The Resolution of Outer Space Related International Disputes

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1. Introduction

In recent years, there has been renewed interest in outer space activities, most notably following SpaceX's successful human spaceflight missions in 2020 and 2021. Spaceflight is, however, simply the most high-profile aspect of the commercial space industry, which also encompasses the supply, installation, assembly, testing commissioning and operation of satellites, launch vehicles and related components

Globally, the space industry is now estimated to be worth approximately US$350 billion,[1] and is predicated to grow to over US$ 1 trillion by 2040.[2]

The growth of the space industry is likely to increase the probability and the range of disputes relating to outer space activities. Examples include financial claims for damages arising from the failure, delayed delivery or under-performance of equipment, as well as claims arising from debris falling on people or property.

Such disputes are likely to cross national borders. Entities in the supply chain could be based in different countries, and damage from space objects could theoretically arise anywhere.

These examples – and other outer space related issues – are not simply future problems. They can and do arise under current commercial relationships and impact existing public rights. In that regard, there is a real and present need for greater clarity in the resolution of international outer space related disputes.

This paper considers the existing mechanisms for the settlement of international disputes, focusing primarily on the Outer Space Rules developed by the Permanent Court of Arbitration at the Hague, and the limited case law which exists in this area. The paper will also address the

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1 https://www.morganstanley.com/ideas/investing-in-space (accessed 6 October 2021)

2 A trillion-dollar space industry will require new markets - SpaceNews (accessed 6 October 2021).

rules of major international arbitration institutions and methods of private dispute resolution such as mediation, adjudication and expert determination.

2. The Outer Space Rules

2.1. Overview

The UN outer space treaties and general international law lay down a basic framework for space related activities. However, they are unable to meet the dispute resolution needs of a highly technical and growing industry that now involves many more private entities.

This reality has led the Permanent Court of Arbitration at the Hague (the PCA) to launch arbitration rules that are specific to outer space activities. These rules are known as the Outer Space Rules. The rules constitute the first formal dispute resolution process for space-related disputes which accommodates private parties, and are considered below.

2.2. The PCA

The PCA is an intergovernmental organisation comprising 122 member States. The PCA is not a "court" in the traditional sense with judges to rule on issues, nor is it of itself an arbitral tribunal, but it is the oldest global institution for the settlement of international disputes.

Unlike the ICJ, the PCA has no sitting judges or arbitrators. The parties themselves select arbitrators and all arbitral proceedings are held in private and are confidential unless the parties to the dispute agree otherwise.

States are obliged to comply with the award of a PCA arbitral tribunal. If they refuse to do so, the tribunal has no enforcement mechanisms (a perennial problem in public international law). However, states who ignore or disregard a PCA award risk losing credibility and losing out in the so-called 'court of world opinion'.[3]

The PCA also provides administrative support services in international arbitration. The Secretary-General of the PCA may be called upon to act as the appointing authority, or to designate another appointing authority, for the appointment of arbitrators under a variety of rules of arbitration procedure.

2.3. The Development of the Outer Space Rules

In 2009, the Administrative Council of the PCA approved the establishment of an Advisory Group of of experts in air and space law, led by the PCA Secretary-General.[4] The Advisory Group's remit was to draft a set of rules in

3 http://www.straitstimes.com/world/europe/south-china-sea-dispute-8-things-to-know-about-the-pca-the-worlds-oldest-tribunal (accessed 6 October 2021).

