

Contract Law and the Space Industry

“Best Efforts” and the Emergence of Environmental Sustainability Provisions

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Introduction

Provisions relating to “efforts” and “endeavours”¹ are commonplace in the space sector and are used in inter alia commercial contracts,² technical assistance agreements (TAAs), insurance policies, research and development contracts and launch service agreements. They are used by private commercial parties and also organisations like the European Space Agency (ESA) and allow parties to a contract to determine the extent of their obligations by qualifying the nature of their commitment through terms such as “best”, “reasonable”, “all reasonable”, “diligent” and “commercial”. The standard of the efforts required may vary according to which wording is adopted. The way in which these clauses have evolved is due to technological and industrial developments, and more broadly speaking, the manner in which they have been interpreted in case law predominantly under English law and the laws of certain US states.

One of the reasons for which these provisions have been so widespread in the space industry, and arguably “the unchallenged maxim for space contracts”³ is because space-related risks remain inherently difficult to calculate and

* International Law Division, European Space Agency. The views expressed in this article belong to those of the author in his personal capacity, and do not necessarily reflect those of the European Space Agency.

1 There is no legal difference (merely a semantic one) between using “efforts”, which is the phrase generally adopted in the law of certain US states and “endeavours” which tends to be used in English law.

2 Including international commercial contracts, see UNIDROIT Principles on International Commercial Contracts (2010), particularly Articles 5.1.4 and 5.1.5.

3 B. Schmidt-Tedd, *Best Efforts Principle and Terms of Contract* (1988) Proceedings of the International Institute of Space Law Colloquium on the Law of Outer Space at p. 330.

provisions like these provide some benchmark to ensure that issues such as liability can be catered for in contracts.

Contract law as it applies to space activities is an innovative area of law which operates in a continuously evolving technological and industrial landscape. Well-established practices like “best efforts” provisions have adapted to these technological changes. Such changes have also given rise to the emergence of new, “innovative” clauses⁴, in particular those in relation to environmental protection and the sustainability of space activities. As new activities and actors emerge – like new private enterprises and large satellite constellation structures in low Earth orbit – contract law will have to continue to adapt to meet these challenges. These constellations are an example which bridge both “best efforts” and environmental-based provisions. The mass production of a large number of space objects with a frequent rate of launching required by such structures question how “efforts” provisions may be applied and enforced in contracts like manufacturing contracts and launch service agreements. Moreover, these infrastructures also raise the question of the way in which sustainability – such as end-of-life disposal measures – will be governed contractually.

The purpose of this paper is to assess how contracting practices – taking the examples of two types of contractual provisions above – have evolved to meet the changes taking place in the space sector. Following an introductory overview of the relationship between international space law and contract law, the paper will be divided into three parts. Part I will assess the development of “efforts” provisions as interpreted under English law and the law of certain US states⁵ and consider their use in the space sector to date. Taking the example of new types of provisions, Part II will then consider how space contracting has evolved to include sustainability-based clauses. Finally, Part III will analyse how these types of clauses have been used in other industries.

Space Law and Contracts

It is clear from a review of the international space law treaties that the law foresaw the development of a private and commercial space sector. Article VI of the Outer Space Treaty 1967⁶ (“OST”) provides that:

4 L. Ravillon, “Les contrats spatiaux de droit privé à l’épreuve du contentieux” in P. Achilleas and W. Mikalef, *Pratiques juridiques dans l’industrie aéronautique et spatiale* (Pedone, 2014) at p. 114.

5 For a comparative analysis of these provisions under common law and civil law systems, see C. Chappuis, *Provisions for best efforts, reasonable care, due diligence and standard practice in international contracts* (2002) *International Business Law Journal* 281.

6 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, entered into force on 10 October 1967, 610 UNTS 2015.

“States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the Moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.”

In many respects, Article VI is the “essential link”⁷ between the State on the one hand as the subject of international law, responsible for the monitoring, authorisation and continuous supervision of the activities of private entities subject to its jurisdiction and, on the other hand, commercial actors and, in turn, contract law. One way in which States meet their international obligation under Article VI and ensure that non-governmental entities’ activities are in conformity with the state’s international legal obligations is through the enactment of national space legislation⁸ and the regulation of domestic space activities through licensing. Having in place national legislation can be a catalyst for the growth of the private space sector as it encourages legal certainty and cooperation between the regulator/States and private entities.⁹ In this relationship, States must on the one hand balance the need to ensure compliance from private actors, and on the other foster and encourage the sector.¹⁰

Other treaties, notably the Liability Convention 1972¹¹ which builds on the provisions set out in Article VII OST,¹² has influenced the way contract law has developed. Indeed, it is as a result of this convention that the space

7 L. J. Smith, “The Principles of International Space Law and their Relevance to Space Industry Contracts” in L. J. Smith and I. Baumann, *Contracting for Space: Contract Practice in the European Space Sector* (Ashgate, 2011) at p. 50.

