

## 14<sup>th</sup> Manfred Lachs Space Law Moot Court Competition 2005

### CASE CONCERNING INTERNATIONAL LIABILITY

#### (*DELTASTAN V GAMMALAND*)

#### **PART A: INTRODUCTION**

The 14<sup>th</sup> Manfred Lachs Space Law Moot Court Competition was held during the Fukuoka IISL Colloquium. The Case Concerning International Liability (*Deltastan v. Gammaland*) was written by Dennis Burnett. Preliminaries were held at regional level in Europe, North America and in the Asia Pacific region. The Finals were judged by three Judges of the International Court of Justice. Prof. Kosuge and his efficient team of collaborators and the LOC organised everything very well. Thanks must be expressed to all sponsors, including JAXA, SOLAPSU and Seinan Gakuin University, along with almost twenty Japanese sponsors, as well as the Association of US Members of the IISL, NASA, ESA/ECSL and JAXA for sponsoring the winners of the regional rounds. The finals were hosted by the Seinan Gakuin University. The University's Seinan Cross-Plaza was the location for the annual dinner attended by some 150 guests.

#### **Results of the world finals:**

- **Winner:** George Washington University, Washington DC, USA, (Ms. Kristie Blase and Ms. Olivia Hussey; Coach: Prof. H. Hertzfeld/Mr. S. Mirmina)

- **Runner up:** National University of Singapore (Ms. Joan Lim Pei Hoon and Kirpalani Rakesh Gopal; Coach: Ass. Prof. Lim Lei Theng)

- **2nd runner up:** University of Cambridge, UK (Mr. Chris Owen, Mr. Alessandro Turati and Mr. Daniel Bovensiepen; Coach: Prof. James Crawford)

- **Eilene M. Galloway Award for Best Written Brief:** National University of Singapore

- **Sterns and Tennen Award for Best Oralist:** Ms. Joan Lim (Singapore)

#### **Participants in the regional rounds**

##### In North America:

- Georgetown University
- Golden Gate University
- Loyola University - New Orleans
- St. Thomas University
- University of Baltimore
- University of Cincinnati
- University of North Carolina
- University of Virginia

##### In Europe:

- BBP School of Law, London, UK
- Warsaw University, Warsaw, Poland
- University of Leiden, The Netherlands
- ISU, Strasbourg, France
- MGIMO University, Moscow, Russia
- University of Bremen, Germany
- Università di Benevento, Italy
- Universidad de Jaen, Spain

##### In the Asia Pacific:

- Aoyama Gakuin University, Japan
- Beihang University, China
- China University of Political Science and Law, China
- Dr. Ambedkar Government Law College, Chennai, India
- Ernakulam Government Law College, India
- Flinders University of South Australia
- Government Law College, Mumbai, India
- Gujarat National Law University, India
- Hidayatullah National Law University, India
- Keio University, Japan
- Kurukshetra University, India
- National Academy of Legal Studies and Research, Hyderabad, India
- National Law School of India University, Bangalore, India
- National Law University, Jodhpur India
- National University of Juridical Sciences, Kolkata, India
- National University of Malaysia
- National University of Singapore
- Parahyangan Catholic University, Indonesia

- Renmin University of China
- University Law College, Bangalore, India
- University of Auckland, New Zealand
- University of Calcutta, India
- University of Delhi India
- University of New South Wales, Australia
- University of Queensland, Australia
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#### Judges for written briefs:

- Mr. Ian Awford, Ebsworth & Ebsworth, Sydney, Australia
- Prof. Joanne Gabrynowicz, University of Mississippi, USA
- Prof. Y. Hashimoto,, National Institute for Defense Studies, Tokyo, Japan
- Dr. Martha Mejia-Kaiser, Independent researcher, Mexico
- Ms. Marcia Smith, Library of Congress, USA
- Dr. Frans von der Dunk, International Institute of Air and Space Law, Leiden, The Netherlands

#### Judges for semi finals:

- Mr. K.R. Sridhara Murthi, Exec. Director, Antrix Corp, India
- Dr. Peter van Fenema, Adj. Professor, McGill Institute of Air and Space Law, Montreal / Consultant, The Netherlands
- Prof. Ram Jakhu, McGill University, Canada

#### Judges for finals:

- H.E. Judge Hisashi Owada, ICJ
- H.E. Judge Abdul Koroma, ICJ
- H.E. Judge Vladlen Vereshchetin, ICJ

## **PART B: THE PROBLEM**

1. The National Agency of Space (“NAS”) and the Ministry of Defense (“MOD”) of Deltastan funded the development of the “Space Elevator” project. The basic concept of the Space Elevator project was to develop sufficiently long nanotubes of pure carbon to create a lightweight carbon tether of sufficient length and strength to allow a space station to be anchored to the earth’s surface. A crawler (known as the “Golden Orb” for its actual, not virtual, web crawling abilities) was developed to climb the tether and reinforce the tether by creating a very narrow (only a few nanotubes thick) but fairly wide (several millimeters) ribbon ( the “Super String”). NAS also developed the crawler power system, communications system and the space and earth anchors.

2. Deployment of the Space Elevator components was initiated soon after funding was secured and commercial operations were turned over to a government-chartered company, the Space Elevator Corporation.

3. Construction of the Space Elevator began with the launch of the Alpha Station: a space station with propulsion communications and a payload consisting of a reel of Super String attached to a drogue. Alpha station was launched by a conventional expendable launch vehicle from Deltastan into a geostationary orbital location over the middle of the Maric Ocean. Alpha Station deployed a very large solar array that provided electrical power. Alpha Station then reeled out the Super String attached to a drogue that had its own propulsion system to decelerate as it was lowered. As the drogue was reeled out on the Super String, the increased forces of attraction from Earth’s gravity on the decelerating drogue were balanced by increasing the altitude and velocity of Alpha Station. Careful balance of these forces maintained the geostationary location and the center of mass in the geostationary orbit of the entire structure.

4. The drogue was captured and attached to the Sea Anchor: a semi-submersible self-propelled oil-drilling platform that was stationed in the middle of the Maric Ocean at

approximately the same latitude and longitude of the Alpha Station, some 10,000 kilometers west of Deltastan. Sea Anchor was temporally anchored to the ocean floor (but is movable).

5. The Golden Orb traversed up and down the Super String to reinforce and strengthen the tether. Power for the Golden Orb was provided by laser systems on both Alpha Station (with a solar generator) and from Sea Anchor (using conventional electrical generating system). Additional Super Strings then were connected between Sea Anchor and Alpha Station to improve its strength.

6. Space Elevator then began providing commercial transportation services for civilian customers and for the Deltastan MOD. Artificial Earth Satellites were transported by Golden Orbs to various altitudes and released into low earth orbits, medium earth orbits and geostationary orbits.

7. Simultaneously with the commercial development of Space Elevator, Alpha Station was replaced by Drachen Station. Drachen Station was transported up the Super String a piece at a time and when assembled at the end of the Super String was a human-rated station with 'return to Earth capabilities'. When Drachen Station was completed, Alpha Station was untethered and was sent on trajectory toward the sun.

8. Drachen Station was then manned by civilian employees of the Space Elevator Corporation who were reserve officers of Deltastan's armed forces. Drachen Station's laser power system was then secretly upgraded to double as a laser weapons system and as a power source for the Golden Orbs that were crawling up and down the Super Strings. Powerful radar tracking and targeting systems also were added to Drachen Station. Drachen Station became a fully capable mid-course interceptor system for missile defense.

9. Gammaland is a new space faring nation and is not an ally of Deltastan. Both countries are located on the equator but are separated by more than 10,000 kilometers by the Maric Ocean. Gammaland opposed the development of Space Elevator on the

grounds that Space Elevator would harm its domestic launch services industry and because it feared that the Space Elevator could be used as an element of a missile defense system that could reduce the deterrence effectiveness of Gammaland's small but growing intercontinental ballistic missile system.

10. Gammaland devoted significant intelligence resources to monitor the development of Space Elevator. Although Deltastan declared a 200-kilometer defensive zone around Sea Anchor, Gammaland vessels and aircraft regularly made incursions into the defensive zone.

11. Gammaland also initiated a secret program for the development and launch of a stealthy "Inspector" satellite that could be used to monitor payloads being transported by Space Elevator. The Inspector was secretly launched as a dual payload with a communications satellite (GammaSat II) and placed into geostationary orbit over Gammaland. Inspector was stationed at a location near where the Space Elevator Super Strings passed through the geostationary orbital arc. Inspector relayed data by a new line of sight intersatellite laser link to GammaSat II.

12. Drachen Station detected the movement of Inspector soon after its deployment from its launch vehicle and tracked Inspector to its position near the Super Strings. Visual inspection of the GammaSat II and Inspector from Earth confirmed the existence of laser "antennas" that appeared to be designed and pointed for an intersatellite link between Inspector and GammaSat II.

13. The close proximity of Inspector to the Space Elevator was considered by Deltastan to be threatening and a cause of concern for the safety of Space Elevator and her personnel. However, the Deltastan Ministry of Defense decided that they would like to have a closer look at Inspector before confronting Gammaland because the Inspector was a significant leap in technology development for Gammaland of which Deltastan had not been aware.

14. Space Elevator then suffered a series of operational accidents that caused Deltastan to convene an Investigation Board to ensure that it was safe for continued manned operation. All activities except supply of Drachen Station were suspended during the investigation.

15. During the investigation, Deltastan constructed a special payload to gather intelligence about Inspector. As the investigation drew to a close, the press reported that the first payload to be transported by Space Elevator after clearance by the Investigation Board would be super-secret black nanosatellite program that would operate in a new artificial intelligence network. Mike Frighton, a famous Science Fiction author with numerous books dealing with nanotechnology, was interviewed by the press for comments on the nanosatellites. Deltastan's MOD vigorously denied the existence of any such program.

16. Gammaland Ministry of Defense decided that a close look at Deltastan's newest payload was warranted. While a closer proximity of Inspector to the Super String might increase the possibility of detection of Inspector, the potential intelligence reward appeared to justify that risk. Inspector was moved to within several kilometers of the Super String and waited for the payload to pass through the geostationary arc where it could be observed in some detail.

17. Upon resumption of service, the Golden Orb ascended with its payload slowly making its way to Drachen. However, at the point closest to the Inspector it stopped. Deltastan announced that there had been a failure of the Golden Orb and that efforts were underway to effect repairs. A Golden Orb with a repair module was dispatched for rescue.

18. In the meantime, sensors were collecting data about Inspector. Photographic evidence of Inspector was obtained as well as other data. Deltastan confronted Gammaland with evidence of the Inspector and its proximity to the Space Elevator and demanded that Inspector be moved at least 1,000 kilometers away from Space Elevator.

19. After vigorous protests, threats and counter-threats, Gammaland informed Deltastan that Inspector would be moved to a position not less than 1,000 kilometers from the Space Elevator. The Inspector was then commanded to reposition. The propulsion system was fully engaged to reposition quickly, all the while being monitored by Deltastan. The spectrographic analysis of the propulsion ignition revealed a new means of propulsion.

20. After the repositioning of Inspector, a storm developed in the Maric Ocean. Forecasts indicated high winds and large swells would develop at the location of Sea Anchor. The repositioning of Sea Anchor and Drachen was initiated and Drachen Station was put on defensive alert as a precaution.

21. In the midst of the maneuver a cascade failure of the Super Strings occurred that resulted in the severance of the Super Strings. On Drachen Station those events were interpreted as an attack on the Space Elevator. The laser weapons system executed a series of preprogrammed firings on all spacecraft that had been identified by the weapon systems as potential foes. Inspector was the first spacecraft destroyed followed by GammaSat II, another geostationary satellite located over Gammaland, and four LEO earth observation satellites (two military spy satellites and two civilian weather satellites) in near polar orbits, (two of which were in orbits that passed over Deltastan but two of which were in orbits which did not pass over Deltastan or come within 10,000 kilometers of the Space Elevator). All of the destroyed spacecraft belonged to Gammaland.

22. Drachen Station then began an emergency crew rescue sequence. Within seconds, Drachen Station was reduced to a crew return vehicle, and began a series of maneuvers to decelerate, reenter the Earth's atmosphere and return to the Earth's surface. However, Drachen Station was unable to execute the vehicle return sequence. A landing in Deltastan or in any other country friendly to Deltastan could not be accomplished and that the only choice was

an emergency landing in Gammaland. Drachen was immediately seized by the armed forces of Gammaland and the crew was arrested and incarcerated. Gammaland then began a systematic disassembly and analysis of Drachen and its equipment.

23. Deltastan fighter aircraft then forced all Gammaland aircraft in the area of Sea Anchor to land immediately on territory of a country allied with Deltastan or be shot down. Three aircraft were grounded, the aircraft seized and the crews put under arrest.

24. Twenty-three thousand miles of Super String then began to reenter the atmosphere. Some larger segments fell harmlessly into the sea, other segments began an acceleration through space towards earth and burned up on reentry into the atmosphere. Other segments of Super String disintegrated into various lengths of nano-fiber and floated to the earth, primarily in Gammaland but some in the territorial waters of Deltastan.

25. While both countries were immediately on a war footing, cool heads prevailed and no further actions were initiated. Deltastan demanded that Gammaland return Drachen and her crew. Gammaland refused to return the Drachen crew because they were criminals who had destroyed Gammaland property and had landed in Gammaland without authorization. Gammaland also demanded that Deltastan compensate Gammaland for the destroyed satellites. Finally, Gammaland demanded that Deltastan return Gammaland aircraft and their crews. Deltastan responded that the Gammaland aircraft and crews were being held as prisoners of war and that Gammaland had attacked and destroyed Space Elevator without warning. Deltastan accused Gammaland of violating the UN Charter by waging aggressive war against Gammaland and demanded that Gammaland reimburse Deltastan for the damage of the Space Elevator. Gammaland responded that Deltastan was guilty of aggression against Gammaland in violation of the United Nations charter and that Deltastan should reimburse Gammaland for the environmental and health damage caused by the pollution of Gammaland with carbon nano-fibers.

Deltastan countered with demands for environmental damage to Deltastan fisheries.

26. After protracted negotiations, Deltastan and Gammaland agreed that an independent investigative Commission would be chosen to investigate what had happened and that the Commission's results would be accepted by both countries. If there were any remaining legal issues that could not be resolved by negotiation after the results of the Commission were released, those issues would be submitted to the International Court of Justice for resolution. The Drachen crew was returned to Deltastan but Gammaland refused to return the Drachen on the basis that it was an aggressive weapons system and Gammaland had no obligation to return it. The Gammaland aircraft and their crews were returned to Gammaland unharmed.

27. In a unanimous opinion, the Commission determined that the most likely failure of the Super Strings that initiated the incident was a decomposition of the carbon nanotubes and the decomposition of ribbon adhesive connecting the nanotubes, both caused by the propulsion exhaust of the Inspector spacecraft. Inspector used a newly invented bipropellant that left a highly reactive stream of molecules in orbit whenever the Inspector was maneuvered. When maneuvering quickly away from the Space Elevator, the trajectory chosen by Inspector resulted in a stream of propulsion molecules that collided with the Super String. Laboratory analysis demonstrated that the propellant had a corrosive effect on both the nanotube carbon lattice and the adhesive quality of the material that was used to connect the nanotube fibers. The largest amount of damage was caused within a few minutes of the maneuver of Inspector but additional damage was caused each time a stream of propulsion molecules completed another orbit and collided with Super String.

28. Following the issuance of the findings of the Commission, Deltastan demanded full compensation from Gammaland for damage to the Space Elevator caused by the Inspector propulsion exhaust, for environmental damage to the geostationary orbit caused by

the Inspector propulsion exhaust, and for return of Drachen. Gammaland counter demanded for a declaration that the stationing of the laser weapons system on Drachen was in violation of international law and requested full compensation from Deltastan for damage to its satellites and for environmental damage caused by the carbon nanotube fibers.

29. Deltastan and Gammaland have agreed that the issues of the legality of the weapons system on Drachen and the contamination of the geostationary orbit shall not be issues considered in this proceeding. Both Parties also have agreed that issues related to the forced landing of Gammaland aircraft return of the crews (both the crew of Gammaland aircraft the crew of Drachen Station) and have been resolved and shall not be adjudicated.

30. Both Parties have agreed to refer the case to the International Court of Justice ("ICJ") and have jointly stipulated the facts published in this Special Agreement.

31. Both Deltastan and Gammaland have ratified the Outer Space Treaty, the Agreement on the Rescue and Return of Astronauts, the Liability Convention, and the Registration Convention. Neither Deltastan nor Gammaland have signed or ratified the Moon Agreement and Deltastan does not recognize the Moon Agreement as being part of international law.

32. Alpha Station was registered by Deltastan in accordance with the Registration Convention and lists Deltastan as the State of Registry.

33. Neither Drachen Station nor any other part of Space Elevator was registered by Deltastan in accordance with the Registration Convention.

34. Inspector was not registered by Gammaland in accordance with the Registration Convention.

### ISSUES

The ICJ has determined that any issues of the amount of damage shall be deferred until after the Court decides the liability issues.

Briefs and arguments should not speculate nor comment on the amount of damages.

