

# Reimagining National Regulatory Approaches to Third Party Liability Insurance

## *Towards a Single Aggregated Policy*

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### Abstract

Extensive liability exposure for launching States in international space law has resulted in a number of States promulgating indemnity and third party liability (TPL) insurance requirements as part of the authorisation procedure under national law. Though the detailed requirements vary across national laws, a common approach is discernible: The risk to the State posed by each new activity, and consequently the level of TPL insurance cover the prospective licensee must obtain (where applicable to the activity in question for which authorisation is sought) is determined by the regulator on a case-by-case basis. This paper examines some of the potential drawbacks of this ‘individualized’ approach, focusing on the potential inadequacy or absence of insurance in some cases, and the stifling effect that policy premium rates may have on innovation and enterprise. Noting that States are free to choose a regulatory regime that best promotes national space activities and provides adequate protection for national treasuries, this paper turns to consider one possible variant approach to TPL insurance. Under an ‘aggregated’ approach the State itself would become the policyholder for a single TPL insurance policy covering all space objects for which it is potentially liable as a launching State, charging the premium on the policy to the private entities creating the risk. Inspired by insurance products for fleets of vehicles, an aggregated approach would reduce costs to all stakeholders by consolidating

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multiple policies, whilst providing a broader scope of coverage for the launching State in respect of ‘all space objects’. In addition, it could enhance the ability of regulators to promote the exploitation of space through emerging technologies, without requiring sacrifices in terms of the insurance protection available to the launching State. Direct beneficiaries of the aggregated approach would include established companies and new entrants seeking to deploy low-cost satellite platforms into constellation architectures.

### **Introduction: Liability in International Space Law**

The Outer Space Treaty 1967<sup>1</sup> requires States to adhere to international law, assume responsibility for activities in space (whether undertaken by governmental or non-governmental entities), authorise and supervise the space activities of their nationals, and bear international liability for damage caused to a third party State or to its natural or legal persons.

The Liability Convention 1972<sup>2</sup> builds on the OST’s formulation of the liability principle<sup>3</sup> in a way that augments, rather than restricts, the liability exposure for launching States,<sup>4</sup> adding:

- Absolute liability for damage caused by a space object on the surface of the Earth or to aircraft in flight (Article II) coupled with fault-based liability for damage done to other space objects in outer space (Article III).
- Joint and several liability where there are multiple launching States (Article V).
- Unlimited liability to restore the damaged individual, entity or State to the condition that would have existed if the damage had not occurred (Article XII).

Consequently, States that become launching States have extensive liability exposure under international law.<sup>5</sup> Moreover, liability exposure does not disappear upon completion of the launch event but subsists for the entire existence of the space object, even beyond its functional lifetime.<sup>6</sup>

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1 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (27 January 1967) 15 U.N.T.S. 206 (‘Outer Space Treaty’).

2 Convention on International Liability for Damage Caused by Space Objects, 961 UNTS 187 (1971) (‘Liability Convention’).

3 Outer Space Treaty, *supra* note 1, Article VII.

4 Liability Convention, *supra* note 2, Article I contains the classical four-fold definition of a “launching State”: A State that launches or procures the launching of a space object or from whose territory or facility a space object is launched.

5 *Ibid*, Article VI establishes a limited number of defences as where, for example, the damage resulted from the gross negligence or a deliberate act of the claimant State.

6 Arnel Kerrest “Legal aspects of transfer of ownership” and Setsuko Aioki “Satellite ownership transfers and the liability of launching States” presented at IISL/ECSL

### Consequences in National Regulation: Insurance and Indemnification

States look to minimise and mitigate against their liability exposure resulting from the space activities of private entities for which the State is responsible. A pragmatic route to minimise liability exposure is to authorise only those private space activities that exhibit an acceptably low risk of causing damage to third parties. However, since risk cannot be wholly excluded, some States make it a precondition of authorisation that the private entity obtain third party liability (TPL) insurance or be otherwise able to demonstrate its ability to indemnify the State against claims brought against it. As one source summarises, “Liability exposure has prompted a number of States to promulgate legislation protecting their national treasuries with insurance or indemnification requirements.”<sup>7</sup>

**Table 1 – Summarising the requirements and provisions concerning TPL insurance in some established and emerging spacefaring nations<sup>8</sup>**