4 https://www.iislweb.org/html/20111210_news.html (accessed 5 October 2021).

response to a perceived need for specialised dispute resolution mechanisms in the rapidly evolving field of outer space activities.
In May 2011, the Advisory Group produced a Preliminary Draft set of Optional Rules, which was produced and sent to States for comment. Having received feedback, the draft was modified and, on 6 December 2011, the PCA gave effect to the Optional Rules for Arbitration of Disputes Relating to Outer Space Activities (Outer Space Rules).[5]

2.4. Overview of the Outer Space Rules

The Outer Space Rules are based on the 2010 Edition of the UNCITRAL Arbitration Rules (the 2010 Rules). The 2010 Rules are widely used and a significant amount of case law has been developed since their first edition was adopted by the General Assembly of the United Nations in 1976.
The Advisory Group decided that arbitration, due to its voluntary and flexible nature, was the dispute settlement instrument best suited to the unique features of space law. The final and binding nature of arbitral awards was likely to have been particularly appealing, from the perspective of bringing legal certainty to the pursuit of commercial activities in outer space.
The Outer Space Rules constitute the first formal dispute resolution process for space-related disputes that accommodates private parties. They are intended for use in a wide range of disputes between States, international organisations and private entities where there is a connection with outer space activities, including any disputes about the interpretation and application of multilateral treaties relating to the use of outer space.
An important aspect of the rules has been the development of a list of space experts whom the PCA can appoint either as arbitrators or as experts. The current list of specialist arbitrators comprises 11 arbitrators from 10 countries.
The Outer Space Rules contain four sections:

1. Section I: Introductory rules (articles 1-6);
2. Section II: Composition of the arbitral tribunal (articles 7-16);
3. Section III: Arbitral proceedings (articles 17-32); and
4. Section IV: The award (articles 33-43).

The scope of application of the Outer Space Rules is extremely broad and is not specifically limited to disputes concerning outer space. Article 1.1 states that "*The characterization of the dispute as relating to outer space is not necessary for jurisdiction where parties have agreed to settle a specific dispute under these Rules.*"

5 Available at https://docs.pca-cpa.org/2016/01/Permanent-Court-of-Arbitration-Optional-Rules-for-Arbitration-of-Disputes-Relating-to-Outer-Space-Activities.pdf.

2.5. The Agreement to Arbitrate (Article 1 and the Annex)

The Annex contains a model arbitration clause for contracts and a possible waiver statement that illustrates the wide approach to applicability adopted by the Advisory Group. The model arbitration clause states that:

> Any dispute, controversy or claim arising out of or relating to this contract, or the breach, termination or invalidity thereof, shall be settled by arbitration in accordance with the PCA Optional Rules for Arbitration of Disputes Relating to Outer Space Activities.

Further, Article 1.2 reads:

> Agreement by a party to arbitration under these Rules constitutes a waiver of any right of immunity from jurisdiction, in respect of the dispute in question, to which such party might otherwise be entitled. A waiver of immunity relating to the execution of an arbitral award must be explicitly expressed.

2.6. Notice of Arbitration (Article 3)

The notice of arbitration under the Outer Space Rules does not require the party serving it to confirm that the registration fee prescribed in the Schedule of Costs has been, or is being, paid to the arbitral institution and that copies of the request and all accompanying documents have been, or are being, delivered to all other parties to the arbitration. This differs from the position under the London Court of International Arbitration Rules (2020) (the LCIA Rules).[6]

Aside from this, the notice of arbitration under article 3.3 of the Outer Space Rules follows the standard requirements set out in article 1 of the LCIA Rules. In summary, the notice of arbitration should include a demand that the dispute be referred to arbitration, the details of the parties, identification of the arbitration agreement that is invoked, identification of any contract or constitutive instrument of an organisation in relation to which the dispute arises, a brief description of the claim and an indication of the amount claimed (if any), the relief sought and a statement of any procedural matters for the arbitration.

2.7. Appointing the Arbitral Tribunal (articles 8-10)

Article 8.1 of the Outer Space Rules provides that the tribunal may consist of a sole arbitrator if the parties agree. If the parties decide to have three arbitrators, each party must appoint one, and the two arbitrators thus appointed shall choose the third arbitrator, who will act as the presiding arbitrator.