The following issues are reserved for briefing and argument to the Court under the agreed Special Agreement. There are no issues of jurisdiction or standing, and briefs and arguments with regard to the issues or remedies are to be confined solely to legal issues, not issues of fact.

1. Whether Gammaland is liable under international law for:

- (a) damage to the Space Elevator, and
- (b) to return the Drachen spacecraft and for damages to the Drachen caused by Gammaland;
- (c) for damage to Deltastan fisheries.

2. Whether Deltastan is liable under international law for:

- (a) damage to the Gammaland satellites, and
- (b) the cost of Gammaland clean-up and environmental damage to Gammaland.

### ADDITIONAL FACTS

35. The Sea Anchor and its "defensive zone" is located in the Maric Ocean entirely in international waters and Gammaland is located 10,000km southwest of Deltastan, about 5,000km south of tDELASTANhe Sea Anchor. The defensive zone declared by Deltastan around the Sea Anchor included both sea space and airspace.

36. Deltastan was aware that the molecules from the exhaust of the Inspector propulsion system could have impacted the Super String. During the events described in Paragraphs 21 and 22, Drachen Station destroyed the Inspector, GammaSat II and the following satellites:

- (a) GammaEOS II, a military spy satellite in a near polar orbit that does not pass over Deltastan or come within 10,000km of the Space Elevator;
- (b) GammaEOS IV, a military spy satellite in a near polar orbit that pass over Deltastan;

(c) GamMetSat I, a civilian weather satellite in a near polar orbit that does not pass over Deltastan or come within 10,000km of the Space Elevator; and

(d) GamMetSat III, a civilian weather satellite in a near polar orbit that pass over Deltastan.

37. The laser weapon system was destroyed by the crew during the descent but remained aboard the crew return vehicle.

38. The Commission referred to in Paragraph 27 considered the possible effect of the repositioning of the Sea Anchor and Drachen Station before rendering its opinion.

39. Both States agree that, while the legality of the weapon system is not to be questioned, the legal effects of its automatic operation as referred to in Paragraph 21 are not excluded.

40. The five satellites (other than Inspector) of Gammaland that were destroyed by Drachen Station were all launched by Gammaland and registered with accordance with the Registration Convention.

41. Both States are members of the United Nations, are parties to the Convention on the Law of the Sea and the Vienna Convention on the Law of Treaties and are members of the International Telecommunication Union.

## **PART C: FINALISTS BRIEFS**

### **A. WRITTEN BRIEF FOR DELTASTAN**

#### **AGENTS:**

Ms. Joan Lim Pei Hoon, Kirpalani Rakesh Gopal (National University of Singapore).

#### **ARGUMENT:**

#### **I. GAMMALAND MUST MAKE REPARATIONS TO DELTASTAN FOR THE DESTRUCTION OF ITS SPACE ELEVATOR AND THE CONSEQUENTIAL HARM TO DELTASTAN'S FISHERIES**

##### **A. Gammaland is internationally liable for the destruction of Deltastan's Space Elevator.**

1. Gammaland is internationally liable under Article VII of the Outer Space Treaty because Deltastan's Space Elevator was destroyed by Inspector, an object launched into outer space by Gammaland.

Article VII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies [hereinafter "Outer Space Treaty"]<sup>1</sup> provides for international liability of a launching state when the space object of a launching State damages the interests of another State Party to the Treaty "on the Earth, in air space or in outer space". Inspector was a space object launched into outer space by Gammaland. Gammaland, as the launching state of Inspector, is therefore internationally liable for the damage caused by Inspector "on the Earth, in air space or in outer space."

Inspector caused the complete disintegration of Deltastan's Super String. The Super String is a structure that extends from Earth, through air space and into outer space. The

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<sup>1</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, *opened for signature* Jan. 27 1967, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

independent Commission sanctioned by both States to investigate the matter found in a unanimous opinion that the most likely cause of the damage was Inspector's newly invented and highly corrosive bipropellant exhaust. The molecules from the bipropellant exhaust caused the decomposition of the carbon nanotubes and the ribbon adhesive connecting the nanotubes. While the initial point of damage was in outer space, it eventually led to the cascade failure and severance of the entire Super String. The bipropellant exhaust molecules are space debris directly emitted by Inspector. Hence, Inspector is the sole cause of the destruction of the Super String.

By causing the complete disintegration of the Super String, Inspector damaged Deltastan's interest on the Earth, in air space and in outer space. Gammaland, as the launching state of satellite Inspector, is therefore internationally liable to Deltastan for the damage caused to the Super String under Article VII of the Outer Space Treaty.

## 2. Alternatively, Gammaland is liable under Article III of the Liability Convention.

Alternatively, should this court find that this case falls under the Convention on International Liability for Damage Caused by Space Objects<sup>2</sup> [hereinafter "Liability Convention"], the standard of liability for damage to the Space Elevator is the same as Article VII of the Outer Space Treaty as the damage by Inspector was caused elsewhere than on the surface of the Earth. Article III of the Liability Convention provides for fault-based liability when damage is caused by one space object to another space object elsewhere than on the surface of the Earth. Gammaland had breached several international obligations under the Outer Space Treaty and is therefore at fault. Gammaland must pay reparations to Deltastan for the damage caused to the Space Elevator.

<sup>2</sup> Convention on International Liability for Damage Caused by Space Objects, *opened for signature* Mar. 29 1972, 961 U.N.T.S. 187 [hereinafter *Liability Convention*].

## 3. Gammaland's liability under Article VII of the Outer Space Treaty and Article III of the Liability Convention is due to its fault.

Article VII of the Outer Space Treaty was a precursor to Articles II and III of the Liability Convention. It is an acknowledged fact that Articles II and III were based on Article VII of the Outer Space Treaty.<sup>3</sup> It follows that liability under Article VII of the Outer Space Treaty can comprise both absolute and fault-based liability. A launching State is liable under Article VII when its space object causes damage "on Earth, in air space or in outer space". A launching State is liable under Article III of the Liability Convention when its space object causes damage to another space object "elsewhere than on the surface of the Earth" and the damage caused is due to the fault of the launching State.

- a. Gammaland's liability under Article VII of the Outer Space Treaty is fault-based because the damage occurred elsewhere than on the surface of the Earth.

Article VII of the Outer Space Treaty contemplates that damage can occur on Earth, in air space and in outer space. This parallels the division between Articles II and III of the Liability Convention. Article II deals with liability for damage caused "on the surface of the Earth or to aircraft in flight" and provides for absolute liability in such instances. Article III deals with liability for damage occurring "elsewhere than on the surface of the Earth" and provides for fault-based liability. However, Article III is limited to damage to space objects or persons or property on board such a space object. It does not deal with damage occurring "elsewhere than on the surface of the Earth" to objects that do not strictly fall within the

<sup>3</sup> CARL Q. CHRISTOL, *THE MODERN INTERNATIONAL LAW OF OUTER SPACE*, 20 (1982) [hereinafter *CHRISTOL, Outer Space*]; BIN CHENG, *STUDIES IN INTERNATIONAL SPACE LAW*, 636 (1997) [hereinafter *BIN CHENG, Space Law*]; CARL Q. CHRISTOL, *SPACE LAW: PAST, PRESENT AND FUTURE*, 216 (1991).



definition of a space object.<sup>4</sup> This lacuna is covered by Article VII. It follows that liability under Article VII for damage caused on the surface of the Earth is absolute while liability under Article VII for the damage caused elsewhere than on the surface of the Earth is fault-based.<sup>5</sup>

The reaction between the highly corrosive bipropellant exhaust emitted by Inspector and the Super String occurred in the geostationary orbit. This caused the complete disintegration of the Super String in outer space and the ultimate destruction of the Space Elevator. It therefore follows that Gammaland's liability for the damage to the Space Elevator must be fault-based.

b. Gammaland is at fault as it breached its international obligation under Article IX of the Outer Space Treaty and general international law to pay due regard to the interests of other States

According to Professor Bin Cheng, a State is at fault when it breaches an international obligation.<sup>6</sup> State Parties to the Outer Space Treaty have an obligation under Article IX to conduct their activities in outer space with due regard to the corresponding interests of all other State Parties. Gammaland breached its treaty obligation under Article IX of the Outer Space Treaty. Gammaland also breached its obligation under international law "not to allow its territory to be used for acts contrary to the rights of other states", as recognized in the decisions of the *Corfu Channel*<sup>7</sup> case and the *Trail Smelter*

*Arbitration Tribunal*<sup>8</sup>. These decisions affirm the duty of every State at all times "to protect other States against injurious acts by individuals from within its jurisdiction".<sup>9</sup> In particular, Gammaland breached three specific obligations which shall be elaborated on below.

i. *Gammaland failed to maintain the minimal safety distance between objects in the geostationary orbit.*

The geostationary orbit shared by Inspector, the Super String and many other satellites, is a limited natural resource.<sup>10</sup> The geostationary orbit is capable of many uses<sup>11</sup> and its obvious limitations of physical size<sup>12</sup> make it prone to overcrowding.<sup>13</sup> From 1977 to present, the number of satellites in the geostationary orbit has increased from 9<sup>14</sup> to

<sup>4</sup> CHRISTOL, *Outer Space*, *supra* note 3, at 110.

<sup>5</sup> OGUNSOLA O. OGUNBANWO, *INTERNATIONAL LAW AND OUTER SPACE ACTIVITIES*, 144 (1975).

<sup>6</sup> BIN CHENG, *GENERAL PRINCIPLES OF LAW*, 226 (1953); International Law Commission, *Draft Articles on Responsibility of States for Internationally Wrongful Acts, Report on its fifty-third session*, art. II, U.N. GAOR, 56<sup>th</sup> Sess., Supp. No. 10, UN Doc. A/56/10 (2001) [hereinafter *State Responsibility Articles*].

<sup>7</sup> *Corfu Channel* (United Kingdom v. Albania), 1949 I.C.J. 4, at 23.

<sup>8</sup> *Trail Smelter Arbitration* (United States v. Canada), 1938 3 R.I.A.A. 1907.

<sup>9</sup> *Id.* at 1963.

<sup>10</sup> The Georgetown Space Law Group, *The Geostationary Orbit: Legal, Technical and Political Issues Surrounding Its Use in World Communication*, CASE W. RES. J. INT'L L. 223, at 223 (1984); STEPHEN GOROVE, *DEVELOPMENTS IN SPACE LAW: ISSUES AND POLICIES* [hereinafter GOROVE, *Developments in Space Law*], 40 (1991).

<sup>11</sup> Siegfried Wiessner, *The Public Order of the Geostationary Orbit: Blueprints for the Future*, 9 Yale J. World Pub. Ord. 217, at 220-21 (1983) (communications and direct broadcasting); 221 (meteorology); 222 (observing the environment and remote sensing); 222-23 (assistance in air traffic navigation); 223 (scientific experiments).

<sup>12</sup> Clyde E. Rankin, III, *Utilization of the Geostationary Orbit – A Need for Orbital Allocation?*, 13 COLUM. J. TRANSNAT'L L. 98, at 98 (1974); The Georgetown Space Law Group, *supra* note 10, at 230.

<sup>13</sup> Stephen Gorove, *The Geostationary Orbit: Issues of Law and Policy*, 73 AM. J. INT'L L. 444, at 446 (1979) [hereinafter Gorove, *Geostationary Orbit*].

<sup>14</sup> *Table of Artificial Satellites Launched in 1977*, 45 TELECOMMUNICATION J., SUPP. (1978).

771.<sup>15</sup> There are 7000 trackable man-made objects in space and twice as many untrackable pieces.<sup>16</sup> A safety distance between objects in the geostationary orbit is therefore necessary for the safe and sound operation of activities in outer space.<sup>17</sup> The obligation to maintain a safety distance arises from the general obligation in Article IX of the Outer Space Treaty to conduct all activities in outer space with due regard to the corresponding interests of all other State Parties to the Treaty.

According to Professor Gorove, the exact distance of the safety zone depends on various factors<sup>18</sup> such as the size of the satellite, the stability of the orbit, the degree of tolerated electromagnetic interference and the state of technology.<sup>19</sup> It is State practice to maintain a safety distance of between 500 km and 1500 km. For example, the International Telecommunication Union (ITU), the international organization charged with the task of allocating space objects into their orbital zones,<sup>20</sup> employs a safety zone of 1500 km.<sup>21</sup> The former Soviet Union<sup>22</sup> and the Office of Technology Assessment of the

United States Congress<sup>23</sup> practices a safety zone of 500km. Eminent publicists such as DalBello<sup>24</sup> and Lazarev<sup>25</sup> also advocate a safety zone of at least 500km in the geostationary orbit to protect space assets. Professor Gorove states that one of the criteria used in determining the safety zone is the state of technology of the objects concerned<sup>26</sup> – the newer and more uncertain the state of the technology, the larger the safety distance required. The Space Elevator and Inspector's propulsion mechanism were new pieces of technology.<sup>27</sup> It was therefore imperative that the safety zone between the two objects had to be a considerable distance, or at the very least 500km.

Gammaland acted in blatant contravention of international law and established state practice when it moved Inspector "to *within several kilometers* of the Super String."<sup>28</sup> As a space-faring nation with a domestic launch services industry and a growing intercontinental ballistic missile system<sup>29</sup>, Gammaland must be clearly aware of the risks involved in placing the Inspector in such dangerous proximity to the Space Elevator. Inspector already posed a threat and was a cause for concern for the safety of the Space Elevator and her personnel.<sup>30</sup> It became an even greater threat once Gammaland moved Inspector to within several kilometers of the Space Elevator.<sup>31</sup> Gammaland's breach forced Deltastan to

<sup>15</sup> Online Office for Outer Space Affairs: Index of Objects Launched in Outer Space. Website, at <http://www.unoosa.org/oosa/search.do>.

<sup>16</sup> GOROVE, *Developments in Space Law*, *supra* note 10, at 128.

<sup>17</sup> WIESSNER, *supra* note 11, at 225.

<sup>18</sup> GOROVE, *Geostationary Orbit*, *supra* note 13, at 445.

<sup>19</sup> GOROVE, *Developments in Space Law*, *supra* note 10, at 36.

<sup>20</sup> *Telecommunication Convention and Final Protocol*, ITU Doc. TIAS 8572 (Oct 25, 1973).

<sup>21</sup> *Id*; *Final Acts of the World Administrative Radio Conference*, Annex 2 Technical Parameters 'Influencing the use of the orbit/spectrum resource', ITU Radio Regulations Doc par.3032B (1979); J. Busak, *The Geostationary Satellite Orbit – International Co-operation or National Sovereignty*, 45 TELECOMMUNICATION J. 169 (1978).

<sup>22</sup> Malcolm Russell, *Military Activities in Outer Space: Soviet Legal Views*, 25 HARV. INT'L L.J. 155, at 184 (1984).

<sup>23</sup> United State Congress, Office of Technology Assessment, Strategic Defenses: Anti-Satellite Weapons, Counter-measures and Arms Control (OTA-ISC-281), Washington D.C., United States Government Printing Office (1985).

<sup>24</sup> R. DalBello, *'Rules of the Road': Legal Measures to Strengthen the Peaceful Uses of Outer Space*, 9 PROC. COLLOQ. L. OUTER SPACE (1985).

<sup>25</sup> M. I. Lazarev, *Future Space Cities*, 5 ANNALS AIR & SPACE L. 529 (1980).

<sup>26</sup> Gorove, *Geostationary Orbit*, *supra* note 13, at 445.

<sup>27</sup> Compromis ¶ 27.

<sup>28</sup> Compromis ¶ 16.

<sup>29</sup> Compromis ¶ 9.

<sup>30</sup> Compromis ¶ 13.

<sup>31</sup> Compromis ¶ 16.

rightfully insist that Inspector be maneuvered away to a safer distance.

Gammaland's breach of its obligation to maintain a safety zone led directly to the destruction of the Space Elevator. When Gammaland reluctantly agreed to reposition Inspector, Inspector's specific choice of trajectory<sup>32</sup> exposed the Super String to massive amounts of highly reactive propulsion molecules that caused its disintegration and the ultimate destruction of the Space Elevator.

*ii. Gammaland breached its international obligation to conduct a safety assessment test before launching Inspector.*

The duty to pay due regard to the interests of other State Parties under Article IX of the Outer Space Treaty also requires that States conduct appropriate safety assessments and tests before a space object is launched. Rocket propellants in particular are usually highly unstable and corrosive,<sup>33</sup> tests must therefore be conducted to stabilize the propellants and to ensure that its exhaust molecules do not cause damage. Many States recognize the need for such tests. The United Kingdom Outer Space Act 1986 requires technical safety assessments to be conducted on all propellants used in space objects and the hazards associated with them.<sup>34</sup> The Australia Space Activities Act 1988 and the Australian Space Activities Regulations 2001 also require their space vehicles to undergo quantitative risk assessments to identify the

potentially hazardous consequences of their space vehicles operations.<sup>35</sup>

The independent investigative Commission sanctioned by Gammaland and Deltastan found unanimously that the disintegration of the Super String was due to the use of a newly invented bipropellant by Inspector. Inspector was a stealth satellite created for the purpose of spying on the Space Elevator. It was launched with the participation of Gammaland's Ministry of Defence.<sup>36</sup> In Gammaland's haste to spy on the Space Elevator, it failed to conduct the appropriate tests on Inspector's newly invented and highly corrosive bipropellant exhaust. This, combined with Gammaland's blatant disregard of the requisite safety distance between objects in the geostationary orbit, resulted in the complete disintegration of the Super String. Gammaland breached its obligation under Article IX of the Outer Space Treaty to conduct appropriate safety assessment tests before launching a space object.

