Arbitration in Space Contracts

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THIS ARTICLE aims at studying the private law disputes that arise from contracts concluded in the framework of space activities, and particularly those that relate to the operation of telecommunication satellites. Public law disputes, linked for instance to the allocation of frequencies or to States' liability for their outer space activities,[1] are thus outside the scope of this study.

Until very recently, space contracts gave rise to very limited litigation. Their public character explains why the parties were reluctant to request judicial intervention. Indeed, satellite operators and manufacturers were often public law international organizations or publicly owned companies.

However, over the last 10 years, parties have increasingly had recourse to private litigation to settle the disputes arising from the performance of contracts related to the manufacture, launch and operation of satellites.[2] This evolution is due both to the fact that these contracts are now quite

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1 Reference can be made, *e.g.*, to the disputes linked to the application of the 1972 Treaty on international liability on aerospace vehicles, or to the inter-state litigation arising from the 1967 Space Treaty. Amongst the extensive literature on these topics, *see notably* the articles in Permanent Court of Arbitration/Peace Palace, *Arbitration in Air, Space and Telecommunications Law* (Kluwer Law International, 2002); and K. H. Böckstiegel, 'Proposed Draft Convention on the Settlement of Space Law Disputes' in (1985) 12 *Journal of Space Law* 136; K. H. Böckstiegel, 'Case Law on Space Activities' in (1992) *Space Law* 205; K. H. Böckstiegel, 'Settlement of Disputes Regarding Space Activities' in (1993) 21 *Journal of Space Law* 1; K. H. Böckstiegel, 'The Settlement of Disputes Regarding Space Activities after 30 Years of the Outer Space Treaty' in *Outlook on Space Law over the Next 30 years, Essays Published for the 30th Anniversary of the Outer Space Treaty* (Kluwer, 1997), p. 237 *et seq.*; S. Gorove, 'The Growth of Domestic Space Law: A U.S. Example' in (1990) 18 *Journal of Space Law* 99 *et seq.*; S. Gorove, 'Liability in Space Law: An Overview' in (1983) VIII *Annals Air & Space Law* 373; S. Gorove, 'Dispute Settlement in the Liability Convention' in (1981) 30 *Zeitschrift F. Luft & Weltraumrecht* 43; S. Gorove, 'The Growth of Space Law Through the Cases' in (1996) 24 *Journal of Space Law* 1; I.H Ph. Diedericks-Verschoor, 'The Settlement of Disputes in Space: New Developments' in (1998) 26 *Journal of Space Law* 41.

2 This trend is illustrated by the resolution adopted by the International Law Association (ILA) during the Helsinki Conference in August 1996, which stated that: 'the growing volume of space activities and in particular of commercial space activities, as well as the growing participation of non-governmental entities and private enterprises in space activities, has given the issue of dispute settlement regarding space activities a new framework and a new relevance'. During its Taipei conference in 1998, the ILA adopted a Final Draft of the Revised Convention for the Settlement of Disputes related to Space Activities.

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commonplace,[3] and to the increasing competition between manufacturers and launchers[4] in a market that is no longer as profitable as it used to be.

In this regard, an author recently emphasized that incidents giving rise to litigation are more frequent, due to 'the pressure for lower manufacturing costs – reduction of the manufacturing time frames – or else to the shorter launching campaigns and therefore to quicker satellite tests'.[5] It is clear that the ferocious competition between manufacturers on a contracting market contributes to reducing their margins. The question arises as to whether the reduction of manufacturing costs induced by this situation is really compatible with the high technical and operational requirements of satellite operators.

The main topic of this article is whether the settlement of disputes arising from the performance of contracts relating to the manufacturing, launching and operation of satellites has any special characteristics in comparison with litigation in other complex commercial operations.

We aim to show, by analysing the context of such disputes, and the way they are adjudicated by State jurisdictions and by international commercial arbitrators, that such specificity exists, but that it is due more to the technicality of the issues at stake than to the legal rules applicable on the merits.

I. THE CONTEXT OF SPACE INDUSTRY DISPUTES

The transmission of signals by satellites has long since become an essential stake in the telecommunications industry. This is a service provided by satellite operators, which are often former public international organizations recently privatized. The clients of these operators are frequently former national companies or private telecommunications operators, using the satellite capacity to provide their own clients with services for television, telephony, land, air and sea carriage, or any other use. These satellites are often geo-stationary, placed into orbit at 36,000 kilometres above Earth, or they are satellites placed into low orbit, such as those of the Iridium constellation, which lead to well-known difficulties.

The operation of communication satellites involves several actors, and entails a succession of contracts of different nature. These contracts may be divided into three categories: the first concerns the design and manufacture of satellites, the second, their launch and the third, their operation in space.

a. The Manufacture of Satellites

Satellite operators enter into contracts with aeronautical and aerospace manufacturers for the purpose of designing and manufacturing satellites. These

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[3] Ms Couston wrote that: 'the fact that it becomes more common, more and more in contact with commercial and social life, will cause space law to involve more disputes': 'Chronique de droit spatial' in [2002] *Revue française de droit aérien et spatial* 376.

[4] L. S. Kaplan, 'Recent Developments in Space Law Litigation' in *Research and Invention in Outer Space: Liability and Intellectual Property Rights* (Martinus Nijhoff, 1995), p. 113 *et seq.*

[5] L. Ravillon, 'Arbitral Disputes in the Space Activities Sector' in (2003) 7 *IBLJ* 825.

procurement contracts may be concluded directly with the communication satellite operator, or with a financial institution when, for example, the acquisition is financed by a lease. The leasing institution, owner of the satellite and holder of the related insurance contracts, will then agree with the operator to a lease contract, that provides for the right of the operator to purchase the satellite after a certain period.

Procurement contracts provide that the manufacturer undertakes to deliver the satellite within a certain time limit, on the basis of technical specifications precisely detailing the characteristics of the vehicle and its expected performance in orbit. Such specifications are generally established by the satellite operator, while the manufacturer elaborates and implements the technical solutions meant to attain the goal so defined. The manufacturer then sub-contracts the manufacturing of the sub-units to be integrated and tested.

The acceptance of the satellite and the transfer of risks can take place on the ground, in which case the operator is responsible for launching and setting the satellite in orbit, which he does by contracting with a launch agency. They can also intervene in orbit, the manufacturer then being responsible for the launch and setting of the satellite in orbit. In any event, the contract always provides for the ground test procedures which condition the technical acceptance of the vehicle before it is launched.

The satellite manufacturing contracts generally provide for cooperation and information procedures which enable the operator, through his engineers, to ensure that the satellite will comply with its technical specifications. The rights therein accorded to the operator include the presence of a permanent representative in the manufacturer's establishments, the organization of joint meetings, the communication of reports at every significant stage of the process, joint decision-making on important questions, etc. These rights are meant to enable the buyer of the satellite to ensure the compliance by the manufacturer with the quality control procedures of the contract. They do not, however, discharge the manufacturer from any liability.[6]

Satellite manufacturing contracts almost always provide for the limitation or exclusion of liability. They also usually provide for price variation mechanisms, based on the satellite's performance in orbit (incentives). Finally, penalties are provided in case of late delivery, which are set-off against the price.