6 Article 1.1(vi) of the LCIA Rules.

It is also possible to appoint a five-member tribunal, possibly on account of the high value and international aspects of most outer space disputes.[7] Thus, article 9.1 states:

> *If five arbitrators are to be appointed, the two party-appointed arbitrators shall choose the remaining three arbitrators and designate one of those three as the presiding arbitrator of the tribunal.*

Article 10.4 states that "*the [PCA] Secretary-General will make available a list of persons considered to have expertise in the subject matters of the dispute*", though this is a recommendation only.

2.8. Challenges to an Arbitrator's Impartiality and Independence (Articles 12-13)

Challenges to an arbitrator's impartiality or independence are not everyday events, and it is rare for such challenges to succeed.
The provisions in the Outer Space Rules on arbitration challenge are similar to equivalent provisions in the UNCITRAL Rules. Article 12.1 states that:

> Any arbitrator may be challenged if circumstances exist that give rise to justifiable doubts as to the arbitrator's impartiality or independence or if he or she does not have the qualifications agreed by the parties in their arbitration agreement.

Article 17.1 requires that "*the parties are treated with equality and that at an appropriate stage of the proceedings each party is given a reasonable opportunity of presenting its case.*"
These provisions are broadly consistent with the requirements of impartiality and independence in commonly adopted international arbitration rules.
Notably, Articles 12.4 and 14.2 of the Outer Space Rules provide "remaining arbitrators" in a three- or five-arbitrator tribunal with the power to continue where one of their number fails to participate in the arbitration. This is a reminder that parties should take great care when appointing the tribunal. The Outer Space Rules differ from the UNCITRAL Rules in that, under article 12.4 of the UNCITRAL rules, the "'remaining arbitrators' have the power in their sole discretion to continue the arbitration and to make any decision, ruling or award".

2.9. The Arbitral Tribunal's Powers and Jurisdiction (Article 17)

The rules provide that any plea that the arbitral tribunal does not have jurisdiction shall be raised no later than in the statement of defence or in the reply to the counterclaim or to the claim for the purpose of a set-off. Any

7 Cf the rules of the ICC, LCIA and UNCITRAL, which stipulate one or three arbitrators

party who wishes to plea that the arbitral tribunal is exceeding the scope of its authority must do so as soon as the matter alleged to be beyond the scope of its authority is raised during the arbitral proceedings. The arbitral tribunal may, in either case, admit a later plea if it considers the delay justified.

2.10. Arbitral Proceedings (Article 17)

Unlike the International Chamber of Commerce (ICC) Rules, the Outer Space Rules do not contain provisions governing the case management conference and the procedural timetable. Parties have more flexibility to conduct the arbitration in the manner they wish. Article 17.1 provides that:

> the arbitral tribunal may conduct the arbitration in such manner as it considers appropriate, provided that the parties are treated with equality and that at an appropriate stage of the proceedings each party is given a reasonable opportunity of presenting its case.

The rules also take a flexible approach to confidentiality, by providing for a confidentiality adviser. The adviser is an expert whose main role is to report to the tribunal:

> on the basis of the confidential information on specific issues … without disclosing the confidential information either to the party from whom the confidential information does not originate or to the arbitral tribunal.

2.11. Place or Seat of the Arbitration (Article 18)

Article 18.1 provides the tribunal with the power to determine the place of the arbitration (having regard to the circumstances of the case) if this has not been previously agreed between the parties. By virtue of article 18.2, the tribunal has a wide discretion as to a location for meetings:

> [the] tribunal may meet at any location it considers appropriate for deliberations. Unless otherwise agreed by the parties, the arbitral tribunal may also meet at any location it considers appropriate for any other purpose, including hearings.

In view of the nature of disputes arising in outer space or from outer space activities, and the international application of the Outer Space Rules, the rules are silent on the juridical seat of the arbitration (unlike article 18(2) of the ICC Rules and article 16.2 of the LCIA Rules).

