CAPE YORK INTERNATIONAL SPACEPORT, AUSTRALIA: A REVIEW OF THE LEGAL ISSUES.

by

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ABSTRACT

In this paper the author considers the obligations imposed on the federal government of Australia and the potential liabilities to be addressed if the proposed international spaceport is to proceed on the Cape York peninsula in Queensland.

The proposal is briefly reviewed and a number of factors are highlighted. For example the proposed site is arguably one of the best in the world not only for the immediate use of expendable launch vehicles but also for the next generation of reusable spacecraft. However balanced against this is the cautionary note that at present, and in the forseeable future, there is no demand for a further facility. The spaceport which is proposed as a privately funded commercial facility will therefore have to attract users away from existing facilities.

An analysis of the international space law treaties then follows with an emphasis given to the obligations of the state where the activities are carried out by private interests. Significantly, Australia will initially be providing the spaceport and inviting foreign-owned enterprises to use that facility. The effect of this arrangement is also considered.

Finally, the above analysis reveals a number of shortcomings apparent in the treaties. Particular reference is made to the omission of certain classes of potential claimants who are possibly at greatest risk of loss or damage following a launch from Australian territory. A review of the common law duties and obligations which have relevance to space-related activities is then undertaken.

RESUME

Dans cet exposé, l'auteur examine les obligations imposées au gouvernement fédéral australien et les éventuelles responsabilités qui seront abordées si le projet de base de lancement d'engins spatiaux de la péninsule du Cap York dans le Queensland est adopté.

La proposition est passée brièvement en revue et un certain nombre de facteurs sont soulignés. On peut dire par exemple que le site proposé est un des meilleurs du monde non seulement pour l'utilisation immédiate des fusées de lancement non réutilisables mais aussi pour la prochaine génération de vaisseaux spatiaux réutilisables. Cependant en pesant le pour et le contre, il faut considérer l'avis prudent qui prétend qu'il n'y a pas à présent et dans le futur proche de demande pour construire une installation supplémentaire. Le projet de base de lancement d'engins spatiaux qui serait une installation commerciale financée par des capitaux privés devrait donc attirer des clients qui utilisent déjà les installations existantes.

Il y a ensuite une analyse des traités internationaux concernant le droit spatial qui met l'accent sur les obligations de l'Etat où de telles activités sont effectuées par des intérêts privés. Un aspect important du projet est

que l'Australie, au départ, construira les installations de la base de lancement d'engins spatiaux et invitera des entreprises étrangères pour qu'elles utilisent les installations. Les conséquences de ces arrangements sont aussi examinées.

L'analyse ci-dessus révèle finalement un certain nombre d'imperfections qui sont évidentes dans les traités. Il y a une mention particulière de l'omission de certaines catégories de potentiels demandeurs qui peuvent être sujets à un plus grand risque de perte ou de dommage à cause des lancements effectués du territoire australien. Il y a donc pour finir un examen des obligations du droit coutumier qui a rapport aux activités spéciales.

2. INTRODUCTION

The "space age" is now just over 30 years old. Although most activity has been dominated by the United States of America and the Soviet Union, the last decade has witnessed a period of great development with the emergence of new major players including Europe, Japan and China. Such development has been notable in the fields of scientific and Earth observation spacecraft as well as commercial space transportation capability.

Until the advent of the Space Shuttle, all launch systems were expendable and used for one mission only. The expenditure involved in these operations was a major factor for the introduction of the reusable Space Shuttle concept. The world space community (with the exception of France)[1] appeared to accept the future domination of the shuttle.

However the disaster of the Space Shuttle "Challenger" on 28 January 1986 and to a lesser extent, the interruption of services by Arianespace following the V18 failure on 30 May 1986, has led to a re-appraisal of the role of the Shuttle in commercial space launches, and has rekindled interest in expendable commercial launch vehicles in the United States. Further impetus was added by the White House directive in December 1986[2] phasing out the Shuttle from

most commercial launches. This change in direction has encouraged private organisations not only in the United States but also in other countries to enter the commercial launch arena. For example, countries possessing or developing expendable launch vehicles capable of carrying commercial spacecraft include the United States, Europe, USSR, China, Japan, India and Brazil. In addition, new forms of reusable space vehicles are being designed and the United States and Soviet space stations will look to generating their own specialised space traffic in the late 1990's.[3]

While the next generation of reusable launch vehicles can be expected to dominate the launch vehicle scene into the 21st Century, it seems certain that a small but necessary expendable launch vehicle market will remain well into the forseeable future.

In particular, there is a demand to launch small scientific payloads into the space environment for short periods of time. It is envisaged that the proposed Australian spaceport could initially accommodate such launchings although their requirements will not, it is thought, have a major impact on the design of the site. The development of the Cape York Spaceport has been studied as a two stage concept.

Stage 1 would be limited to current expendable launch vehicles (unmanned) and low launch rates.

Stage 2 would encompass the current expendable launch vehicles, future hybrid and horizontal take-off and landing vehicles, manned missions and higher launch rates.

Specialised facilities are required to launch spacecraft, space probes and satellites. Such facilities consist of launch pads, assembly and integration buildings, tracking and telemetry facilities, control centres, propellant storage and related services. The efficient launch complex must allow the launch of as many different types of vehicles as possible and exhibit the following qualities:

(a) be reasonably close to industrial complexes and supplies of propellants;

(b) be accessible by at least sea and air;

(c) provide minimum meteorological launch restrictions;

(d) be adjacent to large uninhabited areas to allow for range and site safety;

(e) provide impact areas for expended boosters and other debris;

(f) preferably be close to the equator providing

higher payload capabilities; and

(g) provide recovery sites for the new generation of manned space vehicles.

The above list is by no means exhaustive. Consequently, there are only a limited number of suitable launch facilities in the world. Set out below is a brief review of existing and proposed launch sites which are available for non-military commercial launches.

1. Brazil

Alcantara

Located at the mouth of the Rio Pinclare near Sao Luis at a latitude of 2^{O} South, Alcantara is an almost ideal position for both equatorial and polar type launch trajectories across the Atlantic Ocean. The launch site covers some $520km^{2}$ and is currently being developed to test early versions of the Sonda IV launch vehicle. The responsibility for all launch operations rests with the Brazilian Air Force.

2. China

Xi-Chang

Xi-Chang is the planned launch site for commercial launches in the near future and with the launch of the CZ-3 rocket in January 1984, indicates an intention of the Chinese to move

operations south from the previously more favoured site of Jiuquan in the Gobi Desert. The southern site will of course assist the Chinese in its planned geosynchronous orbit missions.

Jiuquan

The Chinese have recently announced that this site in the Gobi Desert will remain available for non-military commercial launches.

Hainan Dao

Hainan Dao is an island in the South China Sea and it is currently being investigated as a potential launch site for the next generation of Chinese launch vehicles. It is located 10^{o} further south than Xi-Chang and would offer improved capability for geostationary missions.

3. France

Kourou

Located in French Guiana, Kourou is only 5^{o} north of the equator and has clear paths of approximately 3,000km over water to the east and north for equatorial and polar type launches. In addition, there is a well-established chain of downrange tracking facilities situated at Kourou, Devils Island, Natal in Brazil, Ascension Island, and Akakio and Libreville in Africa. With the advent of the Ariane

programme in the late 1970's, Kourou has become probably the most modern facility of its type in the Western World.

There are plans to provide landing facilities for the Hermes (France) and Hotol (Horizontal Take Off and Landing - UK) spaceplanes.

4. India

Sriharikota

The island of Sriharikota is located just north of Madras on the east coast of India and is the major site for the existing generation of Indian launch vehicles. Although it was first used in 1971 it has undergone substantial expansion in recent times.

Terls

The Thumba Equatorial Rocket Launching Station (TERLS) is located close to the southern tip of India near Trivandrum. It acts as a United Nations sponsored station and an international sounding rocket launch site.

The Terls site and the Sriharikota site are not suited to equatorial type launches. Any launch towards the east would pass over heavily populated areas of Burma and Thailand. India has a policy of developing a capability to launch spacecraft into equatorial orbits and will therefore require

a new site for this purpose.

5. Indonesia

Gag Island

The Indonesian Government is studying the possibility of establishing a satellite launch facility on the island of Gag located off the north coast of West Irian in the Halmahera Sea.

6. Italy

San Marco

This facility consists of two modified oil rig platforms moored in international waters about 5 kilometres off the coast of Kenya. It is mainly used for the launch of sounding rockets although it has been used to orbit satellites using United States built multi-stage rockets.

7. Japan

Tanegashima

The island of Tanegashima lies at the southern tip of Kyushu and accommodates the Osaki launch site for satellites, the Takesaki sounding rocket facility and the Masuda TDA (Tracking and Data Acquisition) station. The Osaki launch site in particular will be expanded to cater for the planned H-2 rocket scheduled to enter service in 1992.

The island however has two fundamental limitations.

Firstly, it possesses a relatively high latitude of 30° North giving a high payload disadvantage for equatorial type launches. Secondly, the local fishing industry has been successful in restricting launches to two periods of the year (February and August) in order to limit the perceived hazards of a launch and related noise pollution.

Kagoshima

Kagoshima is situated on the island of Kyushu and acts as the major site for the smaller class of scientific rockets. It is operated by the University of Tokyo.

Kiribati

The current growth of Japanese space development has required the investigation of a new site which would allow an all year launch capability without the restrictions imposed at Tanegashima. Kiribati, a small Pacific state which exhibits remoteness, small population and an equatorial latitude is currently being studied.

8. USSR

Baikonur (Tyuratam)

There are three major Soviet launch sites. They are situated at Tyuratam, Plesetsk and Kapustin Yar. Only the Baikonur Cosmosdrome near Tyuratam has been suggested as a possible commercial facility whereas the remaining two are

solely for military purposes.

Baikonur consists of 70 launch pads and is supported by comprehensive associated facilities, for example, road and rail links, industry radar and tracking facilities. The facility also accommodates the Proton launch vehicle and attempts are currently being made to market the latest Proton to the Western world. The Baikonur site will also be used to support the Soviet equivalent of the US Space Shuttle.

9. United States of America

Kennedy Space Centre

The Kennedy Space Centre is built on swampland at the northern end of Merritt Island on the Atlantic coast in Florida. It was established in the early 1960's to launch the Apollo missions and is managed by the National Aeronautics and Space Administration (NASA). With the introduction of the Shuttle programme, the centre underwent significant changes including the establishment of a 4,500m launching strip. The site is the only one of its type to support the launch and landing of a manned reusable spacecraft.

Launch activities (that is, up to the time of spacecraft separation in its intended orbit) fall under the control of

the launch vehicle supplier and range operator at the launch control centre near the site. Subsequent control of the mission passes to spacecraft authorities located at mission control centres, being more remote from the site. However in the case of a manned launch, this concept must be modified as the launch vehicle may need to be monitored closely for several weeks after launch as the crew (the payload) remain attached to the vehicle for the entire mission. Therefore, the responsibility for a manned mission at Kennedy Space Centre passes at the appropriate time from Launch Control Centre to Mission Control Centre located in the Johnson Space Centre in Houston, Texas.

Cape Canaveral Air Force Station

Cape Canaveral is located immediately south of the Kennedy Space Centre in Florida. It served as the launch site for all United States manned flights until 1968 when this function was transferred to the Kennedy Space Centre. Today it serves as a prime launch site for United States civilian and military satellite launches using a variety of expendable launch vehicles, for example, Atlas, Delta and Titan. It is also extensively used for trials of military missiles.

