



The 2012 Manfred Lachs Space Law Moot Court Competition

Case Concerning On-Orbit Collision, Non-Cooperative Satellite Removal and Damages

Verona v Montague

Part A: Introduction

The City of Naples, Italy, hosted the 21st World Finals of the Manfred Lachs Space Law Moot Court Competition, in October 2012, in the framework of the IISL Colloquium on the Law of Outer Space. The 2012 Problem was titled *Case Concerning On-Orbit Collision, Non-Cooperative Satellite Removal and Damages (Verona v Montague)*, and was prepared by Mr. James Rendleman (USA).

This year, for the first time, the Africa Regional Round was added to the existing Asia-Pacific, European and North American Regional Rounds.

The World Finals in Naples were judged by Judges Xue Hanqin, Joan Donoghue and Leonid Skotnikov of the International Court of Justice. The World Finals took place at the Palazzo Du Mesnil of the Università degli Studi di Napoli 'L'Orientale' with excellent support by Prof. Giuseppe Cataldi and his staff.

The Institute is grateful to Prof. Dr. Elisabeth Back Impallomeni, Prof. Dr. Sergio Marchisio and Dr. Marco Ferrazzani for their invaluable assistance and support.

Sponsors

The following organizations kindly sponsored the World Finals:

- North American Finalist sponsor: Secure World Foundation.
- Asia Pacific Finalist sponsor: Japan Aerospace Exploration Agency (JAXA).
- European Finalist sponsor: European Centre for Space Law, ECSL/ESA.
- African Finalist sponsor: Aerospace Industry Support Initiative of the Department of Trade and Industry, South Africa.

The following organizations kindly provided support for the IISL Annual Awards Dinner:

- EADS North America
- ESA
- Space and Telecom Law, University of Nebraska-Lincoln
- Institute of Air and Space Law, McGill University.

Local Sponsors:

- Università degli Studi di Napoli ‘L’Orientale’.
- Università degli Studi di Napoli Federico II.
- National Research Council of Italy.

Book donations, design and printing:

- Eleven International Publishing.
 - Martinus Nijhoff Publishers.
 - South African Space Association.
- The IISL is most grateful to all these generous sponsors.

World Finals

Winner of World Finals / Lee Love Award:

National Law School of India University, Bangalore, India.
Mr. Viraj Parikh, Mr. Prem Ayyathurai and Ms. Vinodini Srinivasan.
Faculty Advisor: Dr. Sarasu E. Thomas.

Runner up:

National & Kapodistrian University of Athens, Greece.
Ms. Aikaterini Pitsoli, Ms. Melina-Asimina Stroungi, Ms. Stefania Vlachou.
Faculty Advisor: Dr. Georgios Kyriakopoulos.

Semi-finalists:

University Of California, Davis, California, USA.
Mr. James Beck and Mr. Tyler Layton.
Faculty Advisor: Prof. J. Angelo Desantis.

Obafemi Awolowo University, City Of Ile-Ife, Nigeria.
Ms. Olabisi Esther Adeogun, Mr. Iseoluwa Christopher Akintunde and
Ms. Maryann Onyinye Nwokolo.
Faculty Advisor: Dr. Odunola Akinwale Orifowomo.

Best memorials/ Eilene M. Galloway Award:

National Law School of India University, Bangalore (India).

Best oralist / Sterns and Tennen Award:

Mr. Viraj Parikh, National Law School of India University, Bangalore (India).

Judges for Finals

H.E. Judge Xue Hanqin, International Court of Justice.

H.E. Joan Donoghue, International Court of Justice.

H.E. Leonid Skotnikov, International Court of Justice.

Judges for Semi-Finals (Orals):

Dr. Setsuko Aoki (Japan).

Prof. Dr. Elisabeth Back Impallomeni (Italy).

Dr. Tare Brisibe (Nigeria).

Prof. Ram Jahku (Canada).

Mr. K.R. Sridhara Murthi (India).

Mr. James D. Rendleman (USA).