2.12. Interim Measures (Article 26)

The interim measures in the Outer Space Rules have a very similar effect to the "conservatory" measures in article 28 of the ICC Rules and article 25 of the LCIA Rules. Under article 26.2, interim measures are any temporary measures pursuant to which, at any time prior to the issuance of an award finally disposing of the dispute, the arbitral tribunal orders a party to:

- Maintain or restore the status quo pending determination of the dispute;
- Take action that would prevent, or refrain, from taking action that is likely to cause, current or imminent harm or prejudice to the arbitral process;
- Provide a means of preserving assets out of which a subsequent award may be satisfied; or
- Preserve evidence that may be relevant and material to the resolution of the dispute.

2.13. Evidence and experts (Articles 27 and 29)

Article 27.1 states that each party shall have the burden of proving the facts relied on to support its claim or defence.

Article 29 states that the tribunal may appoint one or more independent experts (after consultation with the parties). Article 29.2 stipulates that:

> The expert shall, in principle before accepting appointment, submit to the arbitral tribunal and to the parties a description of his or her qualifications and a statement of his or her impartiality and independence. Within the time ordered by the arbitral tribunal, the parties shall inform the arbitral tribunal whether they have any objections as to the expert's qualifications, impartiality or independence. The arbitral tribunal shall decide promptly whether to accept any such objections.

2.14. The Hearing (Article 28)

Article 28.1 states that the arbitral tribunal will give the parties adequate advance notice of the date, time and place of a hearing. The wording of the article substantively differs from both the ICC and LCIA rules. The ICC Rules say "*the arbitral tribunal, giving reasonable notice*" (article 26(1)) and the LCIA Rules state that "*[t]he Arbitral Tribunal shall organise the conduct of any hearing in advance*" (article 19.2).

The provision in the Outer Space Rules that both "adequate" and "advance" notice will be given by the tribunal perhaps indicates that the Advisory Group wished to emphasise that these rules would deal with very high value disputes that require significant preparatory work.

2.15. The Award (Articles 33-34 and 37-39)

Article 33.1 states that an award or decision must be made by a majority of the tribunal (unless the tribunal consists of a sole arbitrator). An award may be made public with the consent of all parties, or where and to the extent that disclosure is required of a party by a legal duty, or to protect or pursue a legal right, or in relation to legal proceedings before a court or other competent authority (article 34.5).

2.16. Applicable Law (Article 35)

Article 35.1 requires the arbitral tribunal to apply the law or rules of law designated by the parties as applicable to the substance of the dispute. If, however, the parties fail to provide such designation, the arbitral tribunal is able to apply the national and/or international law and rules of law it determines to be appropriate.

2.17. Costs, Advances, Fees and Expenses (Articles 40-43)

Article 41 provides that the fees and expenses of the arbitrators shall be reasonable in amount, taking into account the amount in dispute.
Article 42 of the rules provides that the costs of arbitration shall in principle be borne by the unsuccessful party or parties, but the tribunal may apportion such costs between the parties if it determines that apportionment is reasonable.

3. Other International Arbitration Rules

The Outer Space Rules provide a specialist mechanism for the resolution of outer space related disputes. However, parties in the industry are already using other arbitration rules including, in particular, the ICC Rules of Arbitration and LCIA Arbitration Rules. Both the ICC and LCIA provide tried and tested frameworks for arbitration.
The most recent iteration of the ICC Rules of Arbitration came into force on 1 January 2021. As outlined above, the rules cover similar ground to the Outer Space Rules. The ICC Rules do, however, provide for an expedited procedure, which applies automatically to disputes of up to USD 2 million for agreements entered into between 1 March 2017 and 1 January 2021 and USD 3 million for agreements concluded on or after 1 January 2021. The procedure is optional for cases above this threshold. It is also notable that ICC tribunal awards are subject to an extra layer of scrutiny – any award must first be submitted to the ICC Court. The ICC Court has the ability to make modifications as to the form of the award and draw the tribunal's attention to points of substance.
As with the ICC Rules, the LCIA Arbitration Rules have also been updated recently. The latest version of the rules came into force on 1 October 2020. The LCIA Rules allow for an expedited procedure, although this is left to the discretion of the arbitrator.
In contrast to the Outer Space Rules, both the ICC and LCIA Arbitration Rules contain useful provisions for the appointment of an emergency arbitrator.
Arbitrations conducted under the Outer Space Rules, ICC and LCIA arbitrations are enforceable through domestic arbitration laws and international treaties. The primary treaty in this regard is the 1958 New York Convention, which requires the courts of its 168 contracting states to give

