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Gli Speciali

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Le nuove frontiere del diritto dello spazio

A cura di
Lina Panella - Francesca Pellegrino

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Diretti da CLAUDIO ZANGHÌ e LINA PANELLA

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KRISTIAAN C. BERNAUW*

SPACE INSURANCE: LEGAL ASPECTS

1. *Introduction*

The topic of space insurance (e.g. such of its aspects as the types of cover etc.) has been amply addressed in the past. Commercial space activities, like space tourism and space mining, may raise new insurance issues in the future.

This paper intends to summarily focus on a few current issues and specific characteristics of space insurance.

Space risk insurance poses a few qualification, classification and localization problems.

It also presents a number of peculiar features and offers special formulas, that warrant some further attention.

This analysis will be from a European law perspective.

For comparison, it is recalled that aviation insurance gradually emancipated from the marine insurance regime, to be acknowledged as a distinct insurance class in its own right[1].

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[1] K. POSNER, T. MARLAND and P. CHRYSTAL, *Margo on Aviation Insurance*, London, 2014, p. 14 s., 2.08-2.10; EUROPE ECONOMICS, *Different forms of cooperation between insurance companies and their respective impact on competition, Studies on issues pertaining to the insurance production process with regard to the application of the Insurance Block Exemption*

On the assumption that the regimes cannot be harmonized across the modes, the same development seems justified as between space insurance and aviation insurance.

2. *Space Insurance Concept*

2.1. *The issue*

Space insurance raises a qualification question, that is in several respects similar to other traffic and transport modes.

Firstly, some activities and related infrastructure (manufacturing, (space)port[2] services, handling, maintenance, refuelling, remote control, traffic control, navigation aid, etc.) are inherent to the (marine, air, space) traffic or transport mode, but are land based.

Secondly, a (sea, air, space) craft may to a certain extent be amphibious or multimodal in that it operates in different mediums (on land, in the air, at sea, in space). The spacecraft may, before launch or after landing, travel overland or on the sea surface and, in the initial launch stage or after re-entry in the atmosphere, traverse the airspace.

The demarcation problem between aviation insurance and space insurance is similar to that between land insurance and aviation insurance. During certain parts of its trajectory a spacecraft may also travel through the air space just like in some instances of its operation an aircraft may also move on the ground.

Thirdly, space is the void that exists between celestial bodies. A spacecraft may land, berth and dock on a celestial body. A(n orbital) space station (such as Skylab, International Space Station (ISS), etc.), that floats in space, differs from a moon based station, that sits on solid ground. Strictly speaking, the latter ought to be qualified as a land risk.

2.2. *Relevance*

The relevance of the qualification or demarcation lies both on the public and private insurance law level.

The insurance licensing and supervision legislation/regulation may differ according to the insurance class, that is based on the traffic/transport mode (land, air, space) (cfr. infra).

The extent to which the insurance contract law is mandatory, may also depend on the insurance class. In some insurance classes (generally land insurance), there may be no or little party autonomy so as to freely tailor the insurance contract.

2.3. *Qualification Criterion*

The modal qualification of the risks related to space activity may be based on various criteria, e.g. the spatialist as opposed to the functionalist approach[3].

The spatialist approach is based on the (physical) location of the risk: the type of medium in which the craft evolves, is paramount.

Regulation (IBER), Brussels, European Commission Directorate-General for Competition, 2016, p. 146.

[2] Cosmodrome.

[3] G. ODUNTAN, *The Never Ending Dispute: Legal Theories on the Spatial Demarcation Boundary Plane between Airspace and Outer Space*, in *Hertf. Law Jour.*, 2003, p. 64 ss.

The functionalist approach is based on the nature or the intent of the operation, irrespective of its location.

For the sake of inspiration, it may be interesting to examine the similar problem in legal relationships other than the insurance contract.

In the context of a contract of carriage e.g., for lack of a uniform (the same for all transport/traffic modes) or a *sui generis* (specific for multimodal[4] operations) regime, the choice of the applicable regime on the multimodal transport contract may be based on two systems: either (i) the regime of the predominant mode is applied to the ancillary mode («absorption» theory according to the maxim «*accessorium sequitur principale*») or (ii) the regimes of the respective component modes («combination» or «distribution» or «network» theory, applying the chameleon rule according to which the regime changes with the successive modes).