The nature of these contracts has been debated, as to whether they should be considered as sale contracts or as contracts for the provision of services (*contrat d'entreprise*). In this regard, the Paris Court of Appeal rendered a somewhat

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[6] 'The success in commercial space ventures depends, to a great extent, on the quality of space objects. Therefore, the quality of these space objects must be assured well in advance of their delivery from contractors. The time and costs involved in the development of complex space systems demand that the purchaser is given the right to have the fullest view of the design as well as the production activities of his contractors in order to gain confidence in the resultant space systems. That is not to say that the purchaser will assume the contractor's responsibility': M. Spada, 'Quality Control in Production of Space Objects and Liability in Outer Space Law' in *Outlook on Space Law Over the Next 30 Years* (Kluwer, 1997), p. 191 *et seq.*

contradictory decision on 15 June 1988,[7] in a dispute between Aérospatiale and Arabsat and several insurers, in which, after having categorized the contract as a 'service contract', it referred to Aérospatiale as a 'seller-manufacturer of the satellite'.

Ms Ravillon[8] discussed the issue exhaustively, and concluded that the satellite-manufacturing contract should in principle be considered as a sale of goods to be manufactured (*vente de chose future*), and not as a contract for the provision of services. Certainly, the purpose of the contract is the delivery of a satellite, and not the provision of services by the manufacturer. If we refer to the criteria set out by Article 3 of the Vienna Convention 1980 on the international sale of goods, we cannot consider that the supply of labour or services is a predominant aspect of the manufacturer's obligation: quite the opposite, the predominant aspect of the manufacturer's obligation is the integration of the different sub-systems constituting the satellite. The client's expectation is in fact the delivery of an item of goods.

This categorization, remains uncertain however. For example, how should it be regarded when the delivery of the satellite by the manufacturer is due in orbit, and when the launching cost – insurance included – is higher than the cost of the satellite itself? In such a case, it cannot be doubted that the predominant aspect of the manufacturer's obligation is the supply of services.

More generally, French case law, which considers that a contract is for the provision of services on the basis of the specific nature of the goods to be manufactured,[9] can lead to such classification so far as procurement contracts are concerned. Such procurement contracts, however, are drafted in such a way that this debate often becomes irrelevant. The parties, in practice, carefully define the manufacturer's obligations, as well as the conditions in which his liability may be incurred. As we shall see, disputes arise more often from the interpretation and validity of these clauses than in respect of the contract's nature.

A close look at the case law shows that disputes most generally arise either from an accident occurring during the manufacture of the satellite entailing late delivery,[10] or from an anomaly in the functioning of the satellite appearing after the launch.[11] Damage on the ground most generally occurs in the final phase of manufacture, for two reasons. On the one hand, the imminence of the satellite

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7 *Red Sea* v. *Aérospatiale, CAMAT and Arabsat* in [1988] *Revue française de droit aérien et spatial* 203.

8 L. Ravillon, *Les télécommunications par satellite* (Litec, 1997), p. 129 *et seq.*

9 Cass. Com. 3 January 1995; Cass. Com. 17 March 1998.

10 *e.g.* in the case between Astrium and TRW Inc. following delivery delays caused by the supply of defective solar panels: M. Couston and L. Ravillon, 'Chronique spatiale' in [2002] *Revue française de droit aérien et spatial* 429.

11 As in the case regarding the Telstar 402 satellite, which – after a successful launch – did not attain its orbit because of a satellite malfunction: *ibid.*, Couston and *ibid.*, Ravillon, 'Chronique spatiale' in *Revue française de droit aérien et spatial* 2001, 427. Such was also the case with the Arabsat IA satellite, in the Paris Court of Appeal's decision dated 15 June 1988. Boeing seems to have been confronted with similar problems concerning the supply of solar panels manufactured by Hughes, whose aerospace division it had acquired: 'Boeing Seeks Millions in Dispute with Hughes' in *Space News*, 29 October 2001; 'Hughes Rebuffs Boeing's Reduced Claim in Dispute' in *Space News*, 18 March 2002, p. 6 and 'Boeing, Thuraya Settle Claim for $252m' in *Space News*, 7 April 2003, p. 6; Ravillon, *supra* n. 5, 820.

acceptance date places significant pressure on the manufacturer, who may be tempted to speed up the process as much as possible, with the risks attached to such acceleration. On the other hand, the ultimate phase of manufacture includes the most dangerous operations of integration and testing (such as electromagnetic compatibility tests), during which the assembled satellite will be activated at real power.

Such incidents are all the more serious when they occur in the weeks preceding the launch date. When they cause significant damage to the satellite, they either induce the client to terminate the contract, in accordance with specific clauses to that effect, or cause considerable delivery delays, which can amount to years. Such a situation arose between Eutelsat and Alcatel Space, where damage caused to a satellite during the testing phase prior to acceptance forced the manufacturer to repeat the construction process completely and to deliver a new vehicle.[12] In such cases, the manufacturer's exposure is limited, either by clauses capping the penalties due for delivery delays, or by clauses limiting or excluding his liability. Disputes between satellite manufacturers and operators often crystallize around the issue of the compatibility of such clauses with the law that governs the contract. Two examples of such disputes may be referred to.

First, in the above-mentioned 'Arabsat' case, in which Aérospatiale had invoked a contractual non-liability clause, the invalidity of clauses excluding liability for hidden defects (*garantie des vices cachés*) between professionals of different specialities was invoked on the basis of French law. The Paris Court of Appeal, in a decision dated 15 June 1988 – a decision rendered in summary proceedings – considered that the 'seller, satellite constructor, was bound to know of the possible defects and that, in accordance with section 1645 of the Civil Code, he could not exclude or limit his guaranty'. This decision is interesting in that it shows that, despite the specificity of space contracts, it is the *droit commun* which is applied to them.

Secondly, in *Appalachian Insurance* v. *McDonnell Douglas*,[13] the insurer of the satellite operator Westar VI considered that the contractual exclusions of liability were invalidated by American law prohibiting them when imposed on a weak party, for example in a contract of adhesion. The case was not in fact linked to the construction of a satellite, but to the malfunction of a module (payload assistant module) intended to place the satellite into orbit after its launch by a space shuttle. The case can, however, be compared with the previous one in that the nullity of the contractual exclusion of liability was invoked. The American courts rejected the insurers' argument by holding that the contract could not be considered as imposed upon the operator since the latter had other launch options, such as the Ariane rocket.

When the nullity of the limitation of liability is not invoked on the basis of the provisions of contract law, the existence of a serious breach of contract or gross

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[12] This case entailed an unpublished ICC arbitral award no. 10216/AC/DB of 26 February 2001.

[13] Concerning this case, *see notably* P. D. Bostwick, 'Liability of Aerospace Manufacturers: Pherson v. Buick Sputters into the Space Age' in (1994) 22 *Journal of Space Law* 75; Kaplan, *supra* n. 4 at pp. 120–122.

negligence is often alleged. Under French law, as in several other legal systems,[14] such a fundamental breach may bar the application of limitation of liability clauses.

