities to require a license from other activities, even if not specifically mentioned in the Act, such as procurement of launches elsewhere, in case these may entail South African responsibility or liability on the international level,[83] but that is at the discretion of the authorities.

The licensee generally speaking may be required to reimburse the South African government for any international third party liability claim to the full, although governmental discretion seems to allow for only partial reimbursement or even foregoing reimbursement altogether, if the South African interest would so require.[84]Whilst the Act itself does not provide for obligatory insurance to cover such a reimbursement obligation, conditions may be inserted into the license as to the licensee's liability for any damages occurring, and the financial security to be provided with respect thereto – although it is doubtful whether this formally applies to international liability claims.[85] Private entities requiring a South African license for their space (or

space-related) activities should probably be prepared, however, to accept the obligation of full reimbursement of the South African government and appropriate insurance for relevant cases of international third party damage.

F. THE UKRAINE

The sixth national law of relevance is the 1996 Ukrainian Law on Space Activities.[86] After Russia, the Ukraine was the largest heir of assets and know-how of the previous Soviet space complex, so for essentially the same reasons as Russia – the change to a post-Soviet, post-communist era – the Ukraine drafted its national law. Also the result was very much in line with the Russian Law which had been announced three years earlier.

Thus, the license obligation similarly pertained to activities undertaken "in the Ukraine or, under jurisdiction of the Ukraine, abroad"[87], in other words applied to activities conducted from Ukrainian territory as well as to those conducted by Ukrainian citizens and companies. The activities subject to the licensing obligation themselves, moreover, could turn out to include the procurement of activities as well.

Liability reimbursement of the Ukrainian government in case of an international claim under the Liability Convention is unlimited in principle, coupled to a compulsory insurance subject to a limit.[88] Thus, somewhat similar also to the United Kingdom in this respect, the Ukrainian authorities would be assured that they would at least be reimbursed, as far as claims under the Liability Convention would be concerned, for the amount of the cap to the insurance obligation, whilst reserving the right to impose reimbursement even beyond that cap – to the extent, of course, the licensee would be able to provide such reimbursements somehow from its own assets.

G. AUSTRALIA

Number seven is the 1998 Act of Australia.[89]The licensing system under the Act provides for three different types of launch-related authorisations. A 'launch permit' is required for any launch from Australia,[90] an 'overseas launch certificate' is required for the launch by an Australian national outside Australia,[91] and a 'space license' would be required for the operation of a launch facility in Australia.[92]Thus, the scope in terms of entities addressed by the Act and its licensing system is quite comprehensive, as it applies both to launch activities undertaken from Australian territory and to launch activities undertaken by Australian nationals. Furthermore, the obligation to register all

space objects launched under the Act means that all Australian-registered space objects *ipso facto* are included in the scope of the licensing regime.[93]

The Act also deals in a proper manner with liability applies to launch permits and overseas launch certificates; for space licenses no such requirement is included, as any international liability claim regarding such a license would effectively be already covered by the launch permit which is always (also) involved.[94] Under Part 4 of the Act, generally the licensee "is liable to pay compensation for any damage the space object [concerned] causes to a third party."[95] This purportedly includes reimbursing the Australian government in case the latter is actually paying any international liability claims in conformity with the Liability Convention.[96]

In case of launch permits or overseas launch certificates, this reimbursement is then limited to the insured amount,[97] effectively turning the Australian government into a re-insurer of the licensee for any amount of damage over such insured amounts. Division 7 of Part 3 of the Act further deals with the reimbursement of the Australian government by licensees regarding any international liability claims paid for by Australia, and related requirements. Essentially, in the case of a launch permit or overseas launch certificate the holder should either satisfy the insurance requirements or show direct financial responsibility (i.e. the possibility to reimburse any relevant sums from the licensee's own purse). This obligation is then limited to "the amount of the maximum probable loss that may be incurred in respect of damage to third parties," unless future regulations "will set out a different method of determining a minimum amount for the purposes of this subsection."[98] Whilst the method for calculation of the maximum probable loss is essentially the same as used by the US authorities, the maximum probable loss resulting for a specific launch may well be considerably less than in the case of an identical launch in the United States in view in particular of the lesser population density of Australia.

H. BRAZIL

The eighth state of interest is Brazil, in 2001 enunciating its relevant Administrative Edict No. 27.[99] In doing so, Brazil became the first developing nation with proper national space legislation; the underlying reason being on the one hand the desire to exploit the possibilities that the Alcantara launch base, close to the equator, offered for commercially interesting launches by foreign companies, and on the other hand make sure such activities would not only benefit those companies but also Brazil, its economy and its population itself.

The Edict proper contains four operative Articles, of which the first one is the most important. It provides for approval of the Regulation which is enclosed and which in turn deals with the substance of private involvement in space activities, including most prominently their licensing.[100] In this respect, the Regulation does *not* apply "to space launching activities that could be carried out by Brazilian governmental organisations or bodies";[101] the license itself is "granted to a juridical person, single, an association or consortium, for the purpose of carrying out space launching activities on Brazilian territory."[102]

As some of the further requirements instantly make clear, moreover, the licensing obligation is largely aimed at foreign companies – also the most likely category of private entities interested in the possibilities Alcantara can offer. For example, foreign juridical entities can be granted a license only in case of representation of such an entity in Brazil.[103] 'Representation' in this context refers to physical presence through a local office; by contrast, e.g. the presence of a person empowered to represent a company in contractual negotiations or of a bank account of the company with a Brazilian bank is not sufficient. As a further precise elaboration, "documentary evidence that the applicant has legal representation in Brazil with express powers to be subpoenaed and to answer both at administrative and court levels."[104]

Still more particular controls in regard of foreign applicants to protect Brazilian sovereign interests can be found.[105] Thus, the AEB is expressly authorised to make grant of a license dependent upon the existence of safeguard agreements relating to technology transfer between the home state of the foreign enterprise and the Brazilian government,[106] which amongst others fulfils Brazilian obligations under international law to ensure non-proliferation of particular military or dual-use goods for example under the Missile Technology Control Regime (MTCR).

