SUBROGATION AND SPACE INSURANCE

A U.S. legal perspective

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ABSTRACT

The issue of subrogation in space insurance is one of the hotly debated topics in the space community. Some underwriters have tried hard to pursue the right of subrogation in order to get compensation from third-parties, in most cases the space products manufacturers.

In this thesis, the doctrine of subrogation is examined and the possibility of applying this doctrine to space insurance is explored. Various legal bases in the jurisdictions of the United States, which might be used for compensation under subrogation, are discussed. The thesis also tries to trace the U.S. Courts' attitude towards subrogation and related issues in recent cases. After examining the present legal liability regime for space venture and U.S. policy of commercialization of space activities, a conclusion is made.

ABSTRAIT

La question de la subrogation dans l'assurance spatiale est l'un des sujets les plus chaudement discuté au sein de la communauté spatiale. Certains assureurs essayèrent énergiquement de poursuivre le droit de subrogation afin d'obtenir compensation de la part des tierces parties, pour la plupart les manufacturiers de produits spatiaux.

Dans le cadre de cette thèse, la doctrine de la subrogation est examinée et la possibilité d'appliquer cette doctrine dans le domaine de l'assurance spatiale est explorée. Diverses bases légales dans les juridictions des États-Unis qui puissent être utilisées pour compensation sous la rubrique de subrogation sont discutées. La thèse tente aussi de tracer l'attitude des tribunes américaines envers la subrogation et des questions connexes pendant les années récentes. Après l'examen du régime actuel de responsabilité légale pour les entreprises spatiale et la politique américaine de commercialisation des activités spatiale, une conclusion est tirée.

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I. INTRODUCTION

The text and history books usually tell us that the space age officially began with the Soviet Union's Launch of Sputnik I, which was a tiny satellite launched on October 4, 1957. We also are told that on July 20, 1969, the United States became the first country in the world to put a human on the moon.

Yet two other dates several years later may eventually prove to be the most significant of all, at least in regard to long-term exploration and use of outer space. First, on April 12, 1981, the initial test flight of the United States space shuttle was successfully achieved. Second, on July 4, 1982, Ronald Reagan, President of the United States, set a new national space policy, asking NASA (the National Aeronautics and Space Administration) to begin effecting a transition that would lead to the operational use of space programmes and systems by the nation's private businesses. Thus, the events that took place on these latter two dates unofficially launched the era of the commercialization of space in the United States. Today, the U.S. production volume in the space industry is going to reach 5 billion dollars.[1] Communication continues as the dominant endeavour by private concerns, but it is no longer the only one. Other areas being explored by

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[1]. Asker, James R., " U.S. Commercial Space Revenues Projected to Hit $5 Billion in 1992 ", *Aviation Week & Space Technology*, June 29, 1992, p.68.

the private sector for their market potential are remote sensing, space manufacturing and energy. The following is a brief description of these activities.

1. Communications

Satellite communications is now a well-known part of everyday life. Telephone calls, data and television signals are relayed via satellite. Communications satellites constitute a vital part of a much broader global telecommunications network, composed of many different technologies and types of systems. From their vantage points in space, they provide a variety of services, accessible on land, sea, and in the air, some of which cannot economically be replicated by other communications technologies. Today, more than two-thirds of the world's international voice communications and virtually all of the world's video programming are transmitted by satellite. Numerous concerns are poised to offer direct-to-the-home television from a satellite to a rooftop dish only a few meters wide,[2] as well as to mobile satellite services. At present, most of these services are provided by satellites poised in the geostationary orbit 22,300 miles in space over the equator. That orbit provides the best placement of interference-free

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[2]. Gump, David P., *Space Enterprise: beyond NASA,* Praeger, New York, 1990.

communications and the most consistent footprint[3] for the intended uses. However, with the development of technology, telecommunications could also be provided by a group of smaller satellites in nongeosynchronous orbits.[4]

(a) Relay Satellite Services

Relay satellite services are provided via earth stations at relatively permanent locations, such as tie-in points with terrestrial telephone lines, cable television head-ends, and customer premises. Many business opportunities exist with this communication satellite service, which includes building the satellite, operating the satellite as well as simply leasing satellite transponders for various telecommunications services. Some companies engage in more than one kind of activity, and still more make the ground based receiving equipment.[5] It is estimated that between 1983 to 1990, in this area the business is about $2 billion for space and ground hard-ware, and $10 billion for communication services by satellites.[6]

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[3]. The area which is covered by a satellite signal.

[4]. Klass, P. J., "Low-Earth Orbit Communications Satellites Compete for Investors and U.S. Approval", *Aviation Week & Space Technology,* May 18, 1992, p.60.

[5]. For examples: Ford Aerospace & Communications Corp.; General Electric Space Systems Div.; Hughes Aircraft Co.

[6]. *Space Processing,* 1983, p.15.

(b) Direct Broadcast Satellite

The major U.S. domestic use of satellites is to beam TV programs down to network affiliates and cable systems. By using higher power satellites, the signals could be beamed to small dishes, only two or three feet wide. This technology is called DBS (direct broadcasting via satellite). In the U.S., several private firms are serious about building high-power DBS systems. One of them is TCI/Tempo, which plans a 32-channel system able to reach 1.5-foot dishes.[7]

(c) Mobile Satellite Services

Unlike the relay satellite service, mobile satellite services are designed to be used during transit. These services include voice, data, and paging services to mobile units, such as trucks, boats, cars, trains, and aircraft.[8] Commercial interest in providing land, maritime and aeronautical mobile satellite services has increased dramatically over the past several years. The mobile communications market is potentially quite large, and could become a major profit centre for the satellite industry. By 1995, annual worldwide revenues

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[7]. Gump, David P., *Supra,* note 2, p.94.

[8]. Recently, ICAO is discussing a USSR-U.S proposal to offer satellite navigation. For details, see "USSR-U.S. Accord Reached on Satellite Navigation", ICAO Bulletin, May, 1989.

are expected to reach $1 billion or more.[9]

It is estimated that for the period of 1989-2000, there is a market of $10.7-13.7 billion worldwide for the telecommunications, which represents between 153 and 195 satellites.[10] The supply of telecommunications satellites at the international level can be described as limited to the biggest U.S. companies: Hughes Space and Communications Group (a subsidiary of General Motors), Ford Aerospace and Communications Corporation (a division of the Ford Motor Company), and GE Astro-Space (a division of General Electric). Those three companies alone have supplied three-fourths of the world's commercial market for second generation satellites.[11] There are at least 40 additional firms in the United States that manufacture spacecraft components for commercial satellite systems.[12]

2. Remote Sensing

Remote sensing has been defined by the United Nations as "a methodology to assist in characterizing the nature and

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[9]. Space Commerce--An Industry Assessment, U.S. Department of Commerce, May, 1988, p.47.

[10]. "Space Industry - 10 year survey", *Space Policy*, August, 1990, p.255.

[11]. *Id.*

[12]. *Supra,* note 8, p.48.

condition of the natural resources, natural features and phenomena, and the environment of the earth by means of observations and measurements from space platforms. Specifically at the present, such methods depend on the emission and reflection of electromagnetic radiation".[13] Remote sensing technology can be used in crop prediction, mapping, weather broadcasting, pollution detection, mineral exploration and military reconnaissance.

The existing U.S. remote sensing system consists of Landsat 5, with its multispectral scanner, a new thematic mapper, and the tracking and data relay satellite. The system was operated by the U.S. government until 1984 when Congress promulgated the Landsat Commercialization Act.[14] According to the Act, the Earth Observation Satellite Co. (Eosat), a joint venture of Hughes Aircraft and General Electric, was created. Eosat sells the Landsat data to anyone at a price of $500 to $4,400 for a single Landsat scene. According to Scott Pace of the Commerce Dept., the current U.S. value-added market is around $100 million, and it could easily grow to

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[13]. U.N. Doc. A/AC. 105/111, (1973), p.2.

[14]. Congressional Research Service for the Subcommittee on Space Science and Applications and the Subcommittee on Science and Technology, "Commercialization Policy and Issues in Commercialization of Land and Weather Satellites", 98th Cong., 1st Sess, 1983, p.8.

$200-300 million.[15] However, eight years after the U.S. turned sales of Landsat imagery over to a private company, Congress is now considering a measure that would bring the remote sensing program back under the government umbrella.[16]

3. Space-Based Facilities and Material Processing

Existing and planned space-based facilities are for industrial purposes. They range from relatively simple platforms to fully equipped orbiting laboratories and industrial production facilities capable of supporting manned activities in a shirt-sleeve environment.[17] These facilities can provide accommodations for scientific research, materials processing, satellite assemble and servicing, technology development, remote sensing, and other activities. Several U.S. companies are actively seeking to establish privately

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[15]. Asker, James R., "Congress Considers Landsat 'Decommercialization' Move", *Aviation Week & Space Technology*, May 11, 1992, pp.18-19.

[16]. *Id.*

[17]. The United States, with participation by the member countries of the European Space Agency, Japan, and Canada, is planning to establish a permanently manned Space Station (Freedom). This project began in 1984, and test articles and a few items of flight hardware have been produced for assembly in obit, which is to begin in 1995. See "House Kills Proposal to Cancel Space Station", *Aviation Week & Space Technology*, May 4, 1992.

owned and operated industrial facilities in space.[18]

The advent of space material processing brings with it a myriad of possibilities. The potential uses of the space environment are just beginning to be explored. It uses the microgravity and high vacuum environments of outer space to manufacture some materials in order to get a purity which is impossible to achieve on the earth. Almost all of the microgravity research conducted has been in the area of MRPS (Materials Research and Processing in Space). In the United States, more than 350 companies have been exploring prospects for products in outer space.[19] Pharmaceuticals and electronics are good examples of material processing in space.

The sales of new or improved drugs made in space could reach as much as $20 billion annually in the worldwide market. A TRW study found potential products to include ultrapure serums and vaccines and products that may be made more efficiently in space.[20] For example, the enzyme urokinase

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[18]. These companies include SPACEHAB, Space Industrial Inc., and External Tanks Corporation. Others, such as Fairchild Industries, Wyle Laboratories Inc., GM/Hughes Aircraft, Ball Aerospace, Teledyne Brown, and GE Astro Electronics have made investments to develop concepts and designs for such facilities. See *Supra,* note 9, p.81.

[19]. Wilford, John N., "Business Ventures in Space Studied", *New York Times,* May 27, 1984, p.1.

[20]. Brown, David A., "NASA Ready to Attempt Human Cell Growth in Space", *Aviation Week & Space Technology*, July 6, 1992, pp.56-57.

could be made from human kidney cell cultures in space at six times the efficiency achieved on the earth. The enzyme presently dissolves blood clots at a cost of $1500 per dose, a figure that could conceivably be reduced to $100 per dose if made in space. With regard to the electronics, one application is to manufacture high quality crystals used for semiconductors. Ceramic oxide crystals can be made very pure and uniformly shaped in a microgravity environment. These crystals could be used in computer memories, optical communications, optoelectronics, pyroelectric detection, surface acoustics, and ultrasonics.[21] Because of the purity and uniformity of the crystals, the functions of these devices could be greatly enhanced, and the potential benefits derived from this area are enormous. Computer chips made of gallium arsenide are faster than those made of silicon for switching on computers. With the aid of this semiconductor material, supercomputers can be built which will perform billions of computations every second. Rockwell International has forecast a worldwide market for gallium arsenide of $165 million in 1995, and $860 million by the year 2000.[22] Microgravity Research Associates has signed an agreement with NASA to produce gallium arsenide aboard the space shuttle. The cost of making the products is small compared to the

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[21]. Pardoe, Geoffrey K. C., *The Future for Space Technology*, Frances Printer, London and Doner, N.H. 1984, p.103.

[22]. *Supra,* note 5, p.40.

number of microchips to be sold. It is estimated that $400 million could be realized annually in the 1990s with only ten percent of the market.[23]

4. Space Transportation

All the space activities cannot be performed without space transportation, regardless of whether the activities are conducted by satellites or space platforms. Space transportation consists of the delivery of payloads to and from space, as well as the transfer of payloads between various earth orbits and points beyond. Routine, affordable, assured access to space is essential for conducting commercial activities in space, particularly industrial research and development that can lead to new space-based commercial applications.

This has been changed through a series of Presidential Directives and Orders,[24] and the passage of the Commercial Space Launch Act and its Amendments, which has led to a private launch industry (Expendable Launch Vehicle-ELV's) being established.

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[23]. Finch, E. R. Jr. & Moore, A. L., *Astrobusiness,* Praeger, New York, 1985, pp.10-11.

[24]. Presidential Directive on Commercialization of Expendable Launch Vehicles (May 16, 1983); Commercial Expendable Launch Vehicles, Exec. Order No. 12465, 49. Fed. Reg. 7211 (1984) or 42 U.S.C. 2465 at 180.

Today, the major aerospace companies involved in commercial launch services in the United States include General Dynamics Launch Services Inc., offering the Atlas family of launch vehicles (Atlas I, II, IIA and IIAS), McDonnell Douglas Space Systems Company, offering the Delta class launch vehicles, Martin Marietta Commercial Titan Inc. with the Commercial Titan Launchers, as well as a number of other providers of smaller-class launch vehicles, such as Orbital Sciences Corporation, Space Services Division of EER Systems Corporation, LTV Missiles and Electronics Group, and Lockheed Missiles and Space Company.[25]

At the international level, for the period of 1980-88, the market for about 90 telecommunications satellite launching totalled just over $3.3 billion. For the period of 1989-2000, the market for launchings should amount to $9.2-11.7 billion for 173 satellites.[26]

Space is no longer the sole domain of governments. Private enterprises have invested a lot in space industry, and they expect to get great benefit from those space activities. The Centre for Space Policy, an organization formed in 1983 to evaluate commercial opportunities in space, estimated a market of $44 billion to $53 billion by the year 2000. Some experts

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[25]. *Supra,* note 9, p.8.

[26]. *Supra,* note 7, p.259.

feel even that may be conservative. Former NASA administrator James Beggs estimated that the market will be "several hundred billion dollars". And U.S. Congressmen Newt Gingrich of Georgia and Bob Walker of Pennsylvania think it is possible to create, by the year 2000, a half-trillion-dollar space based world economy, one that could generate twenty million jobs on the earth.[27]

In conclusion, in the United States the private sector has already become a major player involved in space activities. They are making sales of billions of dollars in space industry. However, since space endeavour is considered as a high risk activity from a liability point of view, they also have the potentially destructive burdens of liability which can result from a product failure or from negligence in the performance of launch services. Therefore, the private sector turns to seek support from the space insurance industry. Today, no commercial entity would dream of developing, launching, and operating a space system without comprehensive insurance coverage.[28]

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[27]. Taylor, L. B. Jr., *Commercialization of Space*, Franklin Watts, New York, 1987, p.14.

[28]. "Who Will Underwrite Industry in Space and Why", Special Advertising Section, *Aviation Week & Space Technology*, May 28, 1984.

II. SPACE INSURANCE

1. History of Space Insurance

The first insurance for s commercial satellite operation was placed in 1965, which covered the Early Bird launch vehicle prior to launch. It was recognized at the time that significant launch and post-launch exposures existed, however, it was not possible to purchase insurance for the basic reason that the insurance community knew very little about placing satellites into orbit.

In 1969, the Communications Satellite Corporation (COMSAT) was able to purchase insurance from the major London and aviation markets to insure five launches of the Intelsat III program, with a policy limit of $4.5 million and a one launch failure deductible. One satellite in this series, the Intelsat III F-7, reached the proper orbit, but experienced a shortened life span because it needed to expend extra fuel to achieve orbit. As a result, in 1971 COMSAT and the insurance market rewrote the policies for the Intelsat IV program to include coverage for damage resulting from under-use of the spacecraft in orbit due to launch-related problems.

The Intelsat IV program involved a series of eight launches, and COMSAT agreed to accept a two-failure

deductible. By 1974 six satellites were successfully launched, so the policy automatically terminated. By this time the market capacity was expanding due to increased coverages, including insurance for the Intelsat IV-A, Marisat, and Comstar programs.

In 1975 two major breakthroughs were made. First, the Indonesian government concluded launch and satellite liability coverages for its Palapa series of satellites. Second, RCA was able to secure satellite life insurance for the first of its Salcon satellites. The Indonesian action represented the first governmental effort to purchase satellite insurance. Since then, such countries as France, India, Japan, Canada, Brazil, and Australia have purchased space insurance.