Eutelsat raised such an argument, in the above-mentioned case, against Alcatel Space. In this case, as in others, the gross negligence alleged against the manufacturer took place in a specific industrial context. Sometimes the reduction of profit margins pushes the constructor to accelerate the manufacturing process in order to minimize the impact of substantial delivery delay penalties. Such a curtailment of the manufacturing process, however, is not always compatible with the precaution and safety principles which are required in the space industry. Judges and arbitrators therefore need to determine the standard according to which they should determine the existence of gross negligence, *i.e.* of an abnormal behaviour on the part of the constructor.

Clearly, the basic criterion of the reasonably prudent man (*bon père de famille*) cannot be applied in disputes concerning extremely sophisticated techniques. The manufacturer would have no difficulty in refuting the operator's allegation of gross negligence by showing that the criterion of breach the party's inaptitude to carry out his part of the contract[15] does not apply to him, for example, because other procurement contracts, since the accident occurred, have been concluded with the same (supposedly inept) manufacturer.

Leaving aside the fact that the concept of 'gross negligence' can be interpreted widely by the courts, the real debate in space contract disputes is to assess the level of prudence required from the manufacturer with regard to the state of technology at the time of the damage. Therefore the standard of assessment of any breach cannot be limited to the behaviour expected from a reasonably prudent man, but has to take into consideration the level of technical and human input which could or should be expected from the manufacturer.

In case of a loss, the client will often argue that the manufacturer had an obligation to implement all necessary means to attain the expected result. He will therefore emphasize that the manufacturer should at all times have used the most sophisticated techniques with regard to the state of scientific knowledge, and resorted to the most efficient means available. The client will therefore try to

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[14] French law disregards contractual limitations or exclusions of liability in case of gross negligence (Cass. Com. 3 April 1990; Cass. Civ. 24 February 1993), or when the breach of one party's obligations deprives the contract of its substance (Cass. Com. 22 Oct. 1996). Belgian law refuses to assimilate gross negligence and fraud, but takes into account the 'objective' breach which deprives the contract of its substance (*see* E. Montero, 'Les clauses limitatives ou exonératoires de responsabilité, rapport belge' in *Les sanctions de l'inexécution des obligations contractuelles, études de droit comparé* (LGDJ, 2001), pp. 413, 421). Since the House of Lords overturned its previous doctrine in 1980, English law seems to validate contractual exclusions of liability even in the presence of a fundamental breach (*see* H. Beale, 'Rapport de droit anglais' in *Les clauses limitatives ou exonératoires de responsabilité en europe, actes du colloque des 13 et 14 décembre 1990* (LGDJ, 1990), p. 155 *et seq.*). In Italy, art. 1229 of the Civil Code provides that limitations or exclusions of liability clauses are not applicable in case of gross negligence, and case law disregards clauses which exonerate the debtor of its liability for breach of an essential obligation (97/7064). German law seems to be similarly oriented. The situation in each country is therefore quite different, and it is important to examine carefully the legal regime which will apply to the exclusion of liability before choosing the contractual law.

[15] Cass. Com. 3 April 1990.

show that the other party did not implement the same level of preventive means or the same level of testing as other contractors. He will consequently invite the arbitrators to consider the state of the art with reference to the techniques used by the manufacturer's major competitors, which assessment entails, as we shall see, considerable difficulties. For his part, the manufacturer will try to avoid liability by showing that the contract required the use of new and non-mastered technologies, which were necessary to enable the satellite operator to obtain the important profits he expected from the contract.[16]

The debate is therefore both technical and legal. However, in determining the standard to apply in assessing the manufacturer's gross negligence, other matters are at issue, such as the very conception that each party has of the procurement contract and its industrial environment. The problem here is to strike a balance between the specificity of space activity and the legitimate expectations of satellite operators. Two attitudes exist in this regard.

According to some commentators, space contracts are characterized by the complexity of the techniques used and the risks inherent in space activities. In other words, the concept of 'contingency' is of the essence of such contracts, which should therefore be distinguished from other contracts in that each party accepts to bear part of the risk attached to them, through contractual limitation of liability clauses and/or through insurance.

Some authors[17] accordingly consider that the multiplication of similar or identical clauses, whether in contracts governed by American law or by the laws of European countries, is the expression of the specific usages of the space industry, whereby all parties to the contract mutually accept the risks inherent in space activities. This reasoning reduces the importance of delivery delays, which would not be decisive[18] in the parties' understanding, and restricts the concept of gross negligence to breaches of extreme seriousness, thus excluding the legal concept of 'objective' breach, being the breach of an essential obligation of the contract regardless of the seriousness of the negligence. From this perspective, the only purpose of delivery delay penalties would be to pass on to the manufacturer

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[16] In a case between Indonesia and McDonnell Douglas concerning the default of a satellite, Palaba B-2, the manufacturer proved, before American jurisdictions, that the contract imposed the use of light materials hardly ever used until then; *see* Kaplan, *supra* n. 4 at pp. 122–126. This case is linked to the above-mentioned case concerning the satellite Westar VI, both satellites having been launched by the same rocket and having been placed in a wrong orbit because of the malfunctioning of the 'PAM' modules which were meant to power them. In the above-mentioned case between Eutelsat and Alcatel Space, the latter argued that the damage resulted from the unpredictability of the radiation focusing effect of a satellite antenna, caused by the new technology used for its design. In all of these cases, the manufacturers tried to link the novelty of the technique and the high level of profits anticipated by the operator. *See* Kaplan: 'a second strategy employed by the manufacturers was to emphasize the profit motive of the users, in this case, the government of Indonesia, in opting for a new and unproven technology' (*supra* n. 4 at p. 124).

[17] E. Loquin and P.- F. Veil, 'La gestion contractuelle des risques de l'exploitation commerciale de l'espace' in *L'exploitation commerciale de l'espace* (Litec, 1992); Ravillon, *supra* n. 8.

[18] Loquin and Veil, *supra* n. 17 at p. 176 *et seq.*, according to whom the parties' obligations would be characterized by their 'flexibility' with regard to their performance and, in particular, with regard to the satellite's delivery date.

the launch delay penalties that the operator will itself have to pay to the launcher,[19] the parties having excluded the indemnification of the loss of profit through clauses excluding the recovery of indirect losses.[20] In summary, according to this doctrine, disregarding the manufacturer's limitation of liability would upset the balance of the contract.[21] In addition, the idea that there is a specific usage of the space industry limiting the manufacturer's liability allows avoidance of the national rules of the law chosen by the parties which provide for the nullity of provisions excluding liability (such as the French rule prohibiting the exclusion of a warranty against hidden defects in contracts between professionals of different specialities, such as the manufacturer and the operator), insofar as such rules would not be part of international public order. Ultimately, this contractual approach leads to a reduction of the manufacturer's obligation to a 'best efforts' obligation.

As can be imagined, satellite operators, who emphasize the decisive importance of timely delivery of the satellite, do not share this point of view. It should be stressed here that operators are subject to very precise and restrictive business plans. While satellites' 'filling' rates are currently much lower than they used to be, for many years the transmission capacity of each satellite of an operator's fleet was often fully allocated to its clients months before its launch. In addition, even when the fleet's 'filling' factors allow reallocation of capacity from one satellite to another, such an operation is rendered difficult by the different configurations, missions, and orbital positions of each vehicle. When a satellite is damaged only a few weeks before the scheduled launch date, thereby delaying its launch by months or even years, the consequences for the operator are potentially catastrophic. It is therefore difficult to argue that a satellite procurement contract is a partially contingent operation in which the delivery date is not decisive of the parties' consent.