*iii. Gammaland had reason to believe that its operations would adversely affect Deltastan's interests and breached its obligation under Article IX of the Outer Space Treaty to undertake appropriate international consultations.*

Article IX entitles State Parties to request for consultations when they believe that their interests would be harmed by an activity or experiment planned by another State Party to be conducted in outer space. Article IX of the Outer Space Treaty also requires State Parties which have reason to believe that an activity or experiment planned by it or its nationals in outer space would cause potentially harmful interference with the activities of other State Parties in the peaceful exploration and use of outer space to undertake appropriate international

<sup>32</sup> *Compromis* ¶ 29.

<sup>33</sup> W. F. Foster, *The Convention on International Liability for Damage Caused by Space Objects*, 10 CAN. Y.B. INT'L L. 137, at 151 (1972); J.F. McMahon, *Legal Aspects of Outer Space* 38 BRIT. Y.B. INT'L L. 339, at 387 (1962); BRUCE HURWITZ, STATE LIABILITY FOR OUTER SPACE ACTIVITIES IN ACCORDANCE WITH THE 1972 CONVENTION ON INTERNATIONAL LIABILITY FOR DAMAGE CAUSED BY SPACE OBJECTS, 28 (1992).

<sup>34</sup> United Kingdom Outer Space Act 1986, Chapter 38 at [http://www.oosa.unvienna.org/SpaceLaw/national/united\\_kingdom/outer\\_space\\_act\\_1986\\_E.html](http://www.oosa.unvienna.org/SpaceLaw/national/united_kingdom/outer_space_act_1986_E.html).

<sup>35</sup> Australia Space Activities Act 1988, at [http://www.oosa.unvienna.org/SpaceLaw/national/australia/space\\_activities\\_act\\_1998E.html](http://www.oosa.unvienna.org/SpaceLaw/national/australia/space_activities_act_1998E.html); Australian Space Activities Regulations 2001, Statutory Rules No. 186, at [http://www.oosa.unvienna.org/SpaceLaw/national/australia/space\\_activities\\_regulations\\_2001E.html](http://www.oosa.unvienna.org/SpaceLaw/national/australia/space_activities_regulations_2001E.html).

<sup>36</sup> *Compromis* ¶ 16.

consultations before proceeding with such activity or experiment.

There is nothing in the *Compromis* that indicates Deltastan had attempted to shroud the development of the Space Elevator in any veil of secrecy. Gammaland was clearly entitled under Article IX of the Outer Space Treaty to request for consultations if it believed that the Space Elevator would somehow harm its interests. Instead, Gammaland chose to spy on the Space Elevator and even conducted their spying operations in blatant disregard of international space law by ignoring the requisite safety distance between objects in the geostationary orbit and failing to conduct safety assessment tests. In contrast, because Gammaland's spying operations were shrouded in secrecy, there was no way Deltastan could have known about the potential effects of Inspector's corrosive bipropellant molecules.

Gammaland is obligated by Article IX to conduct international consultations if they had reason to believe that their activities would damage the interests of Deltastan. Launching space objects into outer space requires a high degree of state participation and supervision,<sup>37</sup> Gammaland ought to have conducted tests and realised the adverse reaction between Inspector's exhaust molecules and the Super String. By failing to undertake appropriate consultations with Deltastan, Gammaland has breached its obligation under Article IX.

It is not open to Gammaland to claim that the precise manner in which damage was caused was not foreseeable. Professor Christol advocates that strict foreseeability cannot be a criterion for liability in space law because it is hard to foresee what sort of damages can be caused by a space object.<sup>38</sup> Thus, as long as some form of damage is foreseeable, it does not matter whether the actual form of damage was indeed foreseen. Given the dangerous proximity of Inspector and the Super String, Gammaland ought to have foreseen that there is a high likelihood of

<sup>37</sup> *Compromis* ¶ 16.

<sup>38</sup> Carl Q. Christol, *International Liability for Damage Caused by Space Objects*, 74 AM. J. INT'L. L. 346, at 362 (1980) [hereinafter Christol, *Liability*].

Inspector causing some form of damage to the Space Elevator. In any event, Gammaland turned a blind eye to any possibility of danger in their total disregard for the need of conducting any safety assessments tests on Inspector's bipropellant mechanism.

As established, Gammaland had clear reason to believe that its launch of Inspector with its newly invented corrosive bipropellant exhaust would cause damage to the Space Elevator. Its failure to undertake consultations with Deltastan over its activities led to the ultimate collapse of the Space Elevator. It is clearly in breach of Article IX of the Outer Space Treaty.

#### 4. Accordingly, Gammaland must make reparations to Deltastan for the loss and destruction of the Space Elevator.

In the *Chorzów Factory* case<sup>39</sup>, the Permanent Court of International Justice laid down the principle that a State which has committed an unlawful act must make reparation for the damage that it has caused. This is now reflected in Article 31 of the International Law Commission's Draft Articles on State Responsibility and is also consistent with Article XII of the Liability Convention which provides that reparation must be made for the damage so as to restore the State to the condition which would have existed if the damage had not occurred.

Gammaland's unlawful act in breaching its international obligations caused the destruction of the Space Elevator. It is therefore obligated to make reparations to Deltastan for the loss and destruction of the Space Elevator.

#### **B. Gammaland is absolutely liable for the environmental damage to Deltastan's fisheries.**

##### 1. Gammaland is absolutely liable for the damage caused to Deltastan's fisheries under Article VII of the Outer Space Treaty

- a. A State is absolutely liable to pay compensation when damage is caused

<sup>39</sup> *Chorzów Factory Case* (Germany v Poland), (Jurisdiction), 1927, P.C.I.J., Series A, No. 9, 21.

on the surface of the earth by an object it has launched into outer space.

Under Article VII of the Outer Space Treaty, Gammaland is internationally liable for the damage caused by its space object. As explained above, if the damage occurred on the surface of the earth, the standard of liability under Article VII is absolute.<sup>40</sup> Therefore, Gammaland is absolutely liable for the damage caused on the surface of the Earth to Deltastan's fisheries by its Inspector satellite.

b. Deltastan's fisheries were damaged when Gammaland's Inspector caused the disintegration of the Super String.

Environmental damage was caused to Deltastan's fisheries when the Super String disintegrated. Due to the proximity of Inspector and the corrosive effect of its bipropellant molecules, the Super String was severely weakened at the point of contact between the bipropellant molecules and carbon nanofibres in the geostationary orbit. This led to the cascade failure and severance of the Super String. The Super String disintegrated in the Earth's atmosphere and some segments fell over Deltastan's fisheries, polluting the fisheries with toxic carbon nanofibres.

Even though the direct cause of the pollution to the fisheries was the Super String, the disintegration of the Super String would never have occurred but for its collision with Inspector's highly reactive propulsion exhaust molecules. Therefore, the actions of Gammaland's Inspector caused damage to the surface of the Earth by inflicting environmental damage onto Deltastan's fisheries.

c. The consequential harm to Deltastan's fisheries is compensable under the Outer Space Treaty

The Outer Space Treaty creates international liability for damage caused by space-faring nations. However it does not provide specifically for the scope of damage which is compensable. As the Outer Space Treaty was concluded with the intention of being

elaborated in later treaties,<sup>41</sup> the *travaux préparatoires* of the Outer Space Treaty and the Liability Convention would serve as a good guidance on the issue of the compensability of indirect damage.

The *travaux préparatoires* reveal that the issue of indirect damage is complicated and is best left to be dealt with according to the circumstances of the individual cases.<sup>42</sup> Eminent publicists are of the view that indirect damages are recoverable. Both Professor Christol<sup>43</sup> and Professor Foster<sup>44</sup> have advocated that recovery would be allowed for indirect damages as long as a valid causal relationship can be established between the malfunctioning of a space object and injury to person or property. All that is required is a causal connection between the accident and the damage. To allow compensation for Deltastan's fisheries would also be consistent with the subsequent Liability Convention which provides in Article XII that damages must be assessed in such a manner "so as to restore the injured state to the condition which would have existed if the damage had not occurred". Article XII of the Liability Convention does not distinguish between direct and indirect damages.

The environmental harm to Deltastan's fisheries arose as an indirect result of the collision between Inspector's propulsion exhaust molecules and the Super String. The propulsion exhaust caused the Super String to break up into many different segments, with some of the segments falling on Deltastan's territorial waters. This inevitably led to the contamination of Deltastan's waters and the environmental damage to the fisheries. The causal connection between Inspector's propulsion molecules and the damage caused to Deltastan's fisheries is clear. Gammaland is therefore absolutely liable for the damage caused to Deltastan's fisheries.

## 2. Alternatively, Gammaland is absolutely liable for the damage to Deltastan's fisheries

<sup>41</sup> CHRISTOL, *Outer Space*, *supra* note 3.

<sup>42</sup> Christol, *Liability*, *supra* note 38, at 361.

<sup>43</sup> CHRISTOL, *Outer Space*, *supra* note 3, 110; Foster, *supra* note 33, at 157.

<sup>44</sup> *Id.*

<sup>40</sup> See above, p 3.

## under Article I and II of the Liability Convention

In any event, the harm suffered by Deltastan's fisheries is compensable under the Liability Convention. Under Article II of the Liability Convention, 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 an aircraft in flight. Gammaland is absolutely liable for harm caused to the surface of the Earth.

Article I §(d) of the Liability Convention defines "damage" to include property damage. Fisheries are the property of Deltastan. The essence of property is control over the access to a particular resource.<sup>45</sup> When a State has extensive control over a particular resource such that it has every right, power, privilege and benefit that exists with respect to the resource and can exclude every other person from enjoying those rights, powers, privileges and benefits, the resource can be said to be property. A State clearly has the power to control its fisheries so as to exclude all other persons from exploiting and benefiting from its fisheries without its consent. Fisheries can hence be considered to be a State's property. Environmental damage to a State's fisheries is therefore damage to the property of a State and compensable under the Liability Convention.

Gammaland is therefore absolutely liable under Article II of the Liability Convention for the damage caused by Inspector to Deltastan's fisheries.

## **II. GAMMALAND MUST RETURN DRACHEN STATION TO DELTASTAN AND MAKE REPARATIONS FOR THE DAMAGE THAT GAMMALAND HAS CAUSED TO IT.**

### **A. Article 5(3) of the Return Agreement imposes an unconditional obligation on Gammaland to return Drachen Station.**

Article 5(3) of the Agreement on the Rescue of Astronauts, the Return of Astronauts and

<sup>45</sup> Kevin Gray, *Property in Thin Air*, 50 Cambridge L.J. 252, at 294 (1991)

the Return of Objects launched into Outer Space [hereinafter "Return Agreement"]<sup>46</sup> creates an absolute and unconditional obligation on State Parties to return space objects to their launching States should these objects be found beyond the territorial limits of the launching State.<sup>47</sup> The *travaux préparatoires* makes it clear that the intention of the drafters of this article was to create an absolute obligation that was free from any arbitrary condition. The Soviet Union had made several attempts during the drafting process to exclude certain space objects from the protection of the Return Agreement.<sup>48</sup> All these attempts were unsuccessful. The view of the United States, which insisted that the duty to return must be absolute and free from any arbitrary conditions in order to protect ownership rights of States over their space objects,

<sup>46</sup> Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, *opened for signature* Apr. 22 1968, 672 U.N.T.S. 119 [hereinafter Return Agreement].

<sup>47</sup> NANDASIRI JASENTULIYANA & ROY S. K. LEE, *MANUAL ON SPACE LAW*, VOL. 1, 71 (1979).

<sup>48</sup> *Report of the Legal Sub-Committee of COPUOS*, U.N. GAOR Legal Sub-Committee of COPUOS, at art. 7, U.N. Doc. A/AC.105/C.2/L.2 (1962 (exclusion of space objects which contain devices "for the collection of intelligence information")); U.N. GAOR Legal Sub-Committee of COPUOS, at art. 9 U.N. Doc. A/AC.105/C.2/L.2/Rev.1 (1964 (exclusion of space objects which were not launched "for [the] purposes of peaceful exploration and use of outer space")); U.N. GAOR Legal Sub-Committee of COPUOS, at art. 6 § 2, U.N. Doc. A/AC.105/C.2/L.2/Rev.2 (1964 (exclusion of space objects which have not been launched in accordance with the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space)).

prevailed.<sup>49</sup> This is now reflected in Article 5(3).

The unconditional nature of the obligation to return is further supported by the circumstances of the conclusion of the Return Agreement. Article 32 of the Vienna Convention on the Law of Treaties provides that the circumstances of conclusion of a treaty can be used as a supplementary means to confirm the interpretation of a treaty. In exchange for the lack of opposition to the Return Agreement, with most of the text being bilaterally negotiated between the United States and the Soviet Union, the non-space powers had hoped that their approval would prompt a favourable reaction of the space powers to negotiate in good faith on the Liability Convention.<sup>50</sup> The Return Agreement and the Liability Convention have always been tacitly understood as a “package deal.”<sup>51</sup> The conclusion of the Return Agreement and the Liability Convention involved an exchange between the space powers (namely the United States and the Soviet Union) and the non space-

<sup>49</sup> JASENTULIYANA & LEE, *supra* note 47, at 71; Stephen Gorove, *The Recovery and Return of Objects Launched into Outer Space: A Legal Analysis and Interpretation*, 4 INT’L LAW. 683, at 689 (1970) [hereinafter Gorove, *Recovery*]; Paul G. Dembling & Daniel M. Arons, *The Treaty on Rescue and Return of Astronauts and Space Objects* 9 WM. & MARY L. REV. 630, at 655 (1969) (duty to return a space object is “unconditional”) [hereinafter Dembling & Arons, *Astronauts*].

<sup>50</sup> JASENTULIYANA & LEE, *supra* note 47, at 58.

<sup>51</sup> CHRISTOL, *Outer Space*, *supra* note 3, at 171 (recorded the representative of the United States as explicitly stating that the two agreements, i.e. the Return Agreement and the Liability Convention, should be paired); *Report of the Legal Sub-Committee of COPUOS*, U.N. GAOR Legal Sub-Committee of the COPUOS, Special Sess., at 2, U.N. Doc. A/AC.105/43 (1967) (subcommittee specifically recognised the importance of the relationship between the two subjects, i.e. rescue and return and liability for damages); OGUNSOLA O. OGUNBANWO, *supra* note 5, at 127-28.

faring nations. The non space-faring nations tacitly ceded the responsibility for the text of the Return Agreement to the United States and the Soviet Union in exchange for a favourable position for non space-faring nations under the Liability Convention. The space powers would be able to unconditionally recover their space objects from beyond their territory.<sup>52</sup> In return, non space-faring nations would be able to seek compensation for damage caused by space objects on the surface of the Earth from launching states under an absolute liability regime.<sup>53</sup> The circumstances of the conclusion of the Return Agreement clearly indicate that the obligation in Article 5(3) was intended to be unconditional.

The unconditional nature of the obligation to return is also supported by Professor Gorove, whose view is that the clear language of Article 5(3) does not allow the Contracting Party to refuse the return of a space object on account of the particular function of the space object.<sup>54</sup> This view is shared by other eminent publicists such as Professor Dembling and Professor Arons.<sup>55</sup>

As a party to the Return Agreement, Gammaland is bound by the unconditional obligation under Article 5(3) to return Drachen Station to Deltastan. Despite Deltastan’s demand of its return, Gammaland gave no reason for its refusal to return Drachen Station<sup>56</sup> and is therefore in breach of Article 5(3).

## **B. Article 5(4) of the Return Agreement does not entitle Gammaland to retain Drachen Station.**

### 1. Drachen Station is not of a hazardous or deleterious nature within the meaning of Article 5(4).

<sup>52</sup> JASENTULIYANA & LEE, *supra* note 47, at 53 & 55; CHRISTOL, *Outer Space*, *supra* note 3, at 170-71.

<sup>53</sup> Liability Convention, *supra* note 2, at Art. II.

<sup>54</sup> Gorove, *Recovery*, *supra* note 49, at 689.

<sup>55</sup> Dembling & Arons, *Astronauts* (duty to return a space object is “unconditional”), *supra* note 49, at 655.

<sup>56</sup> *Compromis* ¶ 27.

Where a State Party has reason to believe that a space object found on its territory is of a “hazardous or deleterious” nature, it is entitled to delay the return of a space object until any possible danger of harm has been eliminated by the launching authority.

There is no *travaux préparatoires* which sheds light on what makes a space object “hazardous or deleterious.” The wording of Article 5(4) indicates that objects must, by their very nature, be hazardous or deleterious. Professor Gorove is of the view that it includes “fuel, liquid hydrogen [and]...unchecked radiation.”<sup>57</sup> Dr. Jasentuliyana is of the view that it includes “germs, radioactive or any pyrotechnic or toxic fuels.”<sup>58</sup> It follows that in order for Article 5(4) to apply, the space object must be akin to a radioactive or biologically toxic nature.