Both the *sui generis* regime and the absorption theory reflect a functionalist approach.

In an extra-contractual position, for the sake of traffic safety regulation e.g., the spatialist approach seems more appropriate: the craft must observe the traffic rules of the medium in which it evolves (e.g. COLREGs[5] rule 18 for a seaplane on the water).

Once space operations become less experimental and more commercial and therefore less exceptional and more routine, the segregation of air and space traffic via the designation of exclusive use restricted airspace for the purpose of launch and re-entry of space craft, may not be possible any more[6].

For land based port activities/operations the spatialist approach, that in the context of aviation distinguishes e.g. the «land side» from the «air side», does not solve the problem.

The demarcation between airspace and outer space, based on altitude, is not clear-cut as there is overlap between the lowest possible altitude for orbital flight and the highest possible altitude for aerodynamic flight (cfr. the «Karman line»).

In the functionalist approach the nature of the activity practiced or the type of craft operated, irrespective of their location, determine the nature of the risk and thus the regime of the insurance cover.

It is also worthwhile to examine whether inspiration by analogy *mutatis mutandis* could be drawn from the demarcation between marine and non-marine (land) insurance by the British Marine Insurance Act 1906 (MIA).

Art. 1 MIA defines marine insurance as the cover against marine losses, i.e. the losses incident to the «marine adventure».

As per art. 3 MIA the «marine adventure» means exposure of the ship, the goods, the freight and third party liability to «maritime perils» or «perils of the sea», viz. the perils consequent on or incidental to the navigation of the sea: this means arising from the action of the sea or occurring during the course of a sea voyage. Per art. 12 of the Rules for Construction of the Policy[7] the *ejusdem generis* provision in art. 3 MIA, after the list of examples of perils of the sea, is restricted to perils consequent or incidental to the navigation of the sea.

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[4] Cfr. E. HARDY IVAMY, *Chalmer's Marine Insurance Act 1906*, London, 1993, p. 3 s., who draws the parallel between the multimodal insurance cover and the multimodal transport operation.

[5] International Regulations for Preventing Collisions at Sea, 1972.

[6] R. JAKHU, T. SGOBBA and P. DEMPSEY (eds), *The Need for an Integrated Regulatory Regime for Aviation and Space: ICAO for Space?*, Vienna, 2011.

[7] First Schedule to the Marine Insurance Act 1906.

Even if the term «perils of the sea» is not restricted to «on the sea»[8], this legislation tends towards a spatialist approach.

Addressing the case of transit (mixed sea and land) risks, art. 2, n. 1, MIA allows to extend by contract the marine insurance contract regime to other modes incidental[9] to the maritime operation. Art. 2, n. 2, MIA extends by virtue of the law itself the MIA regime to the shipbuilding and launching risks, but also to the insurance of «adventures analogous to a marine adventure». The construction of the latter term however gives rise to uncertainty: also risks of other modes (road, air, ...)? Other maritime activities and businesses, onshore (wharfingers/harbourmasters, ports, marinas, docks, container terminals, ship builders and repairers, boat dealers, terminal operators, stevedores)? And offshore (deepwater drilling platforms, subsea infrastructures, oil rigs fixed to the sea bed, oil wells and pipelines)[10]?

According to some, there is still doubt under English law as to whether e.g. mobile offshore drilling barges come fully within the ambit of the UK Marine Insurance Act of 1906, which may therefore create uncertainties on important issues such as policy warranties.

According to others the title of Marine insurance is somewhat misleading as it does also cover transportation by land and air, but due to the origins of Insurance with the Greek and Roman trade through the establishment of overseas trading routes in Asia and the Americas and the establishment of Lloyds of London, the term Marine Insurance has remained as various other forms of transport have evolved. And the view was also expressed that marine insurance includes onshore and offshore exposed property (container terminals, ports, oil platforms, pipelines)[11].

Art. 2, n. 2, acknowledges that the marine insurance contract law may deviate from the general insurance contract law. Although fundamentally based on the same original principles of commercial insurance, the marine insurance contract law (codified in the MIA 1906) and the non-marine insurance contract law indeed present substantial differences in some respects[12].