In short, the Regulation seems to provide in particular the AEB with sufficient competencies and instruments to ensure that Brazil's interests – not just of an economic nature, but certainly including those – can be duly protected in the course of licensing foreign launch service providers interested in Alcantara. Whilst these provisions seem fair and reasonable – for example, no specific economic or financial restraints in terms of capital transfers are provided for by the regulation – the proof of the pudding is in the eating: whether foreign entities involved in launch service provision will come to a similar conclusion will probably depend on the way the first few licenses will turn out to deal in detail with these issues.

Under the licensing system proper, the reimbursement and insurance obligations are dealt with together, and there seems to be room for granting a cap to the reimbursement obligation in a given case. The AEB, the authority granting the licenses, may "assess liabilities" in case of an application for a license.[107] Also, the "purchase of insurance to cover possible damages to third parties, according to the degree of risk of the activities to be carried out by the applicant, where appropriate, in the value previously established by the AEB" has to be proven.[108]

Whilst nowhere a direct provision may be found in the Regulation that such insurance coverage includes the reimbursement of possible claims which the Brazilian government may face under the Liability Convention as a consequence of the licensee's activities, it may be safely assumed that in the license proper such a reference somehow *will* be included, or will be inferred from other provisions.[109]Following from this, then, the aforementioned phrasing of "in the value previously established by the AEB" indicates that somehow such liability, respectively reimbursement obligation, will, or at least in individual cases may, be subjected to an – as of yet unspecified – maximum. The tendency here seems to be towards adopting the 'maximum probable loss' approach known from United States and Australian national space legislation.

I. BELGIUM

Ninth on the list is Belgium, with its Law on the activities of launching, flight operations or guidance of space objects of 2005.[110]The license obligation established extends principally to activities conducted from Belgian territory; in addition however it applies in a qualified fashion to activities conducted by Belgian nationals outside of Belgium – namely if that is provided for by special agreement, presumably with the state from whose territory such activities would take place.[111]

Regarding reimbursement by the licensee of the Belgium government in case of international liability claims addressed towards the latter, making explicit reference here both to Article VII of the Outer Space Treaty and to the Liability Convention, the Law calls for such reimbursement in principle to be unlimited.[112] As far as the Law itself is concerned, there is no obligation to take out insurance, but the appropriate Minister may, in granting a license, "create an obligation for insurance to be taken out in favour of third parties to cover the damage that may result from the activities authorised by him."[113]

J. SOUTH KOREA

The Republic of South Korea is tenth, enunciating its Space Development Promotion Act in the same year of 2005.[114] Under it, a launch license is required for launches conducted from the territory or facilities of South Korea, or conducted outside as long as by Korean nationals.[115] The licensee under Article 14 is obliged to reimburse the Korean government in case of relevant third-party liability claims under the Liability Convention, whilst the possibility of capping such a reimbursement obligation is offered; Article 15 then similarly provides for a obligation to insure against liability claims leaving open the possibility to cap such obligatory insurance.

In order to somewhat elaborate the open-ended Article 14 of the Korean Act, in 2007 a Space Damage Compensation Act provided for a limitation of liability to 200,000,000,000 Korean won, an estimated US$ 175,000,000 under current exchange rates.[116]Compared with the theoretical limitation in the US case (of US$ 500,000,000) this seems rather reasonable, whilst compared on the other hand with the practice of US caps on liability in actual launches, this might turn out to be a somewhat onerous limitation of liability.

Much, of course, depends for example on the size and track record of the vehicle – and South Korea, on average, is certainly more densely populated than the United States. Indeed, in the last resort the insurance to be taken out for such a liability, is lower than the amount quoted above, and roughly depends upon the weight of the vehicle.[117] It still remains to be seen, how these provisions will be implemented in practice.

K. THE NETHERLANDS

Next and eleventh is the Netherlands, where in 2007 the Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects entered into force.[118] In terms of its scope *ratione materiae*, with a view to the issue of private entities 'procuring' a launch in terms of the Liability Convention, it is noteworthy that the licensing obligation may come to include the "organization" of space activities as such[119] – which especially refers to the plans to conduct space tourism flights from the Dutch Caribbean islands organised from the European part of the Netherlands.[120]*Ratione personae*, the licensing obligation pertains to those conducting such activities from Dutch territory, which includes for this purpose ships and aircraft registered in the Netherlands.[121] Furthermore, that obligation *can* be made applicable to Dutch nationals if active in the territory of states not parties to the

Outer Space Treaty[122] – in other words, where no other state may be an obvious "appropriate State" to undertake the authorisation and continuing supervision required by Article VI of the Outer Space Treaty.