Judges for Semi-Finals (Memorials):

Dr. Gérardine Goh Escolar (Singapore/Spain).

Prof. Francis Lyall (United Kingdom).

Dr. Peter Martinez (South Africa).

Mr. Maury J. Mechanick, Esq. (USA).

Prof. Vernon Nase (Australia).

Adv. Phetole Patrick Sekhula (South Africa).

Prof. Li Shouping (China).

Ms. Marcia Smith (USA).

Participants in the regional rounds:

In Africa:

1. Mount Kenya University, School Of Law, Nairobi, Kenya.
2. North-West University, Potchefstroom, South Africa.
3. Obafemi Awolowo University, City Of Ile-Ife, Nigeria.
4. University Of Pretoria, Faculty Of Law, Pretoria, South Africa.

In Asia Pacific:

1. Airlangga University, Surabaya, Indonesia.
2. Amity Law School, Delhi, India.
3. Army Institute of Law, Mohali, Punjab, India.
4. Beijing Institute of Technology, Beijing, China.
5. China University of Political Science & Law, Beijing, China.
6. City University of Hong Kong, Hubei, Hong Kong.
7. Dr. Ram Manohar Lohiya National Law University, New Delhi, India.
8. Gujarat National Law University, Gandhinagar, India.
9. IIS Law College, Pune, India.
10. Jaipur National University, Jaipur, India.
11. Kathmandu School of Law, Kathmandu, Nepal.

12. Nalsar University of Law, Hyderabad, India.
13. National Law Institute University, Bhopal, India.
14. National Law School of India University, Bangalore, India.
15. National Law University, Jodhpur, India.
16. National Law University, Delhi, India.
17. National Law University, Orissa, India.
18. National University of Advanced Legal Studies, Emakulam, India.
19. National University Of Singapore, Singapore.
20. Nirma University, Institute of Law, Ahmedabad, India.
21. Rajiv Gandhi National University of Law, Patiala, India.
22. Symbiosis Law College, Maharashtra, India
23. Symbiosis Law School, Noida India.
24. The School Of Excellence, Chennai, India.
25. University Of Indonesia, Jakarta, Indonesia.
26. University Law College, Bangalore University, Bangalore, India.
27. Zhongnan University of Economics And Law, Wuhan, China.

Europe:

1. Faculty Jan Monnet, University of Paris South-Xi, Sceaux-Paris, France.
2. Faculty of Law, Saint Petersburg State University, Saint Petersburg, Russian Federation.
3. Faculty of Law, Universidade Nova of Lisbon, Lisbon, Portugal.
4. Faculty of Law, University of Cologne, Cologne, Germany.
5. Faculty of Law, University of Jaen, Jaen, Spain.
6. John Paul Ii Catholic University of Lublin, Lublin, Poland.
7. National and Kapodistrian University Of Athens, Athens, Greece.
8. Peoples' Friendship University of Russia, Moscow, Russian Federation.
9. The Honourable Society of The Inner Temple, London, United Kingdom.
10. School Of Law, University of Bremen, Bremen, Germany.

North America:

1. Florida State University College of Law, Tallahassee, Florida, USA.
2. Georgetown University Law Center, Washington D.C., USA.
3. George Washington University, Washington D.C., USA.
4. McGill University, Institute Of Air and Space Law, Montreal, Quebec, Canada.
5. New York University School of Law, New York, New York, USA.
6. St. Thomas University School of Law, Miami, Florida, USA.
7. University Of California - Davis School of Law, Davis, California, USA.
8. University of Dayton School of Law, Dayton, Ohio, USA.
9. University of Denver Sturm College of Law, Denver, Colorado, USA.
10. University of Mississippi, School of Law, Oxford, Mississippi, USA.
11. University of Nebraska College of Law, Lincoln, Nebraska, USA.
12. University of Notre Dame Law School, South Bend, Indiana, USA.
13. William S. Richardson School of Law (University of Hawai'i At Mānoa), Honolulu, Hawaii, USA.