The French insurance contract law contains a specific section dedicated to space insurance (art. 176-5 *Code des Assurances*). It governs every insurance contract that covers the risks relating to the third party liability flowing from a space operation («tout contrat d'assurance qui a pour objet de garantir les risques relatifs à la responsabilité civile au titre d'une opération spatiale» (art. 171-1, 3° *Code des Assurances*).

This legislation tends towards a functionalist approach.

3. *Space Risk Classification and Localisation*

3.1. *Space insurance class?*

The insurance supervision legislation does not acknowledge a space insurance class. Consequently space insurance comes under the residual insurance classes.

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[8] Cfr. E. HARDY IVAMY, *Marine Insurance*, London, 1985, p. 145.

[9] It implies the application of the «*accessorium sequitur principale*» rule.

[10] R. RUTHERFORD, *Maritime Insurance for Offshore Risks: Current Policy Forms, Industry Problems, and Recent Decisions*, in *Louisiana Law Review*, 1981, p. 817.

[11] https://www.rakinsurance.com/en/marine-insurance.

[12] M. CLARKE, *Marine Insurance System in Common Law Countries, Status and Problems*, in *MarIus, Scandinavian Institute of Maritime Law Yearbook,* Oslo, 1998, nr. 4. https://www.bmla.org.uk/annual_report/rep_marine_clark.htm; J. ŁOPUSKI, *Maritime law in the second half of the 20th century. Selected articles*, Torun, 2008, p. 327.

The qualification as a «large risk» depends on the insurance class. In turn the qualification as a large risk may determine the applicable regime of supervision, conflict of laws, jurisdiction, party autonomy in the contractual relationship, etc.

According to art. 13(27) Solvency II Directive, a cargo risk (class 7) is a *de plano* (i.e. unconditional) large risk; property (hull) (classes 8 and 9), third party liability (class 13) and business interruption (class 16) however are conditional large risks (i.e. depending on the policyholder size (exceeding certain thresholds of employment, turnover, balance-sheet total).

3.2. *Space risk location*

For the same purposes as mentioned above in 3.1. the geographic location (in the sense of political territory) of the space risk is relevant.

Here again art. 13, n. 13, of the Solvency II Directive defines the member state in which the risk is situated as: (a) for real estate: the physical location (b) for vehicles: the registration state (c) for travel cover: the place of policy issuance and (d) for the residual cases: the place of the policy holder's residence or establishment.

In the latter three cases the risk location is based on a legal fiction.

4. *Conflict of Laws*

4.1. *Substantive Law*

According to the Rome I Regulation[13] for the insurance of large risks there is party autonomy in the choice of the applicable national law (art. 7, n. 2).

For lack of expression of such choice, the default regime designates the national law of the Member State, where the insurer is established (art. 7, n. 2).

In case of a compulsory insurance cover, the national law imposing the insurance obligation prevails over the national law of the risk location (art. 7, n. 4).

4.1.1. *U.K. law*

The leading position of the London insurance market in space insurance warrants some digression on the incidence of the U.K. Insurance Act 2015 (effective 12 August 2016) that applies to all commercial (i.e. other than consumer) insurance contracts governed by U.K. law. The amendments introduced by the Insurance Act 2015 are applicable but not limited to the Marine Insurance Act 1906.

Follows the essence of a few (not all) of the relevant changes.

4.1.1.1. *Duty of disclosure*

The prospective policy holder is henceforth under a duty to make a fair presentation to the insurer of the characteristics of the risk: a reasonable (what the policy holder is as-

[13] Regulation (EC) n. 593/2008 of the European Parliament and of the Council of 17 June 2008 *on the law applicable to contractual obligations (Rome I).*

sumed to know) duty to reveal material (that affect the risk assessment) circumstances of the risk.

In case of unintentional omission, the former remedy of simple and unconditional forfeiture of cover as a penalty for the breach of defaulting on the duty of disclosure is now replaced by a graduated, proportionate sanction, according to the insurer's hypothetical attitude if he had been correctly informed: if the insurer would not have underwritten the risk, he is exonerated; if the insurer would have stipulated different terms, the cover is adapted accordingly; if the insurer would have charged a higher premium, the claim is reduced commensurately.

4.1.2. *Warranties*

As opposed to the former regime, the breach of an insurance warranty will no longer entail the automatic forfeiture of cover, if the non-compliance was irrelevant for the occurrence of the actual loss.