As for the applicable liability arrangement, the licensee is required to offer redress to the Dutch government up to the value of the sum insured,[123] whereas in this respect "the prospective holder shall have and maintain what ... [the responsible] Minister considers to be the maximum possible cover for the liability arising from the space activities for which a licence is requested. Account is taken here of what can reasonably be covered by insurance."[124]

L. FRANCE

Finally, as the twelfth example France will be discussed, and its Law on space activities of 2008.[125]This recent law obliges, firstly, "any operator, whatever its nationality, intending to proceed with the launching of a space object from the national territory or from means or facilities falling under French jurisdiction,"[126] and, secondly, any French operator intending to do so from a foreign state, to be authorized by the French authorities under the Law.[127]Akin to the UK Outer Space Act, this obligation also includes entities "intending to procure the launching of a space object."[128]

A licensee furthermore has to "have and maintain, as long as it can be held liable pursuant to Article 13 and for the amount set out in Articles 16 and 17, insurance or another financial guarantee," which "must cover the risk of having to compensate for the damages that could be caused to third parties" up to the relevant amount, and must cover *inter alia* "[t]he Government and public bodies."[129] Interestingly, Article 15 allows operators from other member states of the European Union (plus those of the European Economic Area[130]) to enjoy the same possibility as a French operator to avail itself of the maximum liability arrangements under a license.[131]

Finally, Article 14 ensures that the French government, if found liable, will be reimbursed by the licensee up to the maximum amount applicable under Article 16 alternatively 17. Those amounts have not been set, although Arianespace – so far the only launch service provider operating in a context requiring a French license – is known to have its third-party liability reimbursement obligation *vis-à-vis* the French state capped at 60,000,000 • per launch currently some 90,000,000 US$, which has to be covered by insurance.[132]

V. TOWARDS A NATIONAL INDIAN SPACE LAW – LESSONS FOR INDIA?

Returning to the basic question posed at the outset of the present article and analysis: what conclusions can be drawn from the above analysis for India, in terms of desirability or need for a national space law? The essential answer has been shown to lie in the main focus of existing national space laws as implementing international law obligations towards private entities, even if the above analysis only focused on the case study of liability. In other words, the question now becomes: to what extent does that analysis corroborate the claims for a need, or desirability, of a national space law including a licensing system for private space operators in the Indian context?

As the above overview has showed, even on key parameters as the scope *ratione personae* of the licensing obligation and the extent to which the principled lack of limitation to liability under the Liability Convention has been reflected, the national laws that have so far regulated private space launch activities for the purpose of dealing with liability offer a range of possibilities. In some cases only launches from the territory of the country concerned have been covered, in other cases also launch activities conducted by nationals of that country outside of its territory have been made subject to licensing obligations – sometimes in unequivocal terms, sometimes less so. Some states have the clear intention to transpose any liability under the Liability Convention, whatever its size, dollar for dollar to the licensee; others have allowed for fixed or flexible caps on liability reimbursement and/or related insurance obligations – or even leave the issue basically open as of yet.

Nevertheless, one overarching conclusion does arise: those states that have a launching capability residing in their territory and have already opened or are willing to open it up to private operators, have all found it necessary to establish *some* sort of licensing control over these operations, *all* including at least the launches of space objects from their territory in view of the unequivocal qualification of any state whose territory is so used as a "launching State" under the Liability Convention, and hence as liable for any damage caused by these space objects under that Convention.[133] Moreover, whereas the actual choice for limited or unlimited derogation, respectively obligatory or optional insurance is a policy choice, and even if, in many cases, such choice was not made (or not made in the law itself), *all* states have made reference to a fundamental obligation to reimburse the state in case of relevant international liability claims.

Thus, the first conclusion for India to draw from this obviously is that, with its launch site at Sriharikota Island operational for a number of years, any private launch conducted from that facility would require a license under a national space law, as the preferable, most comprehensive and transparent means of exercising supervision and control and ensuring proper domestic handling of international liabilities.[134] Once the principled decision to allow, or even invite, such private launch activities has been taken (which is, of course, essentially still a sovereign policy decision on the part of India[135]) then it becomes almost inevitable to deal with liability issues one way or the other (even if also the extent to which India would derogate international liability compensation completely or capped, with insurance being mandatory or optional, is fundamentally a policy decision). It should be pointed out, however, that especially the current developments regarding so-called 'space tourism' may soon prove that private enterprise may be able to bring the cost of access to outer space down considerably, or even enormously, which may make it very interesting also for India to consider allowing in principle such activities to take place from India and/or by Indian companies, or even to actively stimulate them.

Further than that, the brief overview of the domestic consequences of, for example, the international obligations *re* authorisation and control of *all* "national activities in outer space" including those carried out by "non-governmental entities,"[136] and the requirements to develop a national register and provide OOSA with relevant details for the purpose of the international register,[137] should already make clear that more areas than only that of launching activities and attendant liabilities would be concerned. And indeed, most of the laws briefly discussed above also include obligations to obtain licenses in case satellite communications or satellite remote sensing activities are being envisaged by private entrepreneurs.

Therefore, unless India would insist on precluding *any* private sector involvement in space activities, both by Indian companies and by foreign companies operating in or from India and, going decidedly against the global trends, would attempt to roll back any such existing developments in this respect, there can be little doubt that India needs some sort of national legal framework. At the least, this would be necessary for the compliance with key obligations resting upon India under the international space law treaties. From a more positive and proactive perspective, however, it would be desirable to ensure that private efforts and money might be harnessed for the broader public cause of the peoples and economy of India: *if* properly guided by a regulatory framework, this would be the proverbial win-win situation.