Regional organizers of the 2012 competition:

- *Africa*: Adv. Lulu Makapela (South Africa).
- *Asia Pacific*: Dr. Yuri Takaya-Umehara (Japan) and Mr. V. Gopalakrishnan (India).
- *Europe*: ECSL.
- *North America*: Dr. Milton (Skip) Smith (USA).

Contact details of current regional organizers:

- *Africa*: Adv. Lulu Makapela <lachsmoot-africa@iislweb.org>
- *Asia Pacific*: Dr. Setsuko Aoki <lachsmoot-asiapacific@iislweb.org>
- *Europe*: ECSL, <lachsmoot-europe@iislweb.org>
- *North America*: *North America*: Dr. Milton (Skip) Smith <lachsmoot-northamerica@iislweb.org>

Dedicated website of the competition:

<www.iislweb.org/lachsmoot/>

Part B: The Problem

Statement of Facts

1. The Republic of Verona suffers annual monsoon seasons causing the loss of many lives every year. During 2009 and 2010, to support efforts to mitigate the destructive effects of the monsoons, Verona orbited five Earth observation satellites, Juliet 1-5, to monitor weather conditions and obtain information needed by its civil defense forces.
2. The Juliet satellites are some of the largest earth observation satellites ever put into orbit, with in-orbit dimensions of 52 meters (170 feet) x 10 meters (33 feet) x 5 meters (16 feet), and a mass of 16220 kilograms, each. The satellites have been placed into slightly elliptical polar orbits, with a nominal mean altitude of 851 kilometers.
3. The Commonwealth of Montague, a small island nation, has orbited a 30-satellite Romeo remote sensing system. Each Romeo satellite employs sophisticated imaging capabilities and has a mass of 750 kilograms. The satellites have been placed in near-polar, circular, multi-planed constellation orbits, with a nominal mean altitude of 850 kilometers. The full Romeo constellation achieved full operational capability in mid-2007.
4. Montague contracts to obtain all of its space hardware and services from Tybalt Enterprises, an independent stockholder company under the laws of Montague. Under corresponding contractual arrangements, Tybalt Enterprises designed, built, and launched the Romeo system. Tybalt Enterprises continues to perform the system's daily maintenance and operations, and replenishes the constellation as each of the original satellites reach their end-of-life.
5. Verona and the State of Capulet are populous states having a 1000 kilometer contiguous shared border. In the early and mid-20th century they

- fought several border wars with great loss of life and considerable destruction on both sides.
6. While not allied by treaty, Montague and Capulet share close ties and trade relations, a common language, and integrated cultural and scientific institutions. Montague is interested in ensuring that Capulet and Verona continue their present peace, and also in offsetting and reducing its own expenditures on the Romeo system. Accordingly, Montague offers the Romeo capabilities to Capulet in support of those objectives, and Tybalt Enterprises is licensed by Montague to provide satellite services to Capulet. Capulet contracts with Tybalt Enterprises to use the Romeo system services to monitor Verona's global military operations.
 7. In early January 2011, Verona lost control of the Juliet constellation. Despite troubleshooting, Verona was unable to determine the exact cause of the malfunction. It waited for the Juliet system to reset automatically without success. The "glitch" occurred shortly after Verona began to integrate a new software patch into the operating systems of the Juliet satellites.
 8. Verona did not inform the international community of the problem as Verona hoped to fix it speedily. Verona considered the problem to be an internal security matter.
 9. In mid-January 2011, Montague's intelligence community detected the Juliet system anomaly. It also ascertained that Verona had lost the ability to control the satellites. The Montague government's conclusions regarding the Juliet system were immediately shared with Tybalt Enterprises, whose own analysts confirmed the conclusions. These conclusions were not disclosed to others due to Montague's desire, based on security concerns, not to reveal Montague intelligence capabilities to Verona or other states.
 10. In early May 2011, a disabled Juliet-1 satellite collided with one of the Romeo satellites, specifically the Romeo-22, over the South Pole. The Othello Space Situational Awareness Sharing Center ("Othello Center") on the Isle of MacBeth, an independent State, had warned Tybalt Enterprises 72-hours in advance of the conjunction of orbits, but Tybalt Enterprise chose not to maneuver the Romeo-22 to avoid the Juliet-1. The Othello Center provides conjunction analysis, collision avoidance recommendations, and warnings to subscribing international space operators. The Othello Center's warning estimated with high probability that the conjunction was within 0.5 kilometer and less than 100 meters radial miss distance. The Othello Center suggested a collision avoidance maneuver that would have shortened the life of the Romeo-22 satellite by 10 percent.
 11. Tybalt Enterprises did not maneuver the Romeo-22, in part, because its contract with Capulet substantially penalizes it financially for any shortened lifespan of satellites within the Romeo constellation. Also, while Tybalt Enterprises' orbital analysts concluded there was a risk of a collision, they believed the risk was much less than that suggested by the Othello Center. Tybalt Enterprises' analysts now believe that sun activity prior to the collision may have changed the orbits of the Romeo-22 and Juliet-1 and led to what was, for Tybalt Enterprises, an unexpected, low probability event.