Two aspects should be stressed at this point. First, the context of disputes related to satellite construction has changed. We are no longer, as was still the case at the beginning of the 1990s, in a prototype industry where public entities invested important sums to develop new or experimental types of vehicles. The satellite industry has become more mature and has shifted from a prototype

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[19] The penalties due to the launcher for a launch postponement requested by the operator are high when the requested new launch date is close to the original date, whereas they are low or non-existent in case of a postponement of one or two years because, in such a case, the satellite is granted another launch.

[20] Ravillon, *supra* n. 17 at p. 309. Procurement contracts often provide for clauses excluding compensation for 'indirect damage'. This notion of indirect damage is problematic since it can refer to loss of profit as well as to indirect damages in the sense of French law, *i.e.* to losses which are not the direct consequence of a harmful event. For an award ruling on the interpretation of such a clause, *see* (1997) XXII *Yearbook Commercial Arbitration* 164.

[21] This opinion was expressed by a manufacturer: 'Initially, we were dealing with penalties for late delivery of some percentage points, similar to those applied in construction or in any other industrial contract. But, here also, a tragic drift occurred, since contracts now provide for penalties up to 20% for a delay of a few months only. This is completely disproportionate to the contract's balance': F. Turck, 'L'évolution des obligations contractuelles du constructeur vis-à-vis de son client, de l'obligation de moyens à l'obligation de résultats' in *L'exploitation commerciale de l'espace* (Litec, 1992), p. 210.

industry to a mass production industry.[22] The allocation of risks has therefore also changed. An American author wrote 10 years ago that, 'there will be in the future a slow but steady reallocation of the risk of loss from malfunctioning aerospace products away from the purchaser and user of those products and towards the manufacturer'.[23] This prediction has partly come true.

Secondly, space risk should not be looked at in the same way for manufacturing contracts and for launch contracts. Manufacturing contracts, which are performed on the ground, involve sophisticated techniques which are nevertheless perfectly mastered. On the other hand, launch contracts imply a contingency linked to the extreme conditions under which a rocket enters extra-atmospheric space and the satellite is put into orbit. This difference explains why, unlike the damage or destruction risk resulting from a launch accident, pre-launch insurance is not, or has not long, been systematic. For example, Eutelsat was not insured against the operating loss caused by the late launch of its W1 satellite, following which it had initiated an arbitral procedure against the manufacturer.[24]

However, satellite operators sometimes subscribe to such pre-launch insurance policies. By doing so, they insure themselves against the loss of profit caused by a launch delay due to damage to the satellite in its final phase of manufacture. These policies generally compensate for the insured's loss caused by damage to the satellite (*assurance dommages*), regardless of the manufacturer's liability. This means that, above the contractual minimum level of loss insured (*franchise*), the insurer will compensate the insured for losses excluded by the procurement contract.

In most of these insurance policies, which are frequently syndicated, the insurers waive their right of subrogation against the manufacturer. It was justly noted that the consequence of such waivers is to shift onto the satellite operator the burden of the risk of the possible breach of the obligations of the manufacturer, who would thus have no incentive to be diligent in their performance.[25] However, in practice, in the absence of such waivers, it would be very difficult for the insurer alone to conduct a trial against the manufacturer on such technical issues as those which are generally involved in establishing gross negligence. In addition, in an industry as competitive as that of satellite procurement, manufacturers have a very strong incentive to preserve their commercial and industrial reputation. The pre-launch insurance policies therefore permit avoidance of the debate on

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[22] Laurence Ravillon, however, considers that 'mass production does not exist in the space sector. For instance, even where the platform is identical for most satellites (this is the structure that supports the payload, the propulsion, the fuel, the altitude and orbit meter ...) each payload is however unique, since they are designed for each specific mission': 'Chronique spatiale' in *Revue française de droit aérien et spatial* 2001, 420. But, leaving aside the fact that a manufacturer can undertake to manufacture several identical satellites, we may note that, on the one hand, the techniques are now perfectly mastered, and, on the other, the pressures on the manufacturing prices and delays impose a standardization of procedures.

[23] Bostwick, *supra* n. 13 at p. 96.

[24] ICC case, *supra* n. 12.

[25] Ravillon, *supra* n. 5, 828, and the quote from Gicquel, 'Claims Against Space Insurance', IBA Committee Z. Conference, Barcelona, 26 September–1 October 1999.

the validity of the limitation or exclusion of liability clauses contained in manufacturing contracts, but they can give rise to other types of dispute.

In a recent case,[26] a satellite had suffered a considerable launch delay because of a short-circuit which had damaged its on-board computer during the final phase of integration. Despite the fact that the operator had taken out an insurance policy to cover such risk, he was refused indemnity by the insurers. They relied on the fact that, between the date of the damage to the satellite and the launch date, another rocket had exploded on the launch site and had resulted in the local government authorities suspending all further launches for several months. The insurers thus considered that the operator's damage was not due to the insured event, *i.e.* damage to the satellite during its phase of integration and test causing a launch delay, but to the local government's decision to suspend all launches, which was not an insured event.[27]

This type of situation is undoubtedly exceptional. However, the insured will often have to face other objections in relation to evidence of its losses. Such objections may also be raised by the manufacturer in the framework of a dispute related to its liability.

Evidence of the loss suffered needs to be established in two respects. First, the operator must prove the existence of the capacity allocation contracts concluded for the satellite at the date of the loss, or more precisely at the date of the operational starting date following the launch. Secondly, he must show that these contracts covered the satellite's lifetime, or at least a minimum duration. If the marketing campaign was still ongoing at the date of the damage, the operator will have to prove that, given the market conditions, the level of demand was then so high that the satellite's transmission capacity would in any event have been fully allocated at the scheduled operational starting date. This evidence is all the more difficult to provide as some services, such as the transmission of signals for the Internet and other business services, are – unlike television – marketed for very short periods of time and to a vast number of users. It is thus very difficult to provide a forecast of the satellite's operation for these services over several years.

In addition, another argument is raised against operators who manage a vast number of satellites when they try to establish their losses: that they suffered no loss since the service that would have been supplied by the damaged satellite could be supplied by other satellites of the fleet, in particular by using the 'reserve capacity' that every operator maintains in case of emergency. This line of defence, however, does not take into account the fact that such 'reserve capacity' is an

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[26] ICC award no. 11426/DB/EC of 2 June 2003, not published.

[27] Certain insurance policies are specifically intended to cover the political risk, such as a government's decision not to authorize or to suspend a rocket launch. A good example of such a political risk is given by the US government's decision not to authorize the launch of commercial satellites by the space shuttle after the Challenger tragedy, this decision having caused considerable losses to the companies that had planned such launches because of the higher cost of replacement rockets, obtained in particular by Hughes from Arianespace. *cf.* R.C. Walters, 'The 1986 Challenger Disaster: Legal Ramifications' (1991) 1 *Journal of Space Law* 1, and Kaplan, *supra* n. 4 at p. 128. The political risk is undoubtedly a specificity of aerospace contracts in comparison with contracts concluded in other areas.

essential tool for satellite operators, nor that the transfer of services from one satellite to another is often made difficult by technical obstacles due to the orbital positions and specific characteristics of each vehicle. In addition, a wise operator would not survive for long without 'reserve capacity', which enables it to face service interruptions caused by technical incidents, and also to respond to demand with more flexibility, especially when such demand is significant and the capacity available on existing satellites is almost entirely used up. Thus, using the 'reserve capacity' to cope with a launch delay will lead an operator, at least in times of high demand, to purchase additional capacity, which in itself results in damage.