REFERENCE

1. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (hereinafter Outer Space Treaty), Jan. 27, 1967, 610 U.N.T.S. 205, 18 U.S.T. 2410.
2. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (hereinafter Rescue Agreement), Apr. 22, 1968, 672 U.N.T.S. 119, 19 U.S.T. 7570.
3. Convention on International Liability for Damage Caused by Space Objects (hereinafter Liability Convention), Mar. 29, 1972, 961 U.N.T.S. 187, 24 U.S.T. 2389.
4. Convention on Registration of Objects Launched into Outer Space (hereinafter Registration Convention), Jan. 14, 1975, 1023 U.N.T.S. 15, 28 U.S.T. 695.
5. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies (hereinafter Moon Agreement), Dec. 18, 1979, 1363 U.N.T.S. 3.
6. The Moon Agreement, *supra* note 5, currently enjoying only thirteen ratifications not including moreover any of the main spacefaring nations, is generally considered for that reason to be of limited relevance in the global context. India is not a party to the Agreement; as a signatory under Vienna Convention on the Law of Treaties, art. 18(a), May 23, 1969, 1155 U.N.T.S. 331, it may arguably only still be "obliged to refrain from acts which would defeat the object and purpose" of the Agreement.
7. It is not disputed that such varied latter-day developments as the increasing threats posed by space debris and the possibilities to mine the moon or other celestial bodies are not regulated in sufficiently clear and detailed fashion, but as such this would primarily call for further development of *international* law, rather than national law.
8. *See* Fabio Tronchetti, *The Non-Appropriation Principle under Attack: Using Article II of the Outer Space Treaty in its Defence*, *in* PROCEEDINGS OF THE FIFTIETH COLLOQUIUM ON THE LAW OF OUTER SPACE 526-36 (AIAA ed., 2008); Patricia M. Sterns and Leslie I. Tennen, *Privateering and Profiteering on the Moon and Other Celestial Bodies: Debunking the Myth of Property Rights in Space*, *in* PROCEEDINGS OF THE FORTY-FIFTH COLLOQUIUM ON THE LAW OF OUTER SPACE 58-62 (AIAA ed., 2003); Frans G. von der Dunk *et al*, *Surreal estate: addressing the issue of 'Immovable Property Rights on the Moon,'* 20 SPACE POLICY 152-3 (2004); Ricky J. Lee and Felicity K. Eylward, *Article II of the Outer Space Treaty and Human Presence on Celestial Bodies: Prohibition of State Sovereignty, Exclusive Property Rights, or Both?*, *in* PROCEEDINGS OF THE FORTY-EIGHTH COLLOQUIUM ON THE LAW OF OUTER SPACE 95-8 (AIAA ed., 2006); further *infra* at note 12 and accompanying text, with reference to the discussion on Outer Space Treaty, *supra* note 1, art. II.
9. National Aeronautics and Space Act (July 29, 1958), Pub. L. No. 85-568, 72 Stat. 426.
10. Declaration of Legal Principles Governing the Activities of States in the Explora-tion and Use of Outer Space, G.A. Res. 1962(XVIII), ¶ 37, U.N. Doc. A/AC.105/572/Rev.1 (Dec. 13, 1963).
11. Act on launching objects from Norwegian territory into outer space, No. 38 (June 13, 1969), I NATIONAL SPACE LEGISLATION OF THE WORLD (2001), at 286.
12. The Outer Space Treaty, *supra* note 1, has currently been ratified by 100 states, whereas 27 more states are signatories to it; see further http://www.unoosa.org/oosa/en/SpaceLaw/treatystatus/index.html (last visited Jan. 24, 2010).