Gammaland cannot invoke Article 5(4) as its excuse for refusing to return Drachen Station as it has no basis to do so. Drachen Station is neither hazardous nor deleterious. It is a space station. There is no evidence that it contains germs, or unchecked radiation. Its laser weapons are not, by their very nature, hazardous or deleterious. In any event, the weapons had been completely destroyed by Drachen’s crew before the emergency landing in Gammaland and were no longer functional.<sup>59</sup> Therefore Gammaland has no basis for reneging on its obligation to return Drachen Station to Deltastan under Article 5(3) of the Return Agreement.

2. In any event, Article 5(4) merely suspends Gammaland’s obligation to return Drachen Station until any possible danger of harm has been eliminated.

When a space object is found to be of a hazardous or deleterious nature, the obligation to return is not extinguished but is merely temporarily suspended. Upon the elimination of the possible danger of harm,

<sup>57</sup> Gorove, *Recovery*, *supra* note 49, at 691.

<sup>58</sup> JASENTULIYANA & LEE, *supra* note 47, at 72-73.

<sup>59</sup> Compromis ¶ 37.

the obligation to return the space object arises.<sup>60</sup>

Article 5(4) therefore merely suspends Gammaland’s obligation to return Drachen Station until any possible danger of harm has been eliminated. Any possible danger of harm was already eliminated when the laser weapons system was destroyed by Drachen’s crew during descent. Gammaland has no excuse to retain Drachen Station as it never posed any danger of harm to Gammaland.

**C. Gammaland must make reparations for the damage that it has caused to Drachen Station.**

Article 5(3) only provides for an unconditional obligation to return space objects back to their owner State. It makes no allowance for a State Party to systematically disassemble a space object belonging to another State Party. As argued above, Article 5(3) was intended to protect the property rights of space-faring nations. A State must make reparation for any intentional damage that it causes to another State’s property.<sup>61</sup>

Drachen Station remains Deltastan’s property even while in Gammaland’s custody. By disassembling Drachen Station, Gammaland has caused intentional damage to Deltastan’s property and must therefore make reparations for the damage.

### **III. DELTASTAN OWES NO OBLIGATION TO MAKE REPARATIONS FOR THE DAMAGE CAUSED TO GAMMALAND’S SATELLITES.**

**A. Deltastan is not liable under Article III of the Liability Convention as no fault was committed by Deltastan.**

<sup>60</sup> Dembling & Arons, *Astronauts*, *supra* note 49, at 656; OGUNSOLA O. OGUNBANWO, *supra* note 5, at 137; Stephen Gorove, *International Protection of Astronauts and Space Objects* 20 DEPAUL L. REV. 597, at 613 (1971).

<sup>61</sup> Chorzów Factory Case (Germant v. Poland) (Merits), PCIJ, Series A, No. 17. (1928).



As established above, Article III of the Liability Conventions provides for fault-based liability where damage is caused elsewhere than on the surface of the Earth by one space object to another space object. Deltastan is not at fault in any way as its actions were completely in conformity with international law. Deltastan complied with all its international obligations under the Outer Space Treaty.

**B. Deltastan's actions were justified as self-defense because the severance of the Super String can objectively be interpreted as an armed attack by Gammaland.**

The right of self-defence is recognized in customary international law.<sup>62</sup> The *Caroline* case first established the principles of self-defense in customary international law.<sup>63</sup> In the *Nicaragua* case, it was clearly established that the right of self-defense exists as an inherent right at customary international law.<sup>64</sup>

A State's right of self-defense in the case of an armed attack is further enshrined in Article 51 of the Charter of the United Nations. While a literal interpretation of Article 51 of the Charter requires an armed attack to first occur, Article 51 does not 'supersede customary international law'.<sup>65</sup> Customary international law does not require an armed attack before the right of self-defense arises.<sup>66</sup> Article 51 is hence not determinative or exhaustive of the conditions to be met before the right of self-defense arises. In any event, the right of self-defense in customary international law arises so long as an armed attack can be objectively interpreted.<sup>67</sup>

A State can use force to defend itself even if the actual attack has not yet occurred.<sup>68</sup> In the *Caroline* case, British subjects seized and destroyed a vessel in an American port that had been supplying groups of American nationals with the means of conducting raids into Canadian territory. In the correspondence between the United States and Britain that followed, the British justified their actions on the grounds of self-defense. The United States agreed that the right of self-defense can arise where an attack is imminent, but has yet to occur. The right of self-defense can therefore arise even if there is no actual armed attack.<sup>69</sup> Where a state objectively interprets a series of events to amount to an armed attack or use of force on a substantial scale, the use of self-defense is still justified.<sup>70</sup> A State that reasonably believes it is going to be attacked or already under attack can therefore take necessary steps to defend itself.

This right of self-defense extends to activities in outer space in accordance with Article III of the Outer Space Treaty, which provides that States Parties will carry out activities in outer space in accordance with international law and the Charter of the United Nations. Therefore the right of self-defense extends to activities in outer space. The destruction of Gammaland's satellites by Drachen Station was a legitimate exercise of self-defense by Deltastan. The situation created by Gammaland that led up to the automatic operation of the laser weapons system can objectively be interpreted as an armed attack. Gammaland expressly opposed the development of the Space Elevator because the Space Elevator would harm its domestic launch industry.<sup>71</sup> Gammaland feared the Space Elevator could be used as an element in missile defense and would reduce the deterrent effect of its intercontinental ballistic missile system.<sup>72</sup> It also devoted significant intelligence

<sup>62</sup> MALCOLM SHAW, *INTERNATIONAL LAW* (5th ed. 2003), at 1026.

<sup>63</sup> *Id.*, at 1024.

<sup>64</sup> *Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States of America (Merits), 1986 I.C.J. 14.*

<sup>65</sup> SHAW, *supra* note 62, at 1026.

<sup>66</sup> *Id.*

<sup>67</sup> *Id.*, at 1031.

<sup>68</sup> TIMOTHY L.H. MCCORMACK, *SELF-DEFENSE IN INTERNATIONAL LAW: THE ISRAELI RAID ON THE IRAQI NUCLEAR REACTOR*, 261 (1996).

<sup>69</sup> *Id.*

<sup>70</sup> *Id.*

<sup>71</sup> *Compromis* ¶ 9.

<sup>72</sup> *Compromis* ¶ 9.

resources to monitor the development of the Space Elevator. It began by making regular incursions into the 200 kilometer defensive zone placed around Sea Anchor.<sup>73</sup> This later escalated into a secret programme of launching stealth satellites with dual payloads in order to monitor the Space Elevator in the geostationary orbit.<sup>74</sup> Gammaland launched Inspector and GammaSat II with the intention of spying and gathering intelligence on the Space Elevator and its payload.<sup>75</sup> When it got wind of an alleged black nanosatellite programme payload, Gammaland moved Inspector even closer to within several kilometers<sup>76</sup> of the Space Elevator in blatant disregard of international practice. Gammaland also refused to move Inspector away from the Space Elevator despite Deltastan's many requests. Inspector was only moved after vigorous protests, threats and counter-threats.<sup>77</sup>

Gammaland's intentions towards the Space Elevator were clearly hostile. In order to protect its significant investment in the development of the Space Elevator from any potential attack from Gammaland, Deltastan programmed its laser weapons system aboard Drachen Station to automatically identify potential threats and destroy them. This was clearly necessary as any attack from Gammaland, either from its satellites or from its intercontinental ballistic missile system, would be fast and swift with no time for deliberation. The defensive laser weapons systems needed to respond to any threat quickly, decisively and effectively. It was therefore legitimate for Deltastan to arm the weapons system automatically.

The cascade failure and severance of the Super Strings led to the perception that the Space Elevator was under attack. The combined factors of the realm of suspicion created by Gammaland in its interest and opposition over the development of the Space Elevator and the *de facto* damage caused by the proximity of the Inspector satellite to the Super String led Deltastan to

reasonably conclude that it was under attack by Gammaland. The right of self-defense therefore arose and was validly exercised by Deltastan. Deltastan is therefore not obliged to make reparations as its actions were justified.

**C. Deltastan exercised its right of self-defense was exercised validly in accordance with the principles of necessity and proportionality.**

The need for a proportional response to a use of force by a State is founded on the premise that the response of the State alleging self-defense should not be excessive.<sup>78</sup> There are three essential factors in determining whether a State has exercised its right of self-defense in a proportionate and necessary manner.

First, the necessity for self-defense must be viewed from the perspective of the defending State.<sup>79</sup> A State's decision to resort to force in self-defense must be determined reasonably in light of the circumstances. Second, the test of proportionality takes into account the series of activities that formed part of a sequence or chain of events which lead to the act of self-defense.<sup>80</sup> Finally, proportionality is measured by the act's capacity to achieve the desired result.<sup>81</sup> The test of proportionality is qualitative and not quantitative. It does not depend on whether or not the amount of damage caused is quantitatively proportional<sup>82</sup> but rather

<sup>73</sup> Compromis ¶ 10.

<sup>74</sup> Compromis ¶ 11.

<sup>75</sup> Compromis ¶ 11.

<sup>76</sup> Compromis ¶ 16.

<sup>77</sup> Compromis ¶ 19.

<sup>78</sup> EDWARD KWAKWA, THE INTERNATIONAL LAW OF ARMED CONFLICT: PERSONAL AND MATERIAL FIELDS OF APPLICATION, 38 (1992).

<sup>79</sup> Donald Nungesser, *United States' Use of the Doctrine of Anticipatory Self-Defense in Iraqi Conflicts*, 16 PACE INT'L L. REV. 193, at 195 (2004).

<sup>80</sup> SHAW, *supra* note 62, at 1032.

<sup>81</sup> *Id.*

<sup>82</sup> *Addendum to the Eighth Report on State Responsibility*, reprinted in 2 Y.B. INT'L L. COMM'N 13, at 69 (1980), U.N. Doc A/CN.4/318/Add.5-7; R. St. J. Macdonald, *The Nicaragua Case: New Answers to Old Questions?*, 24 CAN. Y.B. INT'L LAW 127, at 153 (1986).

whether the force used was reasonably necessary to repulse the attack.

The automatic firing by the laser weapons was a necessary and proportional act in defense of Deltastan's Space Elevator. First, Gammaland's behaviour in surreptitiously spying on the Space Elevator, while at the same time ignoring international space safety practices concerning the safety distance between space objects led to Deltastan's justifiable determination that the Space Elevator was in peril from objects under Gammaland's control. Second, when the Super String disintegrated, the interpretation by the automatic weapons system of an armed attack leading to the destruction of all of Gammaland's satellites was a reasonable one given the realm of suspicion already generated by Gammaland's opposition and hostility towards the Space Elevator and also the fact that it was Inspector that *de facto* caused the damage to the Super String.

Finally, it was a proportionate measure for Deltastan to have set its automatic weapons system to destroy all of Gammaland's satellites within a range 10,000 kilometers. Many space-faring nations use their satellites in geostationary orbit for military purposes. For example, United States geostationary orbital communications satellites allow implementation of the intelligence and communications networks essential to United States conventional military operations. They can therefore be used as an element in combat<sup>83</sup>. US intelligence assessments have also determined that China's communication satellites, officially characterized as civilian and registered with the ITU as providing communications services, are able to provide commanders with the ability to communicate with armed forces and provide high-speed real-time viewing of the battlefield<sup>84</sup>. The characterization of a satellite as a communication satellite therefore does not necessarily make it non-hostile.

Deltastan could not have distinguished which of Gammaland's satellites were hostile and which were not. The benign or threatening

<sup>83</sup> Neil Wareham, *Space, Weapons and the Role of Law*, presentation at International Institute of Space Law symposium (6 May, 2003).

<sup>84</sup> *Id.*

character of satellite operations is often blurred by circumstances.<sup>85</sup> The fact that the four LEO earth observation satellites were further away than Inspector and GammaSat II did not make them any less a threat since the range of anti-satellite weapons can go as far as 75,000 kilometers.<sup>86</sup> Even if these satellites were not directly threatening, they could have played military roles similar to those used by United States and China communications satellites. Therefore it was a legitimate and proportionate exercise of self-defense for Deltastan to have armed its automatic weapons system on board Drachen Station to protect its technology during a period when it could not be watched by the Earth-bound crew.

The right of self-defense was therefore exercised validly in accordance with the principles of necessity and proportionality.

#### IV. GAMMALAND HAS NO LEGAL BASIS TO CLAIM FOR THE ENVIRONMENTAL DAMAGE AND COSTS OF CLEAN-UP UNDER THE LIABILITY CONVENTION

##### A. The Super String is not a space object and any damage which it caused does not fall within the Liability Convention.

In order for Deltastan to be liable under the Liability Convention for damage caused by the Super String, the Super String must be a space object. There is no definition in the Liability Convention of a space object, save the inclusive definition in Article I(d) of the Liability Convention. Learned publicists have written extensively on the subject, and representations from States provide indicia for the generally recognized characteristics of a space object.

<sup>85</sup> William J. Perry et al., *Anti-Satellite Weapons and U.S. Military Space Policy: An Introduction*, in *SEEKING STABILITY IN SPACE: ANTI-SATELLITE WEAPONS AND THE EVOLVING SPACE REGIME 5* (Joseph S. Nye & James A. Schear eds., 1987).

<sup>86</sup> Dietrich Shrooer, *The Present Status of the Strategic Defense Initiative*, in *SPACE AND NUCLEAR WEAPONRY IN THE 1990S 30-31* (Carlo Schaerf, Giuseppe Longo & David Carlton eds., 1992).

The draft conventions submitted by Hungary, India and Belgium reveal that at the very minimum, a space object must be an object designed for movement in outer space.<sup>87</sup> The mere fact that an object has been launched does not make it a space object if it was never intended to move in space and cannot in fact do so.<sup>88</sup> Launching is therefore not a defining characteristic of a space object.<sup>89</sup> The fact that an object was launched is important for the purposes of *identifying at which point an object becomes a space object*,<sup>90</sup> but by itself it cannot tell us whether an object is indeed a space object. The Super String is an unprecedented concept in space technology. Never before has there been a construct that is tethered to Earth and yet extends 37,000 kilometers into the geostationary orbital position in outer space. The Super String cannot be a space object as it is not designed to move in outer space unlike conventional satellites. If it were to be considered a space object, this would mean that all 37,000 kilometers of the Super String, as well as its component parts including the Earth-bound Sea Anchor would be space objects. This is clearly an absurd result.

Even though the Super String was launched from Earth through the Alpha Station,<sup>91</sup> the Super String was never designed to move in outer space: The Super String was sent up in Alpha Station with the very purpose of being reeled down so that it could be caught by Earth's gravity.<sup>92</sup> Furthermore, the Super

<sup>87</sup> Foster, *supra* note 33, at 145; Stephen Gorove, *Cosmos 954: Issues of Law and Policy*, 6 J. SPACE L. 137, at 141 (1978). [hereinafter Gorove, *Cosmos 954*]

<sup>88</sup> Kevin D. Heard, *Space Debris and Liability: An Overview*, 17 CUMB. L. REV. 168, at 181-182 (1986); Rebecca J. Martin, *Legal Ramifications of the Uncontrolled Return of Space Objects to Earth*, 45 J. AIR L. & COM. 457, at 469 (1980); CHRISTOL, *Outer Space*, *supra* note 3, at 109.

<sup>89</sup> Stephen Gorove, *Toward a clarification of the term "Space object" – An international legal and policy imperative?*, 21 J. SPACE L. 11, at 17 (1993).

<sup>90</sup> *Id.*, at 19.

<sup>91</sup> Compromis ¶ 3.

<sup>92</sup> Compromis ¶ 3.

String is kept taut by the Sea Anchor and Drachen Station, without which the Super String would collapse. This means that the Super String is unable to sustain itself in space and hence is not a space object.

#### **B. Alternatively, Deltastan is exonerated from absolute liability under Article VI of the Liability Convention because Gammaland was grossly negligent.**

Article VI §(1) of the Liability Convention states that any State liable under Article II of the Convention can be exonerated if the damage resulted either wholly or partially from the gross negligence of the claimant State or from any act or omission of the claimant State done with intent to cause damage. Gross negligence under Article VI §(1) can be defined as a high degree of contributory negligence.<sup>93</sup>

Gammaland operated Inspector in a grossly negligent manner because it recklessly disregarded Deltastan's interests.<sup>94</sup> The Commission had already determined that the collapse of the Super String was caused by Inspector's propulsion exhaust.<sup>95</sup> The collapse and disintegration of the Super String directly led to segments of it entering Gammaland's territory and causing environmental and health damage. The compounds making up the Super String are well-known to the scientific community, and so, in sending up Inspector for the very specific reason of spying on the Space Elevator, Gammaland should have at least ensured that Inspector's propulsion exhaust did not damage the Super String. With the knowledge of Inspector's propulsion exhaust and the knowledge of the compounds of the Super String, Gammaland could have easily predicted the reaction between the Super String and the propulsion exhaust. By failing to do so, Gammaland recklessly disregarded the interests of Deltastan.

#### **C. Gammaland is responsible for their own loss as they were wholly at fault for causing the chain of events leading to the**

<sup>93</sup> Heard, *supra* note 88, at 185.

<sup>94</sup> See above, p4-11.

<sup>95</sup> Compromis ¶ 27.