12. Verona does not subscribe to the Othello Center services and did not receive its warning of the conjunction and potential for an on-orbit collision. Instead, Verona performs its own space situational awareness activities and monitors the Juliet constellation with an indigenously produced global surveillance network of military ground-based radar and optical tracking systems.
13. Although Tybalt Enterprises' orbital analysts had concluded there was acceptable risk associated with not maneuvering before the Juliet-1/Romeo-22 conjunction, the company still attempted to communicate with Verona to coordinate their conclusions. This attempt took place 48 hours before the collision. Verona did not acknowledge the communications. For security reasons, Verona does not share or discuss data produced by its military space surveillance network with third parties.
14. The Romeo-22 and Juliet-1 were both damaged by the collision, are uncontrollable, and cannot be returned to operational status. Shortly after the collision, the Othello Center issued a public report that concluded both satellites remained essentially intact after the collision and only one additional debris fragment larger than 10 cm was generated by the collision. It also concluded the Juliet-1 satellite and debris fragment remain in an orbit that poses continuing conjunction and collision hazards to the 29 remaining Romeo satellites, and to other satellite systems.
15. Given their size, the uncontrolled Juliet satellite constellation will pose conjunction and collision hazards to the Romeo constellation and to other space systems and objects. Without debris mitigation measures, like disposal at end-of-life and/or collision-avoidance maneuvers, there is high probability that one or more Juliet satellites will suffer a catastrophic collision sometime during the next 50 years. Unlike the unique May 2011 Romeo-Juliet collision, any future collisions involving the Juliet system would, with very high probability, generate thousands of pieces of orbital debris, with each piece presenting its own conjunction and collision hazards to the Romeo system and to other satellites and space objects.
16. Verona has launched and operated satellites other than those in the Juliet constellation. Its historical practice has been not to perform debris mitigation maneuvers at end-of-life because the maneuvers shorten each satellite's mission life. In addition, during the 2001-2010 decade, three Verona satellites in low-Earth orbit suffered catastrophic breakups after end-of-life. These events were caused by explosions in battery or propulsions systems, which Verona was unable to secure and make safe at end-of-life.
17. In late May 2011, Tybalt Enterprises chief spacecraft engineer, Katherine Minola, briefed Montague's defense minister, Don Pedro, on the company's analysis of the Juliet constellation's conjunction, collision and other hazards. Its analysts concluded:
 - (a) Verona was not attempting to recover the Juliet system.
 - (b) Given the sophistication of Verona's indigenous satellite industry, and its long-standing practice and policy not to use non-Verona resources and capabilities in support of its space efforts, there was a high probability Verona could not recover the Juliet system.

