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## Arbitration of Space-Related Disputes: Case Trends and Analysis

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### Abstract

To advance understanding of how arbitration may contribute to the resolution of space-related disputes, this research catalogues and analyzes all publicly-reported space-related disputes that to date have been resolved through international arbitration. More specifically, this compendium of arbitral awards and court decisions will provide trends and analyses on the: (i) type and subject-matter of space-related disputes submitted to international arbitration, as organized by industry and topics; (ii) kinds of disputants currently employing international arbitration, as organized by type and size of actors; (iii) applicable laws used in international arbitration; (iv) preferred seats; and (v) arbitral institutions administering the dispute. Cataloguing and analyzing space-related disputes that have already been resolved through international arbitration will offer important insights and understandings on current industry practices and complement existing research on the use of arbitration clauses by companies providing space-related products and services. These trends and analyses may be used by scholars, policymakers, and legal practitioners, to assist in the resolution of any future space-related disputes, and assess the successes and failures of the current dispute-resolution infrastructure for resolving space-related disputes. To our knowledge, there exist no consolidated catalogues for publicly-reported space-related disputes that have been resolved through international arbitration.

**Keywords:** arbitration, dispute resolution, space-related disputes,

### Acronyms/Abbreviations

United Nations (UN), International Space Law (ISL), National Aeronautics and Space Administration (NASA), International Space Station (ISS), European Space Agency (ESA), International Telecommunications Satellite Organization (INTELSAT), China International Economic Trade & Arbitration Commission (CIETAC), International Centre for Dispute Resolution (ICDR), International Centre for Settlement of Investment Disputes (ICSID), International Chamber of Commerce (ICC), Iran-United States Claims Tribunal (IUSCT), London Court of International Arbitration (LCIA), Arbitration Institute of the Stockholm Chamber of Commerce (SCC), Singapore International Arbitration Centre (SIAC), Permanent Court of Arbitration (PCA)

### I. Introduction

Technological advancements over the last 40 years have allowed private, non-state actors to enter the space industry, previously the exclusive terrain of states. With this rise in non-state actors, complex cross-border space-related disputes are expected to increase. Since space law cannot automatically be enforced by going to court and receiving a judgment against the party violating its rules, questions arise on the most suitable dispute resolution mechanism for resolving space-related disputes. Binding arbitration is already a leading dispute settlement mechanism for cross-border disputes, both for commercial and state actors. Thus, it is frequently hypothesized that international arbitration

ought to be an attractive tool for the resolution of cross-border space-related disputes [2]. We attempt to test that hypothesis by measuring the extent to which space-related disputes are being resolved through arbitration.

This paper uses empirical research to establish a baseline of the use of arbitration in space-related disputes, which may be tracked over time and compared against other methods of space-related dispute resolution. Similar projects have been undertaken previously in the context of domestic case law in the United States [2]. An inherent challenge of this project is the paucity of publicly available information on the arbitration of space-related disputes. Despite these limitations, we believe that this research provides an important empirical foundation for future research into the use of international arbitration in the resolution of space-related disputes.

### II. Resolution of Cross-Border Space-related disputes

Following the space race of the mid-twentieth century, five United Nations (UN) treaties on outer space were completed between 1967 and 1984. These treaties address issues such as the non-appropriation of outer space by any one country, arms control, the freedom of exploration, liability for damage caused by space objects, and the safety and rescue of spacecraft and astronauts. However, none of the major space law

treaties provide a machinery for *binding* dispute settlement. This lacuna was intentional. Space activities of the day, although limited, were imaginably risky and still in the early stages of development. Moreover, until recently, states were generally reluctant to accept the compulsory jurisdiction of any international tribunal [3]. In the absence of direct guidance on binding methods of dispute settlement, existing methods of dispute resolution in public international law are incorporated into space law through general international law and the principles found in the UN Charter (see notably Articles 2(3) and 33). Consequently, states may avail themselves of, *inter alia*, adjudication and arbitration to resolve inter-state space-related disputes.

However, non-state actors lack the recourses offered by international law, because they are not considered to be subjects of it. Domestic litigation of cross-border space-related disputes often proves unsatisfactory, due to loss of confidentiality, uncertainty in the recognition and enforcement of judgments across jurisdictions, and its susceptibility to political pressure and claims of sovereign immunity on the part of defendant states. With the growth in the space industry, there have been many renewed efforts to establish more effective binding methods of international dispute resolution for cross-border space-related disputes [4].