Up to 1977 the satellite insurance industry had developed new levels of confidence. More underwriters and brokers entered the market, and it appeared that writing satellite insurance was a safe and profitable business.

In September 1977 all that changed, when the first of a number of losses took place. The European Space Agency's OTS I satellite, valued at approximately $29 million, was lost. This was the first major loss for the space insurance industry, and the loss settlement rapidly depleted the premium base by $12 million. The loss of a Japanese Space Agency

satellite in 1978 was the second one, which further depleted the premium base by $12 million.[29]

Many underwriters pulled out of the space insurance market after the unsuccessful deployment of Westar VI and the Indonesian Palapa B-2 in February, 1984.[30] Between 1986 to 1987, the space insurance witnessed a series of failures, which included the French Ariane on May 30, 1986, the U.S. Titan on April 18, 1986, Delta on May 3, 1986, the U.S.S.R. Proton on January 30, 1987, as well as the disaster of the Shuttle Challenger in January, 1986. As the result, the space insurance industry lost confidence in the space industry.[31]

2. Nature of Space Insurance

Historically speaking, the manufacture of satellites and launch vehicles has been dominated by companies primarily engaged in aviation airframe and electronics production.[32] Those companies had been familiar to the aviation insurance

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[29]. Finch, *supra,* note 17, p.40.

[30]. Bunker, D. H., *The Law of Aerospace Finance in Canada,* Institute and Centre of Air and Space Law, Montreal, 1988, p.232.

[31]. Goudge, B., "The Capacity Is Alive", *Space: Legal and Commercial Issues*, Outer Space Committee Section on Business Law, International Bar Association, London, 1988, p.170.

[32]. For examples, Hughes Aircraft Co., McDonnell Douglas Co. and General Electric Corp.

industry long before they were involved in space activities. As a result, when these companies began to have space exposures, it was natural for them to approach aviation insurers for space insurance coverages. Hence, aviation insurers became, almost by default, the original space insurers.[33] More recently, maritime underwriters were involved, and today, the space insurance business is drawing participants from throughout the world underwriting community by the way of so called "reinsurance".[34] Apart from that, space insurance has its own characteristics which differ from other kind of insurances.

(a) Advanced Technology

Space insurance business involves the most advanced technology. It is most often that insurers find themselves up against unfamiliar concepts and technology for which there is no possible basis of comparison. They were compelled to adapt to the needs and demands of their clients, to think up new forms of cover and often to

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[33]. Space Insurance Report, prepared by Johnson and Higgins, New York, Nov. 1982.

[34]. Reinsurers assume much of the ultimate risk of loss by providing insurance to the primary insurers, thereby sharing the risk among a broader group of risk takers. Reinsurance can be prearranged between insurers and reinsurers in an agreement called a "treaty". Alternatively, it can be established on an ad-hoc or "facultative" basis. The extent to which space risks attract sufficient reinsurance determines the ultimate success in achieving the requisite amount of insurance capacity at reasonable cost.

change their ways of thinking and to acquire space expertise.

(b) Non-analogy of Insurable Objects

Since the technology of space activity is improving very rapidly, the law of series and of large numbers is virtually irrelevant in this area, and the conventional probability calculations are not feasible. Due to modifications on each product, a satellite will differ from its predecessors, even if it belongs to the same family, has been built by the same manufacturer, and is used by the same operator for a similar purpose. The situation is exactly the same for launch vehicles. In order to uprate performance, the manufacturers have constantly improved their products with a hope that the vehicles will carry heavier payloads, and enhance reliability. As a result, there are no standard series in this area and every statistic is open to question.

(c) Small Number of Insurable Objects

The number of high-value objects insured is relatively few. There will be 20 satellites per year until the middle of 1990's and then the number will gradually decline to reach a low of about 10 per year by the end of the century.[35] Compared with considerable

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[35]. *Supra*, note 7, p.259.

insured sums of the order of $100 million for property damage, and $500 million for third party liability,[36] the total of insurable objects is very small. On the other hand, launch frequency was too low to provide a continuous infusion of premiums into the market.[37] Because of its narrowness and the very large sums it has to cover, space insurance will be feasible only when it reaches a planetary scale. However, space insurance business today is a joint action by insurers worldwide.

(d) Special Role of the Insured

The role of the insured in space insurance is quite different from that of the insured in other fields of insurance. In most cases, it is the insured and his contractors who design, develop, build and use their products.[38] It is again the insured alone who determines the criteria of success and failure. He is the only one able to really brief the insurer on his product, and is the sole source of such information. It is he who draw up and decides the reliability factors which will be the criterion for charging the premium, who

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[36]. The requirement which was set in Commercial Space Launch Act Amendment, Public Law No. 100-657, Nov. 15, 1988.

[37]. "Satcon 3 Loss Affects Underwriters, Cable T.V.", *Aviation Week & Space Technology*, Dec. 17, 1979, p.51.

[38]. For instance, Martin Marietta manufactures Titan launchers as well as provides commercial space transportation with the vehicles.

defines and fixes them in the light of the objectives he proposes to achieve. Again it is he who intervenes in the event of damage, and only he who decides what will or will not be done to remedy possible malfunctions; and it is he alone who can provide proof of a claim. The insured thus has quite exceptional powers and insures himself for a series of operations which ultimately depend only on him and over which he alone keeps control. The result is that the notion of contingency, which in insurance conditions the materialisation of risk, assumes a very special connotation in space. In aviation for example, the risk usually derives from causes and factors which are external to the insured objects: the pilot, weather, control tower malfunction and faulty maintenance. Space risks derive, however, mainly from a design error,[39] a bad choice of solutions, inadequately tested or proven technology,[40] and errors of judgement. It is almost always the insured who is the direct author of malfunction rather than the occurrence of an external event. The damage is always or nearly always the fault

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[39]. See, *Martin Marietta Corporation v. International Telecommunications Satellite Organization (INTELSAT)*, Civ. A. No. MJG-90-1840, 763 F.Supp. 1327 (D.Md. 1991).

[40]. For example, in the case of the twin failures of Palapa-B2 and Westar VI in 1984. For the details, see Bunker, D. H., *The Financial, Insurance and Legal Implications Arising out of The Failure and Recovery of The Westar VI and Palapa-B2 Satellites*, unpublished paper, Institute of Air and Space Law, Montreal, 1985.

of the insured himself or his contractors. Hence, insurance becomes the endorsement of a technology.

3. Categories of Space Insurance Coverage

Generally, space insurance coverage could be classified into three basic kinds, i.e. first-, second- and third-party insurance. First-party insurance covers losses incurred by the insured to its own property.[41] Second-party insurance covers the policy holder for damages caused to a second, related party.[42] Third-party liability insurance provides protection from liability incurred by the insured as a result of damage caused to unrelated third parties.[43] From a practical point of view, however, to date, the categories of space insurance are still not standardized.

It is a fact that to provide space risk coverage requires

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[41]. For example, this kind of insurance covers the loss of a communications satellite by the satellite owner if it fails to achieve orbit or it malfunctions.

[42]. For example, a launch service provider contracting with the NASA (the second-party) for use of Government launch facilities and related range services would be liable for damage to Government property caused by the launch vehicle. The launch service provider could be also liable to its customer, the satellite owner, or to the insurers of the customer and the owner through subrogation, if the launch vehicle malfunctions and destroys the satellite payload.

[43]. For example, this kind of coverage would apply if a launch vehicle malfunctions and its payload impacts the earth. In this case, it is very possible to cause injury or damage to third-parties.

a huge sum, and no single insurance market has capacity adequate to provide the entire coverage for major risks. For instance, launch insurance for a customary telecommunications satellite program will exceed $100 million. Markets at Lloyds of London, continental Europe, the United States, Japan and Australia will typically commit a portion of their capacity for individual risks. As it is desirable that the risk be covered by a common policy of insurance among all underwriters in order to avoid possible dispute between different markets, it becomes particularly challenging to reach consensus among all participants. The challenge these underwriters face is the different philosophies as to policy wording and the different legal regimes governing these markets. Therefore, unlike other areas of insurance which benefit from many years of experience and established standard from policy wording, insurance contracts for space risks are largely still "manuscript" or individually written and negotiated.[44] Nevertheless, as in other branches of insurance, a distinction could be made between damage insurance and liability insurance.

(a) Damage Insurance

There are three main types of property damage insurance contracts which are designed in accordance with

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[44]. *Supra*, note 33.

the three main phases of a space launch:

(1) Pre - launch insurance

The first policy to occur timewise i.e. the pre-launch policy cover, is intended to cover material damage that could occur to the launcher and to the satellite in the period directly prior to launch.[45] Since the individual insured's requirements may differ from one to another, the period of coverage differs accordingly and, this may be provided during any or all of the following phases:

* while the insured property is in transit from the manufacturing location;
* while the insured property is stored and undergoing testing at the launch site, and
* during the pre-ignition phase, which begins with the commencement of operations to mate the spacecraft to the launching vehicle and ends upon the launch attempt i.e. intentional ignition of the first stage engines.[46]

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[45]. Bunker, D.H., *The Law of Aerospace Finance in Canada,* Institute and Centre of Air and Space Law, McGill University, Montreal, 1988, p.251.

[46]. Magdelenat, J.L., "Spacecraft Insurance", 7 *Annals of Air and Space Law*, 1982, p.372.

The coverage is subject to standard exclusions including loss or damage resulting from: mechanical failure, short circuits, or other electrical disturbances; error, omission or deficiency in design, specification or workmanship; wear and tear; nuclear reaction, radiation or radioactive contamination; hostile act, insurrection or revolution; and confiscation by government order.[47]

However, it is still possible for the insurance to cover business interruption resulting from loss or damage to the insured property. This coverage applies only to revenues which are completely lost as a result of such loss or damage.[48]

(2) Launch Insurance

The second kind of policy starts from the moment of lift-off until in-flight acceptance of the payload, i.e., of the satellite(s) carried. This insurance protects against material damage and malfunctions which could occur during this period

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[47]. Nesgos, P.D., *National Law and Commercial Activities in Outer Space*, unpublished D.C.L thesis, Institute of Air and Space Law, McGill University, Montreal, 1983, p.254.

[48]. Magdelenat, *supra*, note 46.

and affect the launcher and the satellite. The insurers guarantee its ability to place the payload either in low orbit or in transfer orbit. The positioning phase comprises the functioning of the satellite itself, which, in the case of a geostationary satellite, for example, has to place itself in its final orbit with the aid of an apogee motor. Once in this orbit, it will have to position itself satisfactorily and demonstrate in the course of a period of generally 3 to 6 months that it is functioning correctly, has withstood the strains and stresses of launching, and is able to fulfil its mission. After this test period, acceptance is then announced, the satellite is declared operational and the launch cover ceases. In the event of an aborted lift-off, the launch policy would terminate and the pre-launch policy would be reactivated. The launch insurance would also end before the specified term if the space object is or is not declared operational by the insured.[49]

(3) Satellite Life Insurance

As soon as launch insurance coverage terminates, it is replaced by a third damage

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[49]. Nesgos, *supra*, note 47, p.256.

policy, i.e., satellite life insurance or in-orbit insurance. This insurance provides comprehensive coverage of partial or total loss of the satellite, which, during its operational phase, includes the proper operation of transponders, power generating systems and the propellants used for station-keeping purposes. The coverage generally lasts for a three-year period.[50] In the case of a geostationary satellite with the normal lifetime of 7 to 10 years, the insurers will evaluate the terms for renewing cover for a further period of 3 years depending on the "health" of the satellite and the problems that may have occurred during the first 3-year period.[51]

The amount of cover is fixed before the policy takes effect for these three kinds of damage insurance contracts. In the case of pre-launch and launch insurance, it is usually equal to the value of the hardware. In some case the insurers can determine franchises for the number of operational transponders. They may also consider that redundancy of systems and subsystems constitutes in itself a franchise or a sufficient margin of error. In the early years,

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[50]. Bunker, *supra,* note 45, p.252.

[51]. Nesgos, *supra*, note 49.

underwriters wrote a policy covering a series of satellites with one deductible. Today, the practice of a deductible for satellite loss is no longer common in space insurance policies.[52]

The policies also provide the definitions of total loss and partial loss. The former occurs when either the satellite physically disappears or is completely unusable for commercial purposes. The latter happens when the satellite has not met the required specifications but is nevertheless usable for all or part of the duration scheduled by the manufacturer.[53]

These three kinds of insurance only concern direct damage. However, the risk of indirect damage may also be insured. For example, the loss of revenue and the expenses incurred as a result of an asset that has been damaged, destroyed or that fails to operate as intended, or a service interruption resulting therefrom.[54] One kind of such insurance is taken by satellite manufacturers to insure against the financial consequences they may suffer because of the

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[52]. Hosenball, S. N., "Space Law, Liability and Insurable Risks", 12 *The Forum 141*, 1977, p.154.

[53]. Nesgos, *supra*, note 47, pp.272-273.

[54]. Bunker, D. H., *supra*, note 30, p.239.

malfunctioning of their own products.[55]

(b) Liability Insurance

Liability insurance extends coverage over any third party claims for bodily injury or property damage which may occur prior to and during launch, and throughout the existence of the satellite in outer space.[56] This insurance is usually in force for a three-year term with no deductible.

This launch liability policy usually contains certain exclusions, which are as following:

* contractual liability except those contracts relating to the satellite program such as the launch services and satellite manufacturing

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[55]. A satellite procurement contract defines in great detail the specifications for the spacecraft's functioning, performance and lifetime. Such contracts usually provide an incentive scheme whereby the satellite procurement price will vary in the light of services rendered. The client pays on delivery a minimum sum which will be increased as and when the satellite passes the various tests extending from its integration until the end of its life. When malfunctions occur and the satellite functions only partially or not at all, the manufacture can claim a part of the total remuneration which would have been expected if everything had done well. Therefore, this insurance is to make good any lost earnings and to cover incentive payments. See Englesson, P., "Subrogation in Space, Should It Be Permitted?", *Legal and Commercial Issues*, International Bar Association, London, 1987.

[56]. Nesgos, *supra*, note 47, p.276.

agreement;

* automobile liability;
* injury or sickness to the insured's employees;
* property damage to the insured's spacecraft (usually covered by another policy);
* damage to goods in the care, custody or control of the insured;
* wilful violation of statutes;
* damage or injury due to war or nuclear mishap;
* failure of the operator to provide service.[57]

4. The State of the Space Insurance Industry

Generally speaking, insurance is a contract by which one party, for a compensation called the premium, assumes particular risks of the other party and promises to pay him or his nominee a certain sum of money on a specified contingency. In the practice of offering insurance coverage, several factors have to be taken into consideration. First of all the losses must be expected to be irregular in occurrence. If losses occur with regularity, the concept of the pooling of risks and resources is irrelevant. When too many people suffer a loss, spreading a large loss among a group can no longer bring about a small loss for all. Instead, everyone

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[57]. Englesson, P., "Space Commerce and Insurance", Lecture to the Institute of Air and Space Law, McGill University, 1981(unpublished).

suffers a relatively large loss. As result, the premium will rise to a level which is considered to be uneconomical to insure a risk. Therefore, the risk will become uninsurable. Secondly, the cost of insuring the risk must be low in comparison to the coverage.[58] When the cost of the insurance is nearly as high as that of replacing the lost item, there is no need for the insurers to hold the buyer's money until the loss takes place. The buyer might just put the money in the bank and get the interest. Finally the risk must be determinable. The underwriters must have reliable information to assess the risk.

It is natural that in most commercial ventures, one will think of obtaining appropriate insurance cover in order to cover liability exposure. On the other hand, in general insurance, historical data enables insurers to make predictions as to the likely incidence and extent of losses, and then the insurers can figure out premiums which will leave them with a profit after all claims have been paid. The purpose of doing insurance business is the same as other business i.e. to make reasonable profit. The prospect of

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[58]. In the field of space insurance, the premium rating level of approximately 25% was considered to be acceptable to both purchasers and underwriters. The quotes as high as the 30% level could lead the purchasers to seriously consider self-insurance. See Kitano, Y., "Space Industry Insurance and Technology Together", *Commercial and Industrial Activities in Space--Insurance Implications*, 5th International Conference, Rome, 1989, p.219.

reasonably predictable profits will ensure the availability of sufficient insurance capacity to meet demand.

However, as mentioned earlier, there are a number of features of space insurance industry which set it apart from other areas of insurance. Simply, there are relatively few parties requiring insurance, the incidence of losses is relatively high, the quantum of those losses is very high and the number of insurers willing to undertake spacecraft insurance is quite small. As a result, the parties seeking such insurance will find that the market capacity is limited and cost is high in terms of both premiums and deductibles.