13. Outer Space Treaty, *supra* note 1, art. I.
14. In the seventies and early eighties this concept played a prominent role in the discussions on the forthcoming law of the sea convention, and was ultimately indeed not only reflected but also substantially elaborated in the United Nations Conven-tion on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 3; notably in its Chapter XI dealing with the ocean floor and the rights to exploit it commercially. See further Peter Malanczuk, *Actors: States, International Organisations, Private Entities, in* OUTLOOK ON SPACE LAW OVER THE NEXT 30 YEARS 32-4 (Gabriel Lafferranderie and Daphne Crowther ed., 1997).
15. Moon Agreement, *supra* note 5, art. 11(1).
16. Moon Agreement, *supra* note 5, art. 4(1).
17. *See* Frans G. von der Dunk, *The Moon Agreement and the Prospect of Commercial Exploitation of Lunar Resources*, 32 ANNALS OF AIR AND SPACE LAW 91-113 (2007) for an analysis of the use of the two terms in the same treaty.
18. *See* Convention on International Civil Aviation, art. 1, Dec. 7, 1944, 15 U.N.T.S. 296.
19. *See, e.g.*, extensively BIN CHENG, STUDIES IN INTERNATIONAL SPACE LAW 425 ff. (1997).
20. See on this issue in more detail e.g. Frans G. von der Dunk, *Space for Tourism? Legal Aspects of Private Spaceflight for Tourist Purposes, in* PROCEEDINGS OF THE FORTY-NINTH COLLOQUIUM ON THE LAW OF OUTER SPACE 18-28 (AIAA ed., 2007); and Frans G. von der Dunk, *Passing the Buck to Rogers: International Liability Issues in Private Spaceflight*, 86 NEB. L. REV. 400-38 (2007).
21. *See* Outer Space Treaty, *supra* note 1, art. I.
22. *See* Outer Space Treaty, *supra* note 1, art. VI. Literally, the article refers to violations of the Outer Space Treaty itself; in view of its comprehensive character as presenting the basis for development of all further rules of international space law, however, this is generally perceived to refer to violations of *all* outer space law. Further, e.g., FRANS G. VON DER DUNK, PRIVATE ENTERPRISE AND PUBLIC INTEREST IN THE EUROPEAN 'SPACESCAPE' – TOWARDS HARMONIZED NATIONAL SPACE LEGISLATION FOR PRIVATE SPACE ACTIVITIES IN EUROPE 17-22 (1998).
23. *See* Outer Space Treaty, *supra* note 1, art. VII. Further, e.g., VON DER DUNK, *supra* note 22, at 22-6.
24. *See* Outer Space Treaty, *supra* note 1, art. VIII. Further, e.g., VON DER DUNK, *supra* note 22, at 27-32.
25. *See* Outer Space Treaty, *supra* note 1, art. I.
26. Outer Space Treaty, supra note 1, art. IV. Further, e.g., Robert A. Ramey, Armed Conflict on the Final Frontier; The Law of War in Space, 48 A.F.L. REV. 78-85 (2000); Elisabeth S. Waldrop, Integration of Military and Civilian Space Assets: Legal and National Security Implications, 55 A.F.L. REV. (2004) 222-4.
27. Outer Space Treaty, *supra* note 1, art. XIII. See further, e.g., Malanczuk, *supra* note 14, at 30-1.
28. Outer Space Treaty, *supra* note 1, art. VI.
29. *See, e.g.*, Michael Gerhard, *Article VI, in* I COLOGNE COMMENTARY ON SPACE LAW 103-25 (2009); Elisabeth Back-Impallomeni, *Article VI of the Outer Space Treaty, in* UNITED NATIONS TREATIES ON OUTER SPACE: ACTIONS AT THE NATIONAL LEVEL, PROCEEDINGS UNITED NATIONS/REPUBLIC OF KOREA WORKSHOP ON SPACE LAW 75 (2004);

Kunihiko Tatsuzawa, *Policy and Law in Space Commercialization, in* LEGAL ASPECTS OF SPACE COMMERCIALIZATION 19 (Kunihiko Tatsuzawa ed., 1992).

30. Notably, this concerns the Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broad-casting, G.A. Res. 37/92, ¶ 39, U.N. Doc. A/AC.105/572/Rev.1 (Dec. 10, 1982), the Principles Relating to Remote Sensing of the Earth from Outer Space, G.A. Res. 41/65, ¶ 43, U.N. Doc. A/AC.105/572/Rev.1 (Dec. 3, 1986), the Principles Relevant to the Use of Nuclear Power Sources in Outer Space, G.A. Res. 47/68, ¶ 47, U.N. Doc. A/AC.105/572/Rev.1 (Dec. 14, 1992), and the Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of all States, Taking into Particular Account the Needs of Developing Countries, G.A. Res. 51/122, U.N. Doc. A/RES/51/122 (Dec. 13, 1996).

31. *See* in particular Constitution of the International Telecommunication Union, artt. 1(2)(a), 44, Dec. 22, 1992, 1825 U.N.T.S. 1.

32. *See, e.g.*, CARL Q. CHRISTOL, THE MODERN INTERNATIONAL LAW OF OUTER SPACE 168-70 (1982); Roy S.K. Lee, *Assistance to and Return of Astronauts and Space Objects, in* I MANUAL ON SPACE LAW 57 (Nandasiri Jasentuliyana and Roy S.K. Lee ed., 1979); also BIN CHENG, *supra* note 19, at 279-80.

33. *See* Rescue Agreement, *supra* note 2, artt. 5 (in particular sub § 5), and 6.

34. *See, e.g.*, Carl Q. Christol, *International Liability for Damage Caused by Space Objects*, 74 AM. J. INT'L L. 354-6 (1980); Gennadi Zhukov and Yuri Kolosov, INTERNATIONAL SPACE LAW 101 (1984); Bin Cheng, *International Liability for Damage caused by Space Objects, in* I MANUAL ON SPACE LAW 87, 97-8 (Nandasiri Jasentuliyana and Roy S.K. Lee ed., 1979).

35. *See* Liability Convention, *supra* note 3, art. I(c).

36. *See* Liability Convention, *supra* note 3, artt. IV, V, VIII. Cf. further, e.g., Treaty between the Government of Russia and the Government of the Republic of Kazakhstan on the Leasing of the Baikonour-Complex (Dec. 10, 1994); Mahulena Hosková, *The 1994 Baikonour Agreements in Operation, in* PROCEEDINGS OF THE FORTY-SECOND COLLOQUIUM ON THE LAW OF OUTER SPACE 265-8 (AIAA ed., 2000).

37. *See also* United Nations Conven-tion on the Law of the Sea, *supra* note 14, art. 2.

38. *See also* Convention on International Civil Aviation, *supra* note 18, art. 1.