8 See the National Space Law Database on the website of the UN Office for Outer Space Affairs (UNOOSA): <http://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw.html> See also UN General Assembly Resolution 59/115 (2005).

9 L. Ravillon, *The adaptation of contract law to technological innovations: the example of data processing and space sectors* (2007) *International Business Law Journal* 453, at p. 458.

10 M. Gerhard and K. Gungaphul-Brocard, “The Impact of National Space Legislation on Space Industry Contracts” in Smith and Baumann *op cit* note 7 at p. 59.

11 Convention on International Liability for Damage Caused by Space Objects, entered into force on 9 October 1973, 961 U.N.T.S. 187.

12 For an analysis of Article VII OST, see A. Kerrest and L. J. Smith, *The Cologne Commentary on Space Law Volume 1* (Heymanns Verlag, 2009).

insurance regime has developed and is now a crucial part of national licensing frameworks and contracts.¹³

Public international space law therefore plays an important role in the private space industry as it has provided the legal foundation on which the commercial sector, and notably contract law, has developed.¹⁴

Part I: “Best Efforts” & Variants

The weight and enforceability of “efforts” provisions – which are used to reinforce the standard expected of parties in carrying out their contractual obligations or in the allocation of liability¹⁵ – vary considerably from one agreement to another. The focus of this analysis will be on the use of “best efforts”, with reference also being made to other variants such as “reasonable” and “all reasonable”. Consideration is given principally to the way in which courts have interpreted their meaning in different contexts which, it is argued, would influence a contractual dispute concerning a space activity or product.

Best Efforts¹⁶

In English law and other common law systems,¹⁷ courts have made clear that using “best” in a clause does not impose an absolute obligation on a contractual party, but it does impose a high, strictly applied standard. The reason for this is that courts generally presume that if it were the intention to be absolute, the parties to the contract would have agreed to include a more definitive or specific term during negotiation for inclusion in the final drafting of the agreement. The general position is that the “best” standard, which has been held to be more onerous than “reasonable”, requires the party to do all that is in its power and resources, short of guaranteeing the achievement of a given outcome. As described in the leading English case on this matter,

13 C. Gaubert, “Insurance in the context of space activities”, in F. von der Dunk and F. Tronchetti, *Handbook of Space Law*, Edward Elgar, 2015) at p. 910.

14 For the private international legal aspects of space activities, see D. Zannoni, *Conflict and Conciliation of National Space Laws* (2013) *Annals of Air and Space Law* 38 at p. 378, and M. Yuzbashyan, *Regarding Formation of the International Space Private Law* (2008) Proceedings of the International Institute of Space Law Colloquium on the Law of Outer Space at p. 3.

15 Ravillon *op cit* note 9 at p. 469.

16 For a detailed overview of these types of clauses and examples in other sectors, see M. Fontaine, “Best efforts”, “reasonable care”, “due diligence” and industry standards in international agreements (1988) *International Business Law Journal* 98; and L. Gorton, “Best Efforts” (2002) *Journal of Business Law* 143.

17 M. H Whincup, *Contract Law and Practice: The English System with Scottish, Commonwealth, and Continental Comparisons* (Kluwer Law International, 2006).

Sheffield District Railway Company v Great Central Railway Company,¹⁸ a party must “leave no stone unturned” in seeking to find a means of fulfilling the obligation or finding a solution.

English case law has also made clear that ascertaining the nature of the “best” effort is a subjective test which depends on the type of contract concerned (and also the particularities of the industry, where relevant) and what a party could in reality be expected to do to satisfy this standard, e.g. what resources are at its disposal to meet the obligation.¹⁹ For instance, the way the provision is used in a manufacturing contract²⁰ or a launch service agreement²¹ may have different consequences from their incorporation in agreements such as TAAs.²²

The meaning of “best” and the enforceability of these provisions in contracts has been clarified in more recent English authorities. In *R & D Construction Ltd v Hallam Land Management Ltd*²³ the court held that an obligation to use “best endeavours” was not too uncertain to be enforceable provided that the object of the endeavour could be ascertained with sufficient certainty. In essence, there is a difference between a vague clause which is incapable of creating an obligation, and one which may not be precise at the time of drafting but which can nonetheless later achieve certainty in practice. In *Compass Group UK & Ireland Ltd v Mid Essex Hospital Services NHS Trust*²⁴ it was held that in considering whether a party had used its “best endeavours”, the proportionality of the obligations and the endeavours it used was an important factor to be taken into consideration.