For years, the space insurance industry has been in a net loss position. From 1965 to 1982, the insured sums amounted to virtually 2 billion dollars. Over the same period, claims amounted to some $220 million whereas the total of net premiums paid was only about $125 million. The ratio of claim to premiums was thus 176% over that 17 years.[59] During 1983 to 1988, satellite premiums were dramatically increased from around 5% to over 30%.[60] After the one mission failure of Palapa-B2 and Westar VI in 1984, many underwrites dropped out of the space insurance business, including a major London

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[59]. George, V. R., "Space and Insurance", *International Business Lawyer*, March, 1984, p.130.

[60]. Bunker, *supra*, note 45, p.232.

firm, Orion Insurance Company.[61] In 1985, five more satellites suffered launch failures, which cost insurers nearly $370 million, and the amount of insurance capacity available on the world market dropped to $60-70 million.[62]

Satellite underwriters lost total confidence in satellite launches after failure of the Shuttle Challenger[63] and the subsequent failures of the Titan[64] and Delta,[65] and the Ariane[66] and the Proton.[67] Only the renewal of on-orbit satellite polices, whose rates had also risen, kept the space insurance industry alive.[68]

In 1987 the rates began to turn down again, and in 1989 premium rates applied for launch policies were between 19% and 23%. In February 1990, two policies covering multilaunches

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61. U.S. Senate Report No.100-593, 100 Cong., USCA 5525, at 5528.

62. *Id.*

63. *Id.*, in January, 1986.

64. April 18, 1986. Aviation Week & Space Technology, April 28, p.16, and May 5, 1986, p.24.

65. May 3, 1986. *Aviation Week & Space Technology*, May 12, 1986, p.20, and May 19, 1986, p.28.

66. French launch vehicle was failure on May 30, 1986. See *Aviation Week & Space Technology*, June 9, 1986, p.49.

67. It was U.S.S.R. launch vehicle, which failed on January 30, 1987. See *Aviation Week & Space Technology,* February 9, 1987, p.26.

68. *Supra*, note 61.

were placed at premium rate lower than 17%.[69] The current rate is around 18%.[70] According to the Generali Insurance Company, cumulative space losses have amounted to in excess of $1.66 billion compared to net premiums earned of about $1.6 billion with a shortfall of $60 million.[71]

Space insurance industry as a private industry, which by its very nature is profit-oriented, could not afford to take losses in the long run. That is because: (A) insurance is simply "the transfer of the risk of loss from individuals and organizations to a risk-sharing pool"; (B) it also follows that the environment of the market itself will determine, to a large extent, the capacity of the insurance industry to provide adequate coverage to those demanding it. Thus, in order for the insurance industry to attract new capital, investors must perceive that the rate of return on investment in a particular market is adequate in comparison to alternative investments of similar risk. Therefore, unless it appears that the profit opportunities are similar or greater than that in other alternative markets, there could be no such

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[69]. Gobbo, G., "An Insurer's view of the Space Business", *Space Policy*, February, 1991, p.48.

[70]. Nesgos, P. D., "The Practice of Commercial Space Law", paper presented at 40th Anniversary Colloquium: Air and Space Law and the Challenges of the 21st Century, Institute of Air and Space Law, McGill University, Montreal, Oct. 1991.

[71]. *Id.*

incentives to encourage insurance investors to enter or maintain the market. This general pattern of attraction between the insurance industry and the market also applies to the relationship between this industry and existing and potential market in space activities. The space insurance industry cannot be expected to continue subsidizing the commercialization of space activities. Underwriters are in business to make a profit, and if a profit cannot be made, they will naturally abandon the business.

It is also worth noting that the losses which have caused underwriters so much grief all involved loss of satellites or launch vehicles (first-party and second party liability), not possible payouts on claims by third parties suffering injury or loss as a result of spacecraft.[72]

In conclusion, the history of space insurance shows that the commercialization of space activities needs the space

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[72]. The only third party loss resulting in serious claim resulted from the crash of a Soviet Cosmos 954 Satellite in 1978 over the north of Canada. The nuclear power source caused radioactive contamination and the accident resulted in clean up costs of $3 million. It is understood that while a number of claims have been made over the past few years under space liability insurance policies, none have been pursued seriously and no payout has been made. There have, however, been some potentially serious incidents. The Japanese delegate to the COPUOS Legal Sub-Committee reported an incident in 1969 when a Japanese cargo boat was damaged and the crew injured by some fragment; the U.S. delegate produced at a meeting in 1962 a 20 lbs fragment which had landed in a street in Wisconsin.

insurance industry. The insurance industry is a very key player in the pace of the development of space opportunities, and it has a crucial role in facilitating the success of space-based industry. Though the insurance industry cannot stop the movement into space, it could slow it very significantly. On the other hand, a healthy space insurance market will contribute greatly to a strong and viable space industry in general.

In view of those problems, the space commercial community began to debate several space related liability issues. One of those issues is the question of the right of subrogation, which would be available if a launch vehicle or a satellite suffers a physical damage during the launch.

Subrogation is a well established legal principle in insurance law, and works well in other areas of insurance. Since space insurance has its unique features, application of subrogation on space insurance must have its own meanings and practices. In order to discuss this issue, first of all, we have to examine the doctrine of subrogation, which will be covered by the next chapter.

III. DOCTRINE OF SUBROGATION IN INSURANCE

1. The Meaning of Subrogation

Subrogation, which developed as an equitable doctrine, facilitates an adjustment of rights to avoid unjust enrichment in many types of situations by substituting one person or entity in place of another in regard to some claim or right the second person or entity has against a third party.[73]

In the case of *Homeowner's Loan Corp. v. Sears Roebuck and Company,*[74] the doctrine of subrogation was defined as: "A legal fiction through which a person who, not as a volunteer or in his own wrong, and in the absence of outstanding and superior equities, pays the debt of another, is substituted to all rights and remedies of the other, and the debt is treated in equity as still existing for his benefit".

This definition contains essential elements of the general subrogation doctrine: (A) the party claiming subrogation shall have first paid the debt; (B) he is not a mere volunteer, but has a direct interest in the discharge of the debt; (C) he is secondarily liable for the debt or

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[73]. See, *Frost v. Porter Leasing Corp.* 386 Mass. 425 pp.426 - 428, 436 N.E.2d, 387 pp.388-391 (1982).

[74]. 123 Conn. 232, 193A. 769.

discharge of the lien; (D) no injustice will be done to the other party by allowing the equity.[75]

Besides the definition given by the courts, many legal and insurance scholars have provided general definitions of subrogation too. One of the scholars wrote: "Subrogation is a right, equitable in origin and enforceable in common law, whereby a nonvolunteer who has made payment to another party by reason of a debt for which he is only secondarily responsible, takes over that party's rights and remedies against the third party (ies) who is (are) primarily responsible for such debt".[76]

According to those definitions, the party to whom the rights and remedies pass is called "subrogee"; and the party whose rights and remedies are succeeded to is called the "subrogor".

The doctrine of subrogation is broad enough to include every instance in which one party pays the debt for which another is primarily answerable, and which in equity and good

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[75]. These components are summarized in *Hampton Loan and Exchange Bank v. Lightsey*, 155 S.C. 222, 152 S.E. 425.

[76]. Horn, R. C., *Subrogation in Insurance*, Richard D. Irwin. Inc., 1964, pp.13-14.

conscience should have been discharged by such other.[77] Nevertheless, in the insurance context, when an insurer indemnifies an insured who is entitled to recover compensation for that loss from another source, in some situations the insurer may be subrogated to the insured's right. This means the insurer is "substituted" for the insured in regard to either all or some portion of the rights that the insured has to receive compensation from another source. In this case, the insurer is considered as the subrogee and the insured as the subrogor.

2. Historical Origin of Subrogation

It is generally agreed that both the name and the doctrine are borrowed from Roman institutions. Subrogation is a term in Roman constitutional law which signifies the choice of an official to replace or act in concert with another. In England, "the right of subrogation was recognized by the English courts as early as 1637".[78]

The case of *Cheeseborough v. Millard* in 1815 is often cited to establish the approximate date by which subrogation

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[77]. For example in the case of trading trusts, and in contracts of suretyship.

[78]. *Supra*, note 76.

was well established in the United States.[79] It was early decided by the courts that the right would be available to insurers on the maxim that no one should be enriched by another's loss.

3. Nature of Subrogation

(a) Subrogation as a Right

Subrogation is a right in action which must be actively asserted. Generally speaking, the insurer does not *ipso facto* become subrogated to the right of the subrogor.

The general requirements of the right of subrogation in insurance are as following:

(1) the third party is primarily liable to the insured for loss or damage.

(2) the insurer is secondarily liable for some or all of the loss by a contract of indemnity (in conventional subrogation cases).

(3) the insurer has paid the insured under the policy.

The insured, on the other hand, has a duty to assist the insurers to exercise their right of subrogation. He is also obliged not to prejudice or diminish any rights of action

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[79]. For the brief history of subrogation, see *Burrus v. Cook*, 117 Mo. App. 385, 93 S.W. 888 (1906).

or recovery he may have against third parties during the currency of the policy,[80] and particularly after a claim has arisen.[81] The insurer can deny liability under the policy if the insured releases a third party from his liability to the insured in relation to a loss.[82] It is worth mentioning that from a practical viewpoint, subrogation is also a liability of an insurer in the event his insured is a wrongdoer, and in this case the subrogation action will be between two insurers.[83]

(b) Subrogation and Recovery

A successful subrogation collection is in the nature of a recovery, however, subrogation is one of several types of loss recoveries available to an insurer. Salvage collections, refunds of overpayment, and contributions from other insurers are other types of loss recoveries.

Sometimes, the word "salvage" is used synonymously with "recovery". According to that, subrogation can be regarded as one of many forms of salvage. However, from a legal point of

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80. Such as signing a general release without the knowledge of the insurer.

81. Margo, R. D., *Aviation Insurance*, Butterworths, London, 1989, p.304.

82. Derham, S. R., *Subrogation in Insurance Law*, The Law Book Company Limited, 1985, pp.126-132.

83. For some details see Chapter v.

view, it is important to distinguish subrogation form salvage. The word "salvage" has a unique meaning, in most nonmarine insurance "salvage" is used to denote the liquidated value of physical property partially damaged by the event which gave rise to the loss, or property partially or wholly recovered after the loss was paid. Therefore subrogation and salvage are not synonymous. The word "recovery" should be used in a broader sense, not the word "salvage".[84] For the purpose of this paper, the issue of salvage in insurance will not be discussed.

(c) Types of Subrogation

(1) Conventional Subrogation

An insurer's subrogation right may be expressed by the acts of the parties through a clause that is included either in the applicable insurance policy or in a settlement. The right rests on the law of contracts, and its scope is measured both by the terms of the contractual agreement and by the rights of the grantor (the insured) of subrogation. Furthermore, occasionally a right of subrogation for insurers in regard to a particular type of insurance will be specifically

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[84]. Horn, supra, note 76, p.155.

provided for in a state's insurance legislation.[85]

(2) Legal Subrogation

Legal subrogation is effected by the operation of the law and arises out of a condition or a relationship. When there is no contractual provision that explicitly sets forth a right of subrogation, an insurer may be entitled to seek subrogation or the basis of a judicially created right.[86] Legal subrogation rests on equitable principles and does not depend on a contract or on privity of the parties.

(3) Relationship between Two Types of Subrogation

If the requirements of a legal subrogation are met by the facts of a specific case, the subrogation will be automatically accorded to the party who claims the right, even though the contract did not contain an express subrogation provision. On the other hand, in a case where the aforementioned requirements are not fulfilled, subrogation can still be allowed if the parties to the contract agreed.

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[85]. Keeton, R. E. & Widiss, A. I., *Insurance Law -- A guide to fundamental principles, legal doctrines and commercial practices*, Practitioner's Edition, West Pub. Co., 1988, p.220.

[86]. *Frost v. Porter Leasing Corporation*, 386 Mass. 425, 436 N.E.2D, 387 (1982).

When courts in the United States consider whether a subrogation right should exist in the absence of an express provision, they are usually concerned about where an insured will receive compensation that provides more than full indemnification as a result of recoveries from the insurer and other sources.[87] Courts are also in favour of allowing subrogation if a third party (tortfeasor) would be likely to escape financial responsibility while the insurer is not accorded a subrogation right.

4. Rational for Application of Subrogation

The doctrine of subrogation in the insurance context has been closely interwoven with the doctrine of indemnity. The most frequently cited reason for its application is to prevent an insured for profiting from his loss, i.e. obtaining a double recovery, once from his insurer and once from the tortfeasor.

Application of subrogation comports with public policy to allow the ultimate economic burden to be borne by the party causing the loss in the first place. According to this rationale, (A) it can prevent a tortfeasor from profiting from

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[87]. See, *Rixmann v. Somerset Public Schools, St. Croix County*, 83 Wis. 2d 571, 266 N.W. 3d 326 (1978).

insurance paid for by the insured in the event that the insured would forego suit once made whole by his insurance; (B) it can impose a burden that might act to deter the commission of torts.[88]

Subrogation recoveries enter the rate structure, by serving as a reduction in incurred losses, hence the insurer is not paid to take the risk of negligent losses, but rather the risk of negligent losses less net subrogation recoveries. Therefore, the net of subrogation recoveries will in some way be used as a basis for the premium structure. However some scholars consider that subrogation is a windfall to the insurer by arguing that "since the insurer is paid to take the risk of negligent losses, it should not shift the loss to another".[89]

Anyhow, subrogation is generally viewed as an important technique for the ends of justice, which places the economic responsibility for injuries on the party whose fault caused the loss. It would violate the principle of indemnification if a recovery by the injured person from an insurer and the tortfeasor is denied.[90]

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[88]. Dobbyn, J. T., *Insurance Law In A Nutshell*, St. Paul, Minn. West Publishing Co. 1981, p.229.

[89]. Patterson, E., *Essentials of Insurance Law*, 2d ed., New York, McGraw-Hill 1957, p.151.

[90]. Keeton, supra, note 85, p.220.

5. Practice of Subrogation

(a) Types of Contract

An insurer asserting a subrogation right is usually viewed as "standing in the shoes" of the insured in relation to any rights of recovery which may be available to the insured against third parties,[91] once he has indemnified the insured under the policy. The right of subrogation is not automatically accorded to an insurer under every type of policy or contract. In fact, the courts have often reasoned that the contract type is a major element in determining whether a right is available.[92] According to the courts, the doctrine of subrogation applies only to the "indemnity" type of policy,[93] which normally includes:

(1) property insurance;

(2) liability insurance;

(3) uninsured motorist insurance;

(4) casualty insurance.

The subrogation is usually not allowed in an insurance

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[91]. Margo, R. D., *Aviation Insurance*, London, Butterworths, 1989, p.303.

[92]. *Blobe & Rtgers Fire Ins. Co. v. Foil*, 189S.C. 91, 200S.E. 97 (1938).

[93]. *Gatzweiler v. Milwarkee Electric Co.*, 116 N.W. 633; 136 Wis. 34 (1908); *Aetna Life Ins. Co. v. Parker and Co.*, 72S. W. 168 (1903) Texas.

contract covering persons.[94] With regard to space insurance, the policies belong to the first two types.

(b) Liability Contract and Indemnity Contract

A liability insurance contract is concluded to provide indemnity against liability.[95] Liability insurance policies commonly include a subrogation provision, and validity of such clauses usually is not questioned.[96] On the other hand, a property insurance contract provides indemnity against loss. A property insurer is almost always entitled to assert a subrogation right in regard to any tort claims or contract claims its insured may have against other persons or entities. In this context, the principle rationale for subrogation is that it prevents violations of the principle of indemnification. Since space insurance policies are either a liability contract or property contract, the subrogation right of the insurers should be allowed.

(c) Subrogation in Aviation Insurance

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[94]. For example, medical and health insurance; personal accident and life insurance. See, *Matter of Schmide's Estate*, 79 ILL. App. 3d 456, 34 ILL. Dec. 766, 398N.E. 2d 589, p.591 (2d Dist. 1979); *Forst v. Porter Leasing Corp.*, 386 Mass. 425, 436 N.E.2d 387 (1982).

[95]. *City of Topeka v. Rilchie*, 102 Kan. 384, 170 p.1003.

[96]. *Aetna Casualty & Surety Co. v. Porter*, 181 F. Supp. 81 (D.D.C. 1960). In this case, a liability insurer was subrogated to an indemnity claim of an insured against a joint tortfeasor who was primarily liable for the tort.