39. Relevant details of those national laws and acts will be discussed *infra*, chapter 4.

40. Commercial Space Transportation – Commercial Space Launch Activities, 49 U.S.C. §§ 70101-70121 (1994).

41. Act on Space Activities, 1982: 963 (Nov. 18, 1982), I NATIONAL SPACE LEGISLATION OF THE WORLD (2001), at 398; SPACE LAW – BASIC LEGAL DOCUMENTS, E.II.1; 36 ZEITSCHRIFT FÜR LUFT- UND WELTRAUMRECHT (1987), at 11.

42. Law of the Russian Federation on Space Activities, No. 5663-1 (Aug. 20, 1993), I NATIONAL SPACE LEGISLATION OF THE WORLD (2001), at 101.

43. An act about space activities, and for related purposes, No. 123 of 1998 (Dec. 21, 1998), **I** NATIONAL SPACE LEGISLATION OF THE WORLD (2001), at 197.

44. *Cf., e.g.,* Armel Kerrest de Rozavel, *The Launch of Spacecraft from the Sea, in* OUTLOOK ON SPACE LAW OVER THE NEXT 30 YEARS 225-33 (Gabriel Lafferranderie and Daphne Crowther ed., 1997); Armel Kerrest de Rozavel, *Launching spacecraft from the sea and the Outer Space Treaty: The Sea Launch Project, in* PROCEEDINGS OF THE FORTIETH COLLOQUIUM ON THE LAW OF OUTER SPACE 265-8 (AIAA ed., 1998); Marietta

Benkö and Kai-Uwe Schrogl, *The UN Committee on the Peaceful Uses of Outer Space Adoption of a Resolution on Application of the Concept of the "Launching State" and Other Recent Developments*, 54 ZEITSCRHIFT FÜR LUFT- UND WELTRAUMRECHT 58-9 (2005).

45. Outer Space Act, 1986 Chapter 38 (July 18, 1986), §1(a), I NATIONAL SPACE LEGISLATION OF THE WORLD (2001), at 293; SPACE LAW – BASIC LEGAL DOCUMENTS, E.I; 36 ZEITSCHRIFT FÜR LUFT- UND WELTRAUMRECHT (1987), at 12.

46. Liability Convention, *supra* note 3, artt. II, resp. III.

47. Liability Convention, *supra* note 3, art. I(a).

48. *See, e.g.*, extensively BRUCE A. HURWITZ, STATE LIABILITY FOR OUTER SPACE ACTIVITIES 12-9 (1992), arriving at the tentative conclusion, however, that there is no agreement amongst the experts on this at 15. So also PAMELA L. MEREDITH AND GEORGE S. ROBINSON, SPACE LAW – A CASE STUDY FOR THE PRACTITIONER 62-4 (1992).

49. *Cf.* however CHRISTOL, *supra* note 32, at 90-7, who argues that the matter was essentially left open, and therefore did not want to exclude the possibility of either including indirect damage or non-collision damage. Also Bin Cheng, *supra* note 34, at 115.

50. *See* Liability Convention, *supra* note 3, art. XII. The relevant clause in this respect refers to "such reparation in respect of the damage as will restore the person, natural or juridical, State or international organization on whose behalf the claim is presented to the condition which would have existed if the damage had not occurred."

51. *See, e.g.*, Gabriel Lafferranderie, *Jurisdiction and Control of Space Objects and the Case of an International Intergovernmental Organization (ESA)*, 54 ZEITSCHRIFT FÜR LUFT- UND WELTRAUMRECHT 228-9 (2005); Yun Zhao, *Revisiting the 1975 Registration Convention: Time for Revision?*, *in* PROCEEDINGS OF THE UNITED NATIONS/REPUBLIC OF KOREA WORKSHOP ON SPACE LAW 127 (UNOOSA ed., 2004).

52. *See* Registration Convention, *supra* note 4, artt. II(1), resp. I(a). Further, e.g., Michael Chatzipanagiotis, *Registration of Space Objects and Transfer of Ownership in Orbit*, 56 ZEITSCHRIFT FÜR LUFT- UND WELTRAUMRECHT 237-8 (2007).

53. *See* Registration Convention, *supra* note 4, art. II(2).

54. *See* Registration Convention, *supra* note 4, art. II(3).

55. *See* Registration Convention, *supra* note 4, art. II(1).

56. Registration Convention, *supra* note 4, art. IV(1); *cf.* further Chatzipanagiotis, *supra* note 52, at 237, incl. note 40.

57. Registration Convention, *supra* note 4, art. IV(3), also § 2.

58. E.g., the United States has extended the scope of its Patent Act to inventions on board of US-registered spacecraft by means of the Patents in Space Act; 35 U.S.C. § 105. Further HANNEKE VAN TRAA-ENGELMAN, COMMERCIAL UTILIZATION OF OUTER SPACE: LAW AND PRACTICE 298-9 (1993). See, however, also Chatzipanagiotis, *supra* note 52, 230 ff., esp. 234-5 (2007); Marietta Benkö and Kai-Uwe Schrogl, *The UN Committee on the Peaceful Uses of Outer Space: Adoption of the Resolution on Enhancing Registration Practice and of the UNCOPUOS Space Debris Mitigation Guidelines*, 57 ZEITSCHRIFT FÜR LUFT- UND WELTRAUMRECHT 341-2 (2008).

59. For a very extensive discussion of such general issues, see e.g. MEREDITH AND ROBINSON, *supra* note 48, esp. 71-155, 292 ff.; VALÉRIE KAYSER, LAUNCHING SPACE OBJECTS: ISSUES OF LIABILITY AND FUTURE PROSPECTS 12 ff. (2001).