Recent English jurisprudence has highlighted that having a benchmark for comparison, or a specific definition of what would constitute “best”, is important and may assist in upholding the contracting parties’ original intentions. The recent case of *Jet2.com Ltd v Blackpool Airport Ltd*²⁵ noted

18 *Sheffield District Railway Company v Great Central Railway Company* [1911] 27 TLR 451.

19 *Terrell v Marbie Todd & Co* [1952] 27 TLR 574.

20 As Schmidt-Tedd notes, manufacturing, like services and experiments, “make up the most significant contractual risk specific to the space business, one which is virtually incalculable and therefore must be made according to the best efforts principle”, see Schmidt-Tedd *op cit* note 3 at p. 334.

21 An example being NASA’s interpretation of “best efforts” meaning “NASA shall use all reasonable efforts to perform the Launch and Associated Services to be furnished under this Agreement and towards this end NASA will apply its technical and financial resources under the general terms and conditions of this Agreement” cited in L. Ravillon, *Les Télécommunications par Satellite: Aspects Juridiques* (CREDIMI, 1997) at p. 202.

22 M. Fontaine and F. de Ly, *Drafting International Contracts* (BRILL, 2009) at p. 194.

23 *R & D Construction Ltd v Hallam Land Management Ltd* [2010] CSIH 96.

24 *Compass Group UK & Ireland Ltd v Mid Essex Hospital Services NHS Trust* [2012] EWHC 781 (QB).

25 *Jet2.com Ltd v Blackpool Airport Ltd* [2012] EWCA Civ417.

that the inclusion of “best endeavours” in a contract is clearer when specific obligations are detailed, as opposed to being used as a “catch-all” provision for risk and liability management.

While these cases did not deal with space-related matters, they offer important guidance on how efforts/endeavours are understood in commercial contracts and the line of thinking a court faced with a space-related contract would likely follow. It has been made consistently apparent in various subject matters that significant weight should be attached to “best” in as much as the choice by parties to include this wording suggests that it was their intention for the obligation to be of a binding nature.²⁶

In the US, “best efforts” are common in contracts and have also been codified into statute, notably the Uniform Commercial Code. One of the differences between the use of these provisions in the law of certain US states and English law is that US courts have on occasion implied these terms into contracts on the basis of the underlying principle of good faith.²⁷ The New York case of *Valkenberg v Hayden Publishing Co*²⁸ interpreted “best efforts” to mean a duty to act in good faith, but not to the extent that it would require the other party to sacrifice its own commercial interests. Good faith was also implied into the court’s interpretation of the efforts clause in *United Telecommunications v American Television and Communications Corp.*²⁹ In this case and in the absence of a specific definition, the court considered “best efforts” to mean a “diligent, reasonable and good faith effort”.

Similar to English law, the meaning of the clause is subjective and dependent on the type of contract. Some US cases provide clear steps as to what these efforts could mean if not otherwise specified. For instance, the leading authority of *Bloor v Falstaff Brewing Corp.*³⁰ interpreted it to mean generally that: (i) the party under the “best efforts” obligation is not prevented from giving reasonable consideration to its own interests, but (ii) the obligation must be carried out in good faith, (iii) to the extent of the party’s own total capabilities and (iv) performed, at least, as well as the average “prudent comparable performer”. In the absence of definitions or clear instructions laid down in the agreement, US courts have been inclined to use standards based on principles of good faith and reasonableness. Interestingly, and perhaps importantly for the space sector, they have also resorted to considering

26 *Walford v Miles* (1992) 2 AG 128.

27 P. Barasnevicus Quagliato, *The Duty to Negotiate in Good Faith* (2008) International Journal of Law & Management 213.

28 *Valkenberg v Hayden Publishing Co* 30 NY 2d 34 (1972).

29 *United Telecommunications v American Television and Communications Corp.* 536 F 2d 609 (10 CCA) (1976).

30 *Bloor v Falstaff Brewing Corp.* 601 F 2d 6-609 (2d Cir.) (1979).

industry standards and industry practices to ascertain the meaning of the efforts obligations.³¹

As English cases have noted, US authorities too have underscored the importance of parties specifying the meaning of “best” especially when concerning complex projects, i.e. space projects. Two notable cases in the US have addressed the meaning of efforts provisions in the context of space contracts.