- (c) There was a significant probability each Juliet satellite would suffer a catastrophic breakup caused by an explosion in either its battery or propulsion system, or both, since it is not expected they were properly secured when the system loss occurred. Such breakup events would pose conjunction and collision hazards.
 - (d) With high probability, three or more operational Romeo satellites would encounter high-risk conjunctions with the Juliet constellation during each year for the foreseeable future. This conclusion was confirmed with the Othello Center.
 - (e) With Verona unable to control the Juliet system, each conjunction would require that Tybalt Enterprises consider performing a Romeo satellite collision avoidance maneuver in order to reduce risks of a collision.
 - (f) Maneuvers by the Romeo satellite constellation to reduce probabilities of collision associated with each Juliet conjunction will reduce each satellite's life and mission capability. To achieve reductions to very low probabilities of collision, the maneuver operations would reduce the maximum probable life of each Romeo satellite by more than 15 percent.
18. At the conclusion of her briefing, Minola offered Pedro two options. Montague could pay Tybalt Enterprises to either: (1) operate in the current environment and replenish the Romeo system with satellites at a much faster rate than planned, or (2) physically remove the Juliet system from orbit. Tybalt Enterprises had developed robotic technologies for its Escalus satellite system to service scientific satellites. Minola advised Pedro that the Escalus system could be modified to seize and remove each of the Juliet-1, 2, 3, 4 and 5 satellites from orbit.
 19. Pedro told Minola he was not completely convinced that the Escalus robotic technologies could successfully remove the Juliet satellites from orbit. In response, Minola suggested Tybalt Enterprises be contracted to perform a technology demonstration. Pedro agreed. Immediately thereafter, Pedro personally briefed the press on Montague's plans to remove the Juliet satellites, and spoke of the need to protect its and all space-faring states' rights of access to outer space.
 20. In June 2011, Montague issued a diplomatic demarche to Verona, contending that the Juliet system posed an immediate threat to Montague's and other satellite systems, and demanding Verona take steps to mitigate the threat. Concurrently, Montague's foreign minister, Caesar Brutus, convened a press conference to describe the demarche and its reasoning. If Verona failed to act as demanded, Brutus stated Montague would exercise its right to protect its national interests and take steps to defend its space systems. Verona did not respond to the demarche or to the Pedro and Brutus press briefings.
 21. In October 2011, Tybalt Enterprises launched the Escalus-1 satellite, which grabbed and then successfully de-orbited the Juliet-2 in a manner which caused the Juliet-2 to burn up in the atmosphere. The de-orbit operation was concluded two weeks after the Escalus-1 launch.
 22. Immediately after the Juliet-2 de-orbit, Verona's minister of information, Desdemona Lago, held a press conference in which she announced that Verona was endeavoring to resolve issues associated with the lost control

- and its engineers had concluded there was a “good chance” that they could recover the Juliet system and continue to operate the satellites for their important Earth observation mission. Lago protested that the Juliet-2 removal from orbit had been effected without Verona’s consent. Normally very secretive about its military and space activities, Lago acknowledged Verona had not revealed its Juliet problems and recovery operations because of “significant” state security concerns.
23. Lago stated that Verona’s laboratory tests had established that software issues had left the Juliet system vulnerable to an environmental upset if there was “an electrostatic discharge of a particular energy within the satellite.” Citing security concerns, she declined to offer further details on the vulnerability or its cause. Lago explained that Verona’s engineers had encountered difficulties in completing their analysis, but were now very close to resolving all of the Juliet control issues. Despite repeated queries, Lago refused to offer any confirming evidence to support her statements. She refused to confirm whether the resolving technologies and software solutions had been successfully tested or validated. Montague and Tybalt Enterprises rejected Lago’s statements as deceptive and untrue.
 24. In mid-December, 2011, Verona contracted with Benedick Systems, an international software consulting company, to support its Juliet constellation recovery efforts. Shortly thereafter, in late January 2012, Lago announced that Verona had achieved positive control of the Juliet-3, -4, and -5 satellites. Benedick had found the solution to the control problems that had eluded Verona’s engineers.
 25. In February 2012, Verona suffered extensive flooding caused by an unexpected severe monsoonal storm. Without advance warning from the Juliet-1 and -2 satellites, Verona was unable to timely mobilize its civil defense forces, prepare its population to secure property along its coast, and evacuate its people to safety in order to escape the storm’s effects. Five thousand Verona citizens and several hundred international visitors perished during the storms and associated flooding. Many thousands were injured, and thirty thousand homes and businesses destroyed. The flooding also damaged the large Beatrice chemical plant in Verona, and the damage to the facility was amplified by inadequate warning of the monsoonal storm. Beatrice is leaking deadly toxins into Verona’s coastal waters, and the toxins are damaging Verona’s fisheries.
 26. Analysis reveals that had both the Juliet-1 and -2 satellites remained operational, there is a high probability that the entire Juliet constellation would have provided sufficient warning data for Verona to timely prepare its population for the flooding, secure its levies and property, evacuate the population at risk, and safeguard the Beatrice plant. With the Juliet-1 destroyed, had the Juliet-2 remained operational, there is a significant probability Verona could have adequately prepared for the storm given the reduction in the constellation’s capability.
 27. Verona registered the Juliet system pursuant to the Registration Convention. Montague has not registered the Romeo system and did not register the Escalus-1 mission that seized the Juliet-2.