4.1.3. *Contracting out*

The insurance contract partners may contract out of most parts of the new regime as introduced by the Insurance Act 2015, provided the transparency precept is observed so as to achieve the customer's informed consent: the policy holder must be put on notice about a contract term that is less advantageous for the insured than the default regime as per the Act.

4.1.4. *Direct action right*

The Insurance Act 2015 effected the entry into force of the Third Parties (Rights against Insurers) Act 2010, that introduces the direct action right of the third party, who suffered loss, to proceed against the third party liability insurer of an insolvent insured defendant.

It creates an exception to the «pay to be paid» rule, that is based on the privity of contract principle.

4.2. *Jurisdiction*

The Brussels I-bis Regulation[14] in general offers a choice of several fora (insurer's seat/branch, insured's residence) (art. 11). Actions with respect to real estate and liability insurance cover must be brought in the court of the place of loss (art. 12). For disputes on large risk insurance cover, party autonomy is granted (art. 15, n. 5, and 16, n. 5).

Furthermore the third party liability insurer may be joined in the victim's action against the insured (art. 13).

Finally the validity of an arbitration clause is made subject to the applicable substantive national law (art. 1, lett. d).

[14] Regulation (EU) n. 1215/2012 of the European Parliament and of the Council of 12 December 2012 *on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters (recast)*.

5. *Third Party liability insurance cover*

5.1. *Liability regime and loss settlement procedure*

It is recalled that the Outer Space Treaty[15] (art. VII), and its further elaboration in the Space Liability Convention[16] (art. II and III), set the principle of the launching state liability for damage caused by space objects *vis-à-vis* third parties, who are nationals of other states. The regime does not apply to damage caused by a space object to the own nationals of the launching state or to foreign nationals participating in the operation of the space object (art. VII Space Liability Convention).

For damage thus caused on the surface of the earth or to aircraft in flight, the (state) liability is absolute (art. II Space Liability Convention) and for full compensation (art. XII Space Liability Convention) of all types of loss (art. I a Space Liability Convention).

For damage caused elsewhere than on the surface of the earth by a space object to another space object or its persons or property on board, the liability is fault based (art. III Space Liability Convention).

The launching state means: either (i) the state that launches itself the space object or (ii) procures its launching or (iii) from whose territory or facility the launch takes place (art. Ic Space Liability Convention).

Procedurally a state may institute a claim for compensation on behalf of its nationals (natural or legal persons) who have suffered the loss, against the launching state (art. VIII, 1 Space Liability Convention), either through diplomatic channels (art. IX) or for lack of a timely settlement via a Claims Commission (art. XIV) or else in the regular courts and tribunals of the launching state (art. XI, n. 2).

The Space Liability Convention (art. VIII and IX) addresses the liability for damage caused by space objects as a state-to-state matter[17]. This regime is symptomatic for an era when private interests and in particular the position of the third party liability insurer in space activities were not yet fully acknowledged and when one of the two signatory countries with space-faring capability, was a collectivist state.

The following questions on this system arise:

(i) Does the Space Liability Convention waive the launching state's sovereign immunity (cfr. the maxim «the king can do no wrong»)? There seems little doubt that in the cases contemplated by the express provisions of art. II and III of the Space Liability Convention, signatory states cannot invoke the defence of sovereign immunity based on their national law[18].

(ii) Does the Space Liability Convention provide the sole cause of action and

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[15] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (1967) (Outer Space Treaty).

[16] Convention on international liability for damage caused by space objects (1972) (Space Liability Convention).

[17] T. GEHRING and M. JACHTENFUCHS, *Liability for Transboundary Environmental Damage Towards a General Liability Regime*?, in *Eur. Jour. Int. Law,* 1993, p. 102.

[18] R. BENDER, *Space Transport Liability: National and International Aspects*, The Hague, 1995, p. 54 and 328; J. BOSCO, *The United States Government as Defendant – One Example of the Need for a Uniform Liability Regime to Govern Outer Space and Space-Related Activities*, in *Pepperdine Law Review*, 1988, p. 590; for a nuanced position: see B. ABRAMS, *First Contact: Establishing Jurisdiction Over Activities In Outer Space*, in *Ga. J. Int'l and Comp. L.*, 2013, p. 819.

exclusive remedy, so that state law-based claims are pre-empted by the Convention, thus barring alternative recourse under the applicable national law? As the forfeiture of a right is never presumed, for lack of an express[19] provision to that effect, the Space Liability Convention does not preclude recourse under domestic law of a jurisdiction[20]. The common domestic regime may of course be less beneficial than the Convention regime for the claimant, e.g. for lack of a launching state liability by virtue of the law, in terms of onus of proof, in terms of limitation of liability, because of the sovereign immunity defence, etc.