One of the leading contenders in such efforts is international arbitration. This method of dispute resolution is frequently used to resolve disputes between parties that are situated in different jurisdictions, or disputes that have a cross-border component. It is a final and binding method of dispute resolution which is built on the consent of parties and the principle of party autonomy. Due to these characteristics, this method often escapes the many “one-size-fits-all” disadvantages presented by domestic litigation. For example, disputants control the selection of arbitrators, who are often chosen for their expertise and can operate on a confidential basis, which leads to higher confidence in issued decisions (and thus the enforceability of the arbitral award). Indeed, the existing infrastructure of international arbitration has been appealing to both state and non-state actors alike.

Clauses mandating resolution by arbitration are frequently written into contracts and treaties before disputes arise, although it is not uncommon for parties to submit existing disputes to arbitration using submission agreements. With respect to pre-dispute arbitration agreements, various sources may give rise to arbitration, including commercial contracts, investment treaties and free-trade agreements, cooperation and

project-based agreements, and institutional regimes and operating agreements.

Due to the increase in privatization and commercialization of space activities, commercial contracts are one of the richest sources of law giving rise to space-related arbitration. Arbitration clauses are already prevalent in commercial contracts concluded by both state and non-state actors. For example, the European Space Agency (ESA) has long used arbitration as its preferred method of dispute resolution in its model contracts with contractors [5]. Additionally, to protect investments made by a foreign investor from one contracting state in the territory of the other contracting state, many of the thousands of bilateral investment treaties and free-trade agreements in existence also contain arbitration as a method of dispute resolution [6].

This binding method of resolving disputes is also found in very specific instruments for highly limited areas of space activities. For example, cooperation and project-based agreements often demonstrate the will to use arbitration to resolve disputes. Examples include the 1969 United States-Italy Memoranda of Understanding between the Università degli Studi di Roma (Aerospace Research Centre) and the National Aeronautics and Space Administration (NASA) for Launching Satellites from the San Marco Range; the 2010 Cooperation Agreement Between the Government of Canada and the European Space Agency; and the 1972 France - Federal Republic of Germany Agreement for the Construction, Launch and Utilization of an Experimental Telecommunications Satellite. Likewise, several institutional regimes and operating agreements also cite optional or compulsory arbitration provisions to settle disputes. The most notable of these is the 1998 International Space Station (ISS) Intergovernmental Agreement, which permits ISS partners to submit “issue[s] not resolved through consultations” to an “agreed form of dispute resolution such as conciliation, mediation, or arbitration” [7]. Other examples include the 1992 Constitution and Convention of the International Telecommunication Union; the 1980 Convention for the Establishment of a European Space Agency; the 1971 International Telecommunications Satellite Organization (INTELSAT) and its Operating Agreement; and the 1971 Operating Agreement of the Intersputnik International Organization of Space Communications (Intersputnik).

### III. Goals and objectives of study

This research seeks to establish the current status of the use of international arbitration in the resolution of space-related disputes by cataloguing and analyzing all

publicly-reported space-related disputes that to date have been resolved exclusively through international arbitration. Thus, this research builds on prior work undertaken under the McGill University Institute of Air & Space Law Research Project on Space-Related Disputes, which surveyed and examined the demand and use of arbitration by space companies offering space-related products and/or services by providing a foundation for future work that will advance our understanding of how arbitration may contribute to the resolution of space-related disputes [8].

### III. Methodology

This study was designed and executed in four distinct steps to produce a comprehensive and meaningful list of all publicly-reported space-related arbitrations. *First*, we developed a corpus of useful search terms. *Second*, the corpus was searched on comprehensive international arbitration databases and industry websites. *Third*, generated search results were screened for relevance by a primary reviewer. *Lastly*, research results were coded using developed categories of data. Each step is described in additional detail below.

#### A. Development of Corpus

A base list of words and search terms likely to elicit instances of publicly-known “space-related disputes” was developed after consultation of field literature, academics, and industry actors. This list was then further conceptualized based on potentially applicable legal instruments and space-related subject matters and topics. The final corpus contained 152 words and terms related to the phrase “space-related disputes.”

#### B. Database Search

A primary search was conducted when each corpus entry was searched on both Westlaw and Jus Mundi, which are electronic, subscription-based databases that aggregate and present available primary sources of international arbitral awards and decisions.