28. Recognizing that events are escalating, Verona and Montague have agreed to submit their dispute for binding resolution by the International Court of Justice. Before the Court:
 - a. Verona asks the Court to declare that:
 - 1) Montague is liable to Verona for the damage done to the Juliet-1 in its collision with the Romeo-22.
 - 2) Montague is liable to Verona for the loss of the Juliet-2 satellite as it was unlawfully removed from orbit.
 - 3) Montague is liable for the deaths, terrestrial property loss, and environmental poisoning suffered in Verona during the 2012 monsoonal storm.
 - b. Montague asks the Court to declare that:
 - 1) Verona is liable to Montague for the damage done to the Romeo-22 in its collision with the Juliet-1.
 - 2) Montague is not liable for the loss of the Juliet-2 satellite. Verona is under a duty to take actions to preserve the space environment by minimizing the potential threat to the use of outer space by arranging for the de-orbit of satellites in its Juliet system at the end-of-life, and by securing each satellite's battery and propulsion system to substantially reduce risks of explosion at end-of-life.
 - 3) Montague is not liable for the deaths, terrestrial property loss, and environmental poisoning suffered in Verona during the 2012 monsoonal storm.
29. Verona and Montague are parties to the Outer Space Treaty, the Return and Rescue Agreement, the Liability Convention, and Registration Convention and the ITU Convention. Verona is a party to the Vienna Convention on the Law of Treaties. Montague has only signed the Vienna Convention. Both are members of the United Nations.

Problem Clarifications

After evaluating all requests for clarification, the following statement of facts was prepared by the author, without reference to any specific query:

1. With regard to Compromis paragraph 13, in attempting to communicate with Verona, Tybalt Enterprises sent emails to Verona space operators and phoned Verona's military space control center.
2. All of the Juliet satellites were broadcasting satellite health and status information before the collision between Romeo-22 and Juliet-1.
3. After the collision between the Romeo-22 and Juliet-1, analysis shows that the Romeo-22 presents a low probability of continuing conjunction and collision hazards to other satellites and satellite constellations.
4. There was no separate technology demonstration of the Escalus system.

5. The Montague demarche to Verona was sent and received on 14 June 2011. It was worded carefully, using a word processor to check for spelling and grammar errors.
6. Compromis Paragraph 20 describes the current state of diplomatic relations between Montague and Verona.
7. The Romeo system was not leased to Capulet.
8. As to the Compromis paragraph 26 statement “Analysis reveals . . . ,” the parties have agreed to this conclusion.
9. No government possesses ownership interests in Tybalt Enterprises.

Part C: Finalists Memorials

Memorial for the Applicant the Republic of Verona

National Law School of India University, Bangalore, India.

Mr. Viraj Parikh, Mr. Prem Ayyathurai and Ms. Vinodini Srinivasan.

Faculty Advisor: Dr. Sarasu E. Thomas.