State	TPL insurance required for:	Amount of TPL insurance cover:
USA	Launch and re-entry licensees and permittees to cover licensees, permittees, their customers, contractors and employees as well as the US Government and personnel. <sup>9</sup>	Prescribed by the Federal Aviation Authority (FAA) from an assessment of the Maximum Probable Loss that will in no case exceed the lesser of: (1) US \$500 million; or (2) the maximum TPL insurance available on the world market at reasonable cost against claims by third parties; <sup>10</sup> <i>and</i> ; (2) US \$100 million; or (2) the maximum TPL insurance available on the world market at reasonable cost against claims by the US Government, its agencies and subcontractors. <sup>11</sup>
Russia	Organisations and citizens which exploit space technology or procure the creation and use of space technology for	Not specified: Set by the Russian Government in each case. One source suggests cover up to \$80 million for smaller Start launch vehicle operators

Symposium at 51<sup>st</sup> UN COPUOS Legal Subcommittee, 19 March 2012, available at <http://www.unoosa.org/oosa/en/ourwork/copuos/lsc/2012/symposium.html>.

7 Paul Stephen Dempsey, “The Emergence of National Space Law” (November 18, 2015), available at SSRN: <http://ssrn.com/abstract=2692639>.

8 For further examples see Matxalen Sánchez Aranzamedi, “Economic and Policy Aspects of Space Regulations in Europe Part 1: The Case of National Space Legislation – Finding the way between Common and Coordinated Action” (2009) European Space Policy Institute, Report 21.

9 FAA Regulations 14 CFR § 440.9(b).

10 FAA Regulations 14 CFR § 440.9(c).

11 FAA Regulations 14 CFR § 440.9(d).

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	scientific and economic purposes. <sup>12</sup>	and \$300 million for larger Proton and Soyuz vehicle operators. <sup>13</sup>
China	A licence holder. <sup>14</sup>	Not specified: Cover must however be obtained against liabilities with respect to damage or loss caused to third parties by a space object launched through licensed projects.
France	All operators authorised under French law unless the insurance market cannot provide cover. <sup>15</sup> TPL insurance not required for GEO operational phases. <sup>16</sup>	Up to the extent of the operator's potential liability the ceiling for which is set according to French financial law <sup>17</sup> at between €50m and €70m. <sup>18</sup> For launches carried out by Arianespace from Kourou, TPL insurance is taken by Arianespace up to €60m and paid for by the customer in the launch contract. French operators using foreign launch vehicles are also required to carry €60m minimum TPL insurance. <sup>19</sup>
UK	Each licensed activity to cover both launch and in-orbit activities. <sup>20</sup>	Limited to €60 million in the majority of cases, involving single satellite missions employing

12 Law on Space Activity, Federal Law No. 5663-1 (1993, as amended), Article 25(1), unofficial translation available at: [http://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/russian\\_federation](http://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/russian_federation); See further Kerrest de Rozavel, A. and von der Dunk, F. G., "Liability and Insurance in the Context of National Authorisation" (2011). Space and Telecommunications Law Program Faculty Publications, Paper 78 at page 5 "Whereas it is not unequivocally clear that such insurance would cover the [Russian Government], that may at least be assumed".

13 Yana Efimova & Matt Butchers, "Space Insurance" Knowledge Transfer Network Report, 18<sup>th</sup> December 2014, available at: <https://connect.innovateuk.org/web/space/article-view/-/blogs/space-insurance-report>.

14 Interim Measures on the Administration of Licensing for Civil Launch Projects 2002, Article 19.

15 French Space Operations Act 2008-518 of 3<sup>rd</sup> June 2008 ('FSOA'), Article 6.

16 Decree 2009-644 of 9<sup>th</sup> June 2009, Articles 17-18.

17 FSOA, supra note 15, Articles 16-17.

18 Art. 119, Loi n° 2008-1443 du 30 décembre 2008 de finances rectificative pour 2008; See further, C. Gaubert, Insurance in the Context of National Authorisation, in *National Space Legislation in Europe* (Ed. F.G. von der Dunk) (Brill, 2011).