Westlaw’s International Arbitration Awards library compiles documents from major arbitral organizations, such as:

- China International Economic Trade & Arbitration Commission (CIETAC) (coverage from 1963 -1997);
- International Centre for Dispute Resolution (ICDR) (the international division of the American Arbitration Association) (coverage from November 2000 to present);

- International Centre for Settlement of Investment Disputes (ICSID) (coverage from May 1982 to present);
- International Chamber of Commerce (ICC) (coverage from 1975-2004);
- Iran-United States Claims Tribunal (IUSCT) (coverage from 1981-2005);
- London Court of International Arbitration (LCIA) (coverage from 2004 to present).

Jus Mundi covers over 16,000 international law and investor-state arbitration documents, including those from bilateral investment treaties and free trade agreements, multilateral agreements, and arbitration institutions such as the Arbitration Institute of the Stockholm Chamber of Commerce (SCC); CIETAC; ICC; ICDR; LCIA; and the Singapore International Arbitration Centre (SIAC).

Both databases also compile arbitral documents from domestic judgments, for example judgments concerning the use of interim measures, evidence gathering, and the enforcement and set aside of arbitral awards.

Supplementary searches were conducted to bolster results yielded by the primary search. Since basic details of space-related disputes often come to light through press releases and regulatory filings, a subset of the corpus was searched on the industry-news websites Global Arbitration Review, Investment Arbitration Reporter, and SpaceNews. Academic articles and gray literature were also consulted for this purpose.

#### C. Screening Relevant Results

The legal definition of what constitutes “space” is subject to debate, and therefore it remains difficult to precisely define what constitutes a “space-related dispute.” For the purpose of this study, guidance was taken from the 2010 Permanent Court of Arbitration (PCA) Optional Rules for Arbitration of Disputes Relating to Outer Space Activities, which reflect the “particular characteristics of *disputes having an outer space component* involving the use of outer space by States, international organizations and private entities” (emphasis added) [9]. This working definition broadly includes disputes either occurring in outer-space, having effects in outer-space, or having effects on Earth, especially with regards to Earth-facing applications and the operations of man-made space objects. In so doing, it was necessary to distinguish between space operations and uses and space applications (*e.g.*, use of a global position system (GPS) receiver in a car).

Initial results were screened using the above working definition. A few examples of topics that were excluded from the survey results are disputes relating to airspace; telecommunications; and provision of multimedia and television services. The scope of this study also excludes disputes resolved through domestic arbitration.

#### ***D. Coding Relevant Results***

All arbitral awards and decisions identified as being relevant were coded according to eight data categories. The coding process was iterative since information about arbitration is often confidential and thus publicly unavailable. Unavailable data points, or inapplicable data points were noted in the dataset.

The following categories were used, alongside a brief explanation for why:

- 1) *Type and subject-matter of space-related disputes, organized by industry and topics:* Analyzing the type and subject-matter of dispute may provide information about which types of disputes are most likely to be resolved through arbitration, and the underlying source of the arbitration agreement.
- 2) *Disputants currently employing international arbitration, as organized by type of actors:* Analyzing the disputants currently employing international arbitration may provide information about the types of users who are more likely to prefer arbitration over other dispute resolution methods, for example as a result of their formal or informal dispute resolution policies and preferences. Building on a previously developed a schematic for categorizing space disputes, disputants were organized according to whether they were states, commercial entities, or intergovernmental organizations [10]**Error! Reference source not found.** Although the study originally sought to assess the “size” of disputing parties to test whether larger, better-resourced parties employ arbitration more frequently, this data category was subsequently replaced due to difficulties in assessing such variable, and rise of third-party funding in arbitration.
- 3) *Applicable substantive laws:* Where available, analyzing the substantive laws used in international arbitration provides insights into parties’ preferences as to the ideal law that parties wish to govern substantive claims under dispute (e.g., due to a legal jurisdiction’s well-developed jurisprudence, or compatibility with

the contractual expectations of parties). Data was not collected on the procedural laws applicable to the dispute.

- 4) *Preferred arbitral seats:* Where available, analyzing preferred arbitral seats provides insights with respect to the mandatory procedural rules that apply to the arbitration, which can impact, *inter alia*, the validity of the arbitration agreement, jurisdiction of the tribunal, and recognition and enforcement efforts.
- 5) *Arbitral institutions administering the dispute:* Where available, analyzing which arbitral institutions are most frequently used to administer space-related disputes provides insights into user experiences, particularly an institution’s ability to satisfactorily facilitate dispute resolution (e.g., type of facilities, quality of service, perceived neutrality), as well as an institution’s reputation.
- 6) *Amounts claimed or awarded:* Where available, analyzing the quantum in dispute provides insights on compensation for the alleged harm suffered at the hand of the respondent.
- 7) *Size of panel/number of arbitrators elected to tribunal:* Where available, analyzing parties’ preferences with respect to the size of arbitral panel may provide insights on perceived size and complexity of dispute, as well as costs and length of arbitration.
- 8) *Year dispute concluded:* Where available, disputes were also coded by year of the arbitral decision was issued, or alternatively the dispute settled between the parties. This was done to assess trends over time.