(iii) Does the Space Liability Convention channel[21] the liability towards the launching state, thus immunizing all others involved in the space operation? For the same reason as above under (ii), the answer is negative.

(iv) Does the state-to-state claims settlement procedure of the Space Liability Convention bar the institution of a direct action by the victim itself through the judiciary channels. Certainly a claim against the state under de Space Liability Convention can only be brought in accordance with the procedure of the Convention, i.e. via representation by the concerned state[22], so that victims have no standing to bring themselves a claim against a foreign government[23].

A claim outside the ambit of the Convention (based on another cause of action, according to domestic law (cfr. (ii)) could however be brought against a private operator and against the foreign state by the victims themselves.

These questions are relevant in the context of the compulsory third party liability insurance cover and (in some legal systems) its concomitant direct action right.

Whereas a third party liability insurance cover by its very nature only guarantees liabilities incurred by the insured, it is not answerable in instances where the insured state enjoys sovereign immunity and where an insured stakeholder in the space activity, other than the state, may invoke immunity based on the channelled nature of the liability.

On the other hand in case a third party liability insurance cover generates a direct action right, it creates an exception to the state-to-state claims settlement procedure (cfr. 5.2. below).

5.2. *Third Party Liability Insurance Cover and Direct Action Right*

The state liability rule explains the motives for national legislation on licensing conditions, insurance requirements and risk allocation and indemnification precepts for space activities.

In this respect, national law of signatory countries to the Space Liability Convention generally requires the space operator to take out third party liability insurance cover (or to provide other financial guarantee). Sometimes it even requires to include the launching

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[19] For an example of an express provision to that effect: art. III, 4 International Convention on Civil Liability for Oil Pollution Damage, 1992 (CLC 92).

[20] P. DEMPSEY, *Liability for damage caused by space objects under international and national law*, in *Ann. Air Space Law*, 2011, p. 336.

[21] Legal channelling of liability renders one particular entity liable for an event, thereby dismissing other parties involved from liability for that event. For and example: art. III, n. 4, CLC 92.

[22] T. MASSON-ZWAAN and S. FREELAND, *Between heaven and earth: The legal challenges of human space travel*, in *Acta Astronautica*, 2010, p. 1598 ss., and p. 1604.

[23] D. FISHER, *Injury to Rights of Personality Caused by Satellite Programme Contents. Prospects of Relief under the Law of Outer Space*, in *Scandinavian Studies in Law*, 2000, p. 428.

state as an additional insured in this cover[24].

Also national mandatory contract law on launch service agreements often (i) reserves the state's right of recourse against the actual party to blame for the loss for the purpose of recovering its disbursement[25] and (ii) contains risk allocation provisions by imposing the stipulation of liability cross-waiver clauses between and among the stakeholders involved in the space activities (launch site, launcher, manufacturers of launch vehicles, spacecraft and satellite owner/operator, etc.).

If the applicable national insurance contract law provides for a direct action right[26] against the third party liability insurer and in particular in case the state's liability is also covered by this insurance, such a direct action right opens a parallel path to claim compensation.

For lack of a channelled liability regime, there does not seem to be any impediment for the exercise by the victim of its direct action right against the third party liability insurer.

Obiter, it could be argued that if a supranational instrument were to channel the liability (*quod non in casu*) (cfr. *supra*) and at the same time to provide itself for a direct action right against the third party liability insurer[27] (*quod non in casu*), the direct action right prevails as a specific exception to the general rule (according to the maxim «lex specialis generali derogat»).

5.3. Dominus litis *in third party loss settlement*

The combination of the rule of the launching state liability and the private third party liability insurance cover (cfr. supra nr. 5.2.) raises a few interesting questions.