effect to arbitration agreements and to recognise and enforce international arbitral awards. Although there are a number of grounds upon which recognition and enforcement may be refused (which has led to some inconsistency between the application of the Convention by contracting states), the Convention is generally considered to be an effective and powerful instrument for international arbitration.

The Convention on the Settlement of Investment Disputes between States and Nationals of Other States (ICSID Convention) is another important treaty. The ICSID Convention which provides a framework for conciliation and arbitration of investment disputes between Contracting States and nationals of other Contracting States. There are currently 163 signatory and contracting states to the Convention.

4. Space Law Cases

A range of disputes can, and have, arisen between different actors in the space industry. These can arise between private entities; for example, between the manufacturers and operators of satellites, rockets and other equipment. These relationships will be governed by contracts which will generally contain arbitration clauses.

Disputes between state entities and foreign investors could also give rise to investment arbitration cases (these typically involve the satellite industry).

By default, arbitration proceedings are confidential. This makes it difficult to make any general assessments of the frequency and outcome of such disputes. In recent years, however, there are a handful of cases which have come to light. These are summarised below.

4.1. Eutelsat v. Mexico (ongoing)

This was an investment arbitration subject to ICSID Additional Facility Rules.[8] The arbitration involved the reservation of capacity that satellite operators hold on behalf of governments. Operators are required under national regulations in Mexico to reserve a certain amount of megahertz to be used by the government for its own use. Eutelsat claimed that it has been required to provide a larger amount of capacity to Mexico than its competitors in violation of the fair and equitable treatment standard in the Bilateral Agreement between the Government of The Republic of France and The Government of The United Mexican States on the Reciprocal Promotion and Protection of Investments. The tribunal's award was released in

8 https://icsid.worldbank.org/cases/case-database/case-detail?CaseNo=ARB%28AF%29/17/2 (Accessed October 2021)

September 2021. The award has not been made public, but Mexico has stated that Eutelsat's claims were dismissed.[9]

4.2. Avanti Communications v. The Government of Indonesia (2018)

This was an LCIA arbitration concerning a satellite lease agreement. In 2015, after the Indonesian Government encountered issues with its Garuda-1 satellite, the government sought to lease a satellite from Avanti Communications to retain its orbital slot. However, after making a partial payment under the lease agreement, the government refused to make any further payments. The government's position was that the satellite was failing to fulfil its purpose. Avanti commenced proceedings under the lease agreement for the remaining sums due. The tribunal awarded Avanti the full costs owed under the lease agreement and further costs to the sum of USD 20.075 million.[10]

4.3. Spacecom v. Israel Aerospace Industries (2018)

The dispute arose under a contract whereby Israel Aerospace Industries was due to build a satellite for Spacecom. The contract provided that the price would be reduced by up to USD 10 million in the event that the satellite was delivered late. On 1 November 2018, Spacecom announced that Israel Aerospace Industries had been ordered to pay USD 10 million for the late delivery.[11]

4.4. ABS v. KT Corporation and KTSAT Corporation (2018)

The dispute concerned a contract for the purchase and sale of the KOREASAT-3 satellite, between the settler KT (a Korean firm) and the purchaser, ABS (a Bermuda corporation). The issue in dispute was whether title over the satellite had (i) passed from KT to ABS after the parties publicly concluded their purchase contract, or (ii) the purchase contract was null and void as KT had allegedly failed to comply with Korea's Foreign Trade Act. The ICC tribunal held that the title passed to ABS when all the contractual conditions precedent were satisfied and that no existing Korean law had been violated. On 12 July 2018, the United States District Court (Southern District of New York) granted ABS's petition to confirm the arbitral award.[12]