Vandenberg Air Force Base

Vandenberg is located approximately 150 kilometres north-west of Los Angeles. It has three main functions,

which are:-

(a) a launch site for a variety of military missile tests;

(b) a prime site for polar orbit launches owing to the unobstructed corridor to the South; and

(c) as a secondary space shuttle launch facility to that of Kennedy Space Centre.

Wallops Flight Centre

Wallops Flight Centre is located on Wallops Island, on the Atlantic coast in eastern Virginia. It is one of the oldest United States launch sites and is used frequently for rocket launches to place relatively small satellites into orbit.

Hawaii and Florida

The United States government policy adopted following the Challenger accident has encouraged potential users to contract direct with the operator of the launch site. As most launch facilities are owned by the United States Air Force, it is envisaged that there will be some difficulty in a liaison between the Air Force and commercial enterprise in terms of liability, pricing structures and long term contracts. Therefore, there appears to be a need for sites which are free from government controls, especially for the

smaller class of privately funded expendable launch vehicle market. Current studies are being made of sites in Hawaii and Florida.

10. Australia

Woomera

Located approximately 450 kilometres north west of Adelaide, South Australia the facility began operation in 1946 as a joint venture between Australia and Britain. It was seen as the prime launch site for the British Blue Streak rocket and its derivative, the European Europa rocket. It was also used as a test range for guided and ballistic missiles from Europe, USA and Australia. In the mid 1960's, the European Launches Development Organisation (ELDO) decided to scale down the development of the European rocket.[4]

The facility is now relatively inactive although recent moves within Australia have proposed a $250 million development for the purposes of airborne testing and trials, and for military and civil aircraft training. However, owing to its poor location for equatorial type missions, it is not considered to be a viable proposal for a space launch facility.

The Proposed Cape York Space Port

The Cape York peninsula in North Queensland, Australia possesses the qualities required to establish and construct a launch facility.

Probably its greatest asset is the fact that a proposed site will have access to at least 7,000km^2 of land in a virtually uninhabited part of Australia. Apart from providing a buffer zone for safety reasons, this land will be used to give payload recovery areas for sounding rocket missions. It will also allow substantial expansion when reusable launch vehicles begin operating in the early 21st Century.

In addition, the proposed sites[5] are situated 12^o south of the equator (latitude) providing an efficient launch vehicle/spacecraft combination. The advantage in having a launch site close to the equator allows the "plane-change" (change in orbital altitude and inclination) requirement to be minimised and the contribution from the Earth's rotational velocity to be maximised. That is, it is not necessary to use additional fuel propellants to make significant plane-changes thus allowing an increased payload capacity to be used.

Other significant advantages include: the stable political environment in Australia; existing infrastructure which can

be utilised; ease of access for personnel and hardware; excellent climatic and hygienic conditions; meteorological conditions that allow launches on a higher percentage of days per year than most existing sites; minimal limitations from fishing, air and sea traffic; various geo-political aspects which include the future importance of the Pacific Ocean as a "Sea of Technology" surrounded by rapidly developing nations.

On 11 September 1986, the Premier of Queensland made the following Ministerial Statement:

> "Whilst it may appear illogical to consider space launch facilities in Australia, where space programmes are almost non-existent, a deeper examination of the problem alters this perception. I tender for consideration that other countries, who are active in Space, need improved launch facilities for operational reasons, such as limitations of terrain, weather, air traffic and other locational restrictions.
>
> I believe there is scope for Australia to investigate versatile facilities, which could be used by those countries who are developing space programmes today.

> A launch site established in Queensland, would exploit our unique advantages of stable political environment, developed industrial and transport infrastructure, favourable geographical location, reliable weather, good radar coverage and efficient air traffic control.
>
> In this light, I have considered a proposal for a study to investigate the possibility of establishing a major international spaceport in Northern Queensland. The objectives of the feasibility study will be to examine the present space launch situations in the world, and the requirements for such a station in the Cape York area."[6]

The proposal considered and referred to in the statement of the Premier of the State of Queensland was a preliminary feasibility study undertaken by the Australian Institution of Engineers. The study was commissioned in September 1986 and the final report was presented to the Co-ordinator General of Queensland in February 1987. The report addressed the technical feasibility and user demand of the proposed spaceport.

The Queensland Government thereupon commissioned the study by various consultants of selected aspects of the proposed facility. By the middle of 1987, scoping studies were presented to the Government.

The studies embraced five broad areas, namely, infrastructure and environmental issues, economic impact issues, legal issues, management issues, and commercial opportunities. The object of the studies was to identify the major issues involved in establishing a spaceport so that interested parties could benefit from an early assessment of the project by various experts.

In November 1987, the Queensland Government was in a position to invite national and international expressions of interest in the proposal. The responses came not only from those wishing to develop a spaceport facility, but also from governments and organisations wishing to participate.[7]

By February 1988, the Queensland Government had "allowed a commercial entity, the Cape York Space Agency, to commence its (own) investigations and invited it to seek to co-ordinate the involvement of other commercial interests (in the proposal)".[8]

The Government's official endorsement of the Agency came after reviewing approximately fifty expressions of interest.

The Cape York Space Agency originally comprised a consortium of approximately sixty-four companies. However during 1988, an investment company styled Essington Limited, became the sole shareholder in Cape York Space Agency Pty Ltd. It is the intention of this company to seek investments from major Australian companies. The Cape York Space Agency plans to develop a spaceport on the eastern coast of Cape York, at Temple Bay. This proposal appears to indicate the establishment of a significant facility which would utilise the tourism potential of the spaceport to create a sphere of space-related industries, including a Space University. The development would start from uninhabited land without existing infrastructure.

More recently, another major contender has challenged for the approval to construct and operate the proposed spaceport. It is known as the Australian Spaceport Group and originally comprised BHP Co Pty Ltd, Bond Corporation Limited, Comalco Limited and Martin Marietta Corporation, the latter being an American aerospace and information systems company. The Australian Spaceport Group proposes a facility centred on the town of Weipa on the west coast of Cape York. One of the members of the Group, Comalco Limited, operates a bauxite mine at Weipa and it is envisaged the facility could utilise the existing infrastructure including the existing port and township.

At present, both organisations have prospects in obtaining approval to operate the spaceport.[9] The attitude of government (both State and Commonwealth) appears to encourage the competition between the two enterprises and it is accepted that it will be the financiers of the respective enterprises who ultimately determine whether the spaceport will be a reality and which group will operate it.

The Queensland Government, although a key initiator of the proposal, has stated that if the spaceport is to proceed, it must do so upon the basis of private sector and user support. It is envisaged the State Government and its federal counterpart will however provide legislative and to a lesser extent financial support, as well as the required infrastructure.

It has been suggested by the Australian Spaceport Group that the commercial prospects for the proposed spaceport would depend on two factors. The first is the ability of the venture to provide a commercial advantage to users, sufficient to capture a significant share of commercial spacecraft launches in the 1990's. The second factor is the need for international co-operation, at governmental level, to gain broad support and market access for a privately-funded and operated spaceport complex on Cape York.[10] Dr Wood, Chairman of the Steering Committee of the ASG was

reported to say the common international outlook for the commercial space market in the 1990's suggested limited growth for launches, with existing launch site capacity outstripping forecast demand. Therefore, the proposed spaceport will need to attract users away from existing government-subsidised facilities by offering a reliable and competitive launch service at a fee which justifies the investment.

The cost must incorporate the necessary insurance component which currently can increase a launch fee from a site in the United States by 25 percent.[11] An insurance strategy is being prepared by the Queensland Government to make a launch from Cape York more financially attractive. It is estimated that a 10 percent saving on the purchase of insurance would in fact realise a 20 percent or even 25 percent total saving by using Cape York instead of Florida or Hawaii. The further saving is reflected in the cost advantage of conducting a launch closer to the equator.

The United States National Commission on Space in its paper entitled "Pioneering the Space Frontier", has provided an overview of the use of outer space in the 21st Century.[12] It is suggested that private space activities are currently limited to four general categories:

1. remote sensing;
2. satellite communications;
3. space transportation; and
4. microgravity materials processing.

Looking towards the 21st Century, a broader definition of space enterprise will emerge highlighted by three major categories:

1. supporting industries on Earth;
2. space industries with markets on Earth; and
3. space industries with markets in Space.

The Earth launch facility will become a hub of private sector activity (similar to that at today's major international airports) providing a full range of commercial services to support launch operations. Future space vehicle missions will be operational rather than for research and educational and recreational visits to space may develop as an off-shoot of the industry.

Accordingly, any current proposal for the construction of a spaceport must look to its markets in the year 2020 and beyond rather than focusing on the "no-growth" estimates for the remainder of the 20th Century.

It is generally regarded by those involved in the investigation of the spaceport, that Australia's opportunity to develop as a participating space nation has now arrived and that every effort should be made to promote its development. This paper will address the current treaties of international space law and the obligations and liabilities imposed on state-parties. Specific reference will be made to "space activities" undertaken by private commercial entities and the impact of treaty obligations upon those entities.

3. AUSTRALIAN LAW AND INTERNATIONAL LAW

In 1890, the six British Colonies[13] which came to comprise Australia agreed to become States in a federal Commonwealth, sharing the power to govern with a newly-created central polity, the Commonwealth of Australia.[14] The terms of the compact were embodied in a United Kingdom Statute, the Commonwealth of Australia Constitution Act 1900, which became fully operative on 1 January 1901. The Act, which is referred to as the Constitution, gave the federal authority, called the Commonwealth, a specific list of legislative, executive and judicial powers with the undefined residue of power being left with the States.

The State government of Queensland, as a parliament of plenary powers can legislate on matters within its own boundaries, subject only to those limitations of its own constitution and those contained in the federal constitution.

However, in the development of any major project within Australia involving for example public works or overseas investment, federal support and co-operation will be required. Apart from possessing the primary power to levy taxes, the specific enumerated powers of the federal parliament conferred on it by the Constitution will be

enlivened in respect of such projects. One such project would be the proposed spaceport.

Another important aspect of the development of a proposed spaceport in Queensland is the power of the Commonwealth government to legislate to the exclusion of the various State governments.[15] The spaceport would require large areas of land for launch and drop zones and safety ranges which would extend beyond the borders of Queensland. Other states within Australia would need to be consulted in this regard and it is submitted that the Commonwealth government could perform the role of co-ordinating the consultation between the States and hopefully achieving the necessary co-operation.

When the Constitution of Australia was enacted, no specific provision was made for the negotiation and conclusion of treaties. It was accepted, at that time, that the common law principles governing the operation of treaties would continue to apply in Australia. The negotiation of treaties and more generally the conduct of foreign relations, are therefore matters within the royal prerogative, which in Australia have devolved upon the Governor-General.

While the Commonwealth is competent to negotiate agreements with other countries on any conceivable subject, it may not

be able to carry an agreement into effect, so far as action within Australia is required, either because the rigid federal Constitution prohibits such action, or because the domestic distribution of constitutional powers or domestic administrative arrangements are such that state legislative or administrative action is required, so that the execution of treaty obligations may require state or joint Commonwealth-State action.

A fundamental legislative power vested in the Commonwealth is the external affairs power.[16] As a state-party to various international space treaties, Australia assumes responsibilities which the Commonwealth government will be called upon to fulfil. These treaties will be discussed in detail in this paper. An important restriction on the treaty-making power however is that treaties entered into by the Crown could not have effect as law unless they had been implemented by legislation.