An allegedly liable insured person may have an interest in conflict with his third party liability insurer: for motives of personal or commercial relationship or reputation, the insured may prefer the compensation over the challenge of the victim's claim. In addition to the reputational character of the motive, in the case of state liability it may also be of a political nature. Those motives may give rise to «without prejudice» and «ex-gratia» payments in case liability is not firmly established.

Since the loss settlement takes place at the expense of the insurer, there is a moral hazard that the insured (*in casu* the state) may accept liability too leniently[28] and compensate too generously.

This is why in most legal systems an express provision in the law (as illustrated by art. 14:104 (2)[29] of the PEICL) or a contract stipulation[30] reserves the insurer's right to handle

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[24] E.g. in the United States as per the Commercial Space Launch Act of 1994, 51 USC §50914(a)(4); also in Australia: see respectively P. DEMPSEY, *Liability for damage,* cit., p. 352, 354 and 357 and R. MARGO, cit., p. 423, nr. 21.36.

[25] E.g. in Belgian law: art. 15 Act of 17 September 2005 on the launch, the flight operations or guidance of space objects; see also P. DEMPSEY, *Liability for damage,* cit., p. 351 s.

[26] Cfr. art. 15:101 Principles of European Insurance Contract Law (PEICL): see J. BASEDOW, J. BIRDS, M. CLARKE, H. COUSY, H. HEISS, *Project Group* «*Restatement of European Insurance Contract Law*» (eds.), *Principles of European Insurance Contract Law (PEICL)*, Munchen, 2009. The PEICL reflect fairly well the regime in most national bodies of law; cfr. also art. L175-11 French *Code des Assurances*, etc.

[27] Cfr. e.g. art. VII, n. 8, CLC 92.

[28] In a strict liability regime contributory negligence of the victim offers a defence and even an absolute liability regime does not avoid defences based on e.g. (lack of) causation.

[29] According to art. 14:104 (2) PEICL the third party liability insurer is not bound by an agreement between the victim and the policyholder or the insured.

[30] E.g. the French *Code des Assurances* acknowledges the third party liability insurer's option to reserve the right

the proceedings and his decision power in the claims settlement.

When the state liability for events involving a spacecraft is insured, the insurer generally stipulates that the insured launching state shall have the right to settle a claim «reasonably» and following consultation and with the agreement of the insurers[31].

Such clauses present some resemblance with the «lead» («follow the leader», «follow the settlement», «follow the fortunes» and «claims control») clauses in the relationship between respectively co-insurers mutually and re-insurers and their insurers, that define the conditions for the loss settlement by the leader respectively the insurer to bind the other insurers, respectively the re-insurer.

The loss settlement by the state without the approval or at least the involvement of the third party liability insurer, thus denying the insurer to express his arguments and remarks on the basis and extent of liability, could not bind the insurer, lest infringing his fundamental right of defence as guaranteed by art. 6 of the European Convention on Human Rights and Fundamental Freedoms of 4 November 1950.

6. *Peculiar Features and characteristics*

A number of characteristics of space risks explain their specificities.

Firstly the high cost of the devices and their operation[32].

Secondly the relative inaccessibility in orbit of the devices in case of a mishap.

Thirdly the sensitive nature of space technology because of its confidentiality, both from a commercial point of view (intellectual property, trade secret) and from a national security point of view.

6.1. *Limited competition*

The competition amongst space insurers is limited, for only a select group of insurers is able and eligible to provide the space insurance cover, due to specialisation (expertise and know-how), confidentiality, size of the risks, etc.

6.1.1. *Concentration*

The few space insurers control a large market share; the ensuing oligopolistic situation creates the risk of a dominant position and thus anticompetitive conduct of incumbents via the exercise of market power, i.e. the ability to raise prices significantly above marginal cost and make abnormally high profits without inducing further competitive entry.

However the concentration[33] has not reached a critical degree[34] so as to raise competition or market failure concerns.

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to handle the proceedings (art. L176-1 *juncto* art. L175-12): the so-called «clause de direction du procès».

[31] MARGO, cit., p. 427, nr. 21.43.

[32] A satellite costing around US $200 million and its launch costing around US $100 million.

[33] M. ALTUNTAS and J. RAUCH, *Concentration and financial stability in the property-liability insurance sector: global evidence*, in *The Journal of Risk Finance*, 2017, Issue 3.

[34] According to the Herfindahl-Hirschman Index.