60. *See supra*, note 11.
61. Act on Space Activities, *supra* note 41.
62. *See* Act on Space Activities, *supra* note 41, §1.
63. *See* Act on Space Activities, *supra* note 41, §. 2.
64. *Cf.* Act on Space Activities, *supra* note 41, §. 6.
65. *See, e.g.*, Von der Dunk, *Passing the Buck to Rogers: International Liability Issues in Private Spaceflight*, *supra* note 20, at 406.
66. Commercial Space Launch Act of 1984, Pub. L. No. 98-575, 98 Stat. 3055, resp. Commercial Space Transportation – Commercial Space Launch Activities, *supra* note 40.
67. Commercial Space Transportation – Commercial Space Launch Activities, *supra* note 40, §70104(a)(1), (2).
68. Commercial Space Transportation – Commercial Space Launch Activities, *supra* note 40, §70112(a)(1).
69. *Cf.* Commercial Space Transportation – Commercial Space Launch Activities, *supra* note 40, §70112(a)(4)(A). The insurance is also to cover the tort (third-party) liability that arises under *domestic* US law *vis-à-vis* any applicant, suing in a private capacity in US courts.
70. Commercial Space Transportation – Commercial Space Launch Activities, *supra* note 40, §70112(a)(2) & (3).
71. Outer Space Act, *supra* note 45.
72. *See supra* note 45 and accompanying text.
73. Outer Space Act, *supra* note 45,§§. 1(c), resp. 13(2).
74. *See* Outer Space Act, *supra* note 45,§§. 1, 2 & 3(1); for the definition of 'UK national,'§. 2.
75. *See* Outer Space Act, *supra* note 45,§§. 10(1), resp. 5(2) sub (f).
76. Law of the Russian Federation on Space Activities, *supra* note 42.
77. Law of the Russian Federation on Space Activities, *supra* note 42, artt. 1(1), 9(2).
78. *See* Law of the Russian Federation on Space Activities, *supra* note 42, art. 17(2).
79. *Cf.* Law of the Russian Federation on Space Activities, *supra* note 42, art. 30(2) and (4).
80. Space Affairs Act, No. 84 of 1993 (Sept. 6, 1993), Statutes of the Republic of South Africa – Trade and Industry, Issue No. 27, 21-44, I NATIONAL SPACE LEGISLATION OF THE WORLD (2001), at 413.
81. Space Affairs Act, *supra* note 80, §1, 19th def.
82. *See* Space Affairs Act, *supra* note 80, § 11(1).
83. *See* Space Affairs Act, *supra* note 80, §. 11(1)(d), sub (i) and (ii).
84. *See* Space Affairs Act, *supra* note 80, §. 14(1)(b); leaving actual inclusion of such an obligation to the discretion of the South African Council for Space Affairs.
85. *See* Space Affairs Act, *supra* note 80, §. 14(1)(a), (i) and (ii), and by way of *a contrario* argument, §. 14(2)(a).
86. Law of the Ukraine on Space Activities, No. 502/96-VR (Nov. 15, 1996), I NATIONAL SPACE LEGISLATION OF THE WORLD (2001), at 36.
87. Law of the Ukraine on Space Activities, *supra* note 86, art. 10.

88. *See* Law of the Ukraine on Space Activities, *supra* note 86, artt. 24, 25.
89. An act about space activities, and for related purposes, *supra* note 43.
90. *See* An act about space activities, and for related purposes, *supra* note 43, §11. Further details on the launch permit are provided in §§26-34.
91. *See* An act about space activities, and for related purposes, *supra* note 43, §. 12. Further details on the overseas launch certificate are provided in §§35-41.
92. *See* An act about space activities, and for related purposes, *supra* note 43, §. 15. Further details on the space license are provided in §§18-25.
93. *See* An act about space activities, and for related purposes, *supra* note 43, §. 76(2).
94. *See* An act about space activities, and for related purposes, *supra* note 43, §§. 26(3)(d) and 20(d) (for the launch permit), and §§. 35(2)(a)(i) and 41(1)(b) (for the overseas launch certificate). One should note, that in any case §. 18(e) refers to the "international obligations" of Australia, which might serve as a safety-net clause to yet insert relevant obligations in the space license conditions in case the licensing authority might perceive the launch permit not to provide sufficient practical coverage for the potential liability of Australia on the international level.
95. An act about space activities, and for related purposes, *supra* note 43, §§. 67(1), 68.
96. *See* An act about space activities, and for related purposes, *supra* note 43, §64(2).
97. *See* An act about space activities, and for related purposes, *supra* note 43,§. 69(3).
98. An act about space activities, and for related purposes, *supra* note 43,§. 48(3)(a), resp. (b).
99. Administrative Edict No. 27 (June 20, 2001), II NATIONAL SPACE LEGISLATION OF THE WORLD (2002), at 377.
100. Regulation on Procedures and on Definition of Necessary Requirements for the Request, Evaluation, Issuance, Follow-up and Supervision of License for Carrying out Space Launching Activities on Brazilian Territory (hereinafter Regulation). See Administrative Edict No. 27, *supra* note 99, art. 1.
101. Regulation, *supra* note 100, art. 1(2).
102. Regulation, *supra* note 100, art. 2; *cf.* further art.1.
103. Regulation, *supra* note 100, art. 6.
104. Regulation, *supra* note 100, art. 7(V).
105. See Regulation, *supra* note 100, artt. 8(IV), (V), 12.
106. See Regulation, *supra* note 100, art.14(3).
107. Regulation, *supra* note 100, art. 4(V).
108. Regulation, *supra* note 100, art. 9(III).
109. An Agency Edict such as the one currently discussed has no competence to regulate questions such as insurance coverage, as such questions involving governmental expenses and legislation related thereto have to be approved by the National Congress.
110. Law on the activities of launching, flight operations or guidance of space objects (Sept. 17, 2005), NATIONALES WELTRAUMRECHT / NATIONAL SPACE LAW (2008), at 183.
111. *See* Law on the activities of launching, flight operations or guidance of space objects, *supra* note 110, art. 2(1), resp. (2).