The federal parliament is thus empowered to enact domestic legislation to give effect to its obligations under international treaties.[17] All States affected by the commonwealth legislation must conform with its provisions. Any attempt by a State government to legislate inconsistently with the federal legislation will allow the Commonwealth government to displace and override the state

legislation.[18]

Although the power of the Commonwealth government to override state legislation exists, it is submitted that certain aspects of the development of the spaceport appear to be primarily state concern. For this reason it would be advantageous to have state legislation governing the actual operation of the spaceport where such legislation would be incidental to and complement the federal legislation. For example, the designation of range safety areas could be accommodated by state legislation although the overall regulation of flight paths and drop zones would fall within the ambit of the Commonwealth.

In addition, the Queensland government could legislate for restricted development within designated range safety areas which, by necessity, will be characterised by limited existing development and sparse population. Further, the creation of a Range Safety organisation is required where the Chief Officer would report ultimately to the Commonwealth government.

Much of the land likely to be included in the spaceport is state leasehold land under special mining leases, pastoral leases as well as other forms of Australian land tenure. The state government is therefore able to grant the operator

certain rights to enable it to obtain the land and permit the construction and operation of the spaceport.

The development of the spaceport will require a framework whereby the various interests of the relevant government departments, instrumentalities and authorities, may be accommodated and satisfied, and any special rights conferred on the developing entity may be protected. The various consultants to the project have suggested two principal arrangements.[19]

(a) a franchise agreement between the State Government and the operator which would be ratified by an Act of the Queensland parliament and which would constitute an agreement with legislative force between the parties setting out their respective rights and obligations.

(b) a declaration that the project is a prescribed development under the provisions of the State Development and Public Works Organisation Act (Qld) 1971-1981. As such, the development may be exempted from the need to comply with applicable local authority requirements.

There are of course many further issues to be addressed however for present purposes, they lie outside the scope of this paper.[20]

4. AUSTRALIA'S INTERNATIONAL TREATY OBLIGATIONS FOR ACTIVITIES IN OUTER SPACE

4.1 Public International Law Issues

Outer space activities are governed by an international legal framework. Apart from the various multilateral space treaties which outline a state-party's international responsibility for activities in outer space, reference is made to the general principles of international law and custom, the latter having played an important part in developing those principles.

The launch of "Sputnik" by the Soviet Union in October 1957 and the formation of the National Aeronautics and Space Administration (NASA)[21] by the United States prompted the General Assembly of the United Nations to form a Standing Committee on the Peaceful Uses of Outer Space (COPUOS) in 1959.[22]

The United Nations, through the efforts of COPUOS, fostered the development of five treaties which form the basis of the law of outer space. They are, the Outer Space Treaty of 1967[23], the Liability Convention of 1972[24], the Registration Convention of 1975[25], the Rescue Agreement of 1968[26] and the Moon Treaty of 1979[27]. Australia is a party to each of the

treaties.[28]

Nation-states which become parties to the treaties will need to determine their own procedures to comply with the various obligations imposed. In Australia, federal legislation will be required to discharge those obligations as well as to regulate and monitor outer space activities. State-parties will attract liability for damage caused by those activities. Legislation will therefore attempt to minimise government liability or alternatively, in cases where private interests are involved, ensure that the risks associated with the activity are effectively covered by insurance. This latter concept is particularly relevant to the Cape York Spaceport project where it is envisaged that private commercial enterprise will carry out the activities. In such a case, the transfer to private enterprise of the exposure to liability under the treaties would be addressed. This concept per se, raises questions of the availability of liability cover and the cost of obtaining the insurance. Although these questions are beyond the scope of this paper, they highlight some practical difficulties which warrant close examination.

4.2 **The Outer Space Treaty**

The Outer Space Treaty sets out the fundamental principles

of international space law whereas the remaining conventions address in greater detail different areas of that law. The Outer Space Treaty has often been described as a treaty lacking clearly defined legal terms. This appears to be the result of the competing interests of the major powers in negotiating the formal text.

The Soviet Union had sought to limit the participation in outer space activities to nation states only. On the other hand the United States advocated participation and responsibility for launching of space vehicles not only by states but also international organisations and private enterprise. It was pointed out that, pursuant to United States policy, private enterprise had a right to engage in space activity and that the United States had responsibility for public as well as private national activities.

The Soviet Union subsequently withdrew their proposal with the following qualification:

> "The Soviet delegation considers it essential to point out that in this field it would be possible to consider the question of not excluding from the declaration the possibility of activity in outer space by private companies, on the condition that such activity would be subject to the control of

the appropriate state, and the state would bear international responsibility for it".[29]

As a result of these negotiations, Article VI was formulated. Article VI provides:

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

A state-party is therefore responsible for national activities carried out by the state itself or by non-governmental entities. The parallel to the United States proposal is clearly apparent, however there is no specific reference to the activities of private or commercial entities. The treaty by a subsequent article[30], imposes an obligation on a state-party to retain jurisdiction and control over those objects and personnel launched into space that are registered with that state. It is generally regarded that this obligation together with the duty to authorise and continuously supervise non-governmental activities[31] impose upon state-parties the responsibility to regulate commercial space activities.[32] This responsibility would embrace the regulation of launches, outer space activities, and re-entries. Liability issues may arise when a private enterprise contracts with a foreign state to perform activities which result in damage or loss to other states. The consequences of such an illustration will be examined later under the Liability Convention which sets out a regime to determine responsibility in such circumstances. Briefly however, the state of registration of the space object (which, for present purposes, is the foreign state contracting with the private enterprise) and the national state of the private entity may be held jointly liable.

A further observation is that although Article VI imposes on

the "appropriate state-party" an obligation to authorise and continuously supervise activities of non-governmental entities, the treaty fails to clearly define which state is the appropriate state. It is submitted that the state of nationality of the entity or the launching state, if they are different, can both fall within the ambit of the article.[33] Fundamental to this argument is the ability of the appropriate state to regulate the entity in order to control the object after it is launched. It is a general rule of international law that a state cannot enforce its jurisdiction within the borders of another state.

Therefore the state where the assets of the entity are located would appear to be the most appropriate state to regulate that entity and supervise the activity. Accordingly, the state of nationality would be applicable as the state of incorporation of the entity or the state having jurisdiction over the assets. In addition, by the terms of Article VI, it is the state responsible for "national activities".

On the other hand, the appropriate state under Article VI could refer to the launching state. The launching state is the recipient of responsibilities under the Liability Convention and the Registration Convention. The Liability Convention imposes on the launching state absolute liability

for damage caused to the surface of the earth or aircraft in flight without the need to prove fault or negligence[34], and liability for damage to other space objects where fault is established[35]. The Registration Convention provides that the launching state is responsible for the registration of space objects[36]. The launching state may therefore have the best opportunity to authorise or prohibit a launch from its own territory. Finally, Article VIII of the Outer Space Treaty requires the state of registry (the launching state[37]) to "retain jurisdiction and control" over a space object while it is in outer space. The logical implication is that the state of registry had such jurisdiction and control from the time of launch. The launching state would therefore have the obligation to authorise and continuously supervise.

Article VII sets out the circumstances which give rise to liability under the Outer Space Treaty. Article VII reads as follows:-

> "Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State

Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the moon and other celestial bodies."

It is noted that responsibility for damage rests with the state-party and not some non-governmental or private commercial entity. It will be the Australian federal government which is liable to foreign states, nationals and corporations for damage resulting from private launch activities from Australian territory. The federal government will therefore need to control and restrict the activities of the private industry to reduce the risk of damage which may be caused by a private launch and also effectively pass on to the private industry the liability for risk exposure.

Within the United States for example, private industry activities in outer space are subject to the approval and supervision of the Federal Aviation Administration (FAA), the State Department and the Federal Communications Commission (FCC). These agencies have been the key regulatory agencies which have jurisdiction over private launches. On 24 February 1984, President Reagan signed an Executive Order designating the Department of Transportation (DOT) as the lead agency with the Federal Government for

encouraging and facilitating commercial expendable launch vehicle activities by the United States private sector.[38] In order to provide a statutory basis for the DOT to exercise its functions, Congress enacted the Commercial Space Launch Act.[39] The purposes of the Act were to encourage economic growth and private sector activities in space, to promote commercial launches by simplifying the licensing process, and to designate the DOT as the executive department to oversee and co-ordinate the conduct of commercial launch operations. The DOT established the Office of Commercial Space Transportation to carry out the aim of the Act.

Article IX of the Outer Space Treaty provides that state-parties shall conduct exploration of outer space so as to avoid harmful contamination and adverse changes in the Earth's environment resulting from the introduction of extraterrestial matter and where necessary, adopt appropriate measures for this purpose.

The article goes on to provide that where a state-party has reason to believe that an activity or experiment planned by it or its nationals in outer space would cause potentially harmful interference with activities of other state-parties in the peaceful exploration and use of outer space, it is required to undertake appropriate international

consultations before proceeding with any such activity or experiment.

It is envisaged that with the participation of private commercial entities in space activities, the risk of contamination will increase. For example, if a drug manufacturing facility does not take precautions and indiscriminately disposes of industrial and human wastes, the risk of severe damage to other space operations from debris collisions increase.[40] Other examples may include collision with aircraft or space objects, satellite break-up and unscheduled return of objects to Earth.

It is noted that the obligation imposed by Article IX rests with the state-party in respect of the activities of its nationals irrespective of the place from which a launch might occur. Thus a state-party is responsible for supervision and authorisation of a national activity which is launched in a foreign state. Although not clearly provided for, it is expected a state-party would wish to regulate and control activities of private and commercial entities which are launched from a foreign state.

In an effort to promote international co-operation in the exploration and use of outer space, Article X of the Outer Space Treaty requires a state-party to consider, upon the

basis of equality, requests by other state-parties for an oportunity to observe the flight of space objects launched by it. The parties are expressly directed to determine by agreement the conditions under which such opportunities to observe are to be provided as the Treaty is silent in this regard.

In circumstances where a state is deemed a launching state by virtue of a foreign state or international inter-governmental organisation launching an object from its territory, it is arguable whether Article X intended to impose upon that state an obligation to allow other states observation rights. The imposition of the obligation would seem better directed upon states which actually launch or actively procure the launch of a space object.

An alternative solution may be to allow the state, whose territory is used to launch an object, to determine who may be granted observation rights in order to comply with the obligation imposed.

Article XI labours under a similar ambiguity in its interpretation. An obligation is imposed on states conducting activities in outer space to inform the Secretary-General of the United Nations, the public and the international scientific community to the greatest extent

feasible and practicable, of the nature, conduct, location and results of such activities. A state which does not actually launch the object may not be directly involved in "conducting activities in outer space".

Article XII requires all stations, installations, equipment and space vehicles on the moon and other celestial bodies to be open to representatives of other state-parties on a basis of reciprocity with advance notice of a projected visit to be given to enable consultations to be held, safety precautions to be taken and interference with the normal operations of the facility to be avoided.

4.3 **Liability Convention**

It has already been stated that Article VII of the Outer Space Treaty sets out the circumstances which give rise to liability. The Liability Convention provides detailed criteria for imputing liability to a launching state whose space object causes damage. The Convention sets up two regimes. On the one hand, absolute liability where the party sustaining damage does not have to prove negligence or fault. On the other hand fault liability where the imposition of liability is dependent upon proof of negligence or fault.

At the outset however, it is important to describe the terms "damage" and "launching state" as they apply under the Convention.

Article I defines damage as "loss of life, personal injury or other impairment of health or loss of or damage to property of international inter-governmental organizations".