6.1.2. *Co-insurance: cartel*

Because of the high value of the risks ($300 to 600m) and the limited market capacity ($500 to 750m) co-insurance (either or not in institutionalized pools or consortia) is almost meant to be the appropriate formula for space insurance. No single insurer has the resources to retain a space risk all by itself.

Since co-insurance by its very nature creates a cartel issue[35], it is stressed that the Insurance Block Exemption Regulation (IBER) 267/2010 on co-insurance pools expires on 31 March 2017.

Also standard policy conditions developed by the insurance industry create a cartel situation and the IBER 358/2003, granting exemption from the cartel ban, has expired on 31 March 2010.

Since that time, the insurance service providers must assess themselves the compatibility of their joint development of standard policy conditions with the competition precepts under art. 101, n. 1, and n. 3, TFEU.

6.2. *Constructive total loss*

In space hull insurance cover, in case of damage, malfunctioning or reduced capability of the device, constructive total loss is generally defined as loss of (only) 75% of the satellite lifetime performance, e.g. expressed in «transponder years» (the number of transponders multiplied with the design operational lifetime).

This extensive definition of constructive total loss is explained by the relative inaccessibility and irretrievability of the satellite for the purpose of repair.

6.3. *Abandonment and salvage*

The U.K. Marine Insurance Act 1906 (art. 61-63) for marine insurance and the French *Code des Assurances* (art. L172-24 and art. L172-27) for both aviation insurance (art. L175-26) and marine insurance (art. L173-13) acknowledge the possibility of abandonment.

Abandonment entails the transfer to the insurer of the property right of the subject matter insured in case of a (constructive) total loss.

The ownership transfer to a national of another state however does not entail the liability transfer from the launching state to the registration state.

Insurers may have the option to take title to the spacecraft in the event of a total loss, although licensing regulations, export controls and contractual intellectual property restrictions in most jurisdictions make this an impractical option for insurers[36].

If the transfer of title is not possible and should the spacecraft still generate some revenues in spite of being a (constructive) total loss as defined by the policy, the insurer is

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[35] EUROPE ECONOMICS, *Different forms of cooperation between insurance companies and their respective impact on competition, Studies on issues pertaining to the insurance production process with regard to the application of the Insurance Block Exemption Regulation (IBER)*, Brussels, European Commission Directorate-General for Competition, 2016, p. 121-122; Cfr. also EU Commission 20 December 1989, *O.J.L.*, 1990 no. L 13/34 –TEKO.

[36] K. POSNER, T. MARLAND and P. CHRYSTAL, *Margo on Aviation Insurance*, London, 2014, p. 420, nr. 21.27; K. HÖRL, *Legal aspects of risks involved in commercial space activities*, Montreal, 2003, http://digitool.library.mcgill.ca/thesisfile19485.pdf, p. 154.

entitled to this income under the principle of salvage. However due to the scarcity of the ITU[37] allocated slots, it may be more cost-effective to replace the crippled satellite by a fully performing one.

Salvage of inoperative satellites has already been demonstrated. In 1984 the space shuttle Discovery[38] recovered two disabled communication satellites, Palapa B-2 and Weststar VI.

The satellites were returned to Earth for refurbishment and re-use. Before the satellites could be recovered, however, the owners of the satellites, their insurers and the NASA legal staff had to spend considerable time negotiating and drafting agreements to transfer title to the satellites to the insurers and to clarify the rights and responsibilities of the parties

6.4. *Limited duty of disclosure*

The space insurance policy holder's duty of disclosure is limited as he can divulge only certain information to the insurer. The secrecy precept with respect to classified information of overriding public interest inspired by national security, prevails over the insurance based duty of disclosure. Disclosure of classified information of national interest is often criminally sanctioned as high treason[39]. In an insurance contract law system that sanctions only guilty[40] non-observance of the duty of disclosure, the legal duty of secrecy removes the wrongful nature of the omission in that case.

6.5. *Dispute resolution by arbitration*

To an even greater extent than other large risk policies, space risk insurance contracts contain an arbitration clause for the purpose of dispute resolution, thus offering the benefit of confidentiality[41].

7. *Peculiar Formulas & Clauses*

Space insurance presents a few atypical formulas and applies peculiar clauses.