In the framework of insurance policies covering damage caused to satellites, these issues are mitigated by agreed value clauses (*clauses de valeur agréée*), which relate to the burden of proof of the amount of damages. These clauses also often fulfil the role of a compensation cap. Such agreed value clauses have the effect of reversing the burden of proof, and lay on the insurer the burden of proving that the insured's loss is lower than an agreed amount. However, it is often impossible for the insurer – for obvious lack of sufficient information – to provide evidence of the operator's real operating losses. Therefore, arbitrators might be reluctant to enforce such clauses rigorously.

Another way to avoid the difficulties linked to the assessment of loss in disputes between insurers and satellite operators would be to provide for a lump sum indemnity. Such an indemnity could be included in an insurance policy. However, leaving aside the fact that insurers do not generally favour such clauses, some legal systems consider such provisions to be contrary to the principle of public policy according to which the indemnity cannot exceed the losses effectively suffered (*principe indemnitaire*).[28]

In the relationship between operators and manufacturers, penalty clauses have the function of fixing a lump sum indemnity, but they are almost always much lower than the loss effectively suffered. Thus, the operator injured by a launch delay will have to overcome considerable difficulties in order to establish its losses. Such difficulties can be avoided in legal systems where the judge has the power to rule *ex æquo et bono* on the amount of the damages. Such a possibility exists in certain countries, provided that the existence of the loss has been proved.[29]

When the malfunction appears after the launch, the operator is confronted with even greater problems. In practice, for obvious reasons, evidence of the manufacturer's gross negligence is much more difficult to establish when the satellite is in orbit than when it is still on the ground. First, it is extremely difficult to link the malfunction to a design defect or to a manufacturing fault several years after the acceptance of the satellite and its launch. Secondly, the investigation of the causes of the malfunction will be all the more difficult now that the satellite is in orbit and cannot be brought back.

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[28] *e.g.*, in France, Insurance Code, art. L. 121-1(1).

[29] *e.g.*, under Italian law, Civil Code, art. 1226.

It is true that the operator will be entitled to refuse to pay incentive payments[30] in case of malfunction in the first years of operation of the satellite. Nevertheless, he risks having to bear considerable operating losses given the limitation of liability clauses in the manufacturing contract.

These difficulties explain the frequent resort to insurance to cover the risks linked to malfunctions appearing once the satellite is in orbit. These so-called 'in-orbit' insurance policies are thus more frequently used than the 'pre-launch' policies. Such 'in-orbit' policies can refer to an identified risk. For example, a policy relating to the Westar satellites obliged the insurers to indemnify the insured in case of a diminution of the satellite's operational life due to a loss of fuel.[31] They can also cover any loss stemming from the satellite's malfunctioning in orbit. Once again, the dispute will often focus on damage assessment.

From this perspective, the way in which policies are drafted may be problematic. For example, it is frequently agreed that compensation is triggered in case of total or partial loss of the satellite's transponders. A transponder is a component of the satellite which enables the signal transmission. In practice, its role is that of a transmitter/receiver, and each satellite has several or even several dozen of them, some of which serve as reserve capacity in case of the breakdown of others. These transponders are leased to clients of the satellite operators, in whole or in part. However, even the most well-drafted contractual clauses cannot reflect the diversity of problems a satellite may suffer. For instance, disputes may arise if the malfunction does not affect the transponders themselves but other elements of the satellite, or if the transmission power is not diminished but nevertheless suffers from other problems, such as intermittent and sporadic interruptions.

b. The Launch of Satellites

Disputes may first of all arise from the performance of contracts related to the manufacture of a launch rocket and its components. For example, in 1992, Hercules initiated against Martin Marietta before the American courts an important legal action concerning the design and manufacture of a new generation of thrusters to be used on Titan-class launchers. Following a failure in the power tests of the new thrusters, Hercules – designer and manufacturer of the engines – complained that Martin Marietta had not communicated all of the technical data in its possession, whereas the latter objected that Hercules had declared in the contract that it had complete knowledge of the technical constraints linked to its proposal.[32]

Disputes may also arise from satellite launching contracts. As already mentioned, these are concluded either by the operator or by the manufacturer, if the latter has undertaken to deliver the satellite in orbit.

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[30] The manufacturer sometimes takes out insurance to cover this risk.

[31] *Western Union* v. *Lexington Insurance*, cf. Kaplan, *supra* n. 4 at p. 128. Fuel (more precisely 'ergol' in the space language) is necessary to avoid the drift of the satellite and to maintain it in its orbital position.

[32] Kaplan, *supra* n. 4 at pp. 115–117.

Much more than satellite manufacture, launches are characterized by their substantial risk of failure, due to the extreme conditions of a rocket's entry into space. That is why, unlike the manufacturer who has an obligation to fulfil the purpose of the contract (*obligation de résultat*), the launcher's obligation is expressly qualified by the parties as a 'best efforts' obligation.[33] Accordingly, the launching company is only liable if it fails to provide its best efforts. This explains why, when the American government prohibited the launching of commercial satellites by the space shuttle, NASA was successful in invoking the 'best efforts' clause in its contracts: it was able to argue that the contract only set out an obligation to supply a replacement launch on another shuttle (which replacement was made impossible by the government's decision), but not to indemnify its client for the costs of a replacement launch by another provider.[34]

It has been noted by some that this conception of the launch provider's obligation may encourage negligence,[35] and that the validity of the exclusion of liability clauses[36] may be questioned on the basis of public order rules applicable to carriage contracts.[37] However, it is without question that, unlike the satellite manufacturer, the launcher cannot totally control the result of a launching operation.

This debate has little practical relevance, however, since launching contracts are almost inevitably insured. It is unlikely that a strengthening of the launcher's obligation would lead satellite owners to modify their policy and cease to insure launches. A broader interpretation of the launcher's obligation towards its client would at the very best transfer to the latter the burden of insurance.

Such a debate on the scope of the 'best efforts' obligation would nevertheless be relevant in the rare cases in which the launch is not insured, for example because the operator has decided to benefit from the availability of a 'qualification launch'.[38] In practice, the launcher's situation would then not be very different from that of the manufacturer against whom the operator alleges gross negligence. The 'best efforts' clause of the launch contract would in fact place on the operator the burden of proving a failure to fulfil an obligation of due care.[39]

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[33] J. Chappez, 'Arianespace, première société de transport spatial' in [1985] *JDI* 522; K. Iserland, 'Contrats de lancement' in [1983] *RFD Aérien* 404; Ravillon, *supra* n. 17 at p. 199; W. Thomas, 'Launch Service Contracts' in *Bull. ESA* (February 1982), p. 33; 'A Fresh Look at Launch Service Contracts' in *Bull. ESA* (February 1988), p. 49; B. Schmidt-Tedd, 'Best Efforts Principle and Terms of Contract in Space Business' in [1988] *International Institute of Space Law Proceedings* 330.