19 Philippe Montpert "Considerations on Space Liability Insurance" presented at the IISL/ECSL Symposium held on 22 March 2010 at 49<sup>th</sup> UN COPUOS Legal Subcommittee, available at: <http://www.unoosa.org/pdf/pres/lsc2010/symp04.pdf>; see also John Horner "Space Liability Insurance" presented at World Space Risk Forum 2012, available at: <http://worldspaceriskforum.com/2012/wp-content/uploads/2012/03/28JOHN1.pdf>.

20 Outer Space Act 1986, c. 36 (Gr. Brit.), Article 5(f).

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		established launchers, satellite platforms and operational profiles. <sup>21</sup>
Korea	Any applicant for a launch permit. <sup>22</sup>	Not specified: An amount capable of compensating for damages with a minimum amount prescribed by the Minister of Science and Technology.
Brazil	All applicants applying for a licence to carry out launch. <sup>23</sup>	Not specified: Prescribed by the Brazilian Space Agency according to the degree of risk of the activities.

Table 1 illustrates that indemnity and TPL insurance requirements are not treated uniformly across national space laws. Notable differences include the scope of activities for which TPL insurance is mandated (the UK, for example, stands alone in having a general requirement for TPL insurance to cover in-orbit operations); the method for determining the amount of cover the insured must obtain (US law foresees assessment on the basis of Maximum Probably Loss (MPL) while other space laws are silent and may, for example, allow policy considerations to influence the level of cover required); and the inclusion of ceilings on the amount of cover that may be prescribed. These differences are made possible by the wide margin of discretion accorded to State Parties by the Outer Space Treaty on how to go about authorising their non-governmental entities, and tend to reflect the varying nature and extent of national space activities as well as national interests and policies.

However, despite the differences, a common thread runs through the approach taken by all those States that have so far promulgated indemnity and TPL insurance requirements:

For each space activity that carries TPL insurance requirements, an assessment of the liability risk posed, and the determination of any insurance that shall be obtained in mitigation thereof, is undertaken by the regulator on a case-by-case basis. This assessment and determination is repeated for each new space activity for which authorisation is sought. Consequently, the totality of a launching State's TPL risk exposure (i.e. the total risk born out of all the space objects for that State is a launching State) may be thought of as a packet of multiple self-contained and individually assessed risks – some insured, others uninsured – rather than a single aggregated risk. We shall

21 UK Space Agency published guidance for licence applicants, available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/464931/Guidance\\_for\\_applicants\\_-\\_October\\_2015.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/464931/Guidance_for_applicants_-_October_2015.pdf).

22 Space Development Promotion Act, Law No. 7538, 31<sup>st</sup> May 2005, available at: <http://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/index.html>.

23 Administrative Edict No. 27 of 27<sup>th</sup> June 2001, available at: [http://www.sbda.org.br/textos/DirEsp/Portaria%2027\\_AEB\\_2001\\_E.pdf](http://www.sbda.org.br/textos/DirEsp/Portaria%2027_AEB_2001_E.pdf).

refer to this prevailing approach to TPL insurance as the ‘individualized approach’.

### **Potential Deficiencies of the Individualized Approach**

#### **1. State Treasury Exposure to Extraordinary Damages**

‘Extraordinary damages’ is used here to mean third party damages that exceed the cover provided under a TPL insurance policy. Where, for example, a TPL insurance policy provides cover at the level of the Maximum Probable Loss assessment, extraordinary damages would refer to an *improbable*, though not impossible, loss scenario.

If a claim for loss or damage were to be brought against a launching State under the Liability Convention, damages falling within the scope of an applicable TPL insurance policy would be paid out first by the insurer up to the level of cover provided under the policy. However, the launching State would remain internationally liable for any extraordinary damages in accordance with the State’s unlimited liability to restore the injured party under international space law.

Some national space laws require a private entity that has caused the State to incur liability to indemnify the State. However, it is common for the indemnity to be capped (typically at the amount of TPL insurance prescribed as a pre-condition for authorisation). Even in the absence of an indemnity cap, the private entity may have ceased operations or have insufficient assets to indemnify the State for extraordinary damages. In such circumstances, the loss would ultimately be borne by the national treasury of the launching State.