## damage caused to their environment and costs of clean-up.

As Deltastan is exonerated from absolute liability for the damage caused on the surface of the earth by segments of the Super String, the case is then assessed on the fault-based standard of liability. There is apportionment of liability based on the extent of fault when damage is caused by two or more objects of two different launching States to the surface of the earth.<sup>96</sup> As established above,<sup>97</sup> there would be no damage to the surface of the earth *but for* Inspector coming too close and releasing highly reactive propulsion exhaust which reacted adversely with the Super String; thereby causing it to disintegrate and fall onto Earth. Gammaland is thus responsible for their own loss as they were wholly at fault for causing the chain of events leading to the damage caused to their environment and the costs of clean-up.

### **D. In any event, the types of damage suffered by Gammaland are not compensable under the Liability Convention**

Under Article II of the Liability Convention, liability arises when there has been "damage." Article I §(d) of the Liability Convention defines damage as "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international organisations."

#### 1. Costs of clean up are not compensable under the Liability Convention

Professor Gorove has argued that under the Liability Convention, compensation is only available where there has been "damage" as

<sup>96</sup> Liability Convention, *supra* note 2, at Article 4(2).

<sup>97</sup> See above, p 12.

defined by Article I §(d).<sup>98</sup> Clean-up costs are therefore compensable only if they can be considered to be "loss of or damage to property" or "loss of life, personal injury or other impairment of health."

Gammaland is claiming for compensation for the removal of segments of the Super String from its territory. However, the costs of removing the segments of the Super String cannot possibly be equated to "damage" within the contemplation of Article I §(d).<sup>99</sup> The only example of a State compensating for costs of clean-up is the Cosmos 954 incident. However, that incident was never argued before the International Court. The settlement paid by the Soviet Union to Canada was *ex gratia* and cannot constitute State practice since it is just the view of one state. Costs of clean-up are therefore not compensable under the Liability Convention.

#### 2. Environmental damages are not compensable under the Liability Convention

Gammaland is also claiming for environmental damage. The damage to the environment is compensable under the Liability Convention if Gammaland's environment is considered "property". Environment can be defined as "the combination of elements whose complex inter-relationships make up the setting, the surroundings and the conditions of life of the individual and of society as they are and as they are felt."<sup>100</sup>

Unlike Deltastan's fisheries, Gammaland's environment cannot be considered to be property. The environment is such a complex and encompassing phenomena<sup>101</sup> that no State can ever have extensive control over it. Neither can a State restrict or exclude the

<sup>98</sup> Gorove, *Cosmos 954*, *supra* note 87, at 142; Joseph A. Burke, *Convention on International Liability for Damage Caused by Space Objects: Definition and Determination of Damages after the Cosmos 954 Incident*, 8 FORDHAM INT'L L.J. 255, at 278 (1985).

<sup>99</sup> *Id.*

<sup>100</sup> PATRICIA W. BIRNIE & ALAN E. BOYLE, INTERNATIONAL LAW AND THE ENVIRONMENT, 2 (1992)

<sup>101</sup> *Id.*

environment from others. This is the reason for the promulgation of other regimes governing damage caused to the environment in international law. Gammaland's environment therefore cannot be considered property such that any damage caused to it falls within Article I §(d) of the Liability Convention.

This is further supported by the *travaux préparatoires* of the Liability Convention, which records that there was a failed attempt to include pollution of airspace as one of the compensable types of harm available under the Liability Convention.<sup>102</sup> It should also be noted that Article II of the Liability Convention mentions that the damage has to be "on the surface of the Earth." Similarly, Article VII of the Outer Space Treaty states that the damage must occur "on the Earth, in air space or in outer space." At no point do the two treaties say that damage is compensable where it occurs to the surface of the Earth or to air space or to outer space, which would suggest that damage which occurs to those areas are not within the contemplation of the space treaties. There is therefore strong evidence which suggests that environmental damages are not compensable under the Liability Convention.

## V. CONCLUSION AND PRAYER FOR RELIEF

Whereas Gammaland is liable for the damage caused to Deltastan's Space Elevator,

Whereas Gammaland breached its obligation under Article IX of the Outer Space Treaty when it disregarded Deltastan's corresponding interests in space,

Whereas damage to Drachen's fisheries is compensable,  
Whereas the obligation to return Drachen Station is absolute,

Whereas the damage which Deltastan caused to Gammaland's satellites was justified by self-defense,

Whereas the types of damage to Gammaland's environment and the clean-up costs incurred are not compensable under the Liability Convention,

The Government of Deltastan respectfully requests the Court to adjudge and declare that:

1. Gammaland must make reparations for the damage caused to the Space Elevator.
2. Gammaland must make reparations for the damage caused to Deltastan's fisheries.
3. Gammaland must return Drachen Station to Deltastan and make reparations for the damage caused to it.
4. Gammaland's claim for damage to their satellites be dismissed.
5. Gammaland's claim for damage to their environment and clean-up costs be dismissed.

<sup>102</sup> OGUNBANWO, *supra* note 5, at 156.

## **B. WRITTEN BRIEF FOR GAMMALAND**

### **AGENTS:**

Ms. Kristie Blase, Ms. Olivia Hussey,  
George Washington University.

### **ARGUMENT:**

#### **I. DELTASTAN IS LIABLE FOR ITS DESTRUCTION OF GAMMALAND SATELLITES AND ENVIRONMENTAL DAMAGE IT INFLICTED ON GAMMALAND.**

The Liability Convention, has three categories permitting a state to bring a claim.<sup>1</sup> The injury Gammaland claims falls within the first one: “a State which suffers damage, or whose natural or juridical persons suffer damage, may present to a launching State a claim for compensation for such damage.”<sup>2</sup>

*Damage* is defined as “loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations.”<sup>3</sup> A *launching state* is “[a] State which launches or procures the launching of a space object [or a] State from whose territory or facility a space object is launched.”<sup>4</sup> Under these ordinary meanings, Gammaland incurred damage – where Deltastan was the launching state – twice. First, Deltastan’s Space Elevator completely destroyed six of Gammaland’s satellites when its laser weapons system shot the satellites down.<sup>5</sup> These six satellites were property of Gammaland,<sup>6</sup> so they are

included in the definition of damage as “loss of ... property of States.” This damage allows Gammaland to present its first claim to Deltastan under the Liability Convention. Second, Gammaland had to clean up pieces of Deltastan’s Super Strings, which had disintegrated into various lengths of nanofiber and landed primarily in Gammaland.<sup>7</sup> This is *damage*<sup>8</sup> because the nanofibers caused “environmental and health damage” to Gammaland’s property and persons.<sup>9</sup> Deltastan was the launching state because it launched the Super String.<sup>10</sup>

#### **A. Deltastan is liable for destruction of six Gammaland satellites**

Liability is imposed for injuries that were caused by a State’s actions.<sup>11</sup> The principle of “sic utere tuo ut alienum non laedus” is reflected in many international decisions, such as the *Corfu Channel case*,<sup>12</sup> the *Trail Smelter case*,<sup>13</sup> and the *Lac Lanoux arbitration*.<sup>14</sup> These cases all recognize the international duty of care.

#### **1. Deltastan is liable as the launching state of Drachen.**

Liability in space is governed broadly by Articles VI and VII of the Outer Space Treaty<sup>15</sup> and more explicitly by the Liability

<sup>7</sup> *Compromis* at ¶ 24.

<sup>8</sup> *Liability Convention, supra*, note 72, art. VIII.

<sup>9</sup> *Compromis* at ¶ 25.

<sup>10</sup> *Compromis* at ¶ 3.

<sup>11</sup> Sompong Sucharitkul, *State responsibility and International Liability Under International Law*, 18 LOY. L.A. INT’L. & COMP. L.J. 821, 828-29 (1996).

<sup>12</sup> *Corfu Channel Case*, 1949 I.C.J. 4 (1949) (One cannot do damage to the property of another).

<sup>13</sup> *Trail Smelter Case* (United States v. Canada), 3 R.I.A.A. 1905 (1938 & 1941).

<sup>14</sup> *Lac Lanoux Arbitration* (France v. Spain), 24 I.L.R. 101 (1957).

<sup>15</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moot and Other Celestial Bodies, Jan. 27, 1967, 18

<sup>1</sup> Convention on International Liability for Damage Caused by Space Objects, art. VIII, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention].

<sup>2</sup> *Id.* at art. VIII.

<sup>3</sup> *Id.* at art. I.

<sup>4</sup> *Id.*; see also Convention on the Registration of Objects Launched into Outer Space, art. I, Jan. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter Registration Convention].

<sup>5</sup> *Compromis* at ¶ 21.

<sup>6</sup> *Compromis* at ¶ 21.

Convention.<sup>16</sup> Article VI of the Outer Space Treaty states that State Parties “shall bear international responsibility for national activities in outer space . . . **whether such activities are carried on by governmental agencies or by non-governmental entities.**”<sup>17</sup> Article VII of the Outer Space Treaty further states:

Each State Party to the Treaty that **launches or procures the launching** of an object into outer space...and each State Party **from whose territory** or facility an object is launched, is internationally liable for damage to another State Party ....<sup>18</sup>

These provisions nullify any distinction between Deltastan and the Space Elevator Corporation.<sup>19</sup> States are responsible for the space activities of entities under their jurisdiction. The project was conceived and funded by Deltastan’s National Agency of Space and Ministry of Defense,<sup>20</sup> that the Corporation is government-chartered, and the launches occurred in Deltastan.<sup>21</sup>

## 2. Deltastan is at fault for destroying six Gammaland satellites.

The destroyed satellites were space objects in space,<sup>22</sup> the damage was “caused elsewhere than on the surface of the Earth.”<sup>23</sup> The Liability Convention states that damage in

space incurs liability should be assessed “only if the damage is due to its fault or the fault of the persons for who it is responsible.”<sup>24</sup> Fault liability is met if the destruction was intentional or, alternatively, if it was (1) negligent and (2) the claimant’s actions were not the primary cause of damage.<sup>25</sup>

Here, Deltastan intentionally destroyed the satellites by pre-targeting them. However, even if Deltastan is not found to have intentionally destroyed the satellites, it was negligent in the installation of a pre-programmed weapons system and Gammaland was not the primary cause of the damage. Thus, Deltastan is at fault for the destruction.

### *a. Deltastan intentionally destroyed Gammaland’s satellites.*

Internationally, States have “both a prima facie exclusive jurisdiction over a territory and a duty not to intervene in the area of exclusive jurisdiction of other states.”<sup>26</sup> The duty not to intervene includes a duty not to intentionally damage or destroy another states property.<sup>27</sup>

Deltastan’s pre-targeting, which led to the pre-programmed destruction of the satellites, was intentional. Deltastan consciously decided to pre-target these six satellites knowing that they would be destroyed without any threat determination if Drachen perceived an attack from any State.

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U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

<sup>16</sup> Liability Convention, *supra*, note 72.

<sup>17</sup> Outer Space Treaty, *supra*, note 86, art. VI (emphasis added).

<sup>18</sup> *Id.* at art. VII.

<sup>19</sup> *Compromis* at ¶¶ 1-2.

<sup>20</sup> *Compromis* at ¶¶ 1-2.

<sup>21</sup> *Compromis* at ¶¶ 2-3.

<sup>22</sup> Diedericks-Verschuur, AN INTRODUCTION TO SPACE LAW 100, at 17-23 (1999); Jannat C. Thompson, *Space for Rent: The International Telecommunications Union, Space Law, and Orbit/Spectrum Leasing*, 62 J. AIR L. & COM. 279, 303 (1996) (geostationary and low earth orbits are within the definition of space). All six satellites are space objects.

<sup>23</sup> Liability Convention, *supra*, note 72, art. III

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<sup>24</sup> *Id.* at art. III (emphasis added).

<sup>25</sup> Glenn H. Reynolds and Robert P. Merges, OUTER SPACE: PROBLEMS OF LAW AND POLICY 177.

<sup>26</sup> Luan Low and David Hodgkinson, *Compensation For Wartime Environmental Damage: Challenges To International Law After The Gulf War*, 35 VA. J. INT’L L. 405, 415 (1995); 1 OPPENHEIM’S INTERNATIONAL LAW 122 (Robert Jennings & Arthur Watts eds., 9th ed. 1992).

<sup>27</sup> “No State has the right to use or permit the use of its territory in a manner as to cause injury ... to the territory of another, when the case is of serious consequence and the injury is established by clear and convincing evidence.” *See Trail Smelter Case, supra*, note 84, at 1911.



Specifically, Deltastan's use of force was as follows:

In the midst of the maneuver [Drachen Station and the Sea Anchor were being relocated due to weather conditions] a cascade failure of the Super Strings occurred that resulted in the severance of the Super Strings. On Drachen Station those events were interpreted as an attack on the Space Elevator. The laser weapons system executed a series of pre-programmed firings on the spacecraft that had been identified by the weapon systems as potential foes. Inspector was the first spacecraft destroyed followed by GammaSat II . . . and four LEO earth observation satellites . . . .<sup>28</sup>

Drachen fired on the six Gammaland satellites because they had been previously identified as potential threats. There was not even a possibility for individualized threat determination. Thus, Deltastan designed this system to intentionally destroy Gammaland's satellites without cause.

*b. Deltastan was negligent in installing and using a pre-programmed laser weapons system to destroy Gammaland's satellites.*

Fault can be found here even without determining intent, because Deltastan was negligent and Gammaland's actions were not the primary cause of the damages. To find negligence, one State Party must owe and breach a duty to another State Party, causing injury. Here, Deltastan breached its duty to Gammaland twice: (1) installing a pre-programmed weapons system that failed to warn or give consideration to Gammaland's interests; and (2) destroying satellites that posed no threat, subjectively or objectively. Both parties here are signatories to the Outer Space Treaty and the Liability Convention,<sup>29</sup> and thereby are bound to uphold the duties of those treaties in good faith.<sup>30</sup> The Outer

Space Treaty obliges signatories to act in accordance with international law and in the interest of maintaining peace and security and promoting international cooperation and understanding.<sup>31</sup> The Liability Convention imposes duties of responsibility on the launching States not to cause damage through its own fault to other space objects.<sup>32</sup> This duty of care has also been found in case law, specifically the duty to warn in *Corfu Channel*<sup>33</sup> and the duty to consider and protect other State's interests found in both *Trail Smelter*<sup>34</sup> and *Lac Lanoux*.<sup>35</sup>

First, Deltastan breached its duty of care in secretly installing laser weapons that had a pre-programmed attack agenda. The secret installation of pre-programmed weapons violates Deltastan's duty to warn its neighboring states of danger. *Corfu Channel* is analogous to this situation because both situations involve automatic weaponry that discharges without any judgment of the circumstances. In *Corfu Channel* underwater mines were at issue; here the pre-programmed laser system is automatic. Also, installation of a pre-programmed weapon means that Deltastan, could not possibly meet its burden to protect Gammaland's interests, like these six pre-targeted satellites. The system relied on previous, unrelated, assessments of threat. The elimination of all

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Preah Vihear (*Cambodia v. Thailand*), 1962 W.L. 2, 1962 I.C.J. 6, 58-9, 15 Jun. 1962.

<sup>31</sup> Outer Space Treaty, *supra*, note 86, at art. III.

<sup>32</sup> Liability Convention, *supra*, note 72, at arts. II, III.

<sup>33</sup> *Corfu Channel Case*, *supra*, note 83, at 22 (Albania held responsible because it knew the mines were there and had failed to warn the United Kingdom).

<sup>34</sup> *Trail Smelter Case*, *supra*, note 84 (recognizing that a State owes a duty to protect other States against injurious acts by individuals within its jurisdiction).

<sup>35</sup> *Lac Lanoux Arbitration*, *supra*, note 85 (Good faith imposes an "obligation to [consider] the various interests involved, to seek to give them every satisfaction compatible with the pursuit of its own interests, and to show that in this regard it is genuinely concerned to reconcile the interests of the other ... State with its own.").

<sup>28</sup> *Compromis* at ¶ 21.

<sup>29</sup> *Compromis* at ¶ 41.

<sup>30</sup> UN Charter, art. II, sec. 2; *see also* Vienna Convention on the Law of Treaties, art. 26; *see also* Case Concerning the Temple of

the individualized threat assessment prior to attack was a breach of duty.

Second, Deltastan breached its duty of care. None of the satellites presented any threat to Deltastan's security. As discussed *supra*, the facts indicate that while Drachen and the Sea Anchor were being relocated due to weather conditions "a cascade failure of the Super Strings occurred that resulted in the severance of the Super Strings."<sup>36</sup> Even though there was no evidence of attack or aggression by Gammaland at that time, Drachen interpreted the failure "as an attack."<sup>37</sup> This assumption set in motion the preprogrammed attack, where Drachen "executed a series of pre-programmed firings on the spacecraft that had been identified by the weapon systems as potential foes. Inspector was the first spacecraft destroyed followed by GammaSat II . . . and four LEO earth observation satellites."<sup>38</sup>

Drachen attacked the Gammaland satellites without any indication they posed a threat. In fact, at the time of the Super String failure there were many factors that could have caused the Super String failure, not the least of which was the fact that Drachen and the Sea Anchor were moving instead of the usual stationary condition, and the were dangerous weather conditions surrounding the Sea Anchor and in the atmosphere with the Super Strings. Even though "Deltastan was aware that the molecules from the exhaust of the Inspector propulsion system could have impacted the Super String," at that point in time, Deltastan had no evidence that the failure of the Super Strings was related to those exhaust molecules.<sup>39</sup> None of the destroyed satellites were behaving aggressively – in fact, quite the opposite is true.