Almost all aviation insurance polices contain a clause providing that upon payment of a claim, the underwriter will become subrogated to the rights of the insured except with respect to the loss of licence, personal accident and life insurance.[97] The typical wording in a subrogation clause is as follows: "In the event of any payment under this policy, the Underwriter shall be subrogated to all the Insured's rights of recovery therefor against any person or organization and the Insured shall execute and deliver instruments and papers and do whatever else is necessary to secure such right. The Insured shall do nothing after loss to prejudice such rights".[98]

When an insured sustains a loss to an aircraft or suffers a mishap which may result in the lodging of a liability claim by injured third parties, he normally initially notifies the underwriter. The underwriter, in turn, will appoint an adjuster to investigate the claim and to make recommendations relating to the settlement. The adjuster is required to file an investigation report, in which, besides all relevant information, the adjuster should provide information concerning any possibility for the subrogation of the claim against a third-party wrongdoer. As soon as the settlement of the claim is reached, the insured is required to execute a

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[97]. Margo, supra, note 91, p.303.

[98]. See Lloyd's Aircraft Hull Policy (U.S.A.).

formal release in favour of the underwriter in exchange for payment. The current practice among London aviation underwriters requires that funds for settlement of a claim will not be sent until the underwriters have actual sight of a signed release.

It is very important for the underwriter to obtain the release, as the release eliminates the possibility of being sued for the claim in question which has been settled with the insured or other parties, and the insured subrogates all the rights he may have had against the wrongdoer to the underwriter. A release usually provides a provision of subrogation which reads as following: "In consideration of the payment to be made hereunder, the undersigned hereby assign, set over, transfer and subrogate to the Underwriters all the rights, claims, interest, choses, or things in action to the extent of the amount above claimed, which they may have against any party, person, corporation or governmental agency who may be liable for the loss and hereby authorize the Underwriters to sue, compromise or settle in their names or otherwise, and the Underwriters are hereby fully substituted in their place and subrogated to the rights which they have to the amount so paid. It is hereby warranted that no settlement has been made by the undersigned with the wrongdoer".[99]

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[99]. Release Agreement of Airclaims Inc.

If the Underwriter determines that legal grounds for subrogation of the claim exist, he will send a letter to the tortfeasor with a demand for reimbursement of the settlement costs paid by his. If no response to the letter is received within a reasonable time, legal procedure may be introduced to pursue the subrogation.[100]

The right of subrogation may be expressly waived under the policy,[101] and also can be waived by insurers, on a case-by-case basis, in a variety of ways.[102] The reason for the waiver sometimes is "to meet the needs of hold-harmless agreements".[103]

The waiver of subrogation is frequently done in aviation policies which is issued to larger insureds, and it may also be impliedly limited by the wording of the contract.[104] Furthermore, in most situations, an insurer is not entitled to be subrogated to rights that may exit as a consequence of a

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[100]. Johnson, C. F., *Aviation Insurance*, unpublished thesis, McGill University, Institute of Air and Space Law, Montreal, 1980, pp.140-156.

[101]. The Marine Sulphur Queen (1970) 2 Lloyd's Rep 285.

[102]. See, *Fire Assn. of Phila. v. Schellenger*, 94A. 615; *Firement's Ins. Co. v. Ga. Power Co.*, 181 Ga. 621, 183 S.W. 799; *Home Ins. Co. v. Hartshorn*, 128 Miss. 282, 91So. 1.

[103]. Rodda, *Fire and Property Insurance*, New Jersey, Prentice-Hall, Inc., (1956), p.226.

[104]. The Yasin (1972) 2 Lloyd's Rep.45.

liability claim against its own insured,[105] a co-insured,[106] or a person for whose joint benefit property has been insured.[107]

In the United States, subrogation actions are usually brought in the name of the underwriters or in accordance with the statutes.[108]

As discussed earlier, most property and casualty space insurances are contracts of indemnity, such as pre-launch insurance and launch insurance. That is, the insurer has an obligation only to indemnify the insured for the loss suffered and no more. Other insurance contracts, such as satellite life insurance and transmission interruption insurance, are valued contracts. That is, they pay the insured or his beneficiary a certain value irrespective of the actual loss incurred. Third party liability insurance is also an indemnity contract, it indemnifies against damages resulting from the injury or to the property of a third person. Therefore, it is likely that subrogation will be pursued in

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105. *Bow Helicopters Ltd v. Bell Helicopter Textron*, Can. Ilr. 1141, (1980), §1-1298, (QB Alta).

106. *Great American Insurance Company v. Curl*, 18 Ohio Ops. 2d 481, 181 N.E.2d 916 (Ct. App. 1961).

107. *Bow Helicopters Ltd v. Bell Helicopter Textron*, Supra, note 105.

108. For example, Federal Rules of Civil Procedure 24 (a) (2).

space property insurance and third party insurance.

IV. SUBROGATION IN SPACE INSURANCE

1. Space Insurance Contract

Many insurance contracts are standard policies, i.e. the document containing the terms of the proposed contract, occasionally, with some endorsements for special cases. Space insurance is different: unique elements are often introduced to satisfy changed constraints or requirements. This means that risks are specific to the spacecraft and an individual risk assessment is required. Consequently, spacecraft coverages to date have been manuscript policies resulting from lengthy discussion with the owner or user and tailored to its exact requirements.[109] Nevertheless, commonality of policy wording is evolving, and a number of underwriters expect to cooperate in order to create standard space insurance policy forms.[110]

Although no standard wordings are used, some clauses and endorsements and certain policy provisions appear with increased regularity. A typical contract usually will consists of sections such as declarations, insuring agreement, definitions as well as exclusions. The contents of each section will be modified to reflect the needs a particular

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[109]. See *supra*, note 33.

[110]. Nesgos, *supra*, note 70.

insurance requirement.[111]

(a) Declarations

A general description is given in the declarations, which refers to the name and address of the insured, the type of the insurance, the amount of insurance, launch schedule and the policy period with the time of commencement and termination. The premium amount and payment are mentioned, and the provisions are very specific to the policy involved.[112] Provisions on the deductibles, in same cases, are also to be found in the declarations. With respect to communications satellites, a deductible provision could be that, the insurers shall not be liable under this policy for transponder failure of the first x transponders.[113]

(b) Insuring Agreement

The insuring agreement sets out what has been agreed to by the insurer and the insured under the policy. It states the specified performance parameters to be met during the period of insurance. It also explains the indemnity to be

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[111]. Space Insurance Report, prepared by D.Y.P. Insurance Company, 1991.

[112]. Usually the premium will have to be paid 30 days prior to the insurance coming into effect. in case of early payment the rates may be reduced slightly. If a launch be delayed, the insurer refunds 90% of the premium paid until 30 days before the launch.

[113]. It is customary for such deductibles to operate after the spacecraft's redundant capacity has been utilised.

paid for total or partial losses[114] or all risks.[115] The partial loss formulas are provided in the agreement to determine the payments in the event of a transponder or other subsystem failure. Furthermore, it explains how a reduced satellite life should be assessed. At a time when commercial satellites were being launched by the Space Shuttle, insuring agreements provided provision for launch aborts.[116]

A common qualification which will be found in all insuring agreement clauses is one which limits the total amount payable under the policy to the amount of insurance.

(c) Definitions

The definitions section is, without doubt, one of the most important parts, since in the absence of adequate and succinct definition, the meaning of many of the terms used in the policy may at best lack substance and at worst be totally obscure. In order to avoid disputes arising from different interpretation of the policy wording in the event of a loss, a glossary of important terms is provided in this section. In

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[114]. What constitutes a total or partial losses are set out in detail in the definitions section of the policy.

[115]. In the earlier policy, the wording "all risks" can be found. It means the insurer will pay the insured in the event of any loss of or damage to the spacecraft, launch vehicles and ancillary equipment, for which the insured is responsible. See *supra*, note 111.

[116]. *Id*. Launch aborts are still possible with expendable launch vehicles.

the launch and early-orbit policies, for instance, the glossary will define the exact meaning of contract, satellite, intentional ignition, lift-off, terminated ignition, partial loss and partial loss amount, total loss, transponder and transponder failure, satellite performance specifications, as well as relaunch.[117] However, each insurance will produce the need for its own specific definitions, which will invariably be based on the procurement contract and technical specifications.

(d) Exclusions

This section of the policy identifies those losses which are not covered by the policy. It is interesting to note that the exclusions in a launch insurance wording are the first section which may be considered to be standardised policy language.[118] This section usually states that this policy does not apply to loss/damage or failure caused by or resulting from:

* war risks, including terrorist attacks;
* any anti-satellite device, or device employing atomic fusion, or device employing laser or directed energy;
* insurrection strikes, riots, civil commotion, rebellion revolution, civil war, usurpation or

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[117]. *Id.*

[118]. *Id.*

action taken by government authority;

* confiscation by order of any government or governmental authority or public authority;
* nuclear reaction, nuclear radiation, or radioactive contamination of any nature;
* electromagnetic or radio frequency interference;
* wilful or intentional acts of the insured, his contractors, employees and agents.
* loss of revenue, extra expenses, incidental or consequential damages;[119]

(e) Conditions

The conditions constitute the final section of the policy. The number and detailed language of the conditions vary on a case to case basis, and the market domicile of the insurers issuing the policy is a factor reflecting fundamental general insurance principles and practice. Most of the claims are expressed in "standard" aviation heritage policy terms. The following is a general description of those principles other than subrogation.[120]

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[119]. A variation to this exclusion includes loss of market share and some wordings contain a third party liability exclusion which usually appears as third party liability, including but not limited to, liability for bodily injury, property damage and failure to provide service. See *supra*, note 111.

[120]. We will examine the condition of subrogation in the policy in the next subsection.

(1) Declarations

This is a clause which binds the insured to the statements made in the declarations and to make specific undertakings regarding the status of the satellite.[121]

(2) Due Diligence

This is a standard clause, which reads as follows: "The insured shall use due diligence and do and concur in doing all things reasonably practicable to avoid or diminish any loss under this policy and act at all times as if uninsured".[122]

(3) Notice of Loss

This stipulates the time limit by which a notice of loss must be given after a loss occurrence and proof of loss submitted.

(4) Access to Technical Information

Insurers require all relevant technical information

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[121]. For instance, the wording could be: by acceptance of this policy the insured agrees that the statements in the declarations are its own representations and that this policy is issued in reliance upon the truth of such representations, and that this policy embodies all agreements existing between the insured and the insurers relating to this insurance policy. The insured undertakes and agrees that at the attachment of risk the spacecraft and launch vehicle are to the best of the insured's knowledge and belief in a nominal condition.

[122]. *Supra*, note 111.

both before launch and after any loss.

(5) Appraisal

Some policies contain an appraisal clause, which is designed to deal with a situation where the insured and the insurers cannot agree on the amount of the loss.

(6) Arbitration

Some policies may replace the appraisal provisions with the more all-embracing terms of an arbitration clause.

(7) Payment of Claims

This is a clause regarding the payment of the claims, as well as return of any overpayment, if a loss were to prove less severe than initially estimated.

(8) Salvage

After a total loss claim has been paid, the title of the spacecraft passes to the insurer, who is entitled to take over and beneficially dispose of the subject matter of the insurance. There are only two occasions in which insurers have ever recovered salvage in the sense of physically recovering insured satellites for which they

had paid total losses.[123]

Since the authority to launch and operate a satellite is given specifically to the satellite owner/operator, the situation in a satellite salvage is more complex than a general one. This authority is not a transferable asset which can be acquired by insurers under any rights to salvage.[124]

(8) Abandonment

In the event of a loss there shall be no abandonment of any property to the insurers unless the insurers give their written consent.

(9) Other insurance

Most insurance polices also contain miscellaneous

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123. The salvage involved the Westar VI and Palapa-B2 spacecrafts which were launched from the Space Shuttle Challenger on mission 41B on February 3, 1984 and were left stranded in low earth orbit by the failure of their McDonnell Douglas perigee kick motors to fire correctly. They were recovered and brought back to earth on November 8, 1984 by the Space Shuttle Discovery on mission 51A, and after some years in storage sold by the insurers. Westar VI became Asiasat 1, which was launched on a Chinese Long March 3 on April 7, 1990, and Palapa-B2 was reacquired by the Indonesians and relaunched as Palapa-B2R on a Delta 6925 on April 13, 1990. Both satellites are now operational.

124. For a detailed case analysis, see Bunker, D. H., "The Financial, Insurance and Legal Implications Arising out of the Failure and Recovery of the Westar VI and Palapa-B2 Satellites", unpublished paper, Institute of Air and Space Law, McGill University, Montreal, 1985.

conditions. These conditions include the attachment of risk, provisions on arbitration or suit procedures and regulations for policy changes and cancellation etc.

(f) Subrogation Clause in the Space Insurance Contract

The space insurance policy wording regularly contains a normal subrogation clause, which is usually found in the section of "Conditions" of the policy. The typical language used in this clause reads as following:

> *To the extent of any payments under this policy, the insurers shall be subrogated to all of the insured's rights of recovery therefor against any person or organisation, and the insured shall execute and deliver instruments and papers and shall do whatever else is necessary to secure such rights of subrogation for the insurers. The insured shall do nothing after loss to prejudice such rights. The insured shall co-operate with the insurers and, upon request of the insurers shall assist in effecting settlement, securing evidence, conducting investigations, obtaining evidence of witnesses and in the conduct of suits. Any expenses incurred upon such request of the insurers shall be paid by the insurers.*

Subrogation clauses in space insurance have tended to produce a position where rights of subrogation have been more

apparent than real.[125] However, unlike the other insurances, this subrogation right is affected by those factors, such as the "best efforts" basis in spacecraft and launch service procurement contracts, and the disclaimers and limitations of liability in spacecraft and launch vehicle purchase contracts, which are going to be discussed latter.

2. Potential Basis for Subrogation Recovery under U.S. Law

Statistics shows that the main cause of the losses or damages to the insured property in space activities is either defective products or human error. As mentioned earlier, subrogation applies in cases where the insured has some right against the person who is ultimately responsible for the damages under the contract or under the law. In order to subrogate those rights, it is very important, from an insurer's point of view, to know what kind of rights may exist and who are the potential third-parties ultimately responsible in the event of physical property damage incurred during a commercial space activity. Therefore, it is necessary to examine the civil liability scheme under U.S. domestic laws.

In general, there is no law or scheme of liability which applies specifically to commercial space ventures. Although

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[125]. Supra, note 111. The cases will be discussed in Chapter IV.

there are several international treaties[126] and federal statutes[127] which deal exclusively with space ventures, but their impact on domestic civil liability has been insignificant. The law governing the civil liability of manufacturers of aerospace products and providers of launch services is usually the same law which governs the civil liability of those who provide other types of products and services. Generally speaking, it is not federal law but the law of individual states which governs civil liability in this context, and only the law of the specific states which has the most substantial relationship with the incident or transaction will apply. Therefore, in order to determine which substantive law will provide the basis for civil liability, the following factors should be taken into consideration: a) where the allegedly defective products were manufactured or the negligent service was performed; b) where the products or services were sold or used and; c) where the contractual relationship between the parties was established. As a result, the law which is applicable can vary from case to case, and the choice of law analysis can be critical because

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[126]. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies; Convention on International Liability for Damage Caused by Space Objects; and Convention on Registration of Objects Launched into Outer Space.

[127]. Section 308 of the NASA Act; Commercial Space Launch Act 1984, CSL Act 49, USC 2624; and Commercial Space Launch Act Amendment, Public Law 100-657, Nov.15, 1988.

the differences in law of the competing jurisdictions can change the ultimate outcome of a case.

(a) Products liability by Law and In the Contract

The following are the common legal principles for products liability which are recognized in virtually all jurisdictions in United States.

(1) Negligence

Theory of negligence in products liability actions generally includes: a) negligent manufacture, b) negligent design, and c) negligent failure to warn. Negligent manufacture of a product simply involves holding the manufacturer liable for negligently failing to do what it intended to do, if such failure is the proximate cause of property damage or injury. In negligence actions, liability does not arise out of the nature of the product as in strict liability cases, but rather out of the manufacturer's conduct and activities. The manufacturer may be found negligent in the preparation and selling of products;[128] in failing to inspect or test a product;[129] in selecting the materials contained therein;[130] in the workmanship;[131] as well as in

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[128]. Noel, "Manufacturers' Liability for Negligence", 33 *Tenn. L. Rev.*, 1966, p.144.