[34] K. H. Böckstiegel, 'Case Law on Space Activities' in [1992] *Space Law* 212.

[35] S. Chenard, 'Estoppel and Unclean Hands' in *Interavia-Space Markets* (June 1990), p. 304.

[36] Launching contracts often provide for an obligation by the client to insert in his insurance policy a waiver of recourse clause. Such a clause must, however, be expressly provided in order to be valid: *Lloyd's* v. *McDonnell Douglas*, US District Court for the State of Florida, 90–543.

[37] Ravillon, *supra* n. 17 at p. 213.

[38] The first launch of a new generation of rockets, or the first launch following an aborted launch of a rocket of the same generation, is called a 'qualification launch'. These launches are generally carried out with no payload, but they can also launch a satellite. The launching cost is then considerably lower, but the cost of insurance is much higher than for a normal launch.

[39] But if the accident occurred during a qualification launch, judges and arbitrators would presumably take into account the additional uncertainty of the experimental character of the launch.

Such a failure of the launcher to fulfil its obligations with due care may be invoked following a total destruction (explosion of the rocket in flight), or a wrongful positioning of the satellite (satellite placed in the wrong orbit instead of a geo-stationary orbit), or, following damage to the satellite occurring at the moment of its uncoupling from the rocket, such damage having the effect of decreasing its performance or its lifetime expectancy.

This was the case in an action which was brought against Intelsat by Martin Marietta before the American courts, following the setting of one of Intelsat's satellites into the wrong orbit.[40] Martin Marietta had pre-emptively seized the Maryland courts, and applied for a declaration that it had no liability towards Intelsat on the basis that the launching contract provided for a mere 'best efforts' obligation, and that its liability was, in any event, limited to the supply of a replacement launch. Intelsat, on the other hand, asserted that the launch provider was guilty of gross negligence, and that therefore the exclusion of liability clause could not apply.

The United States Court of Appeals[41] considered that the parties' intent to exclude Martin Marietta's liability was not certain, which led the parties to settle their dispute.[42] However, supposing that the parties had not reached an agreement, Intelsat would have had to prove Martin Marietta's failure in its due care obligation, which evidence is – except in rare situations[43] – difficult to adduce. The satellite operator would also have had to prove that the setting of the satellite into a low orbit was equivalent to a total loss.[44]

c. Satellite Operation Contracts

Satellite operators lease the transmission capacity of each of the satellite transponders to telecommunication companies. These contracts may be concluded on a long term basis, such as those concluded for television services, or on a short term basis, as is the case for services for the Internet or for the guiding of fleets of ships or trucks.

These contracts, at least for television, are concluded on the basis of firm bookings made before the launch. They are then confirmed when the vehicle is put into operation. However, with the contraction of demand for satellite capacity, attitudes seem to have changed: the contracts are now often concluded after the launch, and their term is often revised during the satellite's lifetime.

The nature of such contracts may be discussed. Their subject matter is not really the lease of goods, since what is actually offered is a transmission capacity,

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40 Kaplan, *supra* n. 4 at pp. 118–120.

41 US Court of Appeals, 4th Circuit, 21 October 1992, no. 92–1094.

42 Martin, 'Intelsat Agree to Settle Launch Suit', *Space News*, 14–20 June 1993.

43 Ravillon mentions 'the example of a duster left by an Arianespace employee which blocked a pipe and caused the explosion of the launcher and of the Superbird B and BS2X Japanese satellites', *supra* n. 17 at p. 257.

44 For an example in which the setting of the satellite on a wrong orbit was equivalent to total loss, *see* the Los Angeles County Court decision of 26 March 1986 in *Hughes* v. *Lexington*, Aff. C-560-805, *cf.* Kaplan, *supra* n. 4 at p. 130.

represented by a fraction of the transponders' power. In addition, the satellite operator remains in control of the vehicle, and his service consists in ensuring the quality of the transmission. Therefore, in our opinion, these contracts are agreements for the provision of services, which are *sui generis*, rather than lease contracts.

These contracts may contain pre-emption clauses, which allow the satellite operator, under certain conditions, to take back the leased capacity. They may also contain restoring clauses, by which a client whose allocated transponder fails is entitled to be allocated an equivalent capacity on another transponder. In practice, the price of the leased capacity varies according to the rights granted to the client. Thus tariffs vary depending on whether the capacity is pre-emptible and non-restorable, which is the least protected, or non-pre-emptible and restorable, which offers the highest level of protection to the user.

Lease contracts also provide for limitation of liability clauses, by which the satellite operator excludes his liability in case of a persistent service interruption. His obligation is then limited to the provision of a replacement capacity when the service is defined as restorable.

These contracts until now do not seem to have given rise to any significant litigation. In our opinion, this is probably due to the fact that satellite operators try to ensure that they always have sufficient reserve capacity to face a transponder's failure. In addition, the clients of operators such as Eutelsat were, until their recent privatization, the very members of these organizations of which they are now often the shareholders.

Nevertheless disputes exist when the circumstances described above are not present. For instance, a television operator sued a satellite operator because, following fuel leaks,[45] the life expectancy of the satellite from which the service was provided had become inferior to that specified in the contract. Other disputes, such as in the *Comsat*[46] or *Satcom*[47] cases, are related to contract terminations.

II. DISPUTE RESOLUTION IN THE SPACE INDUSTRY

As already mentioned, the disputes stemming from the performance of aerospace contracts are quite specific. However, some of them are not fundamentally different from those which arise in other important industrial contracts. Such is the case, for instance, in disputes arising from the termination, for purely commercial reasons, of a satellite procurement contract,[48] from an industrial

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[45] ***PBS* v. *Hughes***, Kaplan, *supra* n. 4 at p. 129.

[46] (1996) 24 *Journal of Space Law* 46.

[47] US District Court, Southern District of New York, 27 May 1999 and 30 June 1999, (2000) XXV *Yearbook Commercial Arbitration* 949.

[48] As in a case between Hughes and ASC before an arbitral tribunal constituted under the aegis of the London Court of International Arbitration: 'Indian Firm Wins Legal Fight Against Hughes', *Space News*, 30 April 2001, p. 20.

partnership,[49] or more simply from the termination of a transponder lease contract.[50]

When determining whether a satellite has a manufacturing fault, or whether a launching company has been negligent in the preparation of a launch, the debate will focus on very complex technical questions, and this technicality will be decisive for the presentation by a party's counsel of its case and organization of its strategies.

The lawyers' first challenge will be to understand the concepts and vocabulary used by their client's engineers, whether the client is a launch provider, an operator, or a satellite manufacturer. For lawyers, these engineers are permanent and privileged contacts. The success of a party's contentions depends to a great extent on the quality of this relationship. This collaboration between engineers and counsel is decisive not only for the determination of the causes of the damage, but also for the issues relating to assessment of the loss.

Arbitration seems to be the most frequent form of dispute resolution used in the field of space contracts. But, as certain cases mentioned above show, it is not the only one. In fact, American courts have very frequently had to deal with disputes relating to this field.