#### **2. Uninsured Risks**

A large number of space objects represent uninsured TPL risks from the perspective of their launching States. This is because most national space laws do not require operators to carry TPL insurance throughout the lifetime of a space object in space. TPL insurance is typically required for launch and early operational phases (LEOP) as well as re-entry (generally considered the highest risk phases of a mission). Depending upon the applicable law and the mission’s parameters, an operator may continue to operate a satellite without renewing TPL after the initial policy covering LEOP has lapsed. In practice, some commercial satellite operators may acquire TPL insurance as a ‘sleep easy’ of their own volition. However, this is likely to be the exception rather than the norm for satellites that have ceased to function as a source of revenue. Even where a State regulator imposes a TPL insurance requirement for in-orbit operations (as in the UK), the policyholder may go out of business or otherwise fail to maintain the policy. Were a claim to be brought under the Liability Convention in respect of loss or damage caused by an

uninsured space object, any damages assessed would be borne wholly by the launching State.

As there are as yet no historical precedents of claims prosecuted under the Liability Convention it is not yet possible to conduct an empirical analysis of how well the individualized approach fulfils its function of protecting national treasuries. However, the above two points serve to illustrate the potential scenarios in which a launching State's treasury may be exposed to uninsured damages. It may be tempting to dismiss these concerns as 'worst case' or at least 'not yet manifested'. However, it is important to be conscious of these issues as we move towards a new era of space infrastructure; of low-cost satellite systems that can be deployed in large numbers into constellation architectures to provide new services in communications and remote sensing. The relative ease with which these systems can deliver access to space for a variety of new entrants, some of whom may have limited heritage or experience in space missions, will compound the existing problem of orbital congestion and space debris. Perhaps significantly, Lloyd's of London updated its Realistic Disaster Scenarios (RDS) in 2015 to include a new RDS for multiple losses from space debris impact to reflect the insurance industry's view of the increasing risk exposure, especially in Low Earth Orbit (LEO).<sup>24</sup>

### **3. Premium Rates Risk Stifling Innovation and Enterprise**

Assuming a premium rate of 0.1% of the total cover sought,<sup>25</sup> a TPL insurance requirement of £60m would cost a policyholder £60,000 in premium rates. This cost is easily absorbed by a commercial operator launching a £300m telecommunications satellite. However, the cost of building a 1U CubeSat,<sup>26</sup> for example, is typically under £50,000. Excluding certain governmental 'free ride' programmes, launch costs may bring the total mission cost to around £300,000. Nonetheless, TPL insurance premiums are clearly very substantial relative to the total mission cost. As one commentator notes, "this means many small space start-ups [and university projects] looking to utilize CubeSats are stillborn".<sup>27</sup>

CubeSats and other satellites belonging to the micro/mini-satellite segment offer reduced-cost access to space and governments are beginning to recognise the important role they have to play in testing and demonstrating disruptive new payload technologies and in the exploitation of constellation

24 R. Gubby, D. Wade and D. Hoffer "Preparing for the worst: The space insurance market's realistic disaster scenarios" *New Space* (May 2016) 4(2) 98-106.

25 In support of this assumption see Philippe Montpert "Considerations on Space Liability Insurance", *supra* note 19.

26 1U is the smallest standardised CubeSat structure is at 10cm x 10cm x 10cm (~1kg).

27 Christer Newman and Michael Listner, "A very British coup: Lessons from the draft UK regulations for CubeSats", *The Space Review*, 31 August 2015.

architectures to enable the provision of new services.<sup>28</sup> The UK has recently considered how its regulatory provisions might be reformed to benefit the UK CubeSat industry following a call for the UK Space Agency to consider waiving TPL insurance requirements for some CubeSat missions.<sup>29</sup> However, as no mission is altogether without risk, it might be responded that an outright waiver merely creates a scenario of under insurance.

A precise figure for the number of missions that would have gone ahead *but for* the cost of TPL insurance is not easy to determine.<sup>30</sup> However, a balance must surely be struck between protecting the launching State treasury and removing barriers to innovation and new market entrants taking advantage of low-cost access to space using micro/mini-satellites. Unfortunately, the individualized approach is not optimally suited to address this balance. If, as discussed above, a State chooses to exempt certain satellite categories, missions or activities from TPL insurance requirements, premium rates would no longer be an issue in such cases, but the launching State would be exposed to a degree of uninsured risk. Even if a regulator is willing to compromise and accept a lower amount of insurance cover for certain missions, the premium rate may not change significantly. This is because premium rates are not solely a function of the amount of cover sought. The amount of cover sought is *one* factor which influences premium rates by increasing or decreasing the reserve that the insurance company has to put aside to pay claims and remain solvent ('cost of capital'). However, premium rates are also determined by the likelihood and magnitude of expected claims, as well as numerous other figures including normal overhead recovery, variable costs such as brokerage fees and processing the policy, as well as profit. Put simply, there must be enough premium to make it worthwhile for an insurance company (or a consortium of insurance companies) to insure the risk.