Inspector's propulsion system was only activated in response to Deltastan's demand "that Inspector be moved at least 1,000 kilometers away from Space Elevator."<sup>40</sup> Thus, none of the actions taken by the Inspector satellite can be viewed as

exhibiting aggression. Nor were any of the other five satellites exhibiting aggression towards Deltastan.<sup>41</sup> None of these satellites carried any form of weaponry, unlike Drachen; none of these satellites took aggressive actions towards Drachen or the Super Strings; and none of these satellites were violating international law by being in orbit.<sup>42</sup> Finally, none of these five satellites took any actions which actually had any impact on the Super Strings, or even could have been interpreted to cause the Super String failure. Thus, Deltastan's pre-programmed destruction of the satellites – without any determination that they posed a threat – was a breach of the duty of good faith.

*c. Gammaland's actions were NOT the primary cause of the damage.*

Deltastan's negligence equates to fault unless, as discussed above, Gammaland's actions were proven to be the primary cause of the damage. The term "primary" is defined as "immediate or direct;"<sup>43</sup> whereas the term "cause" means "[t]he producer of an effect, result, or consequence."<sup>44</sup> Here, the independent Commission found Deltastan to be the cause, not Gammaland.<sup>45</sup> But for the pre-programmed firings from Drachen, the satellites would not have been destroyed. Thus, the Drachen attack caused the destruction of the satellites.

<sup>36</sup> *Compromis* at ¶ 21.

<sup>37</sup> *Compromis* at ¶ 21.

<sup>38</sup> *Compromis* at ¶ 21.

<sup>39</sup> *Compromis* at ¶ 36.

<sup>40</sup> *Compromis* at ¶ 1, 8.

<sup>41</sup> *Compromis* at ¶ 36.

<sup>42</sup> *Compromis* at ¶ 40. All six satellites were in compliance. Even the two military spy satellites were in compliance with international law because: (1) Spy satellites are a variation of remote sensing satellite used by the Space Powers to keep the peace between states and comply with the "peaceful purpose" doctrine; and (2) customary law, as seen by the practice of the space powers, allows military spy satellites to orbit Earth. See Abram Chayes et al., *SPACE WEAPONS: THE LEGAL CONTEXT, IN WEAPONS IN SPACE* 193, 196-97 (Franklin A. Long et al. eds., 1986).

<sup>43</sup> The American Heritage Dictionary of the English Language 452 (4th ed. 2000).

<sup>44</sup> *Id.*

<sup>45</sup> *Compromis* at ¶ 21.

The exhaust from the Inspector can not be viewed as the primary cause of the satellite destruction because Deltastan's negligence, in installing and using a pre-programmed weapon system that did not accurately determine potential threats, was an intervening act. Because these pre-programmed firings are the direct factual cause of the damage to the satellites and Deltastan negligently breached its duty of care, Deltastan is at fault under the Liability Convention.

### 3. Deltastan can not avoid liability by claiming Self Defense

The UN Charter, Article 51, recognizes the customary international law right to self-defense.<sup>46</sup> This right to self-defense, however, can not be used to legitimate Deltastan's actions because there was no armed attack on Drachen.<sup>47</sup> As discussed above, the actions taken by the Inspector satellite were in response to Deltastan's demand that Inspector move.<sup>48</sup>

Even if this court were to accept as legitimate the radical doctrine of anticipatory self-defense Deltastan's actions were still unjustified. Anticipatory self-defense is a controversial doctrine, advanced by the United States, which would allow the use of force prior to an armed attack, as long as the action is necessary and proportional to the threat.<sup>49</sup> As detailed by U.S. Secretary of State Daniel Webster in his letter to Henry Fox, the British Minister in Washington, anticipatory self-defense is justified if the "necessity of self-defense [was] instant, overwhelming, leaving no choice of means, and no moment for deliberation ..."<sup>50</sup> Here,

<sup>46</sup> UN Charter, art. 51 ("Nothing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member....").

<sup>47</sup> *Compromis* at ¶ 21.

<sup>48</sup> *Compromis* at ¶ 18.

<sup>49</sup> *Caroline case*, 2 Moore 409 (1837).

<sup>50</sup> Letter from Daniel Webster, U.S. Secretary of State, to Henry Fox, British Minister in Washington (Apr. 24, 1841), in

there was no evidence Drachen was even under attack, much less that such an attack was overwhelming, leaving no other choice. Thus, the use of force here can not be characterized as necessary. Also, complete destruction of six satellites can not be deemed proportional to a non-existent attack.

### **B. Deltastan is absolutely liable for the cost of Gammaland clean-up and environmental damage to Gammaland.**

The Outer Space Treaty establishes that State Parties are internationally liable for damage caused by its space objects.<sup>51</sup> The Liability Convention further defines this liability to impose "absolute liability to pay compensation for damage caused by [a launching State's] space object on the surface of the Earth."<sup>52</sup> This black letter treaty law is supported by the customary international law declared by this Court in *Trail Smelter*<sup>53</sup> and by the UN General Assembly in its acknowledgment of Principle 21 of the 1972 UN Conference on the Human Environment.<sup>54</sup>

### 1. Deltastan is liable for the damage of the Super Strings as the launching State.

The Liability Convention imposes "absolute liability to pay compensation for damage caused by [a launching State's] space object on the surface of the Earth."<sup>55</sup> Deltastan is responsible in this situation because the phrase "'space object' includes component parts of a space object as well as its launch vehicle"<sup>56</sup> and the Super String was launched

29 BRITISH AND FOREIGN STATE PAPERS 1840-1841, at 1138 (1857).

<sup>51</sup> Outer Space Treaty, *supra*, note 86, at art. VII.

<sup>52</sup> Liability Convention, *supra*, note 72, at art. II.

<sup>53</sup> *Trail Smelter Case*, *supra*, note 84, at 1911.

<sup>54</sup> UN General Assembly Resolution 2996, 14 Dec. 1972; UN General Assembly Resolution 2995, 15 Dec. 1972.

<sup>55</sup> Liability Convention, *supra*, note 72, at art. II.

<sup>56</sup> *Id.*, at art. I(d).

with Alpha Station.<sup>57</sup> Thus, since Deltastan launched the Super Strings,<sup>58</sup> Deltastan is liable for the damage they caused.

## 2. The Super Strings directly caused the damage in Gammaland.

A launching State is absolutely liable, under the Liability Convention, for any damage it has caused “even in the presence of force majeure.”<sup>59</sup> Absolute liability for ultra-hazardous or abnormally dangerous activities is well settled, finding its source in the historic English case *Rylands v. Fletcher*.<sup>60</sup> Even though the situation here deals with cutting-edge space technology, the instruction of the court in *Rylands* applies.<sup>61</sup> This is because outer space activities are abnormally dangerous, carrying the possibility for wide-spread damage to Earth. In *Rylands* the defendants had built a faulty water reservoir on top of an old mine shaft.<sup>62</sup> The reservoir collapsed and flooded the old mine shaft, which in turn sent water into a neighboring mine shaft.<sup>63</sup> The court held that the damage to the neighboring mine shaft was the “natural consequence” of the water reservoir collapse.<sup>64</sup> The court held the defendants strictly liable for the damage

because a water reservoir was abnormally dangerous.<sup>65</sup>

The situation here is similar to *Rylands* because the Space Elevator is an abnormally dangerous and, when it disintegrated, it caused both environmental and health damage on Earth – primarily in Gammaland.<sup>66</sup> Additionally, the damage was the “natural consequence” here because but for Deltastan building the Super Strings the damage would not have occurred.

## 3. Deltastan should not be exonerated because it does not have clean hands.

The doctrine of clean hands is “a principle of equity and judicial procedure, recognized in all legal systems, by which he who seeks the assistance of a court must come to the court with clean hands.”<sup>67</sup> Concisely expressed the maxim is “he who seeks equity must do equity.”<sup>68</sup>

This doctrine is specifically applicable to this case through the Liability Convention:

No exoneration whatever shall be granted in cases where the damage has resulted from activities conducted by a launching State which are not in conformity with the international law including, in particular, the Charter of the United Nations and the Treaty of Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.<sup>69</sup>

This Court has applied the doctrine of clean hands several times. In the Case Concerning Military and Paramilitary Activities, this Court held that as the first State to intervene with the use force in another State’s affairs, Nicaragua was “prima facie, the aggressor.”<sup>70</sup>

<sup>57</sup> *Compromis* at ¶ 3.

<sup>58</sup> *Compromis* at ¶ 32.

<sup>59</sup> Michael J. Listner, *The Ownership and Exploitation of Outer Space: A Look at Foundational Law and Future Legal Challenges to Current Claims*, 1 REGENT J. INT’L L. 75, 83 (2003) (citing I.H. PH. Diederiks-Verschoor, AN INTRODUCTION TO SPACE LAW 1, 39 (Kluwer L. Int’l, 2d. ed. 1999)).

<sup>60</sup> See generally *Rylands v. Fletcher*, L.R. 3 H.L. 330 (1868).

<sup>61</sup> Jay H. Ginsburg, *The High Frontier: Tort Claims and Liability for Damages Caused by Man-Made Space Objects*, 12 SUFFOLK TRANSNAT’L L. J. 515, 553 (1989) (While liability for outer space activities is a “futuristic medium,” absolute liability for ultrahazardous or abnormally dangerous activities applies under *Rylands*).

<sup>62</sup> *Id.*

<sup>63</sup> *Id.*

<sup>64</sup> *Id.*

<sup>65</sup> *Id.*

<sup>66</sup> *Compromis* at ¶¶ 24-25.

<sup>67</sup> Case Concerning Legality of Use of Force (*Yugoslavia v. Belgium*), 1999 I.C.J. 124 (June 2, 1999).

<sup>68</sup> *Id.* at 184.

<sup>69</sup> Liability Convention, *supra*, note 72, at art. VI(2).

<sup>70</sup> Case Concerning Military and Paramilitary Activities in and against Nicaragua

As the aggressor, Nicaragua did not have clean hands.<sup>71</sup> Accordingly, “[j]udgment in its favour is thus unwarranted, and would be unwarranted even if it should be concluded - as it should not be - that the responsive actions of the United States were unnecessary or disproportionate.”<sup>72</sup>

Like Nicaragua, Deltastan has not come before this Court with clean hands. As a State Party to the Registration Convention, Deltastan is bound by Article II(1), requiring that “[w]hen a space object is launched into Earth orbit or beyond, the launching State shall register the space object.”<sup>73</sup> Here, “[n]either Drachen Station nor any other part of the Space Elevator was registered by Deltastan in accordance with the Registration Convention.”<sup>74</sup> The purpose of requiring states to register their space objects is to facilitate the operation of the other space treaties.<sup>75</sup> Allowing Deltastan to avoid its obligation to register runs counter to the purpose of the Registration Convention.

## II. GAMMALAND IS NOT LIABLE FOR DAMAGES TO SPACE ELEVATOR.

Gammaland is not responsible for the damages sustained by Space Elevator because Gammaland did not act illegally and Gammaland did not knowingly place Deltastan’s property in danger of harm by launching Inspector and covertly observing Space Elevator. International law imposes liability for damages to a State’s property or territory caused by another State’s actions.<sup>76</sup> Customary international law obliges States to take responsibility for “any human activity

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(Nicaragua v. United States of America), 1986 I.C.J. 14, 271-72 (June 27, 1986).

<sup>71</sup> *Id.*

<sup>72</sup> *Id.* See also Case Concerning Legality of Use of Force, *supra*, note 138 (“A[n]y violation of [good faith] would immediately destroy the basis of any order the Court may make.”).

<sup>73</sup> Registration Convention, *supra*, note 75, at art. II(1).

<sup>74</sup> *Compromis* at ¶ 33.

<sup>75</sup> Registration Convention, *supra*, note 75, at *preamble*.

<sup>76</sup> Sucharitkul, *supra*, note 82, at 828.

within the territory or control of one state that gives rise or may give rise to loss or injury (‘harm’) to persons or things within the territory or control of another state.”<sup>77</sup>

Where a State’s conduct is contrary to international law, that State is bound by custom to pay damages to the aggrieved State.<sup>78</sup> Liability can be imposed even where the activities are lawful because of the affirmative duty to protect other States from damage.<sup>79</sup>

The international space treaties impose further potential liability on launching States. Gammaland and Deltastan have signed and ratified the Outer Space Treaty and the Liability Convention,<sup>80</sup> and are bound to uphold the duties assigned in those treaties in good faith.<sup>81</sup> The Outer Space Treaty imposes a general duty to act in accordance with international law and in the interest of maintaining peace and security and promoting international cooperation and understanding.<sup>82</sup> The Liability Convention imposes a duty to avoid causing damage to

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<sup>77</sup> Schematic outline, § 1, art. 1, Third Report on International Liability for Injurious Consequences Arising out of Acts Not Prohibited by International Law, U.N. Doc. A/CN.4/360 and Corr. 1 (1982) (*quoted in* Daniel Barstow Magraw, *Transboundary Harm: the International Law Commission’s Study of “International Liability,”* 80 AM. J. INT’L L. 305, 310 (1986)).

<sup>78</sup> Bin Cheng, *The Commercial Development of Space: the Need for New Treaties*, 19 J. Space L. 17, 19 (1991); General Assembly Resolution 1472.

<sup>79</sup> *Trial Smelter Case*, *supra*, note 84, at 1965-66; Joni S. Charme, *Transnational Injury and Ultra-Hazardous Activity: an Emerging Norm of International Strict Liability*, 4 J.L. TECH. 75 (1989); *Corfu Channel Case*, *supra*, note 83, at 22 (imposing fault liability for legal activities and strict liability for illegal activities).

<sup>80</sup> *Compromis* at ¶ 41.

<sup>81</sup> UN Charter, *supra*, note 101, at art. II, § 2; see also Vienna Convention on the Law of Treaties, art. 26; *Case Concerning the Temple of Preah Vihear*, *supra*, note 102, at 58-59.

<sup>82</sup> Outer Space Treaty, *supra*, note 86, at art. III.

other space objects and Earth and to compensate a State if damages occur.<sup>83</sup> Because Gammaland was not at fault in the accident that damaged Space Elevator, it is not liable for those damages.<sup>84</sup>

**A. Space Elevator, the super strings, Inspector Satellite, inspector's propulsion molecules, and drachen station are space objects and thus covered by the Outer Space Treaty and the Liability Convention.**

The space treaties deal with space objects and the duties assumed by launching States. While none of the space treaties specifically defines the term *space object*,<sup>85</sup> the general consensus is that a space object is any object, and component thereof, launched by man that is intended to move in space and is sustained in space by means other than the reaction of air, such as a space ship or space station, satellite, or launching method.<sup>86</sup> Space Elevator is a space object, even though Deltastan did not register it in accordance with the Registration Convention.<sup>87</sup> Space Elevator consists of a space station and the

<sup>83</sup> Liability Convention, *supra*, note 72, at arts. II & III.

<sup>84</sup> *Compromis* at ¶ 22.

<sup>85</sup> See Marc S. Firestone, *Problems in the Resolution of Disputes Concerning Damage Caused in Outer Space*, 59 TUL. L. REV. 747, 759 (1985); Foster, *The Convention on International Liability For Damage Caused by Space Objects*, 10 CAN. Y.B. INT'L L. 137, 144-45, 165 (1972).

<sup>86</sup> This general consensus definition is culled from definitions of the United States, Belgium, India, and Germany. See Senate Comm. On Foreign Relations, Convention on International Liability for Damage Caused by Space Objects, S. Exec. Rep. No. 92-38, 92d Cong., 2d Sess. 9 (1972) (quoted in Carl Q. Christol, *International Liability for Damage Caused by Space Objects*, 74 AM. J. INT'L L. 346, 349 n.10 (1980)); U.N. Doc. A/AC.105/C.2/L.7; U.N. Doc. A/AC.105/C.2/L.32; Questionnaire on Possible Legal Issues with Regard to Aerospace Objects: Replies from member States, U.N. Doc. A/AC.105/635, 3 (1996).

<sup>87</sup> *Compromis* at ¶ 34.

means for launching different objects into space.<sup>88</sup> Importantly, Space Elevator was developed to "anchor[] [a space station] to the earth's surface."<sup>89</sup> Thus, Space Elevator, and its component Super Strings, are space objects. Inspector, as a satellite, and Drachen, as a space station, clearly fall under the consensus definition of a space object.<sup>90</sup> Furthermore, Inspector's propulsion molecules are components of the satellite's means of sustaining itself in outer space, and thus also space objects. Because the damaged objects and the damaging objects are all considered space objects, all damages caused by these space objects are covered by the Outer Space Treaty and the Liability Convention.