The definition is a broad one and reflects the existence of competing legal systems with differing principles of assessing damages. With this in mind, the Convention appears to leave open the question of quantification to negotiation between the parties where the compensation "shall be determined in accordance with international law and the principles of justice and equity ....".[41] Failing agreement, the claim will be determined by a Claims Commission established under Article XV.

Article I also defines launching state as:

(i) a state which launches or procures the launching of a space object;
(ii) a state from whose territory or facility a space object is launched.

It is possible to theorise different situations where one or

more states could be classified as a launching state under the Convention.

A state which launches an object from its territory is obviously the clearest example of a launching state. However the definition suggests that such a determination could be made on the basis of either activity or ownership. A state which owns a "facility" from which an object is launched may be termed a launching state. It is possible the facility can be located outside its own territory or even in outer space. This is reinforced by Article V(3) which provides:-

> "A State from whose territory or facility a space object is launched shall be regarded as a participant in a joint launching."

A state which procures the launching is also a launching state. The concept of procurement is not clarified by the Convention. One author has suggested that procurement involves a state requesting or initiating its participation in a launching. Alternatively, the state could have accepted or agreed to its participation because of certain benefits accruing from that participation.[42]

The idea of procurement may therefore involve both direct

and indirect participation in the launching of an object. A further example could involve a state agreeing to provide financial support for a launch.

The question is posed whether participation by a private entity or a person renders the national state of that entity or person liable as a launching state. It has been suggested that by reading together Article II of the Liability Convention which imposes absolute liability on a launching state for damage and Article VI of the Outer Space Treaty which provides that state-parties bear international responsibility for national activities in outer space, it can be argued that activities or ownership by a private entity or person could be attributed to the national state for the purpose of imposing liability.[43] The same author does point out that this conclusion appears to run contrary to the interpretation and language of the Liability Convention. It is submitted that a national state could only be subject to liability as a launching state where it has knowledge of its national's participation and agrees to or accepts that participation either expressly or impliedly.

(a) Absolute Liability

Article II provides:-

> "A launching State shall be absolutely liable to pay compensation for damage caused by its space

object on the surface of the Earth or to aircraft in flight."

Once the causal connection is shown between the space object (which includes by definition component parts) and the damage, liability is immediately imposed on the launching state. There is no need to establish negligence or fault on the part of that state. To do so would seem an onerous burden for the victim. Not only would the evidence be extremely complex and technical, but access to such relevant information may be precluded owing to its possible classified nature. Further, it is generally considered the launching state is in a position to foresee the associated risks and make the appropriate provisions.

The Convention does provide an exception to absolute liability. Where a launching state can prove that the damage resulted wholly or partially from either gross negligence or an act of omission done with intent to cause damage on the part of the claimant state (or the persons it represents), the launching state will be exonerated from absolute liability.[44]

It has been argued that contributory gross negligence on the part of one victim would not exonerate the launching state in respect of its liability to further innocent victims.

The exoneration would apply in part only to the party who contributed to the damage.[45]

A proviso or exception to the operation of the exoneration is contained in Article VI(2). In order for the launching state to take advantage of the exoneration, its activities must be in conformity with international law including the Charter of the United Nations and the Outer Space Treaty.

Article VII provides a limitation to the extent of the liability incurred by a launching state. Article VII reads as follows:-

> "The provisions of this Convention shall not apply to damage caused by a space object of a launching state to:
>
> (a) Nationals of that launching state;
>
> (b) Foreign nationals during such time as they are participating in the operation of that space object from the time of its launching or at any stage thereafter until its descent, or during such time as they are in the immediate vicinity of a planned launching or recovery area as the result of an invitation by that launching State."

A national of a launching state or a participating national of a foreign state is precluded from claiming against the launching state. Where there are several launching states involved, [in accordance with the definition under Article I(c)] it is thought a claim by a national of one state against another launching state is also precluded although the Convention does not expressly address this point. The Convention does however suggest that a foreign national of a state which is not involved in the launch, is not entitled to claim against any one of the launching states.

It is noteworthy that the absolute liability imposed under Article II is confined to damage occurring on the surface of the Earth or to aircraft in flight. Article VII of the Outer Space Treaty which enunciates the general principle of liability refers to damage "on the Earth, in air space or in outer space ....". In relation to activities in outer space, the Liability Convention has set up a regime of fault liability. In this regard, it is thought that those states engaged in space activities would equally appreciate the risks involved and would accept a liability to bear losses where fault is shown.

(b) Fault Liability

Article III of the Liability Convention provides:-

> "In the event of damage being caused elsewhere than on the surface of the Earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible."

The launching state of a space object which causes damage to another space object is liable only if the damage is due to its fault or the fault of persons for whom it is responsible.

Article IV further provides that, in the case of joint launchings, where a third state-party suffers damage, the two launching states shall be jointly and severally liable. This liability will be absolute where the damage is caused to the territory of the third state or its national aircraft in flight. The liability will be based on fault where damage is caused to a space object of a third state or persons or property on board that object.

If the extent of liability between the two states cannot be established, it will be apportioned equally.

(c) Joint Launchings

Article V provides that "whenever two or more states jointly launch a space object, they shall be jointly and severally liable for any damage caused".

The view has been expressed that liability under this article is only imposed on those states from whose territory or facility the object was launched.[46] Therefore a state which procures the launching of an object and thus incurs liability as a launching state (Article I(c)) will not be jointly and severally liable under Article V.

This view, it has been suggested, is supported by Article V(3) which regards a state from whose territory or facility an object is launched as "a participant in a joint launching".

Article V(2) provides that a "launching state which has paid compensation for damage shall have the right to present a claim for indemnification to other participants in the joint launching". The paragraph continues that "the participants in a joint launching may conclude agreements regarding the

apportioning among themselves of the financial obligation in respect of which they are jointly and severally liable". It is suggested that if the learned author is correct in his view, the drafters of the Convention have intended that "a launching state" in Article V(2) is a participant in a joint launching. As such, it assumes the quality of a launching state for the purpose of the Convention.

(d) Claims

Liability under this Convention is primarily incurred by states. A private person or private entity may attract liability to the extent that they have contributed to the damage.[47] However this liability lies outside the ambit of the Convention and serves only as an means to exonerate a launching state from absolute liability.

In relation to inter-governmental organisations, Article XXIII provides the one real exception to the state liability regime. This article renders the operative parts of the Convention applicable to inter-governmental organisations where the organisation declares its acceptance of the rights and obligations provided for in the Convention and a majority of the states that are members of the organisation are also parties to both the Liability Convention and the Outer Space Treaty.

It is also noted that the liability of the organisation and each and every member shall be joint and several. A claim for damages however is first presented to the organisation. If the organisation fails to pay the sum agreed or determined within six months, the claimant state may seek payment from the members.

Article XI provides that a claimant is not required to exhaust local remedies before presenting a claim under the Convention. The article obviously does not prevent a claimant pursuing local remedies. However if this latter course is adopted, a claim under the Convention cannot be made at the same time in respect of the same damage. A claimant should also be aware that Article X provides for a one year time limitation period for presenting a claim under the Convention. It is suggested that a claimant should pursue local remedies after presenting a Convention claim and receiving its determination.

4.4 Registration Convention

The Registration Convention establishes a system for the recording of information concerning space objects launched into outer space. A launching state is required to firstly record the information on a national register and secondly supply particular information to the United Nations where it

will be recorded on a central register maintained by the Secretary-General. Full and open access will be available to the international register.[48] The Convention seeks to complement the Liability Convention by providing states with information which will assist in determining responsibility for space objects which have caused damage.

The Convention adopts the same definitions for the terms "launching state" and "space object" as provided for in the Liability Convention.[49] In addition, the Convention defines the "State of Registry" as a launching state on whose registry a space object is carried in accordance with Article II.

Article II requires a launching state to record on a national register details of any space object launched into earth orbit or beyond.[50]

In so doing there appears to be no obligation on a launching state to register launchings of ballistic missiles and sounding rockets which may not venture into "earth orbit or beyond".

Article II further provides the contents of the national register and the conditions under which it is maintained are matters for the launching state to determine. Where there

are two or more launching states in respect of a particular space object, only one will be required to register the object. The launching states will therefore agree on which state will accept the obligation to register and that state will become the State of Registry for the purpose of the Convention. An important consequence of this election is found in Article VIII of the Outer Space Treaty which requires the State of Registry to "retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body".

Notwithstanding this obligation, Article II(2) of the Registration Convention allows the relevant launching states to conclude agreements as between themselves on matters of jurisdiction and control over the space object and its personnel.

It is important at this juncture to set out the text of Article VIII of the Outer Space Treaty in full. It provides as follows:

> "A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of

> objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State, which shall, upon request, furnish identifying data prior to their return."

With the advancement of technology and the development of reusable space platforms or stations, the questions of joint participation and ownership in those stations becomes important to the obligations under the various conventions.

Space stations can be constructed in two or more parts which are launched separately and then assembled in space. The Registration Convention does not expressly provide for this situation. By the terms of Article II(1) of the Registration Convention, each state must record on its national register details of its space object/part launched into outer space. That state will therefore become a state of registry. It will also be liable as a launching state for any damage caused by that object pursuant to the Liability Convention.

A question arises whether a state must therefore register each separately launched component in order to obtain jurisdiction and control over all components which make up the space station. The Registration Convention provides that in the case of a joint launching of one object, those states shall determine which state shall become the state of registry. By implication, the Registration Convention seems to provide that only one state can be the state of registry for one object.

Consequently a state may not be capable of recording on its register objects launched separately by other states which are subsequently connected with its own component to form a space station. Further, by implication that state will not have jurisdiction and control over the space station.

Article II(2) of the Registration Convention does however provide that joint launching states of one object can conclude agreements on the questions of jurisdiction and control quite apart from the provision of Article VIII of the Outer Space Treaty.

Article IV sets out the information to be furnished by the State of Registry and entered upon the Secretary-General's Central Register. That information is as follows:

"1. Each State of registry shall furnish to the Secretary-General of the United Nations, as soon as practicable, the following information concerning each space object carried on its registry:

(a) Name of launching State or States;

(b) An appropriate designator of the space object or its registration number;

(c) Date and territory or location of launch;

(d) Basic orbital parameters, including:

(i) Nodal period,

(ii) Inclination,

(iii) Apogee,

(iv) Perigee;

(e) General function of the space object."

The Convention does not prescribe a time limit in which the state of registry must communicate this information to the Secretary-General. However the information is required to be supplied "as soon as practicable".[51] It was noted in 1985 that it took an average of four months to notify the Secretary-General.[52] At that time, the central register revealed the earliest notification came some 26 days after launching and the longest delay was 11 months.

Additional information may be provided by the State of

Registry. However an examination of the notifications to the Secretary-General indicates the further information is usually general in nature and very limited.[53]

Typical entities in the register which describe the function and purpose of the launch include "investigation of the upper atmosphere and outer space"; "telecommunications"; and "verification of the fundamental technology related to interplanetary missions".[54]

One author observed in 1981 that "no space mission has ever reported as serving military purposes.[55]

It has been suggested that greater benefits could be attained through the Convention by all states notifying and recording the following information:-

(1) non-functional materials; for example; spent rockets.
(2) significant changes in the orbital pattern.
(3) descriptive information relating to size, weight and other capabilities of launch vehicles.
(4) exact information as to the time and place of launch.
(5) the fact that a launched space object has

disappeared from sustained flight as a result of a specific circumstance; for example, natural decay or collision with another celestial body.