[129]. *Kross v. Kelsy Hayes Co.*, 25 App. Dir. 2d 901.

[130]. *Setta v. American Steel & Wire Division*, 254 F.2d 12 (6th Cir. 1958).

the failure to discover possible defects[132] or dangerous propensities.[133]

(i) Negligence in Manufacture

The most noted case permitting recovery for the negligence of a manufacturer is *MacPherson*,[134] where the court held manufacturer Buick negligent for its failure to inspect and test the final product and its parts, stating that: "We think the defendant was not absolved from a duty of inspection because it brought the wheels from a reputable manufacturer. It was not merely a dealer in automobiles. It was a manufacturer of automobiles. It was responsible for the finished product. It was not at liberty to put the finished product on the market without subjecting the component parts to ordinary and simple tests. The obligation to inspect must vary with the nature of the thing to be inspected. The more probable the danger, the greater the need of caution". In 1938, the Ohio Supreme Court held that the *MacPherson* ruling

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131. *Id.*, p.62.

132. *Macpherson v. Buick Motor Co.*, 217 N.Y. 382, 111 N.E. 1055 (1916).

133. *Walton v. Sherwin Williams Co.*, 191 F.2d 277 (8th Cir. 1951).

134. *Macpherson v. Buick Motor Co.*, 217 N.Y. 382,111 N.E. 1050 (1916).

applied to aircraft,[135] and in the same year, the New York Courts were the first to permit recovery under the *MacPherson* rule against a manufacturer for negligence in the manufacturing of aircraft.[136]

(ii) Negligence in design

The second major division of negligence in products liability action is negligence in design. The design of a product includes the plan, structure, choice of materials and specifications. There is no dispute that a manufacturer is under a duty to use reasonable care to design a product that is reasonably safe for its intended use and for other uses which are foreseeable. The question in design cases often turns on what is reasonable care and what is reasonably safe. A manufacturer is not required to design the best possible product, nor one as good as another manufacturer might make, as long as the product that he makes is reasonably safe.

Negligent design in products liability cases can be

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[135]. *Breen v. Conn*, 28 N.E.2d 684 (1938).

[136]. *Gladstone v. Grumman Aircraft Engineering Corp.*, 5 N.Y. Supp. 2d 252 (1938). It should be noted that the Buick case allowed a third party claimant to sue the manufacturer in tort. Prior to Buick the claimant had to have a contractual relationship with the manufacturer or seller.

classified into three basic categories: a) design defects concealing dangers; b) design defects failing to provide needed safety devices; and c) design defects involving the use of materials. The Restatement (Second) of Torts provides a rule as to duty in products designing, by saying that "a manufacturer of a chattel made under a plan or design which makes it dangerous for the uses for which it is manufactured, is subject to liability to others whom he should expect to use the chattel or to be endangered by its probable use for physical harm caused by its failure to exercise reasonable care in the adoption of a safe plan or design".[137]The first of the three main categories of negligent design is the duty to avoid hidden dangers. The general rule is that a product design may be actionably defective if it conceals some danger neither known nor obvious to the person injured by the product.[138] Under the second category, the duty of a manufacturer to use reasonable care arises out of the requirement that products should be safe to use. The design of a machine or product will be considered improper, if it is in lack of a guard, shield, or other

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[137]. Restatement (Second) of Torts, §389.

[138]. *Hyatt v. Hiester Co.*, 106F. Supp. 676 (D.C. N.Y. 1952) and *Blitzstein v. Ford Motor Co.*, 288F.2d 738 15th Cir. 1961).

type of protective device.[139] The duty to use materials of sufficient strength in the manufacturing of a product is the third category of negligent design. Liability could be established on the basis that the manufacturer used materials which were inadequate or were of insufficient strength or durability to make their products safe.[140]It is worthy of mentioning that failure to comply with the Government's regulatory standards in design may in fact constitute "negligence *per se*".[141]

(iii) Negligence in failure to warn

A seller or a manufacturer is under a duty to give an adequate warning of unreasonable dangers involved in the use of its product of which it knows or should know.[142] This duty extends not only to dangers arising from improper design or other negligence in manufacture, but also to dangers inseparable from a properly made product of that particular kind. The manufacturer's duty to warn does not end at the time of the sale; the manufacturer is required to warn consumers whenever and

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[139]. *Otis Elevator Co. v. Wood*, 436 S.W. 2d 324 (Tex, 1968), and *Albert v. J & L. Engineering Co.*, 214 So. 2d 212 (La. App. 1968)

[140]. *Dyson v. General Motors Corp.*, 298 F. Supp. 1064 (D.C. Pa. 1969), and *Mickel v. Blackmon.*

[141]. *Reyes v. Vantage S.S. Co., Inc.* 609 F. 2d 140 (5th Cir. 1980).

[142]. *Gardner v. Q. H. S., Inc.*, 448 f. 2D 238 (4th Cir. 1971).

at whatever time the product is discovered to be dangerous.[143]

(2) Breach of Implied Warranty

Historically speaking, the breach of implied warranty theory can be seen as a theoretical bridge which allowed tort law to progress from negligence principles to strict liability principles. Under the theory of negligence, the plaintiff had to prove that the defendant's product presented an unreasonable risk and that actual damage or loss was caused by its. Actions based upon breach of implied warranties and strict liability avoid this onerous task. Where an express representation was made regarding a product, the manufacturer could be held liable for defects which were unknown to it even if not found negligent.[144]

However certain difficulties did arise with the existence of contractual disclaimers or exclusions. One method invoked to deal with the situation was for the court to find an implied warranty, for instance an implied warranty of merchantability[145] or of fitness,[146] as an integral party of

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[143]. *Comstock v. General Motors Corp.*, 358 Mich. 163, 99 N.W. 2d 627 (1959).

[144]. *Baxter v. Ford Motor Co.*, 12 P. 2d 409 (1932, Wash. S.C.).

[145]. The product has to meet certain minimum standards of quality for the ordinary purpose for which it was sold, including a standard of reasonable safety.

the transaction.[147] It was thought that an express warranty, such as that against defective parts and workmanship was not inconsistent with implied warranties.[148]

Implied warranties can be classified into two categories, 1) implied warranty of merchantability; and 2) implied warranty of fitness for a particular purpose.

(i) **Implied warranty of merchantability**

As set out in the Uniform Commercial Code, implied warranty of merchantability is defined as follows:

Goods to be merchantable must be at least such as:

(a) pass without objection in the trade under the contract description; and

(b) in the case of fungible goods, are of fair average quality within the description; and

(c) are fit for the ordinary purposes for which such goods are used; and...[149]

By applying implied warranty of merchantability,the

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[146]. It is foreseeable that the product is likely to cause injury to a class of persons including the plaintiff, if it is negligently made.

[147]. *Henningsen v. Bloomfield Motors, Inc.* 161 A. 2d 69; 32 N.J. 358 (1960, S.C.), 373.

[148]. *Id.*, 378.

[149]. Uniform Commercial Code § 2-341 (2).

court in *Hochberg*[150] ruled that the test as to whether a food product is fit for ordinary purposes (merchantability) is not only whether the food was wholesome and fit for human consumption and contained no foreign deleterious substance, but also what should reasonably be expected by the consumer in the food served to him.[151]

(ii) Implied warranty of fitness

Implied warranty of fitness for a particular purpose is defined as: Where the seller at the time of contracting has reason to know any particular purpose for which the goods are required and that the buyer is relying on the seller's skill or judgment to select or furnish suitable goods, there is, unless excluded or modified under the next section, an implied warranty that the goods shall be fit for such purpose.[152]

Implied warranty of fitness for a particular purpose is unlike implied warranty of merchantability; a seller is not required to be a merchant for the former theory to apply. An implied warranty of fitness further differs

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[150]. *Hochberg v. O'Donnell's Restaurant, Inc.*, 272 A. 2d 846 (1971).

[151]. *Id.*

[152]. Uniform Commercial Code § 2-315.

from that of merchantability in that a greater degree of reliance on the part of the buyer must be shown. A presumption exists that an ordinary purchaser expects the product to be warranted as "fit for the ordinary purposes" or merchantable when it is sold by a merchant. However, implied warranty of fitness for a particular purpose generally has application only when the seller selects or recommends a certain product, and particularly when the seller knows for what purposes the buyer is purchasing the product.[153]

However, the application of the theory of implied warranty is limited, since in many situations its usefulness has been reduced by the theory of strict products liability.

(3) Strict Liability

Now, a majority of jurisdictions have adopted the doctrine of strict liability as set forth in the Restatement (Second) of Torts.[154] In a separate paragraph titled Special Liability of Seller of Product for Physical Harm to User or Consumer, liability is expressed in the following terms:

1) One who sells any product in defective condition

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[153]. *Northern Plumbing Supply, Inc. v. Gates*, 196 N. W. 2d 70 (N. D. 1972); and *Lewis v. Mobile Oil Corp.*, 438 F. 2d 500 (8th Cir. 1971)

[154]. Restatement (Second) of Torts § 402 A.

unreasonably dangerous to the user or consumer or to his property is subject to liability for physical harm thereby caused to the ultimate user or consumer, or to his property, if

a) the seller is engaged in the business of selling such a product;

b) it is expected to and does reach the user or consumer without substantial change in the condition in which it is sold.

2) The rule stated in subsection (1) applies although

a) the seller has exercised all possible care in the preparation and sale of his product;

b) the user or consumer has not bought the product from or entered into any contractual relation with the seller.

According to the section, it is very clear that privity is not essential and that the ambit of responsibility extends to any user or consumer. Also, the defence of all possible care taken by manufacturer or seller is rejected and the conduct is irrelevant. The restrictions are that the seller be engaged in the business of selling the product and that the product reach the user or consumer in the same condition in which it is sold. As well, the defective condition of the product must be such as to be unreasonably dangerous to the

user or consumer. In order to recover, plaintiff must prove, the defective condition of the product; the proximate cause of the injuries or damages occurring from that defective condition in the product; and the actual loss or injuries sustained. Plaintiff must also show the defect existed at the time the product left the defendant's control. However, it is not necessary to show any reliance upon the reputation of the seller or upon any representation or undertaking made.

The first case to apply strict liability under section 402 A of the Restatement (Second) of Torts was *Greenman v. Yuba Power Products, Inc.*,[155] an action involving an injury caused by a home power tool. The court held that strict liability need not be based on contract warranty but was governed by the law of tort.[156] "To impose strict liability on the manufacturer", it was not necessary for plaintiff to establish an express warranty. A manufacturer is strictly liable in tort when an article he places on the market, knowing that it is to be used without inspection for defects, proves to have a defect that causes injury to a human being".[157] Through the Greenman Case, in case law, the doctrine of strict product liability in tort was established, independent of earlier negligence or warranty theories. It

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[155]. 377 P. 2d 897 (1962 Cal. S.C.).

[156]. Id., 900.

[157]. Id., 899.

was widely accepted by courts in United States.

The scope of applicability of the doctrine and the nature of responsibility in various instances have been clarified by a variety of court decisions. In *Boeing Airplane Co. v. Brown*,[158] the court held that the manufacturer had a duty of reasonable care even if the defect was as a result of a component completely made by another manufacturer and installed by the former into its product. The court stated: "a manufacturer which buys and installs in its product components fabricated by another is subject to the some liability as though it were the manufacturer of the component".[159] This is particularly significant as regards manufacturers of complex products that contract with a variety of sub-contractors over which they have little production control. Furthermore, in *Goldberg v. Kollsman Instrument Corp.*,[160] it is held that a manufacturer of a component part need not be found liable since adequate protection for recovery is provided for by the manufacturer which puts the product on the market. In case the manufacturer of a finished product is in bankruptcy, an action can be brought against a component manufacturer. However the manufacturer of

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158. 291 F. 2d 310 (1961, C.A. 9th Cir.), this case was decided prior to *Greenman v. Yuba Power Products, Inc.*.

159. *Id.*, 313.

160. 240 N.Y.S. 2d 592 (1963, C.A.).

a finished product cannot avoid liability by proving that the defect was caused by the supplier of a component part.

(4) Tort Liability in a Commercial Context

In the United States the general rule, in a commercial context, is that liability for negligence can be excluded but this can only be achieved by language which is plain and unambiguous such that it can have no other meaning except for such exclusion.[161] The clause will be strictly construed against its proponent but there is no public policy consideration which would condemn the validity of such a clause.[162]

The Courts in many jurisdictions in the United States have refused to extend the protection of strict liability theories to commercially equal parties. The rational for this was clearly stated in *Kaiser Steel Corporation v. Westinghouse*

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[161]. For example, in California, an attempt to disclaim liability for one's own negligence will be enforceable only if the contract states explicitly that the parties intended to have the disclaimer apply to negligence claims. In such jurisdictions, the word "negligence" must be used. If the word "negligence" is not used, the disclaimer would likely be unenforceable as to claims based in negligence regardless of how clearly the parties to the contract may have otherwise stated their intention. See Palapa-B2 case, *Lexington Ins. Co. v. McDonnell Douglas Corp.* (Cal. Super Ct., Orange County No. 481713).

[162]. In *Tunkl v. Regents of University of California*, 60 Cal.2d 92, 96, 32 Cal.Rptr. 33, 383 P.2d 441, the Supreme Court held that exculpatory provisions which "involve 'the public interest'" are unenforceable.

Electric Corp.[163] In that case the purchasers of an electric motor for use in a steel mill sued the seller for strict liability, breaches of express and implied warranty, and negligence. The Los Angeles County Superior Court granted summary judgment for the defendant on the warranty theories and non-suit on the strict liability and negligence allegations. The Court of Appeal concluded that the trial court had properly granted a non-suit on the strict liability issue. The court held: "Because the Californian rule of product liability is designed to encompass situations in which the promotions of sales warranties serve their purpose fitfully at best; the rule of product liability does not subsume the entire area of a manufacturer's liability for a defective product". The Court also considered that since the legislature had, through the adoption of the Uniform Commercial Code, defined the precise conditions and extent of liability for defective products in situations covered by the Code, the Court must not create rules of liability which would displace those of the Uniform Commercial Code. In its conclusion, the Court stated that: "the doctrine of products liability does not apply as between parties who: a) deal in a commercial setting; b) from a position of relatively equal economic strength; c) bargain the specifications of the product; and d) negotiate concerning the risk of loss from defects in it".

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[163]. 55 Cal. App.3d 737 (1976).

In *Keystone Aeronautics Corp. v. R. J. Enstron Corp.*,[164] the Court decided that an exculpatory clause protecting against liability for negligence or strict liability is an appropriate subject of negotiation and not *per se* invalid but will be strictly construed. The strength of exclusion clauses was also demonstrated in *S. A. Empresa de Viacao Aerea (Varig) v. The Boeing Company and Weber Aircraft Corp.*,[165] in which, the court held that the disclaimer in the contract between the manufacturer and Seaboard World Airlines was effective against Varig both in negligence and in strict liability. The disclaimer also covered the alleged negligent failure by the manufacturers to warn of defects.

It is interesting to note that in *O'Brien v. Grumman Corp.*,[166] the exclusion clause did not specifically refer to negligence or strict liability but did exclude implied warranties. The court held that negligence was not excluded but that strict liability was. This was based on the conclusion that strict liability was considered to be the equivalent of claims for breach of implied warranty under New York law. One significant question that may arise is whether the rationale behind the liability to rely on a strict

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[164]. 499 f.2d 146 (3rd Cir. 1974).

[165]. U.S.D.C. W.D. Washington No.9, C76-169M, filed 14 January 1973.

[166]. 475F. Supp. 284 (S.D.N.Y. 1979).

products liability remedy between parties of equal bargaining power is based on the ability to rely on exculpatory language, or on the fact that the remedy is not available at all.[167]

There is a contrary view in the commercial equal debate. The leading case is *Sterner Aero AB v. Page Airmotive, Inc.*,[168] the court held that a strict liability should not be denied to a plaintiff as a matter of law merely because of its size or corporate status, or its technological expertise. The court, in *International Knights of Win, Inc* case, [169] held that the applicability of the doctrine of strict liability depends upon whether the particular party is defenceless to the particular type of harm rather than its status. Therefore, according to this view, a waiver of section 402A by a exclusion clause in a contract is not permissible, even when the parties are known to each other and in equal bargaining

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[167]. For example: in *Scandinavian Airlines Syatems v. United Aircraft Corporation*, 601 F. 2d 425 (9th Cir. 1979). The trial judge stated that: "... policy is designed to protect the small consumer and to allocate the risk of loss to the person most able to bear it, in that case, the manufacturer. Here, where there are two large companies contracting, it is only a question of who between two equals should be made to bear the risk of loss. We see no reason why the manufacturer should be made to bear the risk of loss without fault as between it and a large corporate buyer".