In very rare cases, the choice between arbitration and litigation was actually a cause of dispute. For instance, in the *Satcom*[51] case, the parties had inserted a clause conferring an option between arbitration and court litigation in licence contracts for the use of satellite capacity. When the parties choose arbitration, they generally opt for institutional arbitration. Therefore, arbitration clauses usually refer to large institutions such as the International Chamber of Commerce, the American Arbitration Association, or the London Court of International Arbitration.

There is a specialized institution in the field of aerospace contracts,[52] but it has had no success whatsoever until now, proving that disputes stemming from space contracts are not so specific that they cannot be dealt with by large, non-specialized institutions. These large institutions are actually essential, in that they offer the parties irreplaceable experience in the selection of arbitrators and in the management of the proceedings.

With regard to disputes relating to the performance of satellite procurement agreements or launching contracts, arbitration has indisputable advantages. First, it allows a procedure having regard to the highly specialized and technical nature of the dispute. In this regard, the possibility of selecting the best qualified

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49 'Alcatel Dispute Continues with One Victory Each', *Space News*, 4 March 2002, p. 14; 'Alcatel Space Wins a Set in its Trial Against Loral', *Les Echos*, 3 February 2003; 'Arbitration Panel Sides with Loral in Dispute with Alcatel', *Space News*, 10 February 2003, p. 13 ; and the American decision rendered in the framework of the enforcement of the arbitral award: US District Court, Southern District of New York, 25 June 2002, (2003) XXVIII *Yearbook Commercial Arbitration* 990.

50 As in *Satcom*, *supra* n. 47.

51 *See supra.*

52 The International Court of Aviation and Space Arbitration set up in 1990. On this topic, *see* [1995] *Revue française de droit aérien et spatial* 5; [2000] 153 *et seq.*

arbitrators is fundamental. More than in any other field, the adage 'an arbitration is no better than the arbitrators' is pertinent. The arbitrator will not only have to take all the time necessary to familiarize himself with the technical aspects of the dispute, but will also need to have sufficient knowledge of the very specific industrial context of the space industry.

Taking into account the specificity of aerospace, litigation may be approached in different ways. A first approach consists in appointing one or more experts as members of the tribunal, but such a method has drawbacks and may even prove dangerous when each party has to appoint a member of the tribunal. The expert appointed by the claimant as an arbitrator may find himself isolated in a tribunal where the other two arbitrators are lawyers. Thus, the appointment of experts as arbitrators should only be envisaged if both parties agree to do so; such an agreement is, however, difficult to reach once the dispute has arisen. In addition, such a composition, *i.e.* two experts and one lawyer as chairman, in practice leads to having the legal aspects adjudicated by a sole arbitrator. It thereby precludes the parties from benefiting from collegiality, which is so important in complex and difficult cases.

The alternative of appointing an expert as chairman is no more advisable. It is always preferable that the person who has to rule on complex legal issues – such as the validity or the exclusion of liability clauses – should be an experienced lawyer. It should be borne in mind that disputes relating to satellite manufacturing and launching are private disputes to be adjudicated according to the rules of law chosen by the parties and (perhaps) to the general principles of international trade law.[53] Moreover, a chairman-expert will undoubtedly lack the experience to conduct the proceedings properly, and the authority enabling him to resolve the procedural issues arising between the parties. The designation of an inexperienced chairman can thus entail procedural irregularities – or even violations of due process – which may affect the validity of the award. It is therefore preferable to select lawyers who have experience in arbitration and a good knowledge of the technical context of aerospace disputes.

It may be more efficient, in order to take into account the technical aspects of the dispute, to resort to expertise, which in arbitration can be adapted to each particular case. Several techniques may be envisaged. First, the arbitrators may choose to appoint an expert themselves. In practice, such a solution may prove difficult because those who have the required technical knowledge in the field of aerospace industry, are often engineers related to the parties in differing capacities. Therefore, the arbitrators may prefer to let each party appoint its own expert. They will then have the possibility of considering the parties' expert reports, if necessary during the hearings. The tribunal will then have to rule on technical opinions that may diverge, which may sometimes prove quite difficult.

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[53] These disputes cannot therefore be compared to binding expertise in the field of commodities (*arbitrages de qualité*), in which the third party does not rule on a legal dispute, nor can they be compared to the arbitration procedures relating to air traffic control which are organized under the framework of the Eurocontrol Convention.

Alternatively, the tribunal can ask the parties' experts to agree on the name of a third expert. The constitution of such an expert panel, with the mission to draft an expert report, can give satisfactory results.

In addition to being the best way to take into account the technical aspects of the dispute, arbitration also guarantees confidentiality. Whether guaranteed by the arbitration institution rules,[54] or provided for in the terms of reference, the confidentiality of arbitration is another clear advantage in cases which either concern accidents which can jeopardize an industrialist's reputation, or involve classified information or even military secrets.

Arbitration has other recognized advantages, such as neutrality and the possible enforcement of awards in the 134 signatory States to the New York Convention. The issue of the taking of evidence should, however, be further considered. In case of a loss affecting a satellite or a launch rocket, aerospace industrialists generally immediately constitute an investigation commission, composed of engineers and experts, charged with determining the causes of the accident.

The client's representatives are not always involved with the commission's investigations.[55] In such cases, the client will only receive the commission's report days or weeks after the accident. The report drafted by the commission, which is supposedly independent, will be considered as the 'official' truth, which may have to be disputed by the client wishing to initiate a legal proceeding. This type of procedure, which is totally informal and generally not provided for in the contract, causes a major problem to the operator harmed by damage to a satellite, since it increases the burden of proof, even though such reports may sometimes give him some leverage.[56]

The claimant may request that it should attend the commission's investigations: however, access to the commission will usually be denied to a claimant in very sensitive situations. It is of interest to note that, whereas satellite manufacturing contracts are very detailed on the client's right to information during the manufacturing process, they contain no specific provision in respect to the investigating commission in case of damage.

Thus, the issues of evidence and access to documents are crucial for satellite operators in disputes against manufacturers and launchers. The flexibility and confidentiality of arbitral proceedings[57] are a considerable advantage compared with State court litigation, at least in the case of continental tribunals with a written procedure tradition. Arbitration allows the claimant to gain access to the manufacturer's documents by requesting and obtaining reasonable application for

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54 LCIA Rules, arts 19(4) and 30, ICC Rules, arts 20(7) and 21(3).

55 It seems that clients are more systematically involved with the inquiry commission's works in cases relating to abortive launches than in cases relating to losses occurring on the ground.

56 As an author noted, in *Lexington* v. *McDonnell Douglas*, 'the plaintiff insurers enjoyed the benefit of the investigation report of the Palapa B-2 failure prepared by the very manufacturer being sued wherein the manufacturers admitted that the cause of the failure could be attributed to extensive interplay density variation in the perigee motor exit cone': Kaplan, *supra* n. 4 at p. 124.