9 https://advanced-television.com/2021/09/20/eutelsat-loses-120m-dispute-with-mexico/ (Accessed October 2021)

10 https://spacenews.com/indonesia-ordered-to-pay-avanti-20-million-for-missed-satellite-lease-payments/ (Accessed October 2021)

11 https://spacenews.com/israel-aerospace-industries-to-pay-10-million-for-late-delivery-of-satellite-destroyed-in-falcon-9-explosion/ (Accessed October 2021)

12 *KT Corp. v. ABS Holdings, Ltd.*, 17 Civ. 7859 (LGS) (S.D.N.Y. Jul. 12, 2018)

4.5. The Devas Arbitrations (2015-2017)

These three arbitrations concerned Antrix Corporation's decision to cancel an agreement to build, launch and operate two satellites and make available 70 MHz of S-band spectrum for Devas Multimedia Private Limited.

The dispute between the Antrix and Devas was referred to ICC arbitration. Devas was ultimately successful in receiving an award of US$1.2 billion.[13]

The two other arbitrations were commenced pursuant to the India–Mauritius Bilateral Investment Promotion and Protection Agreement. Antrix is wholly owned by the Republic of India and operates as the commercial marketing arm of the Indian Space Research Organisation and the Indian Department of Space, and Devas has three Mauritian shareholders. The arbitrations were heard by the PCA, who also found in favour of Devas.[14]

4.6. The Eutelsat Arbitrations (2013)

These two ICC arbitrations concerned the right to operate at particular orbital slot positions under International Telecommunication Union rules.

Eutelsat operates a fleet of communicate satellite,. Eutelsat sought to enforce its rights to certain transmission frequencies, arguing that these frequencies had been reserved under a 1999 agreement between Eutelsat and SES, a satellite and terrestrial telecommunications network provider. Eutelsat also claimed that Media Broadcast had violated an agreement between Eutelsat and Deutsche Telekom, a telecoms provider, by contracting with SES for frequencies at 28.5° East.

The ICC tribunal declined jurisdiction over Eutelsat's claim against Media Broadcast but permitted the claim against Deutsche Telekom to proceed. The tribunal determined that SES was permitted to use the disputed bands if and when Eutelsat did not hold the regulatory right to operate in such bands.[15]

Media Broadcast subsequently obtained a preliminary injunction from the Regional Court of Bonn to prevent Eutelsat from using the disputed frequencies.

Ultimately, Eutelsat settled its disputes with both Deutsche Telekom and SES.

13 https://www.thehindubusinessline.com/info-tech/us-court-upholds-icc-arbitration-award-tells-antrix-to-pay-12-b-to-devas-multimedia/article32975929.ece (Accessed October 2021)

14 https://www.iisd.org/itn/en/2018/10/17/pca-tribunal-holds-india-liable-for-unlawful-expropriation-and-fet-breach-under-india-mauritius-bipa-gladwin-issac/ (Accessed October 2021)

15 https://globalarbitrationreview.com/eutelsat-settles-icc-satellite-dispute (Accessed 5 October 2021)

4.7. Avanti Communications Group v Space Exploration Technologies (2011)

This dispute arose under a launch services agreement between Avanti and Space Exploration Technologies (SpaceX). Avanti terminated the agreement, claiming that that SpaceX had failed to demonstrate that it had achieved the contractually required number of successful launches in the run up to the launch of Avanti Communications Group's satellite. Avanti requested a refund of the launch cost deposit of USD 7.6 million. On 18 April 2011, Avanti announced that the American Arbitration Association of New York had awarded a full refund of the deposit.[16]

4.8. Thuraya Satellite Telecommunications v Boeing Satellite Systems International (2009)

This was an ICC arbitration in relation to a satellite manufacturing contract. Insurers of Thuraya Satellite Telecommunications commenced arbitration in 2004, alleging that Boeing Satellite Systems International had provided a defective 702 satellite model which lost power whilst in orbit. Satellite manufacturing contracts generally exclude liability of the manufacturer after launch, but Thuraya claimed that the defects had been concealed and sought compensation for the satellite.