### **State Discretion to Select Other Regulatory Models**

It is natural that States should seek to protect themselves from unlimited liability they are exposed to by private entities. However, as has previously been mentioned, States have a wide margin of discretion to decide the best mechanism for doing so. Neither the Outer Space Treaty nor the Liability Convention make any specific reference to indemnity or insurance requirements as a pre-condition of authorisation, and no such detailed

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28 Jeff Foust, "The ups and downs of smallsat constellations", *The Space Review*, 22 June 2015; See also market report "Assessment of the Small-Satellite Market" (September 2015), published by Frost & Sullivan.

29 UK Space Agency, *Draft CubeSat Regulation Recommendations*, 2 June 2015, available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/447284/Draft\\_Cubesat\\_regulation\\_recommendations.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/447284/Draft_Cubesat_regulation_recommendations.pdf).

30 Efimova and Butchers, *KTN Report*, supra note 13, at page 16.

obligations are to be found elsewhere in international law. States are therefore free to choose how to mitigate against their liability exposure.<sup>31</sup>

The United Nations General Assembly (UNGA) has issued a recommendation that “States could consider *ways* of seeking recourse from operators or owners of space objects if their liability for damage under the United Nations treaties on outer space has become engaged; in order to ensure appropriate coverage for damage claims, States could introduce insurance requirements and indemnification procedures, *as appropriate* [emphasis added].”<sup>32</sup> Recommendations of the UNGA are not binding upon the States to whom they are addressed, however they provide a useful insight into the approach advocated by the international community. The UNGA clearly envisages that there is more than one approach that States might adopt to ensure appropriate coverage for damage claims.

It is foreseeable that regulators will try and manoeuvre flexibly within the parameters of the individualized approach, adapting TPL insurance requirements reactively to emerging technologies that offer new opportunities in terms of innovation and growth. Indeed some regulatory authorities already publicly emphasise the flexibility they can offer licensees.<sup>33</sup> The danger of relying on ‘flexibility’, in this author’s opinion, is to promote an unsystematic approach to regulation with States in competition to attract inward investment. This is not, it is submitted, a very satisfactory long term prospect for sustainable space activities. Instead, due consideration should be given to alternative regulatory models that can more adequately balance the need to protect the State from liability exposure with the needs of innovators and entrepreneurs.

### **Towards Aggregated TPL Insurance**

‘Aggregated insurance’ is used here to mean the aggregation or collection of numerous risks under a single overarching insurance policy. The concept draws its inspiration from well-established insurance products in respect of fleets of vehicles (‘fleet insurance’). The underlying rationale behind fleet insurance products is that the policyholder benefits from insuring a number of similar risks collectively under a single policy, rather than individually under multiple policies.

Aggregated insurance in this context also implies a central policyholder. The second element to this alternative approach therefore is that the aggregated

31 Philippe Montpert “Considerations on Space Liability Insurance”, supra note 19 at slides 2-3.

32 UNGA resolution 68/74 of 11 December 2013, at: [http://www.unoosa.org/pdf/gares/A\\_RES\\_68\\_074E.pdf](http://www.unoosa.org/pdf/gares/A_RES_68_074E.pdf).

33 See for example: <https://www.gov.uk/guidance/apply-for-a-license-under-the-outer-space-act-1986>.

TPL insurance policy is procured and maintained by the State through a competent national authority, rather than by private entities. The national authority could flow down the cost of the premium on the policy to private entities based on, for example, an assessment of their proportionate contribution to the State's total TPL risk exposure, and subject to the State's discretion to pursue a policy promoting scientifically or technologically innovative missions.