The first of these – *Martin Marietta v Intelsat*³² – arose following the failure during launch of a Martin Marietta Titan III rocket resulting in the loss of an Intelsat satellite. The remedies stipulated in the contract available to Intelsat were a refund/re-flight option or the right to request Martin Marietta to use its “best efforts” to secure a replacement launch. In the end, the judgment was based on questions of public policy and case precedent with the court arguing that the only duties owed to Intelsat were those specifically defined in the contract.³³

In the second case – *American Satellite Co. v United States*³⁴ – one of the issues at the crux of the matter revolved around the interpretation of “best efforts” in the launch service agreement. American Satellite Company (ASC) sought to recover from the US government increased cost of having to launch a telecoms satellite with McDonnell Douglas instead of NASA as originally intended. NASA agreed in a 1984 contract with ASC to launch two telecommunications satellites on the shuttle and to use its “best efforts” to do so. The first ASC satellite was successfully launched, but the 1987 Challenger crash meant that NASA discontinued all commercial launches from the shuttle except for those with national security implications or because the satellite was unique and only able to be launched from the shuttle. ASC argued that “best efforts” meant that the US government had a duty to provide a launch or at least provide a substitute launch vehicle. The court held that the meaning of “best efforts” may not have been clear at the time, but what was clear was that NASA’s obligation only extended to using its best efforts to perform the terms of the written agreement. This meant that its efforts extended only to a duty to try and make a shuttle available, and not a substitute expendable launch vehicle (ELV).³⁵

“Best efforts” in the space sector and in other industries therefore give rise to strong obligations and a high standard expected of parties. They can generally be construed to mean that parties should take all commercially practicable steps within their power and resources to fulfill the obligation and

31 *First Union National Bank v Steele Software Systems Corp.* 838 A.2d 404 (2003).

32 *Martin Marietta Corp. v Intelsat*, Civil Action No. MJG-90-1840 (1991).

33 N. Jasentuliyana, *Space Law: Development and Scope* (Greenwood, 1992) at p. 208.

34 *American Satellite Co. v United States* 26 Cl. Ct 146 (1992).

35 V. Kayser, *Launching Space Objects: Issues of Liability and Future Prospects* (Kluwer, 2001) at p. 193.

“leave no stone unturned”, act in the same manner as they would if acting in their own interests to achieve the same outcome and incur reasonable expenses, if necessary, without being obliged to take actions which would be detrimental to their core interests.³⁶ To avoid misinterpretations or provisions being rendered unenforceable on account of their vagueness,³⁷ case law has underlined the need for parties to specify what the efforts provisions are to mean in practice by specifying factors, for example, time limits and limits on the expenditure of resources to be expected. This may be especially important when it comes to highly complex projects involving different levels of contractors and subcontractors, as is commonly the case for space projects. If not drafted and clearly outlined in the agreement or reference made to industry standards, lack of specific definitions may prove problematic for the final stages of a project, e.g. implementation, verification, safety reviews and launch readiness reviews.³⁸

Reasonable Efforts

When the term “reasonable” is used, the extent of the obligation is generally considered to be of a lower standard than “best”. These terms are used in commercial contracts as well as other agreements and international instruments.³⁹

In *Rhodia International Holdings Ltd. v Huntsman International LLC*⁴⁰ the dispute concerned a provision in a sales contract which read: “[a]n obligation on both parties to use reasonable endeavours to obtain any third party consents necessary to transfer certain agreements.” It was held in this case that the defendant had not used his endeavours to give a direct covenant with respect to the financial position of the company which would be using a third party supply contract. The judge noted that the “reasonable” obligation is a less stringent one because the amount of courses of action open to a party

36 Such as financial interests or ones which would disproportionately undermine their reputation, commercial standing or goodwill. See the English authority of *Rackham v Peek Foods Ltd* [1990] BCLC 895.

37 For an example of a “best efforts” provision being held to be vague and difficult to enforce, see the English case of *Philips Petroleum Co (UK) Ltd v Enron (Europe) Ltd* [1996] APP.L.E. 10/10. Equally, vagueness may lead to a court interpreting a lower standard efforts clause like “reasonable efforts” as meaning a higher “best” standard unless otherwise specified. See, for instance, the US authority of *In re ValueVision Int’l Inc. Sec. Litigation* 896 F.Supp 434 (E.D.Pa.) (1995) concerning the term “reasonable best efforts”.