The tribunal found for Boeing on the basis that there had been no intentional concealment of the defect and ordered the insurers to pay Boeing's costs.[17]

5. Alternative Dispute Resolution

It is also worth mentioning that, as with many other industries, parties engaging in outer space activities have the option of engaging in alternative dispute resolution (ADR). Simply defined, ADR encompasses a number of structured processes other than litigation or arbitration.

The benefits of ADR are well understood. ADR can be quicker and cheaper than reaching a resolution through litigation or arbitration. ADR is also generally more flexible – parties have greater freedom to tailor the processes and requirements to suit their own needs (and budgets).

Several forms of ADR exist. Broadly summarised, these include:

i. Negotiation – parties seek to reach an agreement on issues in dispute without involving any third parties, often on a "without prejudice" basis (meaning that the contents of any negotiations cannot later be relied on as evidence in later legal proceedings without the contents of both parties).

16 https://spacenews.com/avanti-wins-arbitration-award-against-spacex/ (Accessed 5 October 2021)

17 https://globalarbitrationreview.com/boeing-wins-over-defective-satellites (Accessed 5 October 2021)

ii. Mediation – this is a process where parties try to reach agreement with the assistance of a neutral third party (a mediator), again usually on a "without prejudice" basis. Often, the mediator will not make any express evaluation or determination of the case on its merits, but will simply work to facilitate agreement by helping the parties to explore possible options for resolution.

iii. Adjudication – this has been used in several national jurisdictions as a method of dispute resolution in the construction industry for many years. Decisions by adjudicators are handed down quickly (in the UK, the default deadline is 28 days), and are temporarily binding on the parties until the dispute is finally determined by court proceedings, arbitration or settlement. In this regard, adjudications can be described as a "pay first, argue later" mechanism for resolving claims.

iv. Dispute boards – a dispute board usually consists of a panel of three neutral individuals appointed by the parties at the start of a project. The board is available through the course of the project to hand down interim binding decisions (similar to adjudicators) on disputes that arise during the course of a project. Dispute boards are increasingly popular on large international construction projects.

v. Expert determination – this is when parties agree to appoint an expert to determine an issue in dispute – usually one which is technical (rather than legal) in nature. The expert is not a tribunal. However, the expert's decisions are contractually binding on the parties.

vi. It should be emphasised that ADR is not a replacement for final and binding forms of dispute resolution such as litigation and arbitration. In fact, ADR may increase time and costs in circumstances where the parties are very far apart, and arbitration or litigation is a near-inevitability. However, the diversity of ADR options, and their general benefits, means that, in most instances, parties would benefit from exploring some form of ADR prior to commencing formal litigation or arbitration.

6. Conclusion

The growth in outer space activities continues to increase, both in terms of size and importance to everyday life.

The author submits that the demand for customisable, binding, and enforceable forms of dispute resolution for space activities will increase in line with the number and the diversity of disputes concerning the space industry.

The commercial space industry has used arbitration for several decades. This is expected to be the case going forward, due to the final and binding nature

of arbitration awards, and the relative ease of enforcement. We have also seen a number of investor-state arbitrations being commenced under investment treaties.

However, it is to be expected that, as disputes concern outer space become more common – and potentially, more complex – there will be a great need for industry-specific modifications to account for the unique features and risks of the space environment.

The dispute resolution mechanism in the PCA's Outer Space Rules makes a number of useful adaptations to the rules of well-known arbitral institutions to account for some of the specific issues relevant to space disputes. In the coming years, it will be particularly interesting to see if the PCA's Outer Space Rules gains greater traction.