[168]. 499 F. 2d 709, (1974).

[169]. 168 Cal. Rptr. 301, (1980).

positions.[170]

In conclusion, it would appear to be the case that the courts in the United States are generally reluctant to extend strict liability remedies to commercial plaintiffs by giving effect to exclusion clauses or by denying such remedies completely. This is significant as regards the relationship between a space manufacturer and user of its products. In such circumstances, it is likely that the contract, especially the warranty provisions and exculpatory languages, will play a very important role to clarify the liability between parties with equal bargaining powers. This is particularly relevant to a space products procurement contract.

(5) Spacecraft Procurement

Since satellite costs can range from $15 million to $150 million, the private commercial procurement of a spacecraft is very carefully drafted and can exceed one-hundred pages in length. This kind of contract usually contains detailed provisions, such as the delivery schedule,[171] title and risk

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[170]. *New York Airways Inc. v. United Technologies Corporation*, 17 Avi, 17, 446, (1982).

[171]. The delivery schedule must respond to the launch timetable.

of loss,[172] delay,[173] and indemnities.[174] However, for the sake of our discussion, we will only examine the role of a spacecraft purchaser, the incentive payment scheme and warranty clause, "Agreement to Hold Harmless" clause and reliability objective.

(i) Role of Spacecraft Purchaser

Spacecraft purchasers are different in many ways from consumer product purchasers. The spacecraft purchaser always becomes involved in the development of the product he is going to purchase before it is deemed "qualified". Prior to delivery, the purchaser has a right to conduct a preliminary inspection at either the contractor's or a subcontractor's plant after reasonable notice is given. The purchaser is obliged to inform the contractor in writing of those particulars in which the work performed does not meet the requirements of the contract, and the contractor is then obliged to remedy the defects. Upon final delivery, the purchaser is obliged to conduct a final inspection and test of the items. He must either make an acceptance as it is or

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[172]. This must tie into launch and in-orbit insurance and avoid possible gaps in coverage.

[173]. It includes provision for adequate penalties.

[174]. An area of particular concern to manufacturers in view of recent experience in the courts. See the cases in Chapter IV.

notify the contractor of those particulars in which the items are unacceptable. Both acceptance and notification should be in writing. The contractor will remedy such particulars to satisfy the purchaser at his expense, and the purchaser shall inform the contractor of his satisfaction in writing if the items meet the requirements. If the contractor fails to remedy the defects, the purchaser may elect to have any or all defects remedied through other means at the expense of the contractor.[175]

In the case the purchaser has no ability and no means to perform these jobs, he can utilize a consultant who has expertise in the field.[176]

In sum, it is clear that the spacecraft purchaser is usually a commercial entity with sophistication to investigate the soundness of a particular product, and in practice, exercises his rights and discharges his obligations in inspecting the product which he is going to purchase. As a result, court may very likely conclude that the purchaser has an "assumption of risk".

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[175]. INTELSAT V. Negotiated Contract, Art. XIII.

[176]. In Palapa-B2, Perumtel utilized COMSAT to monitor the design development of the motor, this is typically the case with all foreign purchasers of space related products. See Bunker, *supra*, note 124.

(ii) Incentive Payment Scheme

A spacecraft is usually warranted to operate satisfactorily for a specified period after successful injection into orbit. For instance, a telecommunications satellite is warranted for seven to ten years. A successful satellite orbiting should meet the following conditions:

(A) There is no damage to the spacecraft resulting from launch vehicle malfunction.

(B) The elements of the transfer orbit established by the launch vehicle and the spacecraft orientation at timely separation are within specified limits.

Once a spacecraft has been successfully placed in orbit, the contractor becomes eligible for performance payments, which is often referred to as incentive payments. The incentive scheme is a major feature of the spacecraft purchase agreement and the key to the contractual performance. Manufacturers can earn incentives if the satellite performs according to detailed specifications throughout its design life, otherwise they can suffer penalties for failure of the satellite to perform properly.[177] For instance, with respect to the procurement of ESA'S Orbital Test Satellite (OTS), contractors and subcontractors were

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[177]. Englesson, *supra*, note 55, p.201.

entitled to a specified award or fee in addition to a base contract price for the spacecraft if the satellite's performance was satisfactory. Three-quarters of the incentive fee was allocated to the in orbit performance of an OTS over five years, while the remaining quarter was allocated for schedule performance.[178]

Under the terms of the INTELSAT V contract, the entitlement of the contractors to receive performance payments for each successfully injected spacecraft depends on the satisfactory operation of that spacecraft. For the purpose of performance payments, a spacecraft is deemed to be in "satisfactory operation" if it meets all the requirements which were incorporated in exhibits attached to the contract. A defect in a spacecraft which can be corrected by switching to a redundant (backup) unit in the spacecraft and does not subsequently recur will not be deemed to affect the satisfactory operation. If the spacecraft fails to meet the performance requirements, the contractor will not be entitled to performance payments unless the purchaser, at its option, chooses to operate the spacecraft. Though a one-time switching to a redundant unit will not affect the satisfactory operation, the contractor is normally

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[178]. Stockwell, B., "Procurement of the Orbital Test Satellite", *ESA Bulletin* No. 17, Feb. 1972.

obliged to pay the purchaser a specified sum for each day that elapses until such a defect is removed. If the failure of the spacecraft to meet the specifications is a result from gross negligence of the purchaser in testing or communicating to the spacecraft, the satisfactory operation is not considered to have terminated. Then, an equitable adjustment of performance payments shall be negotiated.[179]

In the event the data available from a launched spacecraft shows that the spacecraft does not meet all the requirements for satisfactory performance at any time during the spacecraft in-orbit design life time, the contractor is usually bound to take prompt appropriate corrective measures at its own cost in all of the unlaunched spacecraft sold under terms of a series agreement, in order to eliminate all the deficiencies noted in the launched spacecraft. This obligation exists whether the purchaser has or has not accepted the spacecraft, or whether title has passed to the purchaser.[180] Besides the payments he receives on the basis of spacecraft performance, the contractor is entitled to payments relating to the construction and delivery of the spacecraft. Such payment are made

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[179]. *Supra*, note 175, Art. VII.

[180]. *Supra*, note 175, Art. VIII.

pursuant to a partial payment schedule and have no relationship with the performance of the spacecraft.

(iii) Warranties

It is a general practice that in a purchasing contract, the contractor expressly disclaims any express or implied warranties including warranties of fitness for particular purpose and merchantability or damages arising out of or in any way connected with the goods and services. For example, in *Appalachian Ins. v. McDonnell Douglas*, the contract between them provided that "[McDonnell Douglas] extends no warranty of any kind, express or implied, including any implied warranty of merchantability or suitability for purpose with respect to the PAM or with respect to services provided by [McDonnell Douglas] hereunder."[181] This kind of warranty disclaimer only applies to spacecraft after the launch. With respect to pre-launch period, the contractor usually warrants, for one year from the date of final acceptance by the purchaser, that the goods or services furnished shall be free from any defects in materials and workmanship and in accordance with the applicable specifications and drawing. During the period of warranty, the purchaser has the right at any time to

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[181]. Art. 7 of the contract, see *Appalachian Ins. v. McDonnell Douglas*, 262 Cal. Rptr. 716 at 721, (Cal. App. 4 Dist. 1989).

reject any goods or services not conforming to the warranty, and the purchaser could also require the contractor, at his expense, to correct or replace, at the purchaser's option, such goods or services with conforming goods or services irrespective of prior inspections or acceptances.[182]

(iv) Agreement to Hold Harmless

Most spacecraft purchase agreements contain an "agreement to hold harmless" clause, whereby the contractor has no responsibility for damage to the spacecraft itself. The contractor's responsibility in the event of a failure is usually limited by contract to some form of payment or credit. For instance, in the Purchase Contract between Western Union and McDonnell Douglas, Article 7 provides that"...Purchaser shall indemnify and hold harmless [McDonnell Douglas], its officers, agents and employees from and against any and all liabilities, damages and losses, including costs and expenses in connection therewith, for death of or injury to any persons whomsoever and for the loss of, damage to or destruction of any property whatsoever, caused by, arising out of or in any way connected with the launch or operation of the PAM, Spacecraft, or Launch Vehicle unless resulting from the sole negligence or wilful

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[182]. *Supra*, note 175, Art. XXXIII.

misconduct of [McDonnell Douglas], its officers agents and employees."[183] The manufacturer, in most cases, has also agreed to hold the component part manufacturers harmless and not assert any claims for damage to his products.[184] However, most contracts do not provide for indemnity for third-party claims. If a third-party is injured as a result of a manufacturing defect, the owner's underwriter is obligated to pay them. He will then be subrogated in the claim against the manufacturer. This requires therefore that the manufacturer maintains sufficient insurance to protect against his product liability exposure. It is very likely that, in the event of an accident causing damage to the third-party, the owner of a spacecraft will be held liable because of his ownership, and his insurance company will be obliged to indemnify the U.S. Government if the claim was paid by it.[185] When the accident was caused by a defect in the spacecraft, the insurance company of the spacecraft owner

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183. *Appalachian Ins. v. McDonnel Douglas*, 262 Cal.Rptr. 716 (Cal.App.4 Dist. 1989) at 721.

184. Pino, R. V., "Subrogation and Product Liability Law Relating to Satellite Claims", paper presented at 3th International Conference on Commercial and Industrial Activities in Space, Assicurazioni Generali, Rome, September, 1985.

185. Under the Liability Convention and Outer Space Treaty, U.S. Government has a duty to compensate the victims if the damage is caused by its nationals in a space activity. In return, U.S. Government will get remedy from the party, who is liable for the accident according to U.S. domestic law.

will have an interest in recovering from the manufacturer by means of subrogation. For this reason, the spacecraft purchaser usually requires that the manufacturer obtain products liability insurance as a condition in the procurement contract, though it is not likely a manufacturer could do business without it.

(v) Reliability Objective

The concept of a "reliability objective" is common in government contracts and spacecraft procurement contracts. A reliability objective is meant to indicate a success rate goal.[186] The potential reliability of a new product is analyzed by examining the success history of the various technologies which the new product incorporates. However, the reliability objective is a difficult concept for space components because oftentimes one or more of the technologies to be employed have no experience base which can be examined. Nevertheless, the reliability objective in a space procurement contract will provide the potential plaintiff with powerful arguments. In a case involving issues related to space technologies, it is likely that the court will look for

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[186]. In the Palapa B-2 case, there was a reliability objective imposed on the satellite rocket motor by McDonnell Douglas of 0.999. In other words, the objective was that the motor would prove reliable in 999 firings out of 1,000. See *Lexington Insurance Co. v. McDonnell Douglas Corp.*, No.481713, Cal. Super Ct., Orange County, (1990).

help in order to determine what the standard of care should be with respect to what is "reasonable" conduct. The court is likely to look to relevant contract terms regarding performance goals in assessing the overall negligence equation.

(b) Liability Under the Commercial Space Launch Act

(1) Insurance Or Financial Responsibility Requirements

Before 1984, most aerospace companies proving launch services in the United States never had to bear the risks arising out of the launch. The situation they faced was that: "Almost invariably, the government contractor was obliged to procure liability insurance for which it was reimbursed for the portion available to the contract of the reasonable cost of insurance. Moreover, the Government agreed to compensate the contractor for liability to third parties for personal injury or damage to property for those risks not covered by liability insurance".[187]

However, with the advent of the Commercial Space Launch Act (1984),[188] this situation changed dramatically. First of all, the private companies would be on their own, and would

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[187]. Nesgos, P. D., "Managing Liability Risks in U.S. Commercial Space Transportation", paper presented at Assicurazioni Generali, Fourth International Conference on Space Insurance, Rome, March, 1987.

[188]. Commercial Space Launch Act 1984, CSL Act 49 USC 2624.

not be Government contractors any longer. Second, these companies would used Government launch facilities to operate their launches. The Commercial Space Launch Act translated this change in its provisions.[189] While the rules related to the licensing procedures had been compiled and adjusted, such was not the case for the provisions concerning liability and insurance. It was considered the those provisions were vague and turned out to be a "major threat to the emergence of an internationally competitive launch industry".[190] Thus, in 1988, the Act was amended with respect to the issue of liability and insurance. It was considered that the most substantial modification in the Act has been made in Section 16.[191] Under the provisions, the licensee must show that he has liability insurance or financial responsibility in order to undertake commercial launch activities in the following aspects:

(i) <u>Concerning "Third Party" Liability</u>

In this case, the Section requires that the licensee

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[189]. See CSL Act 49 USC 2624, Section 15(e) and Section 16.

[190]. For a detailed debate on those provisions, see Hearing Before the Subcommittee on Science, Technology and Space of the Committee on Commerce, Science and Transportation, U.S. Senate, 100th Cong, 2d Sess, May 17, 1988.

[191]. Section 16 as originally enacted simply required a licensee to have in effect liability insurance at least in such amount as the Secretary of DOT deemed necessary, considering the international obligations of the United States.

must obtain insurance or demonstrate financial responsibility "in the amount sufficient to compensate the maximum probable loss... from claims by a third party for death, bodily injury, or loss of or damage to property resulting from activities carried out under the license".[192] The "maximum probable loss" is to be determined by the Secretary after consultation with the heads of NASA, the Air Force and other appropriate agencies.[193] However, in no event shall the amount of such insurance or responsibility be expected to exceed $500 million. If the Secretary finds that the maximum liability insurance available on the world market at a reasonable cost is less than $500 million, he may limit this amount.[194]

(ii) Concerning Government Property

The Section provides that each licensee must obtain insurance or demonstrate financial responsibility "in an

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[192]. Commercial Space Launch Act Amendment, Public Law 100-658, Nov. 15, 1988, Section 16 (a) (1) (A).

[193]. Under the administration of President Ronald Reagan, the DOT was designated as lead agency to regulate private commercial space activities. This idea was to establish a system of one-step shopping, allowing companies seeking launch licenses to apply to one agency only. This rule was kept and formally incorporated in the Commercial Space Launch Act and its Amendments, which provide the Secretary of DOT with exclusive authority with respect to commercial space launches by the private sector.

[194]. Section 16 (a) (1) (A) of the Amended Act.

amount sufficient to compensate the maximum probable loss from claims against any person by the United States for loss of or damage to property of the United States resulting from activities under the license". The maximum insurance or responsibility necessary is not to exceed $100 million or whatever amount is available on worldwide markets decided by the Secretary.[195] Taking into account the possibility by reason of policy exclusion, Congress authorizes the Secretary to waive, on behalf of the Government, the right to recover for damage to or loss of property of the United States to the extent insurance is not available.[196] However, in case the amount of insurance coverage available to cover the maximum probability risk standard is not sufficient, with regard to Government property, Congress directs the Secretary to require from the licensee proof of financial responsibility in an amount sufficient to bridge the difference between the available insurance and the required amount.[197] It is worth mentioning that: "no indication is provided, however, as to whether property of the United States is considered to encompass all property used by the Government in connection with the operation of the site (including, e.g. property of

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[195]. Section 16 (a) (1) (B) of the Amended Act.

[196]. Section 16 (a) (1) (D) of the Amended Act.

[197]. Senate Report No.100-593, (1988), USCA at 5538.

Government contractors) or just such property owned by the Government".[198]

(2) Risk Allocation

The form of risk allocation introduced into the Amended Act was so called "Reciprocal Waivers of Claims", which had been used by NASA since the advent of commercial launch services.

(i) <u>Waivers of Claims among Non-government Parties</u>

Section 16 requires that each licensee "enter into reciprocal waivers of claims with its contractors, subcontractors, and customers, and the contractors and subcontractors of such customers, involved in launch services, under which each party to each such waiver agrees to be responsible for any property damage or loss it sustains or for any personnel injury to, death of, or property damage or loss sustained by its own employees resulting from activities carried out under the license".[199] The intended objectives of this provision, according to Congress, are as followings:

* to limit the potential exposure of any one of the

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[198]. Nesgos, P. D., "Recent Developments in Risk Allocation of Concern to the U.S. Commercial Launch Industry and the Insurance Community", Assicurazioni Generali, Fifth International Conference on Space Insurance, Rome, March 2-3, 1989.