(6) whether portions of the object were recovered.

(7) whether debris reached the Earth and if so, its location.

(8) whether an intended orbital launch had failed.

(9) the submission of information relating to all pre-convention launches.

(10) greater detail as to the function and purpose of the launch.[56]

Article IV(3) further requires each State of Registry to notify "to the greatest extent feasible and as soon as practicable" of space objects which are no longer in Earth orbit.

The General Counsel for NASA has stated that Articles VI[57] and IX[58] of the Outer Space Treaty place responsibility on a state-party for space activities of its nationals irrespective of the place from which a launch might occur.[59]

Questions of liability for damage will be an important

consideration therefore when private enterprise contracts with foreign governments to perform activities that later harm other states or the space environment.

Use by foreign states and enterprises of a spaceport in Australia will involve those foreign states and enterprises assuming the status of launching states. As such they will be required to register the object on a national register as well as supplying the appropriate information to the Secretary-General. As the object is launched from Australian territory, Australia will also be a launching state in relation to that object. An agreement will have to be reached to determine the extent of jurisdiction and control by each state.

It would be fair to say that foreign states will be reluctant to participate unless they have a large measure of control and therefore they will accept the obligations imposed under the Registration and Liability Conventions. Australia on the other hand, would observe the principles enunciated in the Outer Space Treaty relating to the promotion of peaceful use of outer space.

Whether this provision can be extended to encompass the position of several states launching separate objects which later form one space station is debatable. If the assembled

space station can be considered as one object, the Registration Convention appears to embrace this situation by allowing all states to elect one state as the state of registry for the purpose of the central register and then conclude an agreement on the question of jurisdiction and control. It is submitted that each state would also be jointly and severally liable under the Liability Convention.

A further discussion arises where objects are in turn launched from the space station. The Registration Convention, by adopting the definition of launching state from the Liability Convention, allows for the dual registration of that object on the state's national register and the Secretary-General's central register.

If damage is sustained by either personnel or property of another participating state on the space station, unless an appropriate agreement were in place, the full force of Article III of the Liability Convention (fault liability) would apply and the joint venture may be placed in jeopardy by the conflicting legal positions of the participating state partners.

Articles V and VI address the problem which may be encountered in practice in identifying a space object which causes damage. Although Article IV requires the State of

Registry to notify a designator or registration number, there is no requirement that the space object itself bear such identifying information.

In cases where a space object does carry a designator or registration number, Article V requires the State of Registry to communicate this information to the Secretary-General. It will then be recorded on the central register. Therefore, the marking of space objects is voluntary. However, when marking occurs, registration of this fact becomes mandatory. It is noted that Article X provides for a review of the Convention and in particular, a consideration of any technological developments relating to the identification of space objects.

The question of registration of markings or numbers on space objects was the most debated issue leading to the drafting of the Registration Convention.

The Scientific and Technical Sub-Committee of COPUOS addressed at length the manner of marking space objects following submissions that space objects should be marked in such a way to survive re-entry into the Earth's atmosphere. In its report of 1 May 1970, the Sub-Committee concluded that no significant difficulty was to be expected in identifying space objects orbiting or surviving re-entry in

the Earth's atmosphere; that for reasons of economy and safety, a marking system to survive re-entry was not considered technically practicable; and that an analysis of materials used in space objects together with consideration of time of re-entry and trajectories was sufficient to provide identifying information.[60]

Article VI relates to a situation where the registration procedure under the Convention does not allow a state-party which has sustained damage to adequately identify the space object. In such a case the injured state-party can call upon other state-parties with space monitoring or tracking facilities to identify the particular object. Alternatively the request can be made by the Secretary-General of the United Nations.

The assistance provided by state-parties is rendered "under equitable and reasonable conditions" and is to be the subject of agreement between the states concerned.

Article VII relates to space activities undertaken by international intergovernmental organisations. The Article provides that such organisations are to be treated as if they were states for the purposes of the principal/operative parts of the Convention provided the following conditions are satisfied:-

1. that the organisation declare its acceptance of the rights and obligations provided for in the Convention; and
2. that the majority of the states' members of the organisation are parties to the Registration Convention and to the Outer Space Treaty.

4.5 **The Rescue Agreement**

The Rescue Agreement provides the launching state with some measure of security by facilitating assistance to damaged spacecraft and the rescue and return of its personnel, whether they are located within the territory of a state-party, on the high seas or in any other place outside the jurisdiction of any state.[61]

One of the stipulated aims of the Rescue Agreement, and found in its preamble, is to "give further concrete expression" to the rights and obligations contained in the Outer Space Treaty. The Agreement also seeks to promote international co-operation in the peaceful exploration and use of outer space.

Although the launching state has the obligation to register any object it launches into outer space and is

liable for any damage caused by that object, the Rescue Agreement imposes obligations on states other than those states involved in the launching. For example, the following obligations are highlighted:-

(a) Upon receipt of information or discovery that personnel of a spacecraft require assistance, a state-party shall notify the launching authority or make a public announcement and notify the Secretary-General of the United Nations.[62]

(b) Where personnel are located within the territory of a state-party, that state shall also attempt to rescue those personnel and render all assistance.[63]

(c) Where personnel are found within territory under the jurisdiction of a state-party or on the high seas or in any other place not under the jurisdiction of any state, they shall be returned safely and promptly to representatives of the launching authority.[64]

(d) Where an object has been launched into outer space and is (or any of its component parts are) subsequently found beyond the territorial limits of the launching

> authority, a state-party upon request by the launching authority shall return the object or component parts or alternatively hold them for the launching authority. If requested, any identifying marks shall be communicated to the state-party before their return to the launching authority.[65]

In a similar manner as the Outer Space Treaty and the Liability Convention, an international inter-governmental organisation can effectivly be placed in the same position as a state by declaring its acceptance of the rights and obligations provided for in the Rescue Agreement and where a majority of its state members are parties to the Outer Space Treaty.

Article 6 therefore defines a "launching authority" as the state or international inter-governmental organisation responsible for the launching.

It has been suggested that with the prospect of increasing activities in outer space, an international inter-governmental organisation could be established to "manage" those activities.[66] One function would be the availability of a rescue team to assist in recovery operations. It is assumed the costs incurred would be borne by the launching state in line with the provisions of the Rescue Agreement.

Adherence to the Registration Convention would allow all states to know exactly which state is responsible for the launching of that the appropriate claim for damages can be made if loss results. Where private commercial enterprise was responsible, similarly the registration of the object would identify the organisation and its assets. Although the possibility exists, it is thought registration may prevent theft of the object or component parts during the recovery and return operations under the Resuce Agreement.

One author has suggested that where a private enterprise has launched an object which has subsequently decayed or landed accidently, the state responsible for the activities of that enterprise may take steps to retrieve the object or debris and charge the costs to the enterprise.[67] Alternatively, the responsible state could request another state pursuant to Article 5(3) of the Resuce Agreement to retrieve and return the object or debris.

4.6 **The Moon Treaty**

The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies[68] sets out a body of principles to regulate the exploration of the moon and other celestial bodies and the exploitation of their resources.

Apart from the general requirement that state-parties are prohibited from militarizing the moon and other celestial bodies[69], the Moon Treaty primarily focuses on the conduct of state-parties on and in relation to the moon and celestial bodies. In pursuit of the exploration and exploitation of outer space, state-parties are permitted to launch objects from the moon's surface.[70] The Treaty does not however address the concept of the "launching state" but rather attempts to regulate states in respect of their activities in outer space. For the purpose of this paper, Australia would not appear to attract liability under the Treaty merely because the space object was launched from its territory or facility. Similarly, Australia would not incur liability for activities of the nationals of foreign states which used the facility to launch their object and/or personnel.

On the premise that an operational spaceport within Australia would lead to the establishment of national interests, and in particular private interests, capable of exploring the moon and other celestial bodies and exploiting their resources, the following comments are made.

The Outer Space Treaty has expressed that the exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and

in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.[71] It is anticipated that private enterprise will wish to clarify whether this provision imposes an obligation to share any of the benefits obtained from their activities. On its face, the Outer Space Treaty would seem to preclude any activity which would benefit only one entity or state. The benefits must be capable of flowing to "all countries". However there is no expressed procedure to assist in determining what benefits and interests are to be considered.

The above "common interests" principle has been reinforced by Article 11 of the Moon Treaty which provides the Moon and its natural resources are the common heritage of mankind. One author has suggested that the Moon Treaty takes the Outer Space Treaty principle a few steps further towards a determination of equitable sharing.[72]

The Moon Treaty specifically addresses the exploitation of the resources of the moon and other celestial bodies and declares them to be the common heritage of mankind. Article 11 provides that the common heritage principle "finds its expression in the provisions of this Agreement, in particular in paragraph 5 of this article".

Article 11(5) provides as follows:-

> "States-Parties to this Agreement hereby undertake to establish an international regime, including appropriate procedures to govern the exploitation of the natural resources of the moon as such exploitation is about to become feasible ...."

Therefore all activities with respect to such natural resources must be carried out in a manner compatible with the purposes of the international regime. Article 11(7) sets out the main purposes of the international regime as:-

(a) the orderly and safe development of the natural resources of the moon;

(b) the rational management of those resources;

(c) the expansion of opportunities in the use of those resources;

(d) an equitable sharing by all State Parties in the benefits derived from those resources, whereby the interests and needs of the developing countries, as well as the efforts of those countries which have contributed either directly or indirectly to the exploration of the moon, shall be given special consideration.

Therefore, although no express requirements are yet laid down for the equitable sharing of natural resources, the Treaty clearly states that such resources are for the common heritage of all mankind. The stated purposes of the international regime must be adhered to when carrying out national activities.

Obviously the prohibitive cost of such exploration and exploitation would encourage international joint ventures in which Australia may possibly participate. Once again the Moon treaty similarly provides for an international inter-governmental organisation to be placed in the position of a state-party upon the normal declarations and membership requirements.[73]

As previously stated, liability implications under the Moon Treaty would not be relevant to Australia merely because an object which subsequently carries out exploration and exploitation was launched from its spaceport. However when Australia is able to participate, directly or through participation in an international joint venture, legislative regulation will be required to ensure that the Treaty obligations are fulfilled.

5. AUSTRALIA'S OBLIGATIONS AT COMMON LAW

5.1 Private International Law Issues

The previous analysis of the Liability Convention of 1972 highlighted the fact that the Convention did not apply to nationals of the launching state or states and to foreign nationals working or engaged in the launch.[74]

Obviously these categories of possible claimants would theoretically be at high risk at the time of launch. In the absence of treaty or legislative enactment, the above claimants must look to their common law remedies. In a commonwealth jurisdiction, like Australia, these remedies would fall under the following headings:

1. Rule in Rylands v Fletcher;
2. Nuisance; and
3. Negligence.

5.2 Rule in Rylands v Fletcher

The rule in Rylands v Fletcher[75] derives from a decision of the House of Lords of 1868. In that case, water escaped from a reservoir constructed on land owned by the defendants into a disused shaft of an abandoned mine and connecting

passages causing flooding of the plaintiff's mine. The rule was initially expressed in general terms by Blackburn J. in Fletcher v Rylands in the Exchequer Chambers and subsequently limited in its application to non-natural uses as stated by Lord Cairns in the House of Lords. The rule can be expressed as follows:

> "The occupier of land who brings and keeps upon it anything likely to do damage if it escapes is bound at his peril to prevent its escape, and is liable for all the direct consequences of its escape, even if he has been guilty of no negligence."[76]

The rule is one which imposes strict liability where proof of negligence is not required. That is, the plaintiff need only establish that his loss was the direct result of the escape. He is not required to prove how the escape occurred or who was responsible for it. The court, in addition, must be satisfied that the use was "non-natural".