**B. The damages to Space Elevator are damages under the Liability Convention and were sustained in outer space.**

The damages sustained by Space Elevator are subsumed within the Liability Convention's definition of damage: "loss of or damage to property of States or of persons, natural or juridical..."<sup>91</sup> Inspector was under Gammaland's control during the incident,<sup>92</sup> either as a government project or a national project<sup>93</sup> because the Outer Space Treaty directs that a launching State "shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body."<sup>94</sup> Furthermore, all signatories to the Outer Space Treaty are responsible for "national activities in outer space ... whether such activities are carried on by governmental agencies or by non-governmental entities...."<sup>95</sup> Thus, Space Elevator is covered by the Outer Space Treaty and the Liability Convention. As determined by the

<sup>88</sup> *Compromis* at ¶ 1, 6.

<sup>89</sup> *Compromis* at ¶ 1.

<sup>90</sup> See note 157.

<sup>91</sup> Liability Convention, *supra*, note 72, at art. (I)(a).

<sup>92</sup> *Compromis* at ¶ 19.

<sup>93</sup> *Compromis* at ¶ 9.

<sup>94</sup> Outer Space Treaty, *supra*, note 86, at art. VIII.

<sup>95</sup> *Id.* at art. VI.

Commission, Space Elevator was damaged in outer space.<sup>96</sup>

**C. Gammaland is not liable under the Outer Space Treaty or the Liability Convention for any damages to Space Elevator because it was not at fault in the accident.**

The Commission determined that upon maneuvering away from Space Elevator, Inspector's propulsion molecules collided with the Super String and caused the decomposition of the Super Strings, which Drachen perceived as an attack on Space Elevator.<sup>97</sup> The Commission unanimously determined that Inspector had caused the cascade failure, but found **nothing** to indicate that Gammaland was *at fault* in the accident.<sup>98</sup>

The Outer Space Treaty imposes liability on launching States for damage caused to "another State Party to the Treaty or to its natural or juridical persons by [the launching State's space] object or its component parts on the Earth, in air or in outer space..."<sup>99</sup> Similarly, the Liability Convention imposes liability on a launching State for damage caused by its space object "elsewhere than on the surface of the earth to a space object of one launching State ... by a space object of another launching State."<sup>100</sup> The Liability Convention established a two-tier system of liability: absolute for all damage caused on Earth; and fault for all damage caused in space.<sup>101</sup>

Even though the Commission found that Inspector's propulsion molecules caused the decomposition of the Super Strings,<sup>102</sup> Gammaland was **not at fault** in the accident. Fault determination is necessary to assess liability for damages caused in space.<sup>103</sup> The

<sup>96</sup> *Compromis* at ¶¶ 22, 27.

<sup>97</sup> *Compromis* at ¶ 27.

<sup>98</sup> *Compromis* at ¶ 27.

<sup>99</sup> Outer Space Treaty, *supra*, note 86, at art. VII.

<sup>100</sup> *Id.* at art. III.

<sup>101</sup> *Id.* at arts. II, III.

<sup>102</sup> *Compromis* at ¶ 27.

<sup>103</sup> Liability Convention, *supra*, note 72, at art. III.

Commission was charged with investigating and determining the cause of the destruction of the Space Elevator,<sup>104</sup> but not with assigning fault in the accident. The Commission found that "the most likely failure of the Super Strings that initiated the incident was a decomposition of the carbon nanotubes and the decomposition of ribbon adhesive ... caused by the propulsion exhaust of the Inspector spacecraft."<sup>105</sup> Gammaland does not dispute the findings of the Commission, but disputes the use of the Commission's determination of *causation* as a determination of *fault*.

Under the Principles of Remote Sensing, Gammaland has the right to collect information about Earth using its own satellites, without interference.<sup>106</sup> Logically extending from this right is the right to sense other space objects, in order to determine what the objects are and what harm these objects may pose. Thus Gammaland has the right to sense the Earth *and* other space objects. Furthermore, because outer space is *res communis*, or common territory unable to be claimed by a State,<sup>107</sup> Deltastan does not have the right to prevent other States from passing close to Space Elevator. The Outer Space Treaty established that "Outer space...is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."<sup>108</sup> Deltastan did not have the right to establish a defensive zone in space<sup>109</sup> nor to demand Inspector to move<sup>110</sup> because space is *res comunis*.

<sup>104</sup> *Compromis* at ¶ 26.

<sup>105</sup> *Compromis* at ¶ 27 (emphasis added).

<sup>106</sup> Principles Relating to Remote Sensing of the Earth from Outer Space, Principle 1, cl. 1, G.A. Res. 41/65, U.N. Doc. A/RES/41/65 (1986).

<sup>107</sup> Carl Q. Christol and Arvid Pardo, *The Common Interest: Tension Between the Whole and the Parts*, in R. St. J. MacDonald and D.M. Johnson, eds., *THE STRUCTURE AND PROCESS OF INTERNATIONAL LAW* 643-60 (1983).

<sup>108</sup> Outer Space Treaty, *supra*, note 86, at art.

II.

<sup>109</sup> *Compromis* at ¶ 35.

<sup>110</sup> *Compromis* at ¶ 19.

Deltastan cannot own a certain orbit or place in outer space because of these same principles: outer space is not *res nullius*, but *res communis*.<sup>111</sup> In fact, the Moon has been specifically recognized as *res communis humanitatis*,<sup>112</sup> which goes further than the concept of *res communis* by requiring “a sharing of the benefits and of the values derived from” space.<sup>113</sup> Gammaland is not arguing here that space should be considered *res communis humanitatis*, but reiterates that under *res communis*, space cannot be appropriated for exclusive use by any State. Because the area surrounding Space Elevator was not the territory of Deltastan, Gammaland was under no duty to avoid maneuvering close to Space Elevator.

Gammaland is not at fault in the Space Elevator accident because Gammaland was not negligent in navigating its satellites in space, nor in testing its new propulsion system before launching Inspector. Gammaland was under no specific duty to not maneuver its satellites in close proximity to Space Elevator, nor to consider the potential collisions between Inspector’s exhaust particles and the new Space Elevator technology when it acquiesced to Deltastan’s demand that Inspector be moved to a certain distance from Space Elevator.

Deltastan knew that particles from Inspector’s propulsion system might impact the Super Strings<sup>114</sup> and still demanded that Inspector be moved quickly away from Space Elevator.<sup>115</sup> In fact, Deltastan monitored the propulsion exhaust and detected the new propulsion system.<sup>116</sup> Deltastan assumed the risk that the molecules colliding with the Super Strings might damage the carbon nanotubes when Deltastan demanded that Gammaland

remove Inspector.<sup>117</sup> Gammaland had no affirmative duty, nor did it fail to act, to prevent the collision of exhaust molecules with the Super Strings, when it acquiesced to Deltastan’s demand for removal.

The Commission found that Inspector’s propulsion system “left a highly reactive stream of molecules in orbit whenever Inspector was maneuvered,”<sup>118</sup> but *did not find* that Gammaland was negligent in performing its duty to test the safety of the propulsion system before launching the satellite. Because the *Compromis* does not indicate that Gammaland did not sufficiently test the propulsion system, as required by the Outer Space Treaty and as suggested by the Nuclear Power Principles, Gammaland was not negligent in performing its duty to maintain the peace and security of outer space.<sup>119</sup>

1. Gammaland was not negligent in performing its duty to maintain the peace and security of outer space.

The Outer Space Treaty states that “States Parties to the Treaty shall carry on activities in the exploration and use of outer space . . . in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.”<sup>120</sup> The Nuclear Power Principles provide guidance for States developing not only nuclear-powered space objects, but any new and untested power system. The Nuclear Power Principles require “thorough safety assessment, including probabilistic risk analysis, with particular emphasis on reducing the risk of accidental exposure of the public to harmful

<sup>111</sup> *Christol, supra*, note 178.

<sup>112</sup> Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Article XI, Dec. 18, 1979, U.N. GAOR, 34th Sess., Supp. No. 46, U.N. Doc. A/34/46 (1980), 18 I.L.M. 1434.

<sup>113</sup> *Christol, supra*, note 178.

<sup>114</sup> *Compromis* at ¶ 36.

<sup>115</sup> *Compromis* at ¶ 19.

<sup>116</sup> *Compromis* at ¶ 19.

<sup>117</sup> See argument, *infra*, § II(C)(2).

<sup>118</sup> *Compromis* at ¶ 27.

<sup>119</sup> Outer Space Treaty, *supra*, note 86, at art. III; Principles Relevant to the Use of Nuclear Power Sources in Outer Space, G.A. Res. 68, U.N. Doc. A/RES/47/68 (1986), 32 I.L.M. 921 (1993) (hereinafter Nuclear Power Principles).

<sup>120</sup> Outer Space Treaty, *supra*, note 86, at art. III.



radiation or radioactive material.”<sup>121</sup> The Nuclear Power Principles establish guidelines and criteria for safe use that include specific regulations for the use of nuclear-powered reactors and the requirement of designing “foreseeable operational or accidental circumstances” to a “high degree of confidence” that the hazards will remain below the applicable “acceptable” levels.<sup>122</sup> Moreover, a launching state is responsible to “ensure that a thorough and comprehensive safety assessment is conducted” before the object is launched.<sup>123</sup> “This assessment shall cover as well all relevant phases of the mission and shall deal with all systems involved, including the means of launching, the space platform, the nuclear power source and its equipment and the means of control and communication between ground and space.”<sup>124</sup> According to these principles, Gammaland was responsible for conducting a comprehensive safety assessment of Inspector’s power source before launching the satellite. There is no evidence that Gammaland did not conduct such a safety assessment.

## 2. Deltastan was negligent in performing its duty to maintain the peace and security of outer space.

General principles of scientific responsibility further indicate that Deltastan, not Gammaland, was negligent in testing its new technology before launching into space. Carbon nanotube technology, while strong, is fragile in two areas: connection between the nanotubes and the nanotube lattice.<sup>125</sup> The Commission’s “[l]aboratory analysis demonstrated that the propellant had a corrosive effect on both the nanotube carbon

lattice and the adhesive quality of the material that was used to connect the nanotube fibers.”<sup>126</sup> Inspector’s propellant exhaust exposed and exploited both weaknesses in the carbon nanotechnology: lattice and adhesion.<sup>127</sup> Deltastan was responsible to research the effects of space objects, including small particles, that might collide with the Super Strings. Their failure was a blatant disregard for the safety of space and Earth.

**D. Even if Gammaland was at fault in the damage to Space Elevator, Gammaland should be exonerated from liability here because Deltastan was grossly negligent and did not comply with international law.**

The Liability Convention provides for exoneration from absolute liability, but not from fault liability.<sup>128</sup> Exoneration from absolute liability is available when the launching State establishes two conditions: (1) the damage resulted “either wholly or partially from gross negligence or from an act or omission done with intent to cause damage on the part of a claimant State or of natural or juridical persons it represents;”<sup>129</sup> and (2) the damage must not have resulted from “activities conducted by a launching State which are not in conformity with international law including, in particular, the Charter of the United Nations and the [Outer Space] Treaty.”<sup>130</sup> Here, while Gammaland would not be absolutely liable for the damage to Space Elevator, because the damage to Space Elevator occurred in outer space, comparison to the principle of absolute liability exoneration indicates that Gammaland should be exonerated from fault liability.

First, Deltastan was at least negligent in the development and testing of Space Elevator, because it failed to plan for collisions with small space objects. Potential collisions are the largest problem facing space elevator-

<sup>121</sup> Nuclear Power Principles, *supra*, note 190, at *preamble*.

<sup>122</sup> *Id.* at principle 3(1)(a).

<sup>123</sup> *Id.* at principle 4(1).

<sup>124</sup> *Id.*

<sup>125</sup> R.E. Smalley and K. Smith, *Buckytubes and their Future*, unpublished presentation, Advanced Space Infrastructure Workshop on Geostationary Orbiting Tether “Space Elevator” Concepts, NASA Marshall Space Flight Center, June 8-10, 1999.

<sup>126</sup> *Compromis* at ¶ 27.

<sup>127</sup> *Compromis* at ¶ 27.

<sup>128</sup> Liability Convention, *supra*, note 72, at art. VI.

<sup>129</sup> *Id.* at cl. 1.

<sup>130</sup> *Id.* at cl. 2.

type technologies.<sup>131</sup> Large space objects are easy to avoid because they can be tracked from Earth.<sup>132</sup> Smaller objects are more difficult to track; in fact, particles smaller than 10 cm cannot currently be tracked from Earth.<sup>133</sup> Collisions with large or small particles in space could cause significant damage to a space elevator-type technology.<sup>134</sup> Thus, collision avoidance is a requirement for a functional space elevator.<sup>135</sup> There is no evidence on the record, nor did the Commission find, that Deltastan attempted to avoid the exhaust molecules, to prevent their collision with the Super Strings, or to otherwise protect the Super Strings, when Deltastan *knew* that the molecules would collide with the Super Strings.<sup>136</sup> Deltastan obviously invested considerable time, effort, and funds to develop, construct, and maintain Space Elevator; serious assessment and planning for all potential safety risks, including collisions with very small space objects, would have been part of this process.<sup>137</sup> Deltastan assumed the risk of potential deleterious collisions between Space Elevator and small space objects, including newly developed technologies, by constructing and launching Space Elevator. Second, Deltastan did not comply with international law, particularly the Outer Space Treaty and the Registration Treaty. Deltastan failed in its duty to maintain the security and peace of space<sup>138</sup> and did not register Drachen or any component of Space Elevator.<sup>139</sup> Furthermore, there is no evidence that Deltastan consulted with the international community on the new carbon nanotube technology to determine if it was able to resist impacts with all sizes and

<sup>131</sup> D.V. Smitherman, Jr., *Space Elevators: an Advanced Earth-Space Infrastructure for the New Millennium*, NASA/CP-2000-210429, at 25-33 (2000).

<sup>132</sup> *Id.*

<sup>133</sup> *Id.*

<sup>134</sup> *Id.*

<sup>135</sup> *Id.*

<sup>136</sup> *Compromis* at ¶ 36.

<sup>137</sup> Smitherman, *supra*, note 202, at 25-33.

<sup>138</sup> See argument, *supra*, § II(D).

<sup>139</sup> *Compromis* at ¶ 34.

species of space objects. Article IX of the Outer Space Treaty imposes the affirmative duty on launching States to “conduct all their activities in outer space . . . with due regard to the corresponding interests of all other States Parties to the Treaty.”<sup>140</sup> This duty encompasses “appropriate international consultations before proceeding with any . . . activity or experiment” that might potentially cause “harmful interference with activities of other States Parties in the peaceful exploration and use of outer space.”<sup>141</sup> When building and constructing Space Elevator, Deltastan needed to consult with other space-faring States, who all had interests in outer space.

### III. GAMMALAND IS NOT LIABLE TO DELTASTAN FOR ENVIRONMENTAL DAMAGE TO DELTASTAN'S FISHERIES.

Deltastan's fisheries were harmed when the Super Strings fell from space.<sup>142</sup> Harm that occurs on Earth as a result of action or incidents in space is the responsibility of the State that controls and/or launches the space object that directly caused the damage.<sup>143, 144</sup> Gammaland is not liable to Deltastan for environmental damage to Deltastan's fisheries caused directly by the falling Super

<sup>140</sup> Outer Space Treaty, *supra*, note 86, at art. IX.

<sup>141</sup> *Id.*

<sup>142</sup> *Compromis* at ¶¶ 24, 25.

<sup>143</sup> Liability Convention, *supra*, note 72, at art. II.

<sup>144</sup> The Soviet satellite Cosmos 954 crash-landed in Canada. Canada spent CD 14 million in clean-up efforts, and the United States USD 2-2.5 million. Canada only billed the U.S.S.R. for CD 6 million of its expenses (and none of the American expenses), and settled with the U.S.S.R. for CD 3 million. Clearly, environmental damage is not subject to the same absolute liability as damage to another State's property on the Earth. Alexander F. Cohen, *Cosmos 954 and the International Law of Satellite Accidents*, 10 YALE J. INT'L L. 78 (1984) (*reprinted in* Glenn H. Reynolds & Robert P. Merges, *OUTER SPACE: PROBLEMS OF LAW AND POLICY* (1989)).

Strings because the Super Strings were not Gammaland's space objects.