It is well-established that a State may be a beneficiary of an insurance policy obtained on the commercial market. For example, national space laws sometimes require the State to be named as a co-insured in a licensee's TPL policy.<sup>34</sup> Similarly, the European Space Agency (ESA) purchases insurance for some of its missions under policies that name ESA and the participating States as beneficiaries. It is, admittedly, less common for States themselves to be policyholders of insurance products. Governments normally elect to assume their own risks, that is, act as self-insurer. However, central government practice of self-insurance is usually a matter of policy rather than positive law. Countervailing policy considerations sometimes do allow for exceptions to be made. For example, the US Department of State and Department of Agriculture are permitted to purchase insurance covering the liability of employees for damage or injury caused while operating government vehicles in foreign countries.<sup>35</sup> The UK Government primarily operates a policy of self-insurance but allows public sector organisations to place insurance contracts, for example, where there is a requirement to safeguard public funds during wider market activities.<sup>36</sup>

In summary therefore an aggregated approach describes a paradigmatic shift from multiple individual TPL insurance policies taken out by private entities to cover named space objects as required for authorisation, to a single policy held and maintained by a State authority to provide cover against third party liability arising out of damage caused by any space object for which it is a launching State.

## **Merits of the Aggregated Approach**

### **1. Raising the Threshold for Extraordinary Damages**

Suppose, for simplicity, a State is a launching State in respect of exactly 10 non-governmental space objects each individually insured against third party liability with total cover for each space object limited to \$80m. As has been previously discussed, under the individualized approach the national treasury of the launching State would not be covered against a liability event that

34 See for example; (France) FSOA, *supra* note 15, Article 6; (US) FAA Regulations 14 CFR § 440.9(b)(2).

35 22 U.S.C. § 2670(a) and 7 U.S.C. § 2262 (1970).

36 See National Environment Research Council (UK), Insurance Handbook, available at: <http://www.nerc.ac.uk/about/policy/safety/inshandbook/>.

resulted in extraordinary damages (i.e. in excess of the insured amount – \$80m). If, however, all 10 space objects were to be consolidated under an aggregated TPL insurance policy, the State could select a level of cover superior to that which was provided under any of the foregoing individual policies. This raises the threshold for extraordinary damages to be incurred by providing a more robust buffer of insurance.

In the above example, under the individualized approach, there was a total insured risk of \$800m spread across 10 policies. From the State's perspective, it is protected against every one of the 10 space objects independently incurring third party liability, so long as in each individual case, the liability does not exceed \$80m. This is an inefficient allocation of insurance as the probability of multiple liability events (connected or unconnected) is vanishingly small. Under an aggregated approach the State can select a level of cover that corresponds to its own risk appetite. For example, the State in the above example might choose cover up to \$200m. From the State's perspective, it is covered against damage caused by any or all of the space objects during the policy period, so long as the *total or aggregate* liability does not exceed \$200m.

## **2. Cover for TPL in Respect of All Space Objects**

An individual TPL insurance policy will cover only 'named objects', that is to say, only those space objects that are named in the policy. A space object that is not a named object under any active TPL insurance policy therefore presents an uninsured risk to its launching State(s). By contrast, under an aggregated approach it would make sense for a launching State to agree a policy that in scope covers 'all objects', rather than 'named objects'. In other words, an aggregated approach could be used to provide the State with insurance coverage in respect of 'all space objects, at any given time during the policy, for which the State is a launching State'. This does not mean that third party liability would always fall within the scope of an aggregated policy – even aggregated TPL policies issued on an 'all objects' basis might feature agreed exclusions – however, it would offer a broader scope of protection compared with the individualized approach.

## **3. Premium Rates That Promote Innovation and Enterprise**

The advantages of the aggregated approach over the individualized approach in promoting innovation and enterprise are twofold:

First, the total premium rate under an aggregated policy would likely be much less than the combined premium rates paid across multiple individual policies. This is a product of two factors: (i) lower cost of capital, and (ii) reduced overhead and variable costs. The cost of capital would be lower because insurance companies would have to lock-in smaller capital reserves to meet claims up to the level of cover under the aggregated TPL policy only. The overheads and variable costs associated with issuing *one* aggregated

policy would be lower than the overheads and variable costs associated with issuing multiple individual policies. An aggregated TPL insurance policy would therefore be most effective at scale; the greater the number of individual policies consolidated, the greater the benefit. Recall that under an aggregated approach the policyholder (national authority) should recover the policy premium from private entities authorised by the State to carry out space activities. The benefit of a reduction in the collective premium paid for TPL insurance would flow down to all those entities. Companies periodically deploying satellites into constellation architectures that would otherwise have been required to enter into multiple insurance policies would be notable beneficiaries of an aggregated approach.