38 C. Bank, “The Complexities of International Space Industry Contracts” in Smith and Baumann *op cit* note 7 at p. 145.

39 For example, Article 77 of the UN Convention on Contracts for the International Sale of Goods 1489 UNTS 3 which refers to “such measures as are reasonable under the circumstances”.

40 *Rhodia International Holdings Ltd. v Huntsman International LLC* [2007] EWHC 292. See also *UBH (Mechanical Services) Ltd v Standard Life Assurance Co* [2007].

obliged to use its “reasonable” endeavours is less so than for “best”. It was noted that when “reasonable” is used, one course of action must be pursued until exhaustion whereas for “best”, all possible courses must be pursued.

A similar line of argument was used in the judgment of the US case of *LTV Aerospace and Defence Co. v Thomson (in re Chateaugay Corp)*.⁴¹ However, unlike the English cases on this matter, the US position has been less consistent in that some courts have occasionally and interchangeably used “reasonable” and “best”.⁴²

Other common law systems such as Canada have also shed light on the meaning of “reasonable” in the absence of any express definition given in the contract. In *Ontario (Ministry of Transportation) v O.P.S.E.U.*⁴³ the court held that reasonable efforts:

“does not mean ‘efforts to the point of undue hardship’. It does not mean ‘every effort’. What it means is efforts that are reasonable in the circumstances of all things considered. What is reasonable in the circumstances will, obviously, depend on the facts of particular cases.”

In *Dobb v Insurance Corporation of British Columbia*⁴⁴ it was held that “reasonable in the provision is synonymous with the adjectives ‘logical’, ‘sensitive’ and ‘fair’ but does not mean that...the applicant must go to whimsical or unwarranted lengths.”

All Reasonable Efforts

In English law and the law of certain US states, “all reasonable efforts” used to be considered as a middle-ground between “best” and “reasonable”. This is no longer the case, as evidenced in recent cases on this matter.

In the English case of *Yewbelle Ltd v London Green Developments Ltd & Another*⁴⁵ this provision was considered as more stringent than merely reasonable and instead equated to a “best endeavours” clause. In *CPC Group Ltd v Qatari Diar Real Estate Investment Company*⁴⁶ the contractual dispute arose from a sale and purchase agreement which contained a clause stating that one of the parties was to use “all reasonable but commercially prudent

41 *LTV Aerospace and Defence Co. v Thomson (in re Chateaugay Corp)* 186 B.R. 561 (Bankr.SDNY) (1995).

42 On this, see *Permanence Corp. v Kennamental, Inc* 908 F.2d 98 (6th Cir.) (1990) and *Stewart v O’Neill* 225 F.Supp.2d 6 12 (DDC) (2002).

43 *Ontario (Ministry of Transportation) v O.P.S.E.U.* 54 I.A.C. (4th) 1 (Ont. C.E.G.S.B) (1996).

44 *Dobb v Insurance Corporation of British Columbia* CanLII 355 (BC SC) (1991).

45 *Yewbelle Ltd v London Green Developments Ltd & Another* [2007] EWCA Civ. 475.

46 *CPC Group Ltd v Qatari Diar Real Estate Investment Company* [2010] EWHC 1535 (Ch).

endeavours” to meet the payment deadlines. The court interpreted this in a narrow, stringent manner from a commercial perspective.

“All reasonable” is a less developed provision but courts’ interpretation thus far highlights that it generally requires a party to explore all avenues reasonably open to it to fulfil the obligation and is synonymous more with the standard required of a “best” efforts clause as opposed to a “reasonable” one.

The manner in which courts have interpreted these clauses in other commercial contexts has undoubtedly influenced the manner in which they have been interpreted in the limited space-related cases which have gone before courts (as opposed to closed arbitration). What is clear is that “best efforts” and variant provisions will remain a continued practice in space contracts and will likely be incorporated into contracts for new activities, notably large satellite constellations. It of course remains to be seen whether the launching of large satellite constellations which will be more frequent and contain more satellites per payload will lead to new definitions being given in contracts for what may constitute “best” and such. As noted, “efforts” provisions are commonly used in launch service agreements where certain risks may be incalculable and therefore unable to be specified before requiring the launch service provider to use its efforts to carry out the launch. Additionally, these types of provisions can be found in instruments of the European Space Agency such as the General Clauses and Conditions for ESA Contracts. Beyond contracts, they are also used in other international treaties, such as the International Space Station Intergovernmental Agreement. For instance, Article 23(1) states:

“The Partners, acting through their Cooperating Agencies, may consult with each other on any matter arising out of Space Station cooperation. The Partners shall exert their best efforts to settle such matters through consultation between or among their Cooperating Agencies in accordance with procedures provided in the MOUs.”⁴⁷

Part II: Sustainability-Based Contracting Practices

The above analysis has sought to examine one well-established provision used in space contracts which would surely continue to adapt to the new arena of large satellite constellations, particularly in launch service agreements. As noted at the outset of this paper, and like “best efforts”, another type of contractual provision has become increasingly important in the space sector and has emerged as a result of both advances in technology and a growing

47 Other provisions containing “best efforts” in this agreement are Article 12(1) regarding transportation, Article 13(2) concerning communication, Article 15(2) relating to funding, and Article 19(2) regarding the exchange of goods and data.

awareness of the need to address environmental issues like space debris. These are clauses relating to environmental protection and, more broadly, the sustainability of space activities.

The principles of environmental law like the precautionary principle⁴⁸ and objectives like sustainable development⁴⁹ have been included in commercial contracts in other industries. In the space sector, it is only relatively recently that these principles have become part of contracting practices.⁵⁰ Their emergence can be characterised as the result of efforts like the Space Debris Mitigation Guidelines of the Inter-Agency Space Debris Coordination Committee (IADC), the subsequent adoption of these guidelines in UN General Assembly Resolution 62/172 of 22 December 2007 and the work of the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS) Working Group on the Long Term Sustainability of Outer Space Activities (LTSSA).⁵¹

While the Mitigation Guidelines above are voluntary and non-binding, they have become standards used by industry.⁵² However the sustainability efforts in space activities are not limited to work done at the public international level alone. They have become a combined effort⁵³ with industry and part of space contracting and the development of standards, e.g. in relation to space debris mitigation practices. This is precisely because, for the commercial sector, it has become “ever more important to ensure that we can continue to keep space open for business” and that space services can continue.⁵⁴

48 M. Stevens, *The Precautionary Principle in the International Arena* (2002) 2 International and Comparative Environmental Law 13.

49 The objective of sustainable development, which has arguably become a source of international custom, derived from the Brundtland Commission's *Our Common Future* in 1987 in which it was stated as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. It was subsequently elaborated in the 1972 Stockholm Declaration and 1992 Rio Declaration. See generally, D. Bodansky, J. Brunnée and E. Hey, *The Oxford Handbook of International Environmental Law* (Oxford University Press, 2008).

50 Ravillon *op cit* note 4 at p. 115.

51 A formal Working Group was established in 2010 following an initial ad hoc group of experts. The 59th COPUOS session in June 2016 was an important step in the efforts of this group as the first set of long-term sustainability guidelines were agreed.

52 H. Kishindo, “Launch Contracts for Small Satellites – The Essential Elements” in I. Marboe, *Small Satellites: Regulatory Challenges and Chances* (Brill Nijhoff, 2015) at p. 328.

53 As H. Kishindo *ibid* comments, the Compendium of space debris mitigation standards adopted by States and international organisations under the auspices of UNCOPUOS is an example of a “useful text for launch customers to understand current instruments and measures”.

54 R. Tremayne-Smith, “Environmental Protection and Space Debris Issues in the Context of Authorisation” in F. von der Dunk, *National Space Legislation in Europe: Issues of Authorisation of Private Space Activities in the Light of Developments in European Space Cooperation* (Martinus Nijhoff, 2011) at p. 179.

ESA and Sustainability

Sustainable development is an important aspect of ESA and the Agency issues reports to ensure that it is taken into account in core business and support services.

As regards space projects and sustainability, ESA was one of the major agencies which agreed to the European Code of Conduct for Space Debris Mitigation in 2004. In 2008, it released its first ESA Space Debris Mitigation Policy which was subsequently updated in 2014. In this instrument, it is stated that the Agency's standards for the technical requirements on space debris mitigation for Agency projects are the ECSS-U-AS-10C and ISO 24113 standards. Importantly, space debris is also a consideration when it comes to contracting in the Agency and in particular the procurement framework. Indeed, the policy states that it should apply to the "procurement of ESA space systems (launchers, satellites, inhabited or robotic vehicles)".⁵⁵

Licensing and National Legislation

Sustainability measures and provisions are part of national policies and, consequently, have a bearing on contract practice and national licensing procedures for authorising space activities. At the international level, a recent development in this regard has been the *Compendium of space debris mitigation standards adopted by States and international organizations*⁵⁶ outlining the efforts of States to address one issue relating to sustainability, namely that of space debris.