Argument

I **Montague Is Liable for the Damage Caused to Juliet-1 in Its Collision With Romeo-22 under Article III, Liability Convention.**

In May 2011, Tybalt Enterprises failed to prevent an imminent collision between Romeo-22 and Juliet-1, thereby causing irreparable damage to Juliet-1. Verona submits that Montague is liable for this damage under Article III, Liability Convention because Montague is the launching state of the space object Romeo-22 [A] which has caused damage to Juliet-1, a space object launched by Verona [B]; and Tybalt and Montague are at fault for this damage [C]. Further, Verona is not at fault for the collision [D].

A **Montague is the launching State of Romeo-22.**

“*Launching State*” under Article I(c), LIAB includes the State ‘*procuring*’ the launch of a space object.¹ A State procures a launch by requesting it or by being actively involved in it.² Montague owns Romeo-22 and has procured its launch by contracting with Tybalt to design, build and launch the Romeo system.³ Hence, Verona submits that Montague is the launching State of Romeo-22.

1 Convention on International Liability for Damage Caused by Space Objects, *entered into force* Oct. 9, 1973, 24 U.S.T. 2389, Article I(c), 961 U.N.T.S. 187 [hereinafter, LIAB]; Arnel Kerrest, *Remarks on the Notion of a Launching State*, 42 I.I.S.L. PROC. 308 (1999).

2 Karl-H. Bockstiegel, *The Term ‘Launching State’ in International Law*, 37 I.I.S.L. PROC. 80, 81 (1994); William B. Wirin, *Practical Implications of Appropriate State-Launching State Definitions*, 37 I.I.S.L. PROC. 109 (1994).

3 Compromis §3.

B Juliet-1 is a space object launched by Verona.

Under Article III, a State is only liable for damage caused to a *space object*. The definition of a “*space object*” under Article I(d) is inclusive and does not draw reference to either the control over or functionality of the space object.⁴

Hence, Juliet-1, despite loss of control, is a space object. In any event, Juliet 1 continued to remain functional. It continued to relay satellite health and status reports,⁵ and by inference, weather observation data as well, because this data is relayed via the same instruments in a satellite.⁶ For instance, the Galaxy-15 satellite continued to function despite loss of control.⁷

Thus, Juliet-1 is a space object for the purposes of imputing liability under Article III.

C Montague is at Fault for Causing the Collision.

To establish liability under Article III, the damage suffered ought to have been caused by the fault of the Launching State or the fault of persons it is responsible for. Verona submits that fault is a breach of the duty of due diligence [1] and the damage caused by Romeo-22 to Juliet-1 is the fault of Tybalt [2] and Montague [3].

1 Fault is a breach of the duty of due diligence

“*Fault*” has not been defined in LIAB. Under *corpus juris spatialis*, fault has been consistently interpreted as being constituted by a negligent act in the circumstances.⁸ Further, *per* Article 31 of the Vienna Convention,⁹ which codifies existing custom,¹⁰ recourse may be had to principles of International Law in order to ascertain the meaning of the term. Under General International Law,

4 Bin Cheng, *Legal Status of Space Crafts, Satellites and Space Objects* in STUDIES IN INTERNATIONAL SPACE LAW 462, 464 (2004); Stephen Gorove, *Towards the Clarification of the term ‘Space Object’- an International Legal and Policy Imperative?* 21 J. SPACE L. 11, 16 (1993).

5 Response to Requests for Clarifications 2.

6 WILFRIED LEY ET AL, HANDBOOK OF SPACE TECHNOLOGY 485 (2009); SPACE SYSTEMS- LORAL, GOES I-M DATA BOOK, NASA 103-104, <http://goes.gsfc.nasa.gov/text/databook/section09.pdf>.

7 Warren Ferster, *Intelsat Loses Contact with Galaxy 15*, (April 8, 2012) http://www.spacenews.com/satellite_telecom/100408-intelsat-loses-contact-galaxy-satellite.html.

8 GEORGE HACKET, SPACE DEBRIS AND CORPUS JURIS SPATIALIS 180 (1994); HOWARD BAKER, SPACE DEBRIS LEGAL POLICY AND IMPLICATIONS 84 (1989); Stephen Gorove, *Liability in Space Law: an Overview*, 8 Annals. Air & Space. L. 373, 376 (1983).