Second, an aggregated approach could offer the flexibility to promote scientific and technological innovation without creating uninsured risk. The dilemma previously identified in relation to the individualized approach is that TPL insurance requirements may make scientific and/or technology demonstration missions using low-cost satellite systems prohibitively expensive, whilst a TPL insurance waiver necessarily creates an element of uninsured risk. An aggregated approach would overcome this dilemma by allowing the regulatory authority to use its discretion to reduce or waive contributions to an aggregated policy premium for certain mission categories, whilst retaining the benefit of cover in respect of ‘all space objects’.

### **Issues Likely to Be Encountered in Implementing an Aggregated Approach**

This paper only allows for a high-level consideration of an aggregated approach. A number of important practical issues would have to be addressed in order to implement a transition from the individualized approach to an aggregated approach. We may consider, for example, the following issues:

#### **1. Scope of the Policy**

The assumption in the preceding pages is that a State could acquire aggregated TPL insurance to cover all *space objects* for which it is a *launching State*. In other words, the scope of the policy should include all those items for which the State is potentially internationally liable. However, both concepts, the ‘launching State’ and ‘space object’, are loosely defined in international space law.<sup>37</sup> A policy draftsman would therefore face a particular challenge in reconciling the latent ambiguity in international space law with the need to clearly define the scope of the policy.

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<sup>37</sup> See Liability Convention, *supra* note 2, Article I does not define “space object” per se but elaborates that the term “space object” includes component parts of a space object as well as its launch vehicle and parts thereof.

## **2. Multiple Launching States**

For some space objects there will be more than one launching State.<sup>38</sup> States would need to engage bi-laterally to ensure that the same risk is not insured multiple times across different aggregated TPL insurance policies. If this is not done, the net effect would be over insurance.

## **3. Application to in-situ Space Objects**

If an aggregated approach were to be adopted into regulation by incumbent space nations, space objects already in orbit should fall within the scope of the policy as they are a potential source of liability. However, if a company previously authorised in respect of one or more space objects has since gone out of business, a portion of the aggregated policy premium (i.e. corresponding to the risk created by the space object/s) would be unaccounted for. It would be a decision for the national authority whether to assume this cost itself or to share this cost among all remaining entities insured under an aggregate TPL policy.

## **4. Assessing Risk and Deriving a Contribution Model**

Given the diversity of operations licensed by a launching State it will be very demanding for insurance underwriters to assess a launching State's risk on a global basis, and to adjust their assessment on an ongoing basis to account for space objects launched, de-orbited or debris created as a result of a collision. Ultimately, if the aggregated risk is too uncertain, insurers may be deterred from providing capacity to underwrite the policies.

Once risk is assessed and a premium rate is set we could expect further protracted debate between governments and licensed entities as to how much each should contribute. The regulator would be faced with the challenge of creating a contribution model taking into account the diversity of space missions and promoting national interests.

## **Conclusions**

Third party liability under international space law is potentially unbounded. States, anxious to protect their national treasuries, are using insurance and indemnity requirements to mitigate against the liability to which they are exposed by private entities. States are free to decide how to shape their domestic regulations in order to respond to their international liability exposure. However, the individualized approach currently favoured by spacefaring nations exhibits potential deficiencies that may make it sub-optimal to deal with emerging trends such as large constellation architectures and the rapid uptake of CubeSats and other mini/micro-satellite systems. This paper has set out to propose one alternative regulatory approach to

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38 See Liability Convention, Article I, *supra* note 4, definition of a "launching State".

addressing liability exposure inspired by products that already exist in the insurance industry.

An aggregated approach could reduce costs by consolidating multiple policies whilst providing a better scope of protection for ‘all space objects’ and reducing the likelihood of a State incurring extraordinary damages; it could allow States to promote science and innovation without incurring uninsured risk; and it could reduce the financial barriers to new companies using low-cost satellite platforms in constellation architectures to offer a range of new services. While there are undoubtedly certain questions left to consider in terms of how an aggregated approach could be implemented in practice, the potential benefits of the approach ought to mean that it merits further consideration.