112. *See* Law on the activities of launching, flight operations or guidance of space objects, *supra* note 110, art. 15(1). Art. 15(3) allows the state to cap such reimbursement liability, although § 4 requires the licensee "to comply with the conditions attached to his authorization" in order to be able to enjoy the benefits of such a cap.

113. Law on the activities of launching, flight operations or guidance of space objects, *supra* note 110, art. 5(2).

114. Space Development Promotion Act (May 31, 2005), unofficial translation 33 JOURNAL OF SPACE LAW (2007), at 175. See for a detailed description of the Act Yoon Lee, *A Review of the Space development Promotion Act of the Republic of Korea*, 33 JOURNAL OF SPACE LAW 123-74 (2007); Doo Hwan Kim, *Space Law in Korea: Existing Regulations and Future Tasks*, 57 ZEITSCHRIFT FÜR LUFT- UND WELTRAUMRECHT 575-9 (2008).

115. *See* Space Development Promotion Act, *supra* note 114, art. 11(1).

116. Space Damage Compensation Act of 2007, art. 5; *See* Kim, *supra* note 114, at 580.

117. Space Development Promotion Act, *supra* note 114, art. 11; Space Damage Compensation Act, *supra* note 116, art. 6; see Kim, *supra* note 114, at 580.

118. Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects (Jan. 24, 2007), NATIONALES WELTRAUMRECHT/NATIONAL SPACE LAW (2008), at 201.

119. Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects, *supra* note 118, §2(2.b). Space activities themselves are defined as "the launch, the flight operation or the guidance of space objects in outer space," §1(b).

120. The Kingdom of the Netherlands, which ratified the five space treaties, also includes a few small remnants of its colonial empire in the Caribbean region that internally enjoy a special status, including some measure of autonomy on a number of issues. Whilst externally the Netherlands is the state for example responsible and liable for activities conducted from those Caribbean islands, internally under the Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects, *supra* note 118, it is not automatically entitled to impose domestic legislation regarding space activities to that extent.

121. *See* Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects, *supra* note 118, §2(1).

122. *See* Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects, *supra* note 118,§. 2(2.a).

123. *See* Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects, *supra* note 118, §12(2) & (3); following § 1 which provides for the generic reimbursement obligation.

124. Law Incorporating Rules Concerning Space Activities and the Establishment of a Registry of Space Objects, *supra* note 118, §3(4).

125. Law on space activities (June 3, 2008), unofficial translation 34 JOURNAL OF SPACE LAW (2008), at 453.

126. Law on space activities, *supra* note 125, art. 2(1).

127. Law on space activities, *supra* note 125, art. 2(2).

128. Law on space activities, *supra* note 125, art. 2(3).

129. Law on space activities, *supra* note 125, art. 6(I), resp. (II) & (III). Articles 16 and 17 provide the French authorities with the possibility to separately limit the indemnification for damage caused during the launching phase respectively thereafter.

130. The European Economic Area was created by the Agreement on the European Economic Area (May 2, 1992), 1994 O.J. (L 1) 3, to extend the scope of the larger part of the European Union's Internal Market regime to a few other European states, notably (as of today) Iceland, Liechtenstein and Norway.

131. In this sense, the French national space law was the first to explicitly conform to a fundamental principle of European Union law; that there is to be no discrimination between companies from one EU member state and those from another.

132. European Space Agency, Declaration by certain European governments relating to the Ariane Launcher Production Phase (July 14, 1980; rev. Oct. 4, 1990), art. 3.8; see further Study of the Liability Risk-Sharing Regime in the United States for Commercial Space Transportation, Aerospace Report No. ATR-2006(5266)-1 (Aug. 1, 2006), at 48.

133. Liability Convention, *supra* note 3, art. 1(c); *cf.* also artt. 2-5.

134. It may be noted that France, for many years prior to its enunciation of a national space law as discussed above, controlled Arianespace launches for such purposes by means of the aforementioned European Space Agency, Declaration by certain European governments relating to the Ariane Launcher Production Phase, *supra* note 127, instead of by means of a national licensing system. Nevertheless, this system was no longer considered appropriate in today's environment, where launch activities of others from Kourou (French Guyana) or by Arianespace elsewhere have become a distinct reality.

135. It may be noted here that until its demise the Soviet Union, due to its communist doctrine, had never allowed for any private legal involvement in space activities, negating any necessity to develop a national licensing system; and currently the People's Republic of China in the same vein as an at least formally communist country has major hesitations in allowing private operators to become involved in the launch business as well.

136. Outer Space Treaty, *supra* note 1, art. VI.

137. *See* Registration Convention, *supra* note 4, artt. I-IV.