7.1. *«First Dollar Coverage»*

First Dollar Coverage is an insurance plan without deductible (zero deductible or no deductible policy). The («own risk») insurance deductible is a risk sharing technique between the insured and the insurer used as a tool to counter the so-called «moral hazard», the insured's reduced diligence inspired by the insurance cover.

Deductibles are however seldom applied in space insurance[42]. This practice of no de-

[37] International Telecommunication Union.
[38] However after the termination of the space shuttle programme, this opportunity has become theoretical.
[39] Cfr. e.g. art. 116 and 118 Belgian Criminal Code.
[40] Cfr. art. 2:102 (5) PEICL.
[41] MARGO, cit., p. 420.
[42] MARGO, cit., p. 420.

ductible formula may be explained by several factors. On the one hand carefully designed «due diligence» clauses exempt the insurer from cover in case of negligence on the side of the insured. On the other hand the limited accessibility in orbit of the device, reduces or even bars the opportunities of (positive or negative) impact on the risk by the insured after launch. Also the traditionally high premium rate (up to 20% of the insured value), possibly combined with a premium rate adjustment (decrease) in case no claims are lodged during the period of cover, creates an incentive for diligent conduct with the insured.

7.2. *«Performance Incentive Payment»* insurance

The performance incentive payment insurance covers the manufacturer for the difference between the agreed and the collected sales price due to not meeting warranties (viz. the satellite service performance and lifetime).

Manufacturers may participate in the system risk of a given satellite throughout its lifetime, either via penalty (payback to the customer in case of a malfunction) or incentive schemes (a portion of the contract price is withheld and paid by the customer in instalments spread over the satellite's design lifetime).

The «incentive payment insurance» essentially is a performance guarantee cover and therefore gets very close to being uninsurable due to the «moral hazard» obstacle and the entrepreneurial[43] nature of the risk. The insurance cover of a business risk would turn the insurer into a silent business partner, which is not his function.

Expert evaluation of the risk, the contracts and specifications and due diligence commitments by the insured may render such cover possible for underwriters.

7.3. *Reciprocal liability waivers of stakeholders*

Another unconventional practice is the reciprocal or cross-waiver of claims («hold harmless» pact) by all participants in the satellite contractual chain of manufacture and launch services.

Each participant accepts his own risk of property damage or loss and agrees to be responsible for injury, damage or loss suffered by its employees.

It avoids interparty litigation.

However such arrangements bar the property insurers from exercising their subrogatory right of recourse after having indemnified their insureds for the loss. Insurers note and acknowledge the liability waivers and contractually agree to forsake their right of recourse against the party responsible for the damage caused after indemnification of their insured for the loss.

This waiver of recourse is atypical since the insurer's subrogation right is one of the cornerstones of insurance law (cfr. e.g. art. 79 U.K. Marine Insurance Act 1906).

The drawback of such liability immunity is again the moral hazard.

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[43] The entrepreneurial or business risk is the risk of loss so closely tied to an insured's way of doing business that it is considered not to be an appropriate subject of insurance coverage; such risks are typically addressed as overhead (i.e., the cost of the loss is included in the price of the business's products or services) or as a subject for loss control. The cost of replacing a defective product or redoing defective work is a classic «business risk», and therefore is excluded from most liability policies.

8. *Conclusion*

In view of the impending commercial space activity, space insurance ought to be recognized as an insurance class, next to marine and aviation (or aerospace) insurance.

As the space activity reaches the age of maturity and private (as opposed to state) operations become a common practice, a revision of the liability regime at the supranational level in the international conventions with attention for the position of the private operator and his third party liability insurer is warranted.

ABSTRACT**:** *Space Insurance: Legal Aspects*

The paper intends to focus on several current issues and specific characteristics of space insurance.

Space risk insurance poses some qualification, classification and localization issues.

It should be remembered that aviation insurance gradually broke away from the marine insurance regime, to be finally acknowledged as a distinct insurance class in its own right. It can be argued, at the same level, that regimes cannot truly be harmonized across the modes, and therefore, the author sees the separation of the space insurance and aviation insurance markets.

In view of impending commercial space activity, space insurance ought to be recognized as an insurance class, next to marine and aviation (or aerospace) insurance.

As space activity reaches the age of maturity and private (as opposed to state) operations become a common practice, a revision of the liability regime at the supranational level in the international conventions, with attention on the position of private operators and third party liability insurers, is warranted.