#### **IV. Results**

Out of the total results yielded, only 38 reported disputes were considered relevant enough to be analyzed for key trends. This section describes the main challenges and limitations of the study, as well as the breakdown of research results by category.

The low number of results can be attributed to at least three main challenges and limitations. *First*, as expected, the confidential nature of arbitration resulted in missing data points and unreported awards. These limitations reduced the comprehensiveness of the research undertaken, and affected the reliability of results. Going forward, and where possible, these limitations may be overcome by monitoring and periodically iterating the research conducted. The low

turnout of decisions and information may also be supplemented by surveying individuals involved in the space arbitration community, who may have first-hand knowledge of such space-related disputes. *Second*, the adopted search strategy and databases used likely contributed to the low yields in relevant arbitral decisions. As there exists no universally-accepted definition of “space-related disputes,” the corpus used to elicit relevant hits may not have adequately captured all relevant space-related disputes. The scope of the adopted working definition affected the total number of relevant disputes ultimately analyzed. Moreover, the two comprehensive international arbitration databases employed had certain coverage limitations (e.g., Westlaw’s coverage for ICC administered disputes spanned the period 1975-2004 only). Going forward, and where possible, these limitations may be overcome by generating additional words and terms, which may be searched on other international arbitration databases, particularly those belonging to arbitral institutions. *Third*, the relevance of results generated was a subjective inquiry, which may have led to a number of results being improperly excluded. This was particularly the case given the overlapping scope of telecommunications law and space law, and attempts to differentiate between space operations and space applications. Going forward, development of an inclusion/exclusion criteria and/or assistance from a second reviewer may be useful in confirming the relevance of results generated.

#### ***A. Type and Subject-matter of Dispute***

Of the 38 total disputes, 32 were commercial disputes (84.2%), and six were investor-state disputes (15.7%). Research results yielded no disputes arising from cooperation and project-based agreements, or institutional regimes and operating agreements.

Further, out of the 38 total disputes, 34 disputes were reported as satellite-related disputes (89.4% of total). Out of the two disputes that were not satellite related disputes (5.2% of total), one related to seizure of assets arising from space-related transactions, and the other related to a space-craft launch service partnership agreement. The subject-matter of two disputes was unknown (5.2% of total).

Moreover, most satellite-related disputes triggered multiple subject-areas or topics. Out of the 34 satellite-related disputes, a majority of disputes related to launch and delivery of satellites into orbit (10 disputes, or 29.4% of satellite-related disputes); regulatory measures and policies (9 disputes, or 26.4%); and lease of satellite capacity (8 disputes or 23.5% of satellite-related disputes). Insurance disputes and disputes relating to

commercial arrangements and partnerships comprised six disputes each (17.6% of satellite-related disputes). Finally, a minority of disputes included disputes stemming from onboard technical failure (5 disputes, or 14.7% of satellite-related disputes); manufacturing, sale, and purchase of satellites (5 disputes, or 14.7% of satellite-related disputes); and lease of spectrum rights and orbital slots (4 disputes, or 11.7% of satellite-related disputes).

#### ***B. Disputants Employing International Arbitration***

Of the 38 total disputes, disputes between two purely commercial parties formed the largest category of disputants (19 disputes, or 50% of total). Disputes between commercial and state (or state-related) parties formed the next largest category of disputes (13 disputes, or 34.2% of total). Within these 13 disputes involving a commercial and state (or state-related) party, 8 disputes were commercial arbitration cases, and 5 disputes were investor-state arbitration cases. Taking into consideration privatization of intergovernmental organizations, disputes between former intergovernmental organizations and commercial entities, and former intergovernmental organizations and states (or state-related) parties comprised 3 (7.8%) and 2 (5.6%) out of the total 38 disputes, respectively. Finally, only 1 dispute concerned an existing intergovernmental organization and commercial entity (2.6% of total). Notably, there were no instances of intra-state disputes, or intra-intergovernmental organization disputes.