The possible application of this rule to outer space activities can be seen in circumstances where a plaintiff will be at a significant disadvantage if he is required to establish the cause of his loss or damage and the party responsible for it. As has been previously mentioned in

this dissertation, outer space activities involve highly technical and often classified data. A plaintiff may be precluded from access to this information. Therefore the rule in Ryland v Fletcher would assist a plaintiff by avoiding the need to establish fault.

A number of United States authorities have considered the application of the Rylands v Fletcher doctrine.[77] These applications include aviation and space-related activities. However the American authorities apply a rule which differs from the English doctrine. Strict liability was initially imposed in respect of abnormally dangerous or ultra-hazardous conditions or activities which are not natural at their location. The doctrine was subsequently limited to abnormally dangerous activities and conditions.[78]

In Berg v Reaction Motors Division[79] the Supreme Court of New Jersey held the defendant company, which was engaged in the testing of a rocket engine for the X-15 supersonic military aircraft, liable to neighbouring property owners for structural damage caused to their properties by vibrations set up by the testing. The defendant was held liable to pay compensatory, but not punitive damages. In so doing, the activity carried on by the defendant was considered "ultra-hazardous" and the plaintiffs were not required to establish a failure on the part of the defendant

to take reasonable care in the performance of the tests.

The Supreme Court, after considering analogous cases concerning blasting operators, reasoned that where the activity is ultra-hazardous and introduces an unusual danger into the community, -

> "if damage does occur, it should in all fairness be absorbed as an operating business expense, for the enterprise may not reasonably expect its wholly innocent neighbours to shoulder the loss."[80]

Therefore, in support of this rationale, the Supreme Court was of the opinion that although the defendant's activities were "conducted with great care and had great public utility"[81], this did not excuse them from a strict liability to compensate for the damage caused.

In the case of Smith v Lockheed Propulsion Company[82] the Court of Appeal followed the Supreme Court decision in Berg. The plaintiff alleged damage to a well on his property caused by seismic vibrations from the testing of a rocket engine on land adjoining the plaintiff's ranch.

The Court found there was no evidence of negligence on the

part of the defendant company. The evidence would not have allowed the jury to find that reasonable prudent engineering practices for the activity would have required additional precautions. In deciding that the activity was ultra-hazardous, the Court noted that the rocket motor was the largest ever tested to that date. Further, the test firing was not a matter of common occurrence.

The Court found the present case to be "remarkably similar" to the Berg case. Although the testing was carried out in a generally undeveloped area (whereas damage occurred in a neighbourhood community in Berg), portions of the defendant's property bordered the plaintiff's ranch on three sides. As the defendant was fully aware of the risk of harm to the plaintiff's property, the defendant was held to be strictly liable.

A further case concerning rocket testing was H.L. Properties Inc v Aerojet-General Corp[83] in which it was alleged that hydrogen chloride gas emitted from the rocket mixed with rain and moisture in the atmosphere thus producing acid rain which fell onto the plaintiff's property causing damage to crops and plants. The United States Government, through NASA, was held to have a non-delegable duty to ensure that its contractors carried out the testing in a manner that was not negligent. The defendant was held to be (and in fact

conceded it was) negligent. It failed to take steps to monitor the testing and the prevailing weather conditions at the time. Although the activity was ultra-hazardous, it was thought unneccessary to rely upon the strict liability doctrine where negligence could clearly be established.

The case of Pigott v Boeing[84] is another example of a departure by the American courts to apply the doctrine of strict liability in circumstances similar to the previously mentioned cases. In this case, the plaintiffs alleged that vibrations from the testing of a Saturn Booster rocket damaged their home. The court required the plaintiffs to establish negligence rather than applying the principles of strict liability . In finding that the defendant company had not been negligent and therefore not liable, the court observed that the defendant had conducted the firing at a special NASA test range and that a buffer zone had been provided for. In addition the research was considered necessary for the general welfare and security of the United States. It is submitted that these considerations do not per se, appear to provide sufficient basis for distinguishing this case from the decisions of Berg and Smith.

The American courts have therefore applied, albeit with exceptions, the principles of strict liability in relation

to activities which exhibit similar characteristics to space-related activities. Without a substantial change in the judicial decisions, the Second Restatement of Torts in 1977 affirmed the Rylands v Fletcher doctrine in respect of abnormally dangerous activities and conditions rather than ultra-hazardous ones. Factors to be considered in determining whether an activity or condition is abnormally dangerous are:-

1. the high degree of risk;
2. the likelihood of great harm;
3. the inability to eliminate the risk;
4. the extent to which the activity is not a matter of common usage;
5. the inappropriateness of the activity to its location; and
6. the value of the activity to the community.[85]

Returning to the rule in Rylands v Fletcher, a plaintiff must establish that the defendant's use of his land was "non-natural". In a review of the relevant case law, courts not only consider the character of the activity but also its location and relation to its surroundings, and the manner in which it is maintained.

It has been held that the escape of gas[86] or electricity[87]

from a domestic or household system is a natural use, but escape from an industrial electricity supply[88] or where gas is stored in quantity[89] is non-natural and falls within the rule. Similarly, it is a natural use of land to retain water in a cistern[90] or in ordinary household pipes[91] but an escape of water from a water main[92] or a cellar[93] is a non-natural use and once again falls within the rule.

The abovementioned examples illustrate the difficulty experienced in applying the concept of "non-natural use" resulting in an inconsistent line of authority in the application of the rule. However, a proposed spaceport would seem to fall within the ambit of non-natural use of land.

If we accept the general proposition that the rule in Rylands v Fletcher has application to the activities of a spaceport, mention should be made of certain limitations and exceptions placed upon its applicability. Firstly, a potential plaintiff must be able to establish that an escape has occurred. The House of Lords in Read v J. Lyons & Co Ltd[94] clearly decided that this requirement was essential to a finding that the rule applied. In this case, the plaintiff was employed as an inspector at a munitions factory. Whilst carrying out those duties on the premises, the plaintiff was injured by an exploding shell. It was

held that no escape had occurred as the plaintiff was on the land at the time she sustained injury.

One class of plaintiff which must look to common law remedies in case of injury or damage at a spaceport is the employee performing work at the launch site. The limitation expressed in Read v Lyons would mean that a plaintiff in this category would fall outside the rule if injury was suffered when he or she was within the spaceport environs.

A further limitation may derive from the fact that there is some doubt as to whether or not a plaintiff is required to have title or some other interest in the land upon which he or she sustains injury or damage. Authority can be found for opposite views to this proposition. On the one hand, it has been decided that the plaintiff must be the owner or occupier of land in order to bring a claim within the rule in Rylands v Fletcher.[95] That is, he cannot be merely a bystander or passerby who happened to sustain injury when he or she is in reasonable proximity to the non-natural use or abnormally dangerous activity.

On the other hand, Fleming in his text Fleming on Torts[96] has suggested the plaintiff need not show any interest in the land. It is submitted that this opinion which would be open to wide interpretation may lead to inconsistent

results. At the same time the opposing view could restrict the class of plaintiff unnecessarily. It is therefore submitted that it is this type of situation which dictates a need for legislative regulation if a proposed spaceport is to proceed.

The volume of decided cases on the rule of Rylands v Fletcher indicates alleged damage sustained in circumstances where the escape has been unintentional or accidental. A fortiori, there is an absence of authority to suggest that an intentional escape would mean that liability is excluded.[97] Whether an intentional launching from a spaceport which causes damage or an unintentional ignition or launch would affect the application of the rule could also be the subject of future regulatory control.

Finally, an exception to the rule in Rylands v Fletcher exists where the activity is borne out of statutory authority. Menzies J. in the case of Benning v Wong[98] stated at page 477:-

> "It was, I think, a correct understanding of the rule in Rylands v Fletcher that led to the decision in Green v Chelsea Waterworks Company (1894) 70 L.T. 547 that Rylands v Fletcher does not apply to the escape of what has been brought

> to the point where it escapes by the authority of an Act of Parliament. If a person acts in accordance with statutory authority in bringing a dangerous substance to his premises, why should he be absolutely liable if it escapes?"

In the case of Green v Chelsea Waterworks Company, referred to by Menzies J., the defendant was authorised by statute to lay a water main and was subject to a statutory obligation to maintain supply. When a water main burst and escape occurred, the plaintiff's premises were flooded.

The court held the rule in Rylands v Fletcher did not apply and the plaintiff, in order to succeed in his claim for damages had to establish negligence on the part of the defendant company.

It is understood that an exception to the rule applies only in circumstances where the enabling statute expressly or impliedly exempts the Authority from liability to which it would otherwise be subject. In all other cases the functions and acts of the Authority fall within the rule.[99] In relation to a proposed Spaceport which would be constructed and operated by private enterprise, it is thought the enabling legislation would merely authorise that operation. As such, the legislation would differ from the

type which imposes a public duty or some Authority to perform a function or public utility. In these circumstances, it is submitted the Spaceport legislation would not expressly exclude the application of the rule in Rylands v Fletcher. However, in light of the limitations and exceptions placed upon the rule, it is further submitted that regulations be enacted to address and embrace the anomalous situations discussed in this section.

5.3 Nuisance

The tort of nuisance is a further possible basis for liability at common law. One frequently referred to formulation is found in the case of Cunnard v Antifyre[100] where Talbolt J. stated as follows:-

> "Private nuisance, at least in the vast majority of cases, are interferences for a substantial length of time by owners or occupiers of property with the use or enjoyment of the neighbouring property."

The doctrine of nuisance therefore regulates the relationship between owners and occupiers of neighbouring properties insofar as interferences are concerned. It is important to note that a possible remedy in nuisance can be

avoided by legislative sanction. Further, where the nuisance is an inevitable result of the performance of a statutory duty and the enactment is silent with respect to possible sanctions, a person affected by the nuisance is left without a remedy.

This principle has been judicially expressed in the (Australian) New South Wales Supreme Court[101]:

> ".... the initial question must, so it seems to me, always be one of construction of the relevant statutory provision; if the provision either directs or permits the construction and/or operation of a precisely defined structure or work of or in a specified location, then it would seem hard to avoid the conclusion that the consequences naturally flowing from the construction and/or operation of that work were intended, and thus made lawful by the statute; in which event, unless the nuisance arose by reason of the work negligently constructed and/or operated, those affected by the nuisance would have no redress.

The English Court of Appeal in the case of Allen v Gulf Oil Refining Ltd[102] was required to consider legislation which authorised the defendant company to

construct certain works in connection with an oil refinery. The legislation gave the power to compulsorily acquire land for the construction of the refinery and associated works which included construction of railway line outside the boundary of the land. The legislation then authorised the construction and use in connection with the railway line of certain subsidiary works.