Taking a few examples, in Japan, the JAXA Debris Standard JMR-003B provides technical measures for debris mitigation and stipulates the requirements that must be met by contractors.

In France, the French Space Operations Act (FSOA)⁵⁷ is a good example of sustainability being incorporated into national legislation and, in turn, contracts with the French space agency CNES. The legislation "presents a formally legally binding recuperation at the national level of non-binding international guidelines."⁵⁸ Article 4 of the Act makes reference to the environment being an important consideration for granting authorisation in that it must be ensured that "systems and procedures to be implemented are

55 For an overview of ESA's procurement regime, see G. Stjernevi and E. Katsampani, "Space Contracting within the Framework of the European Space Agency" in Smith and Baumann *op cit* note 7 at p. 169; see also S. Fiorilli, "Principles of contract law and application to satellite procurement: the European Space Agency perspective" in C. Bruenner and A. Soucek, *Outer Space in Society, Politics and Law* (2011, Springer-Verlag) at p. 464.

56 A/AC.105/C.2/2014/CRP.15.

57 Loi no. 2008-518 of 3 June 2008.

58 J. Wouters, P. de Man and R. Hansen, *Space Debris Remediation, its Regulation and the Role of Europe* (Working Paper No. 153, Leuven Centre for Global Governance Studies, March 2015).

compliant with the Technical Regulations (TR) set forth for the safety of persons and property, the protection of public health and the environment.”⁵⁹ Moreover, sustainability clauses are included in CNES’ Contracting Clauses (Cahier des clauses administratives particulières du CNES⁶⁰), Article XVII of which states that: “in addition to the legal and regulatory provisions of Article 7 of the Public Markets Clause Terms⁶¹ as applicable to the market, CNES requires contracting parties to take environmental preservation measures in the contract. The contracting party must respect the terms.”⁶² In the UK, environmental considerations are part of the licensing procedure for authorisation to carry out a space activity, based on the Outer Space Act 1986.⁶³ In the license application, applicants are required to outline plans for end-of-life disposal like re-orbit, de-orbit or retrieval of the space object. The procedure looks at whether the activity sought would be in compliance with *inter alia* the IADC Space Debris Mitigation Guidelines and the relevant ISO standards.

Environmental Impact Assessments (EIAs)

Environmental impact assessments are commonplace in commercial contracts in a number of sectors but, with some exceptions, are less so in the space sector. Principle 4 of the Nuclear Power Principles⁶⁴ states that a “comprehensive safety assessment” should be carried out before the launch and, where relevant, done in conjunction with those who “designed, constructed or manufactured the nuclear power source, or will operate the space object, or from whose territory or facility such an object will be launched”. Similarly, Part 4 of the IADC Guidelines recommend that a “feasible Space Debris Mitigation Plan” should be established for each programme and project in order to manage the implementation of debris mitigation measures. As sustainability continues to be an important aspect taken into account in space activities, it is conceivable that such assessments may become more common. This may also be true given that they can be

59 P. Clerc, “Consequences of the French Space Law on Space Operations (FSOA) on CNES’ Mission as a Contracting Space Agency” in Smith and Baumann *op cit* note 7 at p. 123.

60 Known as the “CCAP”.

61 Known as the “CCAG” – Cahier des clauses administratives générales des marchés publics.

62 Translated from the French: “outre les dispositions et exigences légales et réglementaires visées à l’article 7 du CCAG applicable au marché, le CNES demande au titulaire de prendre les mesures de préservation de l’environnement figurant dans le contrat. Le titulaire s’engage à en respecter les termes”.

63 L. Viikari, *The Environmental Element in Space Law: Assessing the Present and Charting the Future* (Martinus Nijhoff, 2008) at p. 276.

64 UN General Assembly Principles Relevant to the Use of Nuclear Power Sources in Outer Space – A/RES/47/68 (14 December 1992).

commercially attractive as they can reduce project costs and foresee potential consequences which might require remediation efforts or compensation for damages.⁶⁵

Space contracts are increasingly incorporating environmental and sustainability-based provisions and standards. It is likely that this will continue to be the case as the sector continues to grow and new activities emerge. Regulatory changes are also influencing the way in which environmental considerations are treated in contracts, an example being the European REACH Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals.⁶⁶ Non-compliance with this regulation, where it is relevant, may give rise to both regulatory and commercial risks, e.g. supply chain and production disruptions. The development of large satellite infrastructures raise different legal questions, for instance, how these space objects will be registered, insured, as well as questions relating to access to and availability of the radiofrequency spectrum. They also raise interesting contractual questions. As previously mentioned, the characteristics of these structures from a manufacturing and launching point of view query the manner in which “efforts” provisions will be drafted in contracts and what these will mean. From a sustainability point of view, the contracts relating to the manufacturing of the satellites will likely include provisions relating to end-of-life and disposal measures to be considered from the outset in the design stage.⁶⁷