**A. Gammaland would be absolutely liable for damage caused by its space object to another State's property on the Earth's surface.**

The Liability Convention imposes absolute liability, in the form of compensatory damages, for "damage caused by [a launching State's] space object on the surface of the Earth,"<sup>145</sup> where damage is defined as "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical...."<sup>146</sup> The absolute liability for damage to property on the Earth also stems from international customary law.<sup>147</sup>

**B. International law provides for compensation for a portion of environmental damages sustained by States.**

The Liability Convention extends liability to environmental damages sustained by States. Environmental damage is a type of covered damage – damage to real property. Customary international law also dictates that environmental damage caused by one State to a second State must be compensated, as evidenced by the 1978 Cosmos 954 incident. The Cosmos 954 damages settlement between Canada and the U.S.S.R. recognized the principle that even though "no physical or property damage had been suffered by Canadian citizens,"<sup>148</sup> the U.S.S.R. was responsible for environmental damage and clean-up costs when the nuclear-powered satellite Cosmos 954 crashed on Canadian soil.<sup>149</sup> This settlement reconfirmed the existence in international law, both

customary and treaty, of liability for particularly dangerous kinds of environmental damage, such as nuclear fallout.<sup>150</sup> Further, it also established that a State in whose territory a dangerous space object lands is responsible for some of the clean-up costs.<sup>151</sup>

**C. Even if Gammaland proximately caused the damage to Deltastan's fisheries, Gammaland is not absolutely liable to Deltastan for these damages.**

The Commission determined that the cause of the destruction of the Super Strings, and thereby the proximate cause of their re-entry into the Earth's atmosphere, was "the propulsion exhaust of the Inspector spacecraft."<sup>152</sup> Even though the decomposed particles of Super String, falling to Earth, polluted the waters of Deltastan, and caused the environmental damage to the fisheries,<sup>153</sup> Gammaland is not absolutely liable for this damage. The Liability Convention requires direct, not proximate, causation. The Super Strings, the direct cause of the damage to Deltastan's fisheries, were not Gammaland's space objects: they were owned and controlled by Deltastan. In addition, the Super Strings were not particularly dangerous, in contrast to the nuclear-powered Cosmos 954 satellite. Finally, Deltastan is attempting to impose the entire liability for the damage to the fisheries on Gammaland and taking no responsibility itself, which is contrary to the principle established by the Cosmos 954 settlement agreement: costs for environmental damages are shared between States.<sup>154</sup>

**D. If Gammaland is partially liable for the damage to Deltastan's fisheries,**

<sup>145</sup> Liability Convention, *supra*, note 72, at art. II.

<sup>146</sup> *Id.* at art. I, cl. a.

<sup>147</sup> Cheng, *supra*, note 149, at 19.

<sup>148</sup> Peter P.C. Haanappel, *Some Observations on the Crash of Cosmos 954*, 6 J. SPACE L. 147, 148 (1978).

<sup>149</sup> Cohen, *supra*, note 215.

<sup>150</sup> General Assembly Resolution 2996, 14 Dec. 1972; General Assembly Resolution 2995, 15 Dec. 1972.

<sup>151</sup> See Haanappel, *supra*, note 219; Cohen, *supra*, note 215.

<sup>152</sup> *Compromis* at ¶ 27 (emphasis added).

<sup>153</sup> *Compromis* at ¶ 24.

<sup>154</sup> Cohen, *supra*, note 215 (Canada, the damaged State, assumed 3/4 of the cost of clean-up).

**Gammaland should be exonerated from this liability because Deltastan contributed to the damage through gross negligence and because Deltastan did not conform to international law.**

The Liability Convention provides that exoneration is available from absolute liability, when the launching State proves two conditions,<sup>155</sup> *supra*.<sup>156</sup> Here, the damage to Deltastan's fisheries resulted partially from the failure of Deltastan to plan for Super String that might fall to Earth, for whatever reason, in pieces large enough to withstand re-entry. Deltastan placed at least twenty-three thousand miles of Super String in space, which fell to Earth after the cascade failure of the Strings.<sup>157</sup> Some "segments of Super String disintegrated into various lengths of nano-fiber and floated to the earth" intact.<sup>158</sup> That some segments fell intact onto the earth, both land and water, demonstrates that Deltastan was negligent in its emergency safety planning.

Moreover, Deltastan did not conform to international treaty law. First, Deltastan positioned and maneuvered Space Elevator without consultations with other space-faring States and did not register any portion of Space Elevator, violating the Registration Convention.<sup>159</sup> Second, Deltastan undertook potentially dangerous activities without consulting other States that might be adversely affected by its actions or projects, violating the Outer Space Treaty.<sup>160</sup> Finally, Deltastan placed a dangerous weapons array in space, in contravention of the Outer Space Treaty's admonition to "maintain[] international peace and security and promot[e] international co-operation and

<sup>155</sup> Liability Convention, *supra*, note 72, at art. VI.

<sup>156</sup> See argument, *supra*, at § II(d).

<sup>157</sup> *Compromis* at ¶ 24.

<sup>158</sup> *Compromis* at ¶ 24.

<sup>159</sup> *Compromis* at ¶ 33. Registration requires the entry of a single orbit that the space object will be found in, which is important for other States wishing to launch new space objects.

<sup>160</sup> Outer Space Treaty, *supra*, note 86, at art. IX.

understanding."<sup>161</sup> We encourage the Court to take note of these violations.

#### **IV. GAMMALAND IS NOT LIABLE TO DELTASTAN FOR DAMAGE TO THE DRACHEN SPACECRAFT AND NEED NOT RETURN DRACHEN TO DELTASTAN.**

Gammaland is not liable to Deltastan for damages to the Drachen spacecraft because there is no evidence that Gammaland caused any damage to Drachen in outer space. Furthermore, because Drachen doubled as a laser weapons array, Gammaland was permitted to seize and examine Drachen. Any damage sustained by Drachen after it landed illegally in Gammaland is not covered by the space treaties and Gammaland is not liable for this damage. Moreover, Gammaland is not required to return Drachen to Deltastan under the Rescue Agreement.

##### **A. Gammaland is not liable for damages to Drachen.**

Drachen is a space object<sup>162</sup> that Deltastan launched into space.<sup>163</sup> Gammaland, through its Inspector satellite, caused components of Space Elevator, of which Drachen was part, to fail, which Drachen interpreted as an attack.<sup>164</sup> Drachen then destroyed Gammaland's satellites and reduced itself into a crew return vehicle.<sup>165</sup> Drachen was unable to land in friendly territory and instead was forced to land in Gammaland territory.<sup>166</sup> Upon this illegal landing, Gammaland seized and disassembled Drachen.<sup>167</sup> Gammaland is not liable for the damage to Drachen once Drachen landed in Gammaland's territory nor is it liable for Drachen's malfunctioning in space that prevented Drachen from completing its reentry successfully.

<sup>161</sup> *Id.* at art. III.

<sup>162</sup> Drachen is a space object under the definitions, *supra*, note 159.

<sup>163</sup> *Compromis* at ¶ 9.

<sup>164</sup> *Compromis* at ¶ 27.

<sup>165</sup> *Compromis* at ¶¶ 21, 22.

<sup>166</sup> *Compromis* at ¶ 22.

<sup>167</sup> *Compromis* at ¶ 22.

### 1. Gammaland did not cause any damage to Drachen in outer space.

After Drachen destroyed Gammaland's satellites and reduced itself into a crew return vehicle,<sup>168</sup> Drachen was unable to land in friendly territory.<sup>169</sup> The Commission did not find that Drachen's malfunctioning in space was a result, direct or otherwise, of Gammaland's Inspector satellite.<sup>170</sup> Only the damage to Space Elevator was attributed to Inspector.<sup>171</sup> Any damage that occurred to Drachen while in space, causing the malfunction, was not caused by Gammaland. A malfunction not attributed to Gammaland cannot be said to have been caused by Gammaland; thus Gammaland is not liable for damages that Drachen sustained in space. In fact, the *Compromis* notes that Deltastan had been experiencing operational failures with Drachen and Space Elevator before the cascade failure of the Super Strings.

### 2. Damage to Drachen on Earth is not covered by the Liability Convention.

When Drachen was forced to land in Gammaland's territory and "immediately seized by the armed forces of Gammaland,"<sup>172</sup> damage to Drachen was no longer covered by the Liability Convention. The Liability Convention provides for "absolute liabl[ility] to pay compensation for damage caused by its space object on the surface of the earth . . ."<sup>173</sup> Because Drachen was not grounded due to some action or inaction on Gammaland's part, but rather because of an internal malfunction, damage sustained by Drachen when it was "systematic[ly] disassembl[ed] and analy[zed]"<sup>174</sup> was not damage "caused by [Gammaland's] space object."<sup>175</sup>

<sup>168</sup> *Compromis* at ¶¶ 21, 22.

<sup>169</sup> *Compromis* at ¶ 22.

<sup>170</sup> *Compromis* at ¶ 27.

<sup>171</sup> *Compromis* at ¶ 27.

<sup>172</sup> *Compromis* at ¶ 22.

<sup>173</sup> Liability Convention, *supra*, note 72, at art. II.

<sup>174</sup> *Compromis* at ¶ 22.

<sup>175</sup> Liability Convention, *supra*, note 72, at art. II.

Furthermore, Gammaland is not liable any damage sustained by Drachen after it landed in Gammaland's territory because Drachen housed an aggressive weapons system that attacked and destroyed Gammaland property and because Drachen landed illegally in Gammaland territory. Deltastan admits that Drachen was equipped with a laser weapons array that had missile interception capabilities.<sup>176</sup> Deltastan further admits that Drachen was sensing Inspector and collecting covert data.<sup>177</sup> When a State seizes another State's military or spy property, that State is not responsible for any damage done to the weapon or observation system to determine how it works, if it is dangerous, or the origin of the parts.<sup>178</sup> Drachen falls under these definitions: it was both a weapons system and a covert observation system. Therefore, Gammaland is not liable for any damage sustained to Drachen after it landed in Gammaland territory.

### **B. Gammaland is not required to return Drachen to Deltastan.**

Drachen is a space object under the meaning of Rescue Agreement,<sup>179</sup> but Gammaland is under no obligation to return Drachen because military installations that have been used against a State are not required to be returned to the owner-State.<sup>180</sup> The Rescue Agreement does not trump principles of customary international law; instead, it incorporates these principles. Drachen, as a military installation, falls within the Hague Convention definition of "machine of war"

<sup>176</sup> *Compromis* at ¶ 8.

<sup>177</sup> *Compromis* at ¶¶ 12, 13, 18, 19.

<sup>178</sup> The Hague Regulations of 1907, 18 Oct. 1907, 1 Bevans 631, art. 53.

<sup>179</sup> The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, art. 5, cl. 3, 19 U.S.T. 7570, U.N. Doc A/6716 [hereinafter Rescue Agreement].

<sup>180</sup> The Hague Regulations of 1907, *supra*, note 249, at art. 53 (a State may seize "all moveable property belonging to [another] State that may be used for military operations.").

and Gammaland is within its rights under the Hague Convention to hold Drachen.

### 1. The space treaties do not supersede international law.

None of the space treaties supersede international law or customary international law. To the contrary, the space treaties recite that these principles are incorporated into the treaties. Thus, the principles of customary international law, when in conflict with a space treaty, triumph. Here, the Rescue Agreement covers the return and rescue of astronauts and space objects.<sup>181</sup> “[O]bjects launched into outer space or their component parts” are considered space objects for the purpose of the Agreement.<sup>182</sup> If any of these objects are “found beyond the territorial limits of the launching [State, such objects] shall be returned to or held at the disposal of representatives of the launching [State]” if the launching State requests their return.<sup>183</sup> Indeed, Drachen and its component parts are space objects within the meaning the Rescue Agreement, because each component part was launched into space.<sup>184</sup> However, Gammaland is not responsible for returning Drachen after it landed illegally and was seized in Gammaland because principles of customary international law sanction such seizure.<sup>185</sup>

### 2. Deltastan cannot recover Drachen under the equitable Rescue Agreement because Deltastan has unclean hands.

Moreover, the principles of equity govern all international law. Comparing the Rescue Agreement with the Liability Convention, as these are the only space treaties to deal with liability, is useful in understanding the principles of equity therein. The Liability Convention prohibits recovery where a State

violates international law.<sup>186</sup> Thus, a State with unclean hands cannot recover against another State: an important interpretation concept.

Interpreting the Rescue Agreement according to the principles of clean hands, Deltastan clearly cannot recover Drachen. Here, Deltastan committed to register all space objects launched into space to assist other States in planning and launching,<sup>187</sup> yet Deltastan failed to register not only Drachen, but any part of Space Elevator and Space Elevator itself.<sup>188</sup> This failure is not merely technical: Deltastan failed to warn not only Gammaland, but every other space-faring State, of which orbit Space Elevator would inhabit in space, potentially causing space agencies worldwide much unneeded grief in planning space activities. Additionally, Deltastan pledged to preserve space for peaceful purposes,<sup>189</sup> yet Deltastan placed a weapons system in space.<sup>190</sup> Again, Gammaland is not arguing that Drachen’s weapons system was a weapon of mass destruction, but that it is nonetheless a dangerous weapon that destroyed Gammaland’s satellites.<sup>191</sup> Deltastan undertook the responsibility to maintain peace in outer space, but breached that peace by installing a weapons system in space and further breached that peace by attacking and destroying other space objects.<sup>192</sup> Thus, Deltastan violated its international commitments and duties and is not permitted under the Rescue Agreement to recover Drachen.

### 3. Under the principles of customary international law, Gammaland is not required to return Drachen and is justified in holding Drachen.

<sup>181</sup> Rescue Agreement, *supra*, note 250, at *preamble*.

<sup>182</sup> *Id.* at art. 5, cl. 3.

<sup>183</sup> *Id.*

<sup>184</sup> *Compromis* at ¶ 7.

<sup>185</sup> *Compromis* at ¶ 22.

<sup>186</sup> Liability Convention, *supra*, note 72, at art. VI.

<sup>187</sup> Registration Convention, *supra*, note 75, at art. II, cl. 1.

<sup>188</sup> *Compromis* at ¶ 33.

<sup>189</sup> Outer Space Treaty, *supra*, note 86, at art. III.

<sup>190</sup> *Compromis* at ¶ 8.

<sup>191</sup> *Compromis* at ¶ 21.

<sup>192</sup> *Compromis* at ¶ 21.

Customary international law, as found in the Hague Conventions, permits belligerent States to seize the property of another State that is used aggressively against it. Drachen is a military installation that crash-landed illegally in Gammaland's territory after destroying Gammaland's six satellites. Deltastan, in placing Drachen, a military station, in outer space, was not promoting the peaceful uses of outer space. The Outer Space Treaty confirms that outer space is to be maintained for peaceful purposes.<sup>193</sup> while military satellites are allowed in space,<sup>194</sup> to promote and guarantee peace on Earth and in space,<sup>195</sup> military installations that include weapons systems, and specifically "anti-ballistic missile systems and components," are not permitted.<sup>196</sup>

Drachen was a weapon of destructive power that did in fact destroy other space objects. Looking to the Outer Space Treaty's prohibition of weapons of mass destruction in orbit around Earth demonstrates that weapons, such as Drachen, were understood to be governed not by the space treaties, but by customary international law.<sup>197</sup> Weapons of mass destruction are prohibited from outer space for two reasons: their destructive power and potential for contamination and

<sup>193</sup> Outer Space Treaty, *supra*, note 86, at art. I.

<sup>194</sup> Douglas S. Anderson, *A Military Look Into Space: the Ultimate High Ground*, 1995-NOV ARMY LAW. at 19, 20 (discussing the long-accepted uses of outer space for military purposes).

<sup>195</sup> Robert A. Ramey, *Armed Conflict on the Final Frontier: the Law of War in Space*, 48 A.F. L. REV. 1, 155-56 (2000).

<sup>196</sup> *Id.* at 156. Many military uses of outer space are prohibited, including "Placement of military bases ... on celestial bodies and in orbits around them; Use of space weapons or tactics that are ... 'disproportionate' to the militarily necessary objective sought, or are incapable [of] 'distinguish[ing]' between legitimate and illegitimate targets; [and] Development, testing, and deployment of space-based or other anti-ballistic missile systems..." *Id.*

<sup>197</sup> Outer Space Treaty, *supra*, note 86, at art. IV.

States' fears of this power and potential.<sup>198</sup> Drachen's laser weapons system functioned as a "fully capable mid-course interceptor system for missile defense."<sup>199</sup> In fact, laser weapons systems are prohibited by the United Nations in certain situations.<sup>200</sup> Space objects that are destructive weapons systems and are used against a State fall within the scope of customary international law.

Customary international law permits a State that is in a state of armed conflict, particularly where a State has been attacked by another State, to seize "generally, all movable property belonging to the State which may be used for military purposes."<sup>201</sup> Such property, with a military purpose, is considered contraband and can be permanently seized from, and never returned to, the other State.<sup>202</sup> The Rescue Agreement does not abridge this Convention; therefore, because Drachen housed a military weapons system and was seized while Gammaland and Deltastan were in a state of armed conflict, Gammaland is not required to return Drachen.

## SUBMISSIONS TO THE COURT

For the foregoing reasons, the Government of Gammaland, Respondent respectfully requests the Court to adjudge and declare that:

1. Deltastan is liable for the destruction of the six Gammaland satellites.
2. Deltastan is absolutely liable for the cost of Gammaland clean-up and environmental damage to Gammaland.

<sup>198</sup> Ramey, *supra*, note 266, at 99-100.

<sup>199</sup> *Compromis* at ¶ 8.

<sup>200</sup> Protocol IV "Blinding Laser Weapons," First Review Conference for the 1980 United Nations Conventional Weapons Convention (October 1995). (*quoted in* LTC David M. Crane, et al., *Operational Law Handbook* 18-5 (1996)).

<sup>201</sup> The Hague Regulations of 1907, *supra*, note 249.

<sup>202</sup> *Id.*; *see also* Fourth Geneva Convention: Convention (IV) Relative to the Protection of Civilian Persons in Time of War, art. 53, 12 Aug. 1949, 75 U.N.T.S. 286.

3. Gammaland is NOT liable to Deltastan for damages to the Space Elevator.
4. Gammaland is NOT liable to Deltastan for environmental damage to Deltastan's fisheries.
5. Gammaland is NOT liable to Deltastan for damage to the Drachen spacecraft and need not return Drachen to Deltastan.