57 But this confidentiality is now questioned by some. *See in particular*, on this issue, H. Bagner, 'L'imbroglio de la confidentialité dans l'arbitrage commercial international' in (2001) 12(1) *Bull. de la Cour internationale d'arbitrage de la CCI* 19.

discovery procedures. These discovery procedures, if applied under the control of the arbitrators, alleviate to a certain extent the negative effects for the claimant of the principle *onus probandi incumbat allegandi*, which is traditional in the Continental legal culture. By resorting to these procedures, the claimant will manage to gain access, prior to the exchange of written submissions, to the relevant documents in the possession of the defendant.[58]

These documents can be individually specified, such as, for example, the minutes of the investigation commission's meetings and hearings, the documents used to establish its report, the internal procedures handbook of the manufacturer, the log-books and the minutes of the test operations, the minutes following the eventual intervention of safety or police authorities on site, and the claims made to the counterparty's insurers.

Some cannot be precisely identified, however, which gives great significance to the discovery procedure. The claimant will therefore ask the defendant to communicate all documents in his possession, including all paper and electronic correspondence linked to the damage. In cases relating to satellite construction, the number of such documents can be considerable. However, most of the documentation relating to the manufacturing, assembling, integration and testing of the satellite will already be in the client's possession, given his contractual right to information. Therefore, the only documents left to be communicated are those not covered by such right.

In reality, the discovery procedure will not only enable the claimant to support its arguments, relating for instance to the manufacturer's gross negligence, but may also enable him to discover its very existence.

It is true that, if not properly handled, a discovery procedure may entail important costs and delays. It also creates an imbalance in the traditional roles between the claimant – who has the burden of proving the facts upon which his claim is based – and the defendant. That is why arbitrators tend only to accept limited and precise requests for disclosure during the proceedings.[59]

It is, however, necessary to take into account the specificity of space contracts, as well as the position of the operator of the satellite. The latter is confronted with a loss, the causes of which he is generally unaware, whereas the manufacturer will already have taken a position supported by its inquiry commission's report. In such conditions, denying the operator access to the manufacturer's file in order to rebut the commission's conclusions is equivalent to tipping the balance against him. That is why disputes relating to satellite manufacturing or launch accidents

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[58] The purpose of the discovery procedures in disputes related to aerospace contracts is illustrated by an American author: 'in *Martin Marietta Corp.* v. *Intelsat*, the buyer of the launch vehicle and services would have needed to take depositions of a number of the ELV manufacturer's engineers if it hoped to prove at trial its allegations of gross negligence by that manufacturer, Martin Marietta. Conversely, Martin Marietta needed no discovery to file its motion to dismiss Intelsat's counterclaim on the ground that it was barred by the cross-waiver provisions in the Commercial Space Launch Act': P. D. Bostwick, Going Private with the Judicial System: Making Creative Use of ADR Procedures to Resolve Commercial Space Disputes' in (1995) 23 *Journal of Space Law* 23.

[59] *See* IBA Rules on Evidence Administration in Arbitral Proceedings, art. 3.3(a).

are cases in which arbitrators should accept discovery, albeit subject to control, so that the proceedings do not become too cumbersome.

When the documents requested by the claimant are confidential, there is an alternative to the discovery procedure. In such a case the arbitral tribunal may appoint one or several experts, who will not be charged with determining the causes of the loss, but only with selecting in the defendant's premises the documents relevant to the case. This technique[60] may be appropriate when the documents requested are secret or when the defendant, engaged in other proceedings, fears being the victim of a fishing expedition for documents unrelated to the arbitration.

However, leaving aside the fact that this issue can be addressed in the terms of reference by the insertion of a confidentiality clause, or by an order of the tribunal rendered during the proceedings declaring the documents in question to be covered by confidentiality, it should be kept in mind that the recourse to an expert may prove to be difficult, since only the engineers of both parties are able to identify the information relevant to the case. A third party expert – assuming it is possible to find one with the required qualifications – may not in practice have sufficient knowledge of the case to select the most pertinent and useful documents.

Most arbitration rules give arbitrators the power to order any appropriate investigative measure. This is the case, for example, under Article 20-1 of the ICC Rules of Arbitration, Article 15-1 of the UNCITRAL Rules, Article 25 of the CEPANI Rules, Article 27 of the Deutsche Institution für Schiedsgerichtsbarkeit (DIS) rules, Article 14-2 of the LCIA Rules, Article 15-3 of the new Rules of the International Chamber of Milan, and Article 16-3 of the new International Rules of the American Arbitration Association.[61] These powers include discovery, whenever appropriate.

Arbitration also offers other possibilities, which can prove very useful in aerospace contracts disputes in comparison with the possibilities offered by State court litigation. Any procedure relating to damage to a satellite or a rocket necessitates the hearing of numerous witnesses, engineers and experts. Once again, the advantage of arbitration is its flexibility, which allows for adapting the procedure to the specificities of a dispute relating to a space contract. In practice, it would be very difficult to assess evidence of the existence of gross negligence or a design fault without hearing all of the engineers who, on both sides, participated in the design, assembly and testing of the satellite. Hearing engineers from other manufacturing companies and scientists might also prove essential to assess the state of the art and the degree to which the accident was foreseeable given the level of knowledge at the time. If the manufacturer and the launcher have constituted a commission of inquiry, the tribunal will want to hear the members of that commission as well as the persons it has itself heard.

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60 *See* the decision of the arbitral tribunal in ICC case no. 6401, [1996] *JDI* 1060.

61 Article 28–2 of the NAI ruling is more restrictive: 'The arbitral tribunal shall have the power to order the production of specific documents which it deems relevant to the dispute'.

Given the high technicality of the debates, innovative and interactive forms of hearing evidence, such as witness conferencing,[62] may prove to be very useful. This technique consists in questioning the witnesses all together on carefully selected issues, rather than in a traditional sequential way, with the direct examination followed by cross-examination. This method can be very fruitful, particularly when the hearing relates to complex technical issues, since it allows a real debate to take place between experts. Bringing the experts face-to-face often helps to clarify technical questions much more rapidly than a traditionally fashioned hearing.

Finally, the arbitral tribunal may envisage visiting the manufacturer's premises. These site visits can be very useful to arbitrators, in that they enable them to visualize the installations and equipment that are at issue in the proceedings. They must, however, be conducted at a stage in the proceedings when they can really benefit the arbitrators. Visiting a line of satellite assembly, a launch pad, or an anechoic chamber (which reproduces the extra-atmospheric environment for the purpose of carrying out tests), may prove to be totally useless if the technical matters at issue have not been clearly set out beforehand. It is therefore preferable to organize such visits at a fairly advanced stage of the proceedings, for example at the time of or after the witness hearings.

In conclusion, the specificity of disputes relating to aerospace contracts is linked more to the complexity of the technical matters at issue, and to the fundamental importance of the rules of evidence, than to their legal regime. Indisputably, arbitration is the most suitable form of dispute resolution, in that it enables those who have to decide the dispute to combine and adapt rules originating from different legal traditions in order to ensure a complete and in-depth conduct of the case. In addition, unlike State court judges, arbitrators will have the expertise required to understand the technological and industrial issues involved. Finally, institutional arbitration will be preferred to *ad hoc* arbitration, because important institutions such as the ICC or the LCIA have the experience necessary, in case of disagreement between the parties, to select arbitrators with the required experience and qualifications.

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[62] On this type of witness hearing *see* W. Peter, 'Witness Conferencing' in (2002) 18(1) *Arbitration International* 47.