[199]. Section 16 (a) (1) (C) of the Amended Act.

parties involved in launch activities, and

* perhaps more importantly to minimize opportunities for litigation among such parties and their employees in the aftermath of damage-causing events.[200]

It should be noted that the non-government parties assume responsibility for their own losses regardless of how the losses were caused. This would include losses caused by the wilful negligence of one party[201] or government employees participating in "activities carried out under the license". It was considered that there was one unfortunate effect of the language contained in Section 16 (a) (1) (C), which requires each party to agree to be responsible for any property damage it sustains. If it was read literally, it would require the licensee customer to assume loss of its payload and would preclude the licensee from offering any form of launch risk guarantee.[202] Though the language used in this provision is vague, the Senate has pointed out that the required waivers are not intended to prevent or encumber enforcement of the private entities' contractual rights

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[200]. Senate Report No. 100-593, (1988), at 14.

[201]. For wilful negligence in sense of reciprocal waivers of claims, see Chapter V.

[202]. Nesgos, *supra*, note 198.

and obligations.[203] Therefore, it is likely any claim between any direct contracting parties would not be affected.

(ii) Waivers of Claims Required from The Government

In most cases, when a commercial launch is going to be carried out, the private launch provider must use a Government facility and services. In this way, the U.S. Government is one of the participants involved in the launch operation. Thus, the United States is expected to enter the cross-waiver system. As required by the Amended Act, on behalf of the United States, the Secretary must enter into the same waiver scheme as that among other participants. However, the Government waiver of claims is restricted in two circumstances:

* the waiver is allowed "to the extent that claims exceed the amount of insurance or demonstration of financial responsibility" required by the Secretary.[204] It is important to note that U.S Government has no obligation to waive its claims when it is the beneficiary of the insurance. Nevertheless, the U.S Government is obliged to waive its claims when the damage is in excess of the amount of liability insurance set forth by the

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[203]. Senate Report No. 100-593 USCA, at 5538.

[204]. Section 16 (a) (1) (D) of the Amended Act.

Secretary.

* when no insurance can be obtained by the licensee because the insurer does not underwrite certain types of risk, after consultation with the NASA, and the Air Force, the Secretary may also waive claims to the extent such insurance is not available by reasons of policy exclusions which are determined by the Secretary to be "used for the type of insurance involved".[205] With regard to the types of waiver, the Secretary was requested "to ensure that the exclusions are in fact 'usual' for the type of insurance involved".[206]

(3) Risk Sharing

As previously mentioned, the Secretary is required to determine the maximum probable loss, all insurance is required to cover the United States, its agencies, personnel, contractors and subcontractors at no cost to the United States. In return for this coverage, the United States agrees to the extent appropriate, to indemnify others and pay third-party claims in excess of the maximum probable loss ($500 million), but not to exceed $1.5 billion.[207] This government

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[205]. *Id.*

[206]. *Supra*, note 200, at 15.

[207]. Section 16 (b) (1) of the Amended Act.

indemnification has the following characteristics:

a) This indemnification only relates to third-party claims.[208]

b) U.S. Government will only pay the successful claims with cost of litigation or settlement.[209]

c) It covers damage resulting from an operation conducted under the license.[210]

d) The Government will indemnify the claims which is in excess of the insurance required under Section 16 (a) (1) (A).

e) Government indemnification will not be in excess of the level of $1.5 billion. Consequently, the licensee must assume any loss above $1.5 billion.[211]

f) Government indemnification may be provided without regard to the minimum amount of financial protection required for third party claims not covered by insurance for the reason of policy exclusions.[212]

g) Government indemnification will not cover the damage arising from the wilful misconduct of the

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[208]. *Id.*

[209]. *Id.*

[210]. *Id.*

[211]. Section 16 (b) (1) (B) of the Amended Act.

[212]. *Id.*

licensee.[213]

(4) Liability and Warranty in Launch Services Contract

(i) Cross-waivers of Liability

As required by the law, contracts of launch services usually contain cross-waiver of liability clauses by which each participant in the launch agrees to be responsible for its own losses and to waive any potential claims which it may have against other participants in the project. For instance, the NASA Standard Launch Services Agreement provides that "...the parties hereto agree to a no-fault, no subrogation, inter-party waiver of liability pursuant to which each party agrees not to bring a claim against or sue the other party or other customers...irrespective of whether such damage is caused by NASA, the customer, or other customers participating the STS operations, and regardless of whether such damage arises through negligence or otherwise".[214] In some launch contracts, it is required that any insurance carried shall provide that the insurers shall waive any

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[213]. *Id.*

[214]. Art. V. 3. b. of NASA Standard Launch Services Agreement. This waiver clause is common in the commercial launch contracts of all other launch companies, such as Martin Marietta, McDonnell Douglas and General Dynamics, see Chapter V.

rights of subrogation against the launch provider.[215] Nevertheless, a cross-waiver of liability clause may apply to the participants in the launch who are parties to the launch services agreement as well as to their contractors and subcontractors. However, the manufacturer of a component part which is sold to a party to the launch services agreement can be sued by a participant in the project if the cross-waiver of liability clause is not expressly intended to "flow down" to contractors and subcontractors of the each of participants. In view of this, NASA requires the parties agree to extend the waiver to contractors and subcontractors at every tier of the parties and other customers. That is intended to protect these contractors and subcontractors from claims, including "products liability" claims, which might otherwise be pursued by the parties, or the contractors or subcontractors of the parties, or other customers or the contractors or subcontractors of other customers.[216]

(ii) Reflight Warranty

In the launch services agreements, the most common

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[215]. Art. 17. 5. 2. of the Launch Services Contract Between Martin Marietta and INTELSAT, see *Martin Marietta v. INTELSAT*, 763 F. Supp. 1327 (D.Md. 1991).

[216]. Art. V. 3. C. of the NASA Standard Launch Services Agreement.

warranty arrangement has been a commitment by the launch provider to refly a commercial mission in the event of an initial failure.[217] It was NASA's policy to offer a reflight opportunity at no cost if the Shuttle caused the commercial payload not to be deployed properly. As a condition, this failure must not be a result of the defect of the payload or fault of the customer.[218]

The other alternative used by NASA has been the marginal cost relaunch option.[219] This second warranty goes beyond the simple promise of a free relaunch. It means that if anything goes wrong with the payload during the first 90 days after launch, "regardless of fault", NASA would agree to provide another launch at marginal costs. The General Dynamics Model Agreement allows the customer to specify at the time of execution of the contract its preference for a refund or a reflight,[220]

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[217]. For instance, Art. 6 of the Launch Contract between Martin Marietta and INTELSAT provided for a replacement launch (at the option of INTELSAT) in the event of a launch failure. See *Martin Marietta v. INTELSAT*, 763 F. Supp. 1327 (D. Md. 1991).

[218]. Art II. 1. d. of the NASA Standard Launch Services Agreement.

[219]. O'Brien, "Allocation of Risk and the Commercial Use of Outer Space", 33 *Fed. B. News & J.* 169, April, 1986, p.36. NASA Launch Services Agreement 1005-015. Art. I. 3. e. (2). Marginal cost reflights would be approximately 50 percent of the standard Shuttle price.

[220]. G. D. Model Agreement, Art.8.

which reflight will be no later than 18 months after the failure.[221] In the event of the failure of a reflight, no further reflight would be provided.

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[221]. *Id.*, Art. 8.6.

V. U. S. COURTS' APPROACHES TO SUBROGATION AND LIABILITY

In this chapter, we will examine the approaches of the courts towards to issues of subrogation and liability in space-related activities through cases.

1. *Appalachian Insurance Co. v. McDonnell Douglas Corp.*[222]

This is a subrogation action which was initiated by several insurers of the Westar VI satellite,[223] led by Appalachian Insurance Company, against the McDonnell Douglas Corporation, Morton Thiokol, and Hitco in a California state court. This action arose out of an unsuccessful launch of the satellite in geosynchronous orbit 22,000 miles about the earth, from the payload bay of the Space Shuttle Challenger in February, 1984. The satellite was launched from the Space Shuttle using a McDonnell Douglas power assist module (PAM) to propel the satellite into its final orbit. The PAM in

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[222]. *Appalachian Insurance Co. v. McDonnell Douglas Corp.*, 214 Cal. App. 3d 1, 262 Cal. Rptr. 716 (1989).

[223]. Westar VI coverage was placed by Sedgwick Group as brokers on terms led at Lloyds by the Richard Maylam Syndicate for the first layer of $50 million, followed by the Cameron Webb Syndicate for another layer and finally by an excess layer over $80 million led by Merrett Syndicates Ltd. representing the rest of the cover to about $100 million. The full insured value was $105 million, with various syndicates at Lloyds taking 35% and the UK company market another 15%. The remaining commitments are in European and world markets, with some placed in the U.S. by Alexander and Alexander Services Inc. See Bunker, *supra*, note 124, pp.40-41.

question utilized components made by Morton Thiokol and Hitco. Unfortunately, the PAM burned out within seconds leaving the satellite in an orbit only 655 miles from the earth, which was ineffective for telecommunications purpose.[224]

Western Union (the insured) made a claim against its insurance companies for a total loss of the satellite. After paying Western Union approximately $5 million[225] for their share of the loss of the satellite, the insurers were subrogated to the rights of Western Union and sued McDonnell Douglas, Morton Thiokol and Hitco on the basis of negligence and strict product liability.[226] At trail, the court granted summary adjudication against the insurers on their strict liability claim and granted summary judgement in favour of the defendants on the basis of the exculpatory clauses barring the causes of action in the Western Union-McDonnell Douglas contract. The insurers appealed the dismissal of their claims.[227] During the pendency of the appeal, the leading plaintiff, Appalachian Insurance Company, abandoned its

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[224]. *Supra*, note 222, at 719.

[225]. This amount was out of a total claim for $105 million. Actually, Western Union recovered $105 million from the insurers.

[226]. *Supra*, note 222, at 720.

[227]. *Id.*, at 716.

claim.[228]

A California appellate court affirmed the trial court's decision. The court determined that the exculpatory clauses at issue contained in the contract between McDonnell Douglas and Western Union were not ambiguous[229] in their disclaimer of all liability, were consciouable,[230] and were not contrary to the public interest.[231]

Of interest in the case is the discussion of the inter-party liability waivers. The contractual provisions governing this issue were set forth in two clauses, Articles 7 and 14 respectively.[232] McDonnell Douglas made a complete warranty disclaimer in Article 7 which provided "McDonnell Douglas extends no warranty of any kind, express or implied warranty of merchantability or suitability for purpose with respect to the PAM or with respect to services provided by McDonnell Douglas hereunder". Except as provided in Article 13, 15, 16

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228. Pino, Rudolph V. Jr., "Legal Issues Arising from Space Activities", paper presented at Fifth International Conference on Commercial and Industrial Activities in Space--Insurance Implications, Assicurazioni Generali, Rome, 1989.

229. *Id.*, at 725.

230. *Id.*, at 731.

231. *Id.*, at 734.

232. *Id.*, at 721.

and 17 of the Agreement, it was provided that McDonnell Douglas would not under any circumstances be liable to purchaser under or in connection with the Agreement, under any tort, negligence, strict liability, contract or other legal or equitable theory, for incidental or consequential damages or for purchaser's cost of effecting cover.[233] The insurers argued that Article 7 did not extend the waiver to McDonnell Douglas's subcontractors, here Morton Thiokol and Hitco. The court then examined Article 14 of the contract, which sought to implement the NASA inter-party waiver of liability. The waiver was initially implemented in the launch services agreement between Western Union and NASA and required each party to flow-down the waiver to its respective contractors and subcontractors at every tier. By incorporating the allocation of risks provisions in the NASA launch services agreement, the word "except" was included in Article 14, which made the broad exclusionary language of Article 7 obscure. The insurers argued their suit was permitted by the "except" clause in Article 14.3. The court was of the opinion that Article 14 excepted from the waiver of liability claims between Western Union and "its other contractors and subcontractors". Morton Thiokol and Hitco were not "other contractors or subcontractors of Western Union; they were a contractor and subcontractor of McDonnell Douglas".[234] Based

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[233]. *Id.*, at 721.

[234]. *Id.*, at 723.

on that reasoning, the court held that the contract precluded Western Union from suing McDonnell Douglas, Morton Thiokol or Hitco.[235] As a result, this effectively barred the suit which was filed on the doctrine of subrogation by Western Union's insurers.

With regard to strict liability, the court applied California law, by stating that: "since liability for defective products when commercial entities and business loss are involved is governed by the California Uniform Code which allows disclaimers of warranties and by the parties' agreement, liability for defects may be disclaimed".[236] The court held that the tort theory of strict liability does not apply and thus does not bar the disclaimer.[237] Since strict liability was properly disclaimed in this contract, the court further dismissed the strict liability claims.

2. *Lexington Insurance Co. v. McDonnell Douglas, Corp.*[238]

This is a case related to the Westar VI case, which arose from the unsuccessful deployment of the Indonesian Palapa B-2 satellite on the same mission, The case was also a

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[235]. *Id.*, at 720.

[236]. *Id.*, at 735.

[237]. *Id.*, at 736.

[238]. Cal. Super Ct., Orange County No. 481713.

subrogation action. Three plaintiff-insurers sought the return of their pro-rate share of the $75 million insurance loss occasioned by the satellite failure.

The Palapa-B2 satellite was insured for $75 million at rate between 5% and 6%[239] from an Indonesian insurance company known as P.T. Auransi Jasa Indonesia (JASA). JASA, in return, reinsured its risk with an Indonesian reinsurer known as P.T. Reasuransi Umun Indonesia (Umum Re). Umum Re further reinsured its risk with numerous companies in the world insurance market,[240] including the plaintiffs.

Soon after the failure of the launch, notice of loss was filed by Indonesia with the insurance companies. On July 14, 1984, Indonesia entered into an agreement with the underwriters to settle the Indonesian claim. The agreement provided a payment permitted Indonesia to purchase a replacement satellite. Besides this and other terms, the agreement also provided that all rights of salvage and recovery were to accrue to the underwriters.[241]

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[239]. Bunker, *supra*, note 124, p.40.

[240]. The risk was then brokered by Crowley Warren on terms led at Lloyds by Merrett Syndicates Ltd., with part of the cover placed in the U.S. by Corroon and Black Inspace Inc. Altogether Lloyds' syndicates held 50% of the $75 million risk, 17% went to the UK and European markets, and the remaining 33% was 18 companies in the U.S. and elsewhere. See Bunker, *supra*, note 124, p.53.

[241]. *Id.*, p.53.

At the trial, one of the interesting discussions was related to the subrogation right, which was whether the plaintiffs, as reinsurers of P.T. Asuransi Jasa Indonesia (JASA), the insurers of Palapa's owner, Perumtel[242], had acquired any subrogation rights against the third-party manufacturers of the satellite. The insurance contract between JASA and Perumtel did provide for a right of subrogation in the event that any payment under the policy was made. However, the reinsurance contracts were silent on the issue of subrogation.[243] McDonnell Douglas contended that plaintiffs had failed to show that they were properly subrogated to the rights of the Indonesian government because, as reinsurers of the Indonesian insurance companies, plaintiffs were required to prove that the Indonesian insurers had contractually assigned the right to sue the defendants. Since no such right existed, plaintiffs could not have standing to sue.

This argument, along with others, was rejected by the trial court. The court held simply that plaintiffs were entitled to assert a negligence action under California

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[242]. Perumtel is the wholly-owned telecommunications company of the Government of Indonesia.

[243]. *Supra*, note 228.

law[244] and ruled that plaintiffs' own reinsurance was a collateral source which did not extinguish their right to damages. After a five-month trial, the case ultimately went to the jury on the issues of whether the defendants had been negligent in the design and testing of the PAM rocket motor exit cone, and whether the satellite failure constituted a breach of warranty by Morton Thiokol. After deliberation, the jury found that none of the defendants were negligent. The jury also found that the motor failure had constituted a breach by Morton Thiokol of a warranty contained in a subcontract between McDonnell Douglas Corporation and Morton Thiokol. However, the trial court ruled that the plaintiffs damages were limited to their proportionate share of the value

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[244]. Under California law, in order to have a right to equitable subrogation one must fulfil the following requirements: (1) the insured has suffered a loss for which the party to be charged is liable, either because the latter is a wrongdoer whose act or omission caused the loss or because he is legally responsible to the insured for the loss caused by the wrongdoer; (2) the insurer, in whole or in part, has compensated the insured for the same loss for which the party to be charged is liable; (3) the insured has an existing, assignable cause of action against the party to be charged, which action the insured could have asserted for his own benefit had he not been compensated for his loss by the insurer; (4) the insurer has suffered damages caused by the act or omission upon which the liability of the party to be charged depends; (5) justice requires that the loss should be entirely shifted from the insurer to the party to be charged, whose equitable position is inferior to that of the insurer; and (6) the insurer's damages are in a stated sum, usually the amount it has paid to its insured, assuming the payment was not voluntary and was reasonable. *Patent Scaffolding v. William Simpson Construction Co.*, 256 C.A.2d 506, 509; 64 Cal. Rptr. 187, 190(Second Dist., Div. Five 1967).

of the solid rocket motor ($39,000 plus interest).[245] The court ruled this on the basis of a limitation of remedy clause within the subcontract, and also on the custom of the space industry not to subject component suppliers to the consequential damages of an end user. However, this case did not turn on the implementation of reciprocal claims waivers.