The Court of Appeal found the defendant company liable for nuisance arising from the use of locomotive engines on the railway line. The relevant provision merely authorised its construction but not the use on it of locomotive engines. In contrast, the further provision did authorise its use in respect of subsidiary works. Lord Denning reasoned as follows:

> "Wherever private undertakings seek statutory authority to construct and operate an installation which may cause damage to people living in the neighbourhood, it should not be assumed that Parliament intended that damage should be done to innocent people without redress. Just as in principle property should not be taken compulsorily except on proper compensation being paid for it, so also in principle property should

> not be damaged compulsorily except on proper compensation being made for the damage done ..... They ought to provide for it [compensation] as part of the legitimate expenses of their operation, either as initial capital cost or out of the subsequent revenue."[103]

The principles enunciated in the abovementioned cases would strongly support the view that before proposed legislation was drafted authorising the construction and operation of a Spaceport, an analysis should be undertaken to assess those interests of neighbouring owners and occupiers which could be affected by the construction, operation and associated activities of a Spaceport. Provision could then be made to allow for the payment of adequate compensation to those individuals. In so doing, the enabling legislation, which would specifically address the functions and activities of the Spaceport, having already made compensation in that regard, could protect the spaceport from future actions in nuisance.

5.4 **Negligence**

The third basis of liability is that of negligence. Briefly stated, liability arises in respect of any failure to take reasonable care to prevent personal injury or damage to the

property of others in circumstances where such injury or damage is reasonably forseeable.

A failure to attain a standard of care exercised generally by others who are in a similar position to that of the defendant and who conduct their businesses in a reasonably competent manner, results in a finding of fault on the part of the defendant.

In line with decisions from other jurisdictions, a Spaceport and its related activities may be viewed as abnormally dangerous. The prescribed standards of care will therefore be very high. In Queensland, a plaintiff would need to establish a failure to meet these standards of care and a comparison of other similar and/or analogous activities may be required before a decision can be made. The main problem arising from this practical requirement is access to relevant information about the activity. As previously highlighted in this dissertation, the information may be of a classified nature. Further, where material is obtainable, its technical content may require highly expert analysis, the cost of which could be prohibitive to the average plaintiff. Also fundamental to the action is the need to identify the exact party who is responsible for the alleged negligence.

The inequality in the status of the potential parties would suggest that there is a need for the introduction of a liability which is imposed strictly without the requirement of establishing fault. The extent of a Spaceport operation would allow for the provision of adequate insurance and the cost of such insurance would be built in to the legitimate expenses of the operation. Proposed legislation would provide for the imposition of strict liability and the recovery of damages as if the plaintiff had in fact established negligence on the part of the defendant. The operators of the Spaceport would in turn be entitled to seek indemnity from a third party where such liability is shown to exist. In terms of enacting the appropriate legislation, it is submitted that the State of Queensland has the power to pass legislation which would complement any commonwealth legislation giving effect to Australia's obligations under the Liability Convention.[104]

6. CONCLUSION

Although it was recognised in 1967 that the private sector had a role to play in outer space, the various treaties have been drafted primarily with governmental activity and liability in mind.

It is now increasingly important to provide an environment where private commercial interests can look with some certainty at their possible legal position before investing in an activity with enormous capital outlay and extremely high risks.

Recent developments in the United States have signalled an opportunity for commercial enterprises in various countries to enter the space business and in particular, to contribute in the immediate future to the development of expendable launch vehicles. It is against this background that Australia has perceived its own opportunity to develop as a participating space nation.

The Constitution of Australia has vested specific powers on the federal parliament which will ultimately impact upon the development of a spaceport in the State of Queensland. The external affairs power allows the federal parliament to enact domestic legislation which will give effect to the

various international treaties applicable to outer space. Residual powers are left to the various state governments.

A project of the magnitude of the proposed spaceport will require support from both federal and state governments. The enactment of State legislation must therefore complement any Commonwealth Acts of Parliaments, particularly in regard to the provision of the necessary infrastructure.

The spaceport has been studied and proposed on the basis that it will be privately funded and operated. As such, it will be necessary for the Commonwealth government (in conjunction with the Queensland state government) to find a balance between allowing private enterprise the latitude to develop a space industry within Australia on the one part and exercising the appropriate regulation and control of the activities of that private enterprise so as to fulfil the obligations imposed upon it as a party to the various international space law treaties. Further, it is envisaged that initially, Australia's role will be merely that of a provider of launching facilities and ancillary services. Foreign states will plan and organise the "missions" and provide the spacecraft, crew and payloads. Australia will be deemed a launching state in these circumstances and the relevance of the international treaty obligations would need to be considered carefully.

In the latter case, it is thought Australia's means of controlling the spacecraft following its launch would be restricted by the foreign state which actually procures the launching. The Outer Space Treaty effectively imposes upon state-parties international responsibility for national activities in outer space. Furthermore, the appropriate state has an obligation to continuously supervise the activities. The foreign state which has procured the launch from Australian territory may, in these circumstances, be the appropriate state to fulfil this obligation.

The Liability Convention sets out detailed provisions where a launching state incurs liability for damage caused by its space objects. Whilst the Convention imposes a joint and several liability on all "launching states", it also provides the right of parties to agree (on a without prejudice basis) as to an appropriate allocation of risk.

The state which bears ultimate responsibility for the control of the space object and to compensate for damage caused by it would appear to be the "State of Registry". In the circumstances outlined above, the foreign state, as the State of Registry and having those obligations imposed by the Registration Convention, would seek to further limit Australia's capacity to carry out any of the obligations it may incur as a launching state. However, once again the

Registration Convention provides that the parties can conclude agreements as between themselves on matters of jurisdiction and control over the space object.

In respect of launchings by private foreign enterprises, it will be necessary to execute an agreement where the private enterprise accepts the effect of certain obligations which would normally fall upon its national state. It is thought the private enterprise would apply to the federal government for a licence, validated for that particular launch, which would require sufficient insurance cover to be held. In addition the enterprise would be liable to indemnify the government in respect of all claims for loss or damage arising as a result of the launching.

There would also be a need for the government to regulate to ensure sufficient information is provided to it to comply with the requirements of the Registration Convention and the Moon Treaty. For example, quarantine regulations would be enacted to prevent contamination of outer space and similarly, contamination of the Earth following the mission's return from outer space.

The analysis of the international treaties highlighted the fact that there are two classes of potential claimants who lack any rights to claim against the launching state. They

are the nationals of the launching state and those foreign nationals who are engaged or are participating in the launching operation.

Without the benefit of the rules of strict liability, the claimants must attempt to establish negligence on the part of the launching state. The practical difficulties in so doing have been referred to in this paper. It is thought the enterprises engaged in the operation of a spacecraft are appropriately placed to allow for these risk categories and provide for compensation as part of the legitimate expenses of the operation. The state government could therefore legislate to provide for strict liability for all damage caused to persons or property on the ground as a result of the launching or landing of the spacecraft.

FOOTNOTES

1. The French maintained a programme to develop Ariane expendable launch vehicles primarily aimed at the commercial communications market.

2. White House Directive implemented by National Security Decision Directive 254, 27 December 1986.

3. See generally, "Cape York International Spaceport: Part I: A Feasibility Study", The Institution of Engineers Australia. February 1987.
(A report prepared under the auspices of the National Committee on Space Engineering of the Institution of Engineers, Australia for the Co-ordinator-General, Premier's Department, Queensland).

4. Its role was eventually taken over by the newer Ariane rocket under French control.

5. Two sites on the Cape York Peninsula are currently being investigated, one being favoured by the Cape York Space Agency and the other by the Australian Spaceport Group.

6. Ministerial statement by the Premier and Treasurer of Queensland, Sir Joh Bjelke-Petersen on Thursday 11 September 1986.

7. The Australian Financial Review, Wednesday June 24, 1987, article entitled "Russians, Chinese, Americans Back Cape York Site For Rockets".

"The controversial $1.5 billion space launch base planned for Australia's Cape York Peninsula has won support from the world's leading rocket manufacturers. The Soviet Union Space Organisation, Glav Kosmos, Chinese authorities and the United States' three main launch companies, General Dynamics, Martin Marietta and McDonnell Douglas, are all potentially keen to use the Cape York launch site."

8. Paper entitled "A Case Study and Its Implications: The Cape York International Spaceport; Part A - Developing a Concept" Craig J, Brisbane Australia May 1988.

9. Final reports from the two groups are due to be presented to the Premier of the State of Queensland in late July 1989 and a decision will be made shortly thereafter in respect of whether the Spaceport will proceed and which group will be given approval to construct and operate it.

10. Australian Financial Review, Thursday 4 May 1989 Article entitled, "July Studies will settle fate of the Cape York Spaceport" by Peter Osborne.

11. Brisbane Courier-Mail, Wednesday 26 April 1989 Article entitled, "Plan will lure space launches: Borbidge" by Dennis Connors.

12. "Pioneering the Space Frontier: The Report of the National Committee on Space". United States. National Commission on Space. Canada. Bantam Books 1986.

13. New South Wales, Victoria, Queensland, South Australia, Western Australia and Tasmania.

14. See generally "International Law in Australia" Chapter 2 entitled Australian Constitutional Law by Geoffrey Sawer, The Law Book Company, 2nd Edition 1984 Edited by K W Ryan.

15. For example, see Section 51 of the Constitution, namely,

    (a) the power to regulate trade and commerce with other countries (S.51(i));

    (b) taxation (S.51(ii));

    (c) postal, telegraphic, telephonic and other similar services (S.51(v));

    (d) astronomical and meteorological observations (S.51(viii));

(e) insurance both intra and inter state (S.51(xiv));

(f) copyrights, trademarks (S.51(xviii));

(g) foreign corporations; trading or financial corporations formed within Commonwealth jurisdiction (S.51(xx));

(h) external affairs (S.51(xxix));

(i) acquisition of property from any State or person in respect of which the federal parliament has power to make laws (S.51(xxxi));

(j) matters incidental to the execution of any power vested by the Constitution in the federal parliament (S.51(xxxix)).

16. S.51(xxix) of the Constitution.

17. Australian High Court decision in The Commonwealth and another v The State of Tasmania and others (1983) 46 A.L.R. 625.

18. See Section 109 of the Constitution.

19. See generally, "Cape York International Spaceport: Legal Issues Scoping Study, Chambers NcNab Tully & Wilson Brisbane. July 1987.

20. The development, ownership and management of the

facility; the impact of Commonwealth legislation in respect of taxation; government restrictions on foreign investment; foreign exchange regulations; import duties.

21. Created under the NASA Act 1958 Public Law 85-568 85th Congress, H.R. 12575 July 29, 1958. 72 Stat. 426, 42 U.S.C. 2451.

22. G.A. Resolution No. 1472 (XIV) of 12 December 1959. When COPUOS met in 1962, it formed a Legal Sub-Committee and a Technical Sub-Committee.

23. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. 27 January 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205.

24. Convention on International Liability for Damage Caused by Space Objects. 29 March 1972, 24 U.S.T. 2389, T.I.A.S. No. 7762.

25. Convention on Registration of Objects Launched into Outer Space. 14 January 1975, 28 U.S.T. 695, T.I.A.S. No. 8480.

26. Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into

Outer Space. 22 April 1968, 19 U.S.T. 7570, T.I.A.S. No. 6599, 672 U.N.T.S. 119.

27. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies. 24 U.N. GAOR Supp. (No. 20) U.N. Doc. A/3420 (1979).

28. (a) Outer Space Treaty.

Signed for Australia on 27 January 1967. Instrument of Ratification deposited on 10 October 1967. Entry into force for Australia on 10 October 1967. Aust. T.S. 1967 No. 24.

(b) Liability Convention.

Instrument of accession deposited on 20 January 1975. Entry into force for Australia on 20 January 1975. Aust. T.S. 1975 No. 5.

(c) Registration Convention.

Instrument of accession deposited on 11 March 1986. Entry into force for Australia on 11 March 1986. Aust. T.S. 1986 No. 5.

(d) Rescue Agreement.