#### ***C. Applicable laws***

A wide variety of laws were applied to the space-related disputes studied. Although data was unavailable for a majority of disputes (19 disputes, or 50% of total), English law, Indian law, Spanish law, Swedish law, and United Arab Emirates law were all applied to substantive claims in commercial cases. Other applicable laws included California law, New York law, and Ontario law. International law applied to investor-state claims, particularly as negotiated under investment treaties and free-trade agreements. This variable did not apply to two disputes which were discontinued at an early stage of the proceedings.

#### ***D. Preferred Seats of Arbitration***

A wide variety of seats were chosen for the space-related arbitrations studied. Although data was unavailable for a significant number of disputes (12 disputes, or 31.5% of total), Paris (5 disputes, or 13.1%

of total), London (5 disputes, or 13.1% of total), and New York (4 disputes, or 10.5% of total) led the pack of known seats. Other known seats included Geneva, Madrid, Moscow, New Delhi, Stockholm, and The Hague. This variable did not apply to one dispute which was discontinued before seat selection.

#### ***E. Arbitral Institutions Administering the Dispute***

Of the 38 total disputes, data on arbitral institutions was unavailable or inapplicable for 7 disputes (18.4%). Out of the remaining disputes for which data was available, a fair number of disputes were resolved at the ICC (12 disputes, or 31.5% of total). The ICDR and the LCIA administered 6 disputes (15.7% of total) and 4 disputes (10.5% of total) respectively. Other notable administering institutions included the SCC, HKIAC, ICSID, IUSCT, Moscow-based International Commercial Arbitration Court (ICAC), and the PCA.

#### ***F. Claimed Amounts in Dispute***

Of the 38 total disputes, data on claimed amounts (or in the alternative, amounts awarded) was unavailable or inapplicable for 13 commercial and investor-state disputes (34.2%). Out of the 23 commercial space-related disputes for which data was available, majority of the amounts claimed (or in the alternative, amounts awarded) were in the USD 10-49 million category (9 disputes, or 23.6% of total). Amounts sought in the next largest category of commercial cases ranged between USD 200-499 million (6 disputes, or 15.7% of total), and four disputes sought amounts in the range of USD 1-9 million (10.5% of total). A total of three commercial disputes were sought in the range of USD 50-199 million (7.8% of total). Amounts greater than USD 10-49 million were claimed in only one dispute (2.6% of total). On the investor-state side, information was available on only two cases: one dispute sought amounts less than USD 1 million (2.6% of total), and the other dispute sought amounts in the range of USD 50-99 million (2.6% of total).

#### ***G. Number of Arbitrators***

Although data was unavailable for a significant number of disputes (12 disputes, or 31.5%), a majority of space-related arbitrations employed a panel of three arbitrators (21 disputes, or 55.2% of total). There were only three known cases with sole arbitrators (7.8% of total). This variable did not apply to two disputes (5.2% of total), where the tribunal was not constituted because the dispute was discontinued.

#### ***H. Year Dispute Concluded***

Out of the 38 total disputes, information about the year a space-related dispute was concluded was available for 28 space-related disputes. Out of the known disputes for which information was available, the majority were concluded between 2010-2020 (15 disputes, or 39.4% of total), of which commercial disputes comprised an overwhelming amount (14 disputes). The remaining disputes were concluded in 2000-2009 (11 disputes, or 28.9% of total), and one dispute was concluded each in 1990-1999 (3.5% of total), and 1980-1989 (3.5% of total). Ten disputes from the total of 38 were excluded from the analysis since they were either pending, unknown, or discontinued.

### **V. Discussion**

A dispute resolution mechanism broadly comprises three considerations: (1) the types of dispute; (2) the disputing parties and their substantive obligations; and (3) the methods adopted to resolve those disputes [11]. The results from the survey point to at least three emerging themes of interest in the arbitration of space-related disputes.

#### **(1) An overwhelming amount of arbitration disputes concern the satellite industry**

An overwhelming majority of disputes resolved by international arbitration arise from commercial contracts in the satellite industry. Indeed, out of the 38 total disputes studied, 34 disputes were reported as satellite-related disputes arising from commercial disagreements (89.4% of total). Moreover, issues relating to satellite launch and delivery, regulatory measures and policies affecting satellites, and lease of satellite capacity featured most frequently in international arbitrations. This suggests that commercial satellite-related disputes are likely to continue being resolved through international arbitration.