In this case, the jury had an opportunity to examine the issues relating to space products liability, such as the "reliability objective" in space procurement contracts, subsequent remedial measures, evidence of similar failures, as well as assumption of risk. The finding of those issues was in favour of all the defendants.[246] Nevertheless, it is interesting to note how the jury came to a conclusion to the issue of "assumption of risk". As we mentioned before, space product purchasers are different in many ways from consumer product purchasers, typically has some involvement in the development of the product it is purchasing before it is deemed "qualified". In trial, McDonnell Douglas emphasized the involvement of the plaintiffs. The plaintiffs rebutted the evidence of Perumtel's knowledge by citing the U.S. law which prevented Perumtel from directly obtaining security-

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[245]. Craft, Jr. Randal R., "Aviation Liability Law Developments in 1990", 57 *Journal of Air Law and Commerce*, 1991, p.110.

[246]. Ginger, S. R., "The Trial of the Palapa B-2 Case--A look at the liability issue in commercial space launches", *Federal Bar News & Journal*, Vol. 38, No.3, April, 1991, p.132.

sensitive technology data. However, Perumtel utilized a U.S. consultant, COMSAT, to monitor the design development of the motor. The jury believed that this relationship made it possible for the Indonesians to be sufficiently aware of all of the experimental aspects of the motor. Therefore, the jury concluded it was inappropriate for the purchaser to receive damages for alleged negligence when it was sufficiently aware of the risk involved.[247]

3. *Martin Marietta v. INTELSAT*[248]

This case is not concerned about the issue of subrogation, nevertheless, it is one of the most recent and significant challenges to the enforceability of broad reciprocal waivers of liability in space launch contracts. *Martin Marietta v. INTELSAT* arose from the 1990 unsuccessful launch of an INTELSAT Satellite on board a Martin Marietta Commercial Titan launch vehicle. INTELSAT did not obtain launch insurance and thereby had to assume the risk of any loss itself. Martin Marietta originally brought a declaratory judgement action seeking to absolve itself of any

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[247]. "A Juror's Perspective on Space Litigation", 2 *Space Law News*, Spring, 1992, p.5.

[248]. *Martin Marietta Corp. v. INTELSAT*, 763 F. Supp. 1327 (D. Md. 1991).

liability for the incident.[249] INTELSAT counterclaimed asserting breach of contract, negligence, gross negligence and negligent misrepresentation by Martin Marietta and sought $400 million damage for lost value of launch services, loss of use, damage to the satellite,[250] and the cost of rescuing the satellite.[251]

Martin Marietta filed a motion to dismiss INTELSAT's counterclaim. U.S. District Judge Marvin Garbis dismissed three of the four counts of INTELSAT's counterclaim. On the grounds that its contract waiver of liability barred all of INTELSAT's claims including those based upon "gross negligence". The judge temporarily left INTELSAT's breach of contract count intact and ordered both parties to submit

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[249]. *Id.*, at 1329.

[250]. *Id.*, after an investigation by Martin Marietta, it was determined that the technical cause of the malfunction was due to miswiring and /or faulty computer programming of the Titan's upper stage separation system. Contributing to the malfunction was the alleged failure of Martin Marietta's managerial and supervisory personnel to properly communicate and coordinate the pre-launch testing of the separation system. In fact, Martin Marietta publicly admitted that the wiring error should have been detected prior to the launch through its internal test procedures.

[251]. INTELSAT paid $90 million to NASA for rescuing the satellite. In may, 1992 the satellite was reboosted to geosynchronous orbit by the pioneering rendezvous/extravehicular mission of the space shuttle Endeavour. See *Aviation Week & Space Technology*, June 1, 1992.

additional briefs.[252] In dismissing the tort claims of negligence, gross negligence, and negligent entrustment, the judge acknowledged the usual public policy against enforcing waivers of liability for gross negligence. In this case, however, the judge enforced the disclaimer as to the gross negligence claim, which was based on his belief that the United States Congress had enunciated specific public policy which favoured limiting the liability of those who provide launch services. The court held that the public policy which favoured limiting liability for providers of launch services was pronounced by Congress in the 1988 Amendments to the 1984 Commercial Space Launch Act. 49 U.S.C §2601.[253] This is a significant pronouncement that answers a question often asked as to the intended pervasiveness of reciprocal claims waivers. However, it is important to note that, although the court dismissed INTELSAT's negligence and gross negligence claims in this case, the court relied on what the court believed to be specific congressional intent to protect providers of launch services. The decision still leaves some doubt as to whether the court would have reached the same result if the defendants had been the manufacturers and suppliers of products and services.

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[252]. Memorandum and Order, Civil Action No. MJG-90-1840, in the United States District Court for the District of Maryland.

[253]. See, *supra*, note 248, at 1334.

The court examined the issue of whether by enacting the reciprocal waiver provision requirement, Congress intended to pre-empt all state law tort claims brought in connection with the launch service contract. Martin Marietta contended that the Commercial Space Launch Act itself automatically created mandatory reciprocal waivers in all contracts between launch participants, even if the contract itself does not contain express waiver provisions.[254] The court rejected Martin Marietta's argument stating that the language of the statute does not mandate that cross-waivers will be imputed into contractual agreements which do not contain express cross-waiver provisions. The court held that the statue only permitted the licensee to include cross-waiver clauses in its contract. The DOT has the power to revoke the launch provider's license, or otherwise penalize the licensee. However, the court stated, "nothing in the language of the statute indicates that a launch participant cannot be liable if the contract does not contain the required waiver".[255]

With regard to INTELSAT's claim for negligent misrepresentation, the court held that in accordance with Maryland law, a claim based on negligent misrepresentation is improper when the only relationship between the parties is contractual, because both parties are equally sophisticated,

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[254]. *Id.*, at 1330.

[255]. *Id.*

and a contract does not create an express duty of due care in making representation.

Seven months later, the court issued a Memorandum and Order dismissing the last pending count of the breach of contract. In this Memorandum and Order, Judge Garbis stated: "The court finds that the contract between Martin Marietta and INTELSAT clearly and unambiguously bars the relief sought in count II of the counterclaim",[256] and "The subject contract calls for Martin Marietta to provide two satellite launch missions. The first mission failed but the second succeeded. INTELSAT argued that because Martin Marietta materially and fundamentally breached a contract, Martin Marietta was no longer entitled to the protection of the exclusive remedy provisions of the rescinded contracts..."[257] In view of that, the Judge held: "...whether it be labelled a material and fundamental breach or 'total abandonment', it is not present here. There is absolutely nothing to indicate that Martin Marietta did not attempt to provide two successful launches (one of which succeeded) or otherwise so fundamentally breached the contract that it must be stripped of the protection afforded it by the contracts remedy limitations provisions".[258] Thus, the implication of this

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[256]. *Supra*, note 252, at 3.

[257]. *Id.*, at 10.

[258]. *Id.*, at 11.

ruling would be that, where a manufacturer can demonstrate that it satisfied meaningful contractual obligations, the existence of exculpatory provisions is not likely to render a launch services contract illusory.[259]

4. *Certain Underwriters at Lloyds v. McDonnell Douglas Corp.*[260]

Another action has been filed by Several Underwriters at Lloyds against McDonnell Douglas, upon the basis of subrogation, seeking over $6,000,000 in damages which arose from a launch pad accident involving an INSAT-1D communications satellite. The Government of India was the owner of the satellite, and the satellite was originally manufactured by Ford Aerospace and Communications Corporation according to the purchasing contract between them. The Indian Government also entered into a launch service agreement with McDonnell Douglas to launch INSAT-1D into orbit using a Delta launch vehicle. On June 19, 1989, the satellite was damaged during the course of mating and integration procedures when the cable of a crane broke allowing a hook and debris shield to fall onto the satellite. As a result, the satellite had to

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[259] This order was partially overturned in appeal by the 3rd Circuit last Fall.

[260]. *Certain Underwriters at Lloyds, et al. v. McDonnell Douglas Corp. et al.*, Docket No. 90-543 (U.S.D.C., Fla. 1990)

be repaired, and the cost was approximately $6,000,000.[261]

Under the contract between Ford Aerospace and Communications Corporation and the Government of India, Ford Aerospace had agreed to assume full responsibility for any loss or damage until launch, and the title to the satellite would pass to the Government of India prior to launch. This arrangement made Ford Aerospace purchase insurance from the plaintiffs to cover this pre-launch exposure. After the accident , the plaintiffs paid for the cost of repairing the satellite, and then pursuant to the policy, they were subrogated in all the rights of Ford Aerospace for recovery.[262] In the instant case, the plaintiffs sued McDonnell Douglas alleging negligence, gross negligence, negligence per se, and negligent misrepresentation.[263]

On September 27, 1991, McDonnell Douglas filed a motion asking the Court to enter summary judgment in its favour on the base of following reasons: (1) The negligence claims are

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[261]. See Memorandum of Law in Support of McDonnell Douglas Corporation's Motion for Summary Judgment.

[262]. The plaintiffs filed lawsuits in both the Federal District Court in Los Angeles and Florida State Courts seeking recovery from McDonnell Douglas. The Florida state case was then removed to Federal Court and the Federal case pending in Los Angeles was transferred to the same Florida District Court. See Adler, Kaplan & Begy's, *Space Law News*, Spring, 1992.

[263]. *Id.*

expressly barred by a contractual waiver agreed to by Ford Aerospace, plaintiffs' subrogor, in its sale contract. (2) The contractual waiver of claims agreed to by plaintiffs' subrogor must be upheld under the preemption doctrine, because it was mandated by the Commercial Space Launch Act. (3) This waiver agreed by Ford Aerospace included claims based upon negligence against any person. (4) Ford Aerospace was and is a sophisticated business entity and had equal bargaining power, and Ford's waiver was freely given. (5) Under the insurance policy, plaintiffs expressly waived their subrogation rights with respect to any claims waived by Ford Aerospace prior to loss.[264]

McDonnell Douglas' motion for summary judgment was denied in February of 1992 by Judge Sharp without opinion. There were no reply briefs and no oral arguments. It was believed that the judge was simply reluctant to dispose summarily of such a large case with such complex issues. This case will go through the usual discovery and litigation motions.[265] Nevertheless, this case will again test the strength and weakness of the inter-party waiver system.

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[264]. See Motion of McDonnell Douglas Corporation for Summary Judgment Based upon Applicable Launch Contracts and the U.S. Commercial Space Launch Amendments Act, 49 U.S.C. App. §2615 (a) (1) (c).

[265]. Bosco, Joseph A., a letter to Dr. Bunker, August 12, 1992.

VI. CONCLUSION

The doctrine of subrogation works well in general insurance, but not in the space field. Some space insurance underwriters have challenged their unfavoured situation in the U.S. courts. Although the result was disappointing, their qualification as subrogees was fully recognised. The issue of subrogation in space insurance is not a question as "should the subrogation be permitted", instead, it is a question of whether the subrogee will get actual recovery of the losses, caused by a defect in space product or negligence of the space launch providers, when they step into the shoes of their insured under the present space liability legal regime. Because of the status of the law, policy provisions, and attitudes of underwriters, it is unlikely that there will be any substantial and successful subrogation cases involving space activity losses. This is due to the following reasons and facts:

* Since participants in space venture are commercial entities, the contracts between them are the only legal bases which provides rights and obligations to each party.

* It is in most situations that the owner and (or) insured has waived its right of claim, by "hold

harmless" clauses in contracts, against the manufacturer for losses caused by products failure.

* In the launch services agreement, there is a inter-party waiver of liability clause, which requires each party to bear the damage to, or loss of, its own property, and precludes any party from making claims against other parties. The performance of launch services is only on a "best efforts" basis. However, between a satellite purchaser and a manufacturer this would not apply.

* The theories of products liability cannot be the basis of claim by the owner or subrogee of a space product against manufacturers. The technology used in space ventures is so complicated that it is very difficult to prove that the manufacturer is negligent. Furthermore, the owner of a spacecraft is usually involved in the development of the product, which could be considered as "assumption of risk", and the fact that many of the key documents are confidential or proprietary to the owner will not help much. The parties are of equal strength and in a commercial setting, there is little justification for shifting the risk of loss from user or owner of the property to the

manufacturer. Each party is in a similar position to obtain protection from the risk of the loss.

* Each party realizes the importance of the provisions in the contracts, and therefore, the contracts are very carefully drafted. It seems almost a futile effort to pursue subrogation.

* Most of the underwriters of space insurance are also underwriters for the major space product manufacturers. The underwriters consider that to pursue a subrogation claim may be against their own insured, and they feel that it will only lead to shift money from one pocket to another and some of the money will go into lawyers' pocket in terms of services fees.[266]

From a legal point of view, it appears extremely difficult for the underwriters to have recovery of the losses on the doctrine of subrogation. The question of who (the manufacturers, the insurers, or the buyers) should bear the financial responsibility for failure of a space venture is a dilemma. It seems that the question is an issue of policy rather then a legal one. Recent failure of the Hubble Space

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[266]. Actually, premiums are paid by the policy holder and raised when he makes a claim.

Telescope[267] and the delays of a next generation weather satellite project, the Geo-Stationary Operational Environmental Satellite (GOES-NEXT),[268] made the U.S. Congress consider restricting NASA's commercial contract authority,[269] and legislators intend to shift more of the burden to manufacturers. Representative George Brown (D. California), the Chairman of the House Science, Space and Technology Committee introduced legislation that would limit

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[267]. A report, which was made by Hubble Failure Review Board, shows that a technical error in the use of a measurement device caused the primary mirror to be ground improperly, despite several opportunities to discover the error. The report further found that the manufacturer of the flawed mirror, Hughes Danbury Optical Systems ignored conflicting test data and failed to perform a simple test that could have directly detected the flaw. See *Space Law News*, Adler, Kaplan & Begy, Spring, 1992, p.6. Some scholars expect that in this case manufacturers could have been held liable, and then they would have been more careful.

[268]. *Id.*, The GOES-NEXT system is manufactured by Space Systems/Loral of Palo Alto and its subcontractor on the project, ITT Aerospace of Fort Wayne, Indiana. Problems have been discovered with the two remote sensing instruments which are being developed for the satellites. The project has been delayed for three years, and the cost has doubled to $1 billion since 1985. Despite the delay, the two contractors have been awarded two thirds of possible award fees for good performance on the contract. Space Systems/Loral has collected $6.8 million out of a possible $9.8 million and subcontractor ITT Aerospace has collected $1.1 million out of a possible $2 million.

[269]. The House Appropriations Committee inserted additional language in its 1992 NASA Budget Bill which would mandate setting aside liability waivers on all Space Agency contract. However, after heated debate on the House floor, the language setting aside liability waivers was removed. See *Space Law News*, Adler, Kaplan & Begy, Spring, 1992, p.6.

NASA's ability to issue liability waivers,[270] while Representative Charles Schumer (D. New York) submitted another bill which would hold contractors to greater accountability.[271] If successful, these new proposals would have far reaching implications for insurers, and manufacturers as well as lawyers in the space field.

The U.S. space commercialization requires more involvement of private enterprises. While they are doing business in outer space, the enterprises face high risk or high stakes, and no one will commit to such a business without having insurance. Underwriters invest in space insurance with the hopes of making a profit. However, the space insurance balance sheet, in general, has been in red for years which has discouraged insurers from taking space risks. As a result, this situation will have a negative impact on the U.S. policy of promoting the exploration and exploitation of outer space. How Congress may regulate these interests remains to be seen.

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[270]. A Bill, "To impose certain restrictions on the contracts of the National Aeronautics and Space Administration, to provide for a study of the use of waiver of negligence liability provisions in Government contracts, and for other purposes", H.R. 2162, 102d Congress, 1st Session.

[271]. *Supra*, note 259.

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