Signed for Australia on 22 April 1968. Instrument of Ratification deposited on 18 March 1986. Entry into force for Australia on

18 March 1986. Aust. T.S. 1986 No. 8.

(e) Moon Treaty.

Instrument of accession deposited on 7 July 1986. Entry into force for Australia on 6 August 1986. Aust. T.S. 1986 No. 14.

29. U.N. Document A/AC 105/PV 22 (1966) 37 (also see "Space Activities and emerging International Law" p 297. Edited by Nicolas Matte. Canada. Centre for Research of Air and Space Law. Institute of Air and Space Law, McGill University 1984).

30. Article VIII Outer Space Treaty.

31. Article VI Outer Space Treaty.

32. K Durant, G Trowbridge, "Commerce and Outer Space: A Legal Study", 37 Mercer L.R. 1551, 1554 (1986).

33. A Ritholz, "International and Domestic Regulation of Private Launching Ventures", 20(1) Stanford J.I.L. 135, 140 (1984).

34. Article II Liability Convention.

35. Article III Liability Convention.

36. Article II Registration Convention.

37. Ibid., Article II.

38. Executive Order No. 12465, 49 Federal Regulation 7221 (1984).

39. Commercial Space Launch Act of 1984, 49 U.S.C.A. Sections 2601, 2623 (Supp. II 1984).

40. S Freeman, E Inadomi, "Who's the Captain Kirk of this Enterprise?: Regulating Outer Space Industry Through Corporate Structures", 18(3) Davis L.R. 795, 804 (1985).

41. Article XII Liability Convention.

42. S Gorove, "Space Transportation Systems: Some International Legal Considerations", Proceedings of the Twenty-Fourth Colloquium on the Law of Outer Space (1981) I.I.S.L. 117, 122.

43. Ibid., Gorove.

44. Article VI(1) Liability Convention.

45. N.M. Matte, "Aerospace Law: From Scientific Exploration to Commercial Utilization", The Carswell Company Limited, Toronto. Canada (1977) at p 160.

46. Ibid., N.M. Matte, p 163.

47. Article VI Liability Convention.

48. Article III(2) Registration Convention.

49. Article I Registration Convention.

50. Article II(1).

51. Article IV(1) Registration Convention.

52. L. Perek, "Strengthening the Registration Convention", Proceedings of the Twenty-Eighth Colloquium on the Law of Outer Space (1985). I.I.S.L. 187, 188.

53. M. Rothblatt and N. Samara, "Legal Consequences of the Registration Convention for Space Platforms, Space Stations and Space Habitats", Proceedings of the Twenty-Eighth Colloquium on the Law of Outer Space (1985) I.I.S.L. 192, 195.

54. Ibid., Rothblatt and Samara, p 195.

55. I.A. Vlasic, "Disarmament Decade, Outer Space and International Law". 26 McGill L.J., 190, 191 (1981).

56. C.Q. Christol, "The Modern International Law of Outer Space". Pergamon Press (1982) at p 235 et seq.

57. Article VI of Outer Space Treaty is set out at page 35 of this paper.

58. Article IX of Outer Space Treaty provides as follows:

> "In the exploration and use of outer space, including the moon and other celestial bodies,

States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space, including the moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty. States Parties to the the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose. If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer

space, including the moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the moon and other celestial bodies, may request consultation concerning the activity or experiment."

59. Hosenball, "The Law Applicable to the Use of Space for Commercial Activities", Proceedings of the Twenty-Sixth Colloquium on the Law of Outer Space, (1983) I.I.S.L. 143.

60. Supra note 45 at p 182.

61. The reference to "any other place outside the jurisdiction of any state" has been suggested to refer to the Moon and other celestial bodies. See Supra note 45 at p 187.

62. Article 1 Rescue Agreement.

63. Article 2 Rescue Agreement.

64. Article 4 Rescue Agreement.

65. Article 5(3) Rescue Agreement.

66. Supra note 56 at p 203.

67. Supra note 33 at p 150.

68. The Moon Treaty. Also see supra note 27.

69. See generally Article III Moon Treaty.

70. Article VII(2) Moon Treaty.

71. Article I Outer Space Treaty.

72. S. Gorove, "Implications of International Space Law for Private Enterprise", 7 Annals of Air and Space Law 319 et seq (1982). Institute of Air and Space Law, McGill University.

73. Article XVI Moon Treaty.

74. Article VII Liability Convention.

75. (1868) L.R. 3 H.L. 330.

76. St Anne's Well Brewery Co. v. Roberts (1928) 140 L.T. 1, 6.

77. See generally C.L. Deem, "Liability of Private Space Transportation Companies to their Customers". 1984 Insurance Council Journal 340.

78. Restatement (Second) of Torts, Section 519 (1977).

79. 181 A.2^{d}. 487 (1962).

80. Ibid., p 494.

81. Ibid., p 492.

82. 56 Cal. Rptr. 128 (1967).

83. 331 F. Supp. 1006 (S.D. Fla. 1971).

84. 240 So.2d. 63 (Miss. 1970).

85. Supra note 78, Section 520.

86. Miller v. Robert Addie & Sons Collieries [1934] S.C. 150.

87. Collingwood v. Home & Colonial Stores [1936] 1 All E.R. 74.

88. National Tel. Co. . Baker [1893] 2 Ch. 186.

89. Northwestern Utilities v. London Guarantee & Accident Co. [1936] A.C. 108.

90. Blake v. Land & House Property Corp. (1887) 3 T.L.R. 667.

91. Rickards v. Lothian [1913] A.C. 263.

92. Charing Cross Electricity Supply Co. v. Hydraulic Power Co [1914] 3 K.B. 772.

93. Snow v. Whitehead (1884) 27 Ch. Div. 588.

94. [1947] A.C. 156.

95. Weller v. Foot & Mouth Disease Research Institute (1966) 1 Q.B. 569.

96. 6th Edition, p 313.

97. See generally W. Prosser, "Handbook on the Law of Torts". 5th Edition. Wests. St Pauls, Minnesota, USA. 1984 p 554.

"The failure to make a careful distinction between intentional and accidental invasions of all kinds of interests has led to much confusion about strict liability ...."

98. (1969) 43 A.L.J.R. 467. This case involved a claim arising from an escape of gas from pipes laid by the Australian Gas Light Company, the latter company being authorised to supply and distribute a dangerous thing, namely gas, by Statute.

99. See generally Salmond and Heuston, "Law of Torts", 18th Edition. Heuston and Chambers. Sweet and Maxwell, London. 1981. Page 310.

100. (1933) 1 K.B. 551, 557.

101. York Brothers (Trading) Pty Ltd v. Commissioner of Main Roads (1983) 1 N.S.W.L.R. 391, 397.

102. (1979) 3 All E.R. 1008.

103. Ibid., p 1016.

104. See generally Chapter 3 of this paper.

BIBLIOGRAPHY

Texts

CHRISTOL C.Q., "The Modern International Law of Outer Space". Permagon Press (1982).

CHAMBERS McNAB TULLY & WILSON, "Cape York International Spaceport: Legal Issues Scoping Study". July 1987.

INSTITUTION OF ENGINEERS AUSTRALIA, "Cape York International Spaceport: Part I: A Feasibility Study". February 1987.

MATTE N.M., "Aerospace Law: From Scientific Exploration to Commercial Utilization", The Carswell Company Limited, Toronto. Canada (1977).

NATIONAL COMMISSION ON SPACE. United States. "Pioneering the Space Frontier: The Report of the National Committee on Space". Canada. Bantam Books 1986.

PROSSER W., "Handbook on the Law of Torts". 5th Edition. Wests. St Pauls, Minnesota, USA. 1984.

RYAN K.W., "International Law in Australia". Chapter 2 entitled Australian Constitutional Law by Geoffrey Sawer, The Law Book Company, 2nd Edition 1984.

SALMOND AND HEUSTON, "Law of Torts", 18th Edition. Heuston and Chambers. Sweet and Maxwell, London. 1981.

Articles

AUSTRALIAN FINANCIAL REVIEW, "Russians, Chinese, Americans Back Cape York Site for Rockets". Wednesday June 24, 1987.

BJELKE-PETERSEN J., "Ministerial statement by the Premier and Treasurer of Queensland". Thursday 11 September 1986.

CONNORS D., "Plan will lure space launches: Borbidge". Brisbane Courier-Mail, Wednesday 26 April 1989.

CRAIG J., "A Case Study and Its Implications: The Cape York International Spaceport; Part A - Developing a Concept". May 1988.

DEEM C.L., "Liability of Private Space Transportation Companies to their Customers". 1984 Insurance Council Journal 340.

DURANT K., TROWBRIDGE G., "Commerce and Outer Space: A Legal Study", 37 Mercer L. R. 1551, 1554 (1986).

FREEMAN S., INADOMI E., "Who's the Captain Kirk of this Enterprise?: Regulating Outer Space Industry Through Corporate Structures", 18(3) Davis L.R. 795, 804 (1985).

GOROVE S., "Space Transportation Systems: Some International Legal Considerations", Proceedings of the Twenty-Fourth Colloquium on the Law of Outer Space (1981) I.I.S.L. 117, 122.

GOROVE S., "Implications of International Space Law for Private Enterprise", 7 Annals of Air and Space Law 319 et seq (1982). Institute of Air and Space Law, McGill University.

HOSENBALL, "The Law Applicable to the use of Space for Commercial Activities", Proceedings of the Twenty-Sixth Colloquium on the Law of Outer Space, (1983) I.I.S.L. 143.

OSBORNE P., "July Studies will settle fate of the Cape York Spaceport". Australian Financial Review, Thursday 4 May 1989.

PEREK L., "Strengthening the Registration Convention", Proceedings of the Twenty-Eighth Colloquium on the Law of Outer Space (1985). I.I.S.L. 187, 188.

RITHOLZ A., "International and Domestic Regulation of Private Launching Ventures", 20(1) Stanford J.I.L. 135, 140 (1984).

ROTHBLATT M. AND SAMARA N., "Legal Consequences of the Registration Convention for Space Platforms, Space

Stations and Space Habitats", Proceedings of the Twenty-Eighth Colloquium on the Law of Outer Space (1985) I.I.S.L. 192,195.

VLASIC I.A., "Disarmament Decade, Outer Space and International Law". 26 McGill L.J., 190, 191 (1981).

Legislative Documents

Commonwealth of Australia Constitution Act 1900.

G.A. Resolution No. 1472 (XIV) of 12 December 1959.

UN Document A/AC 105/PV 22 (1966) 37.

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies. 27 January 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347, 610 U.N.T.S. 205.

Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space. 22 April 1968, 19 U.S.T. 7570, T.I.A.S. No. 6599, 672 U.N.T.S. 119.

Convention on International Liability for Damage Caused by Space Objects. 29 March 1972, 24 U.S.T. 2389, T.I.A.S. No. 7762.

Convention on Registration of Objects Launched into Outer Space. 14 January 1975, 28 U.S.T. 695, T.I.A.S. No. 8480.

Restatement (Second) of Torts, Section 519 (1977).

Agreement Governing the Activities of States on the Moon and Other Celestial Bodies. 24 U.N. GAOR Supp. (No. 20) U.N. Doc. A/3420 (1979).

Executive Order No. 12465, 49 Federal Regulation 7221 (1984).

Commercial Space Launch Act of 1984, 49 U.S.C.A. Sections 2601, 2623 (Supp. II 1984).

White House Directive implemented by National Security Decision Directive 254, 27 December 1986.