Although there is wide variance in the amounts claimed in dispute, the majority of disputes involved damages requests over the USD 10 million mark. The absence of other types of disputes is noteworthy in light of this observation. We observed no space-related disputes stemming from arbitration agreements in cooperation and project-based agreements, or institutional regimes and operating agreements. Moreover, only a small number of disputes came from investment treaties (15.7% of total). In at least one instance, a commercial dispute between a private entity and state-related actor gave rise to parallel investor-state arbitration claims (see *Devas Multimedia Private*

*Limited v. Antrix Corporation Limited*). Since regulatory measures and policies affecting the satellite industry frequently contribute to space-related disputes, it remains to be seen whether commercial agreements signed by state-related actors will give rise to more investor-state arbitrations in the future. The suitability of international arbitration to resolve disputes arising in other space-related industries has not yet been tested and also remains to be seen.

### **(2) Space-related arbitration disputants are changing**

Our research shows that although commercial entities form the largest category of disputants, states and state-related entities (*e.g.*, state-owned enterprises, agencies, or instrumentalities) are also quite likely to be involved in international arbitration of space-related disputes. Specifically, the second largest category of disputes occurred between commercial entities and state (or state-related) parties (13 disputes, or 34.2% of total), which arose from arbitration agreements found in commercial contracts and investment treaties. However, there were no documented instances of intra-state disputes, or intra-intergovernmental organization disputes, which may be a function of the confidentiality of arbitration, and/or may suggest the use of other dispute resolution mechanisms.

Interestingly, at least one former intergovernmental organization, Eutelsat, seems to be a habitual user of international arbitration to resolve disputes both with other commercial parties and with states (*e.g.*, *Eutelsat S.A. v. United Mexican States*, ICSID Case No. ARB(AF)/17/2)). We only found only one international arbitration involving an existing intergovernmental organization (Intersputnik) and another commercial entity.

### **(3) Existing international arbitration infrastructure appears adequate**

While it can be safely assumed that other dispute resolution methods are being utilized to settle space-related disputes, the increase in the use of international arbitration over time suggests that parties are satisfied with the existing international arbitration regime to resolve space-related disputes. The diversity of applicable laws, seats, and arbitral institutions revealed by our study results suggest that disputants are taking advantages of one of international arbitration's key strengths – the flexibility it allows parties to customize their dispute resolution process. While there is always room for improvement, there is no indication that a centralized institution nor a more specialized legal regime is warranted at this time. As such, Böckstiegel's 1992 pronouncement would appear to hold true nearly

30 years later: “An attempt to create anything specific for this field for the space industry would therefore neither seem feasible nor necessary. Indeed, it might be a step backwards, because a multilateral system of enforcement of arbitration awards is available for international commercial arbitration and has been accepted worldwide by industrialized and developing countries . . .” [12].[10] That said, while a specialized legal regime appears unnecessary, there exists an opportunity for players in the arbitration market, whether they be arbitral institutions or legal jurisdictions to develop a reputation for comparative expertise in space-related dispute resolution within the existing international arbitration regime. Luxembourg represents one such notable example [13].

## **VI. Conclusion**

In conclusion, our study confirms that international arbitration is indeed used by both state and non-state actors in the resolution of publicly-known space-related disputes. This method of dispute resolution is primarily employed in the resolution of commercial disputes, followed by investor-state disputes. To date, there are no publicly known instances of international arbitration used to resolve public international law inter-state space related disputes, or disputes arising from cooperation and project-based agreements.

In addition to the empirical data generated from this study, three themes have also emerged. *First*, even as the space industry grows and evolves, satellite-related disputes continue to dominate space-related disputes resolved by international arbitration. *Second*, the changing face of the space industry is reflected in the parties to space-related international arbitration. *Third*, despite these changes, the existing international arbitration regime appears to meet users' needs and further specialization does not seem to be warranted at this time. These trends and analyses may be used by scholars, policymakers, and legal practitioners, to assist in the resolution of any future space-related disputes, and assess the successes and failures of the current dispute-resolution infrastructure for resolving space-related disputes.

Finally, future comparative research will be required to enrich the applicability of this study. For example, most space-related disputes documented concern satellites. We hypothesize this is due to the relative importance of the satellite industry, rather than any inappropriateness of international arbitration as a mechanism for resolving other types of space-related disputes. However, additional research will be needed to confirm this hypothesis. Likewise, further research into the resolution of all satellite-related disputes may

reveal the comparative importance of the international arbitration mechanism, and whether there continues “to be a . . . demand to develop techniques for the settlement of disputes” [14], or whether there exist particular features of such disputes which make them better suited for one dispute mechanism over another.

### Appendix

Dataset of arbitral decisions available upon request.

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