Part III: Other Sectors

Part I of this paper noted that “best efforts” provisions are not restricted to contracts relating to space activities, but are widely used in other contexts. As far as sustainability clauses are concerned, it is again helpful to analyse these types of provisions comparatively with other regimes. In doing so, some elucidation may be had for how space contracts can effectively govern new space activities.

Aviation

The aviation sector raises a number of environmental issues like noise pollution, engine emissions, air quality and contribution towards climate change among others. As air traffic is set to continue to grow, ensuring that environmental elements are taken into account in contracts and regulations is important. Organisations like the European Aviation Safety Agency (EASA),⁶⁸

⁶⁵ Viikari *op cit* note 63 at p. 279.

⁶⁶ EC No. 1907/2006 (29 May 2007).

⁶⁷ Tremayne-Smith *op cit* note 54 at p. 184.

⁶⁸ See, for instance, EASA’s SAMPLE contracts for sampling and measure aircraft particulate emissions.

the European Organisation for the Safety of Air Navigation (EUROCONTROL) and the International Civil Aviation Organisation (ICAO) have underscored the need for airlines to ensure compliance with environmental regulations. Similarly, the International Air Transport Association (IATA) encourages airlines to actively use voluntary initiatives and develop best practices which can become part of the commercial process, voluntary measures having the advantage of being flexible when it comes to contract negotiation. IATA has also introduced several such measures, e.g. the alternative fuels programme, carbon offset programme, cargo sustainability initiatives and the use of environmental assessments.

Construction

Environmental clauses form an important part of agreements in the construction industry, e.g. development contracts. Common clauses relate to the disclosure by parties of salient environmental information, for instance the environmental condition of the site being used for the project as well as the outcomes from environmental impact assessment reports. Others include clauses relating to pre-existing contamination which are used to indemnify the contract in the event of environmental liability, waste disposal clauses and also environmental insurance requirements.⁶⁹ Like for aviation law, contracts will also specify the regulations to which compliance is necessary, and upon which parties in the contract compliance obligations fall. Similar to other sectors, including space, objectives like sustainable development are increasingly being transformed into contractual terms in the construction industry.⁷⁰

Concluding Remarks

This paper has sought to demonstrate the innovative nature of contract law as it applies to the space industry by looking at two types of clauses: “best efforts” provisions and its variants, and the emerging types of sustainability-related clauses which are being used more and more in space contracting. Though both of these clauses are different in their content and application, looking at both together is a useful exercise especially in light of new activities coming on to the market like large satellite constellations. As technological advancements in the space sector have done in the past, large constellations will require the contractual practices in this industry to continue to adapt to new demands in terms of manufacturing processes and

69 For example, contractor’s pollution liability (CPL) coverage which may be included in commercial contracts to better manage risks.

70 J. Glover, *Sustainable Development in the Construction Industry: Sustainable Provisions in Construction Contracts* (Fenwick Elliott, 2008).

deadlines, and the importance of ensuring that sustainability, in particular end-of-life measures, are adequately governed in agreements.

By comparatively analysing space contracts with the practice in other sectors, a number of similarities can be drawn. In high-tech, large-scale international projects like aviation and construction, the terms of contracts are largely similar to usual space contracts (obligations characterised by efforts, intellectual property, confidentiality, non-performance etc.) The future trends also appear to be heading in the same direction as far as environmental and sustainability clauses are concerned. The explanation for this similar cross-industry trend is on the one hand the fact that being environmentally-friendly can be a commercially sensible solution long term, and on the other hand, the growing culture of corporate social responsibility and the manner in which it has become part of contracting practices. An example of this is the inclusion of sustainability contractual clauses (SCCs) in international supply chain contracts which have become widely used.⁷¹ The advantage of these types of clauses, and which could possibly be transferable more widely for the space industry, is their flexibility and the fact that they encourage the development of best practices and directly involve industry.

71 K. Peterkova Mitkidis, *Sustainability Clauses in International Supply Chain Contracts: Regulation, Enforceability and Effects of Ethical Requirements* (2014) 1 Nordic Journal of Commercial Law at p. 3.