9 Vienna Convention on the Law of Treaties, *entered into force* on Jan. 27, 1980 Article 31(3), 1155 U.N.T.S., 331 [Hereinafter VCLT];

10 Dispute Regarding Navigational and Related Rights (Costa Rica v. Nicaragua) (Merits) 2009 I.C.J. 214, 237 (July 13).

fault is constituted by negligence,¹¹ i.e. *reasonable foreseeability without the desire of consequences*.¹² This interpretation is confirmed by the *travaux*.¹³ The standard for negligence is due diligence.¹⁴ Due diligence requires an operator to be *aware of the risk of harm* and *undertake measures for the prevention of collision*.¹⁵ For ultra-hazardous activities such as space exploration,¹⁶ this standard is especially high.¹⁷

2 Tybalt is at fault.

Seventy-two hours prior to the collision, Othello notified Tybalt's analysts of a high probability of the conjunction in the orbits of Romeo-22 and Juliet-1.¹⁸ Tybalt's failure to perform the collision avoidance maneuver upon receiving this information constitutes fault [a]. Additionally, Tybalt's failure to confirm Othello's information from independent sources before disregarding it constitutes fault [b].

a) Tybalt's failure to perform a collision avoidance maneuver constitutes fault.

An operator is at fault for failing to prevent harm, if there exists adequate information to foresee such harm.¹⁹ Verona submits that Othello provided adequate information to foresee a collision.

In order to prevent collisions in outer space a satellite operator requires accurate and timely knowledge of the positions and movements of other space objects.²⁰ Admittedly, Space Situational Awareness Agencies such as Othello do not always

11 ANTONIO CASSESE, *INTERNATIONAL LAW*, 251 (2nd ed. 2005); Carl Christol, *International Liability for Damage caused by Space Objects* 74(2) AM. J. INT'L L. 346, 365 (1980).

12 IAN BROWNLIE, *STATE RESPONSIBILITY*, 45 (2001).

13 Article 32, VCLT; Comm. on the Peaceful Uses of Outer Space, Legal Subcomm., Rep. on its 8th Sess., 9th June- 4th July 1969, Annex II, 19 U.N. Doc. A/AC.105/58 (July 4, 1969). Comm. on the Peaceful Uses of Outer Space, Legal Subcomm., Rep. on the 2nd part of its 3rd Sess., 5th Oct-23rd Oct, 1964, Annex II, 20 U.N. Doc. A/AC.105/21 (May 21, 1965). Comm. on the Peaceful Uses of Outer Space, Legal Subcomm., Rep. on its 3rd Sess., 9th-26th March 1964, Annex II, 23 U.N. Doc A/AC.105/19 (March 26, 1964).

14 Horst Blomeyer-Bartenstein, *Due Diligence* in 10 *ENCYCLOPEDIA OF PUBLIC INTERNATIONAL LAW* 138, 141 (R. Dolzer et al. eds., 1981).

15 Martha Mejia-Kaiser *Collision Course: 2009 Iridium Cosmos Crash*, 52 I.I.S.L. PROC.3.9, 4 (2009). Blomeyer-Bartenstein, *supra* note 14;

16 C.W. Jenks, *Liability for Ultra-Hazardous Activities in International Law*, 117 *RECUEIL DES COURS*, 99, 165 (1966).

17 Riccardo Pisillo-Mazzeschi, *Due Diligence Rule and the Nature of International Responsibility of States*, in *STATE RESPONSIBILITY IN INTERNATIONAL LAW* 113, 136 (Rene Provost ed., 2001); John Kelson, *State Responsibility for Abnormally Dangerous Activities* 13 *HARV. INT'L. L. J.* 197, 238 (1972).

18 Compromis §10

19 Mejia-Kaiser, *supra* note 15.

20 Lubos Perek, *Traffic Rules for Outer Space* 25 I.I.S.L. PROC. 37, 41 (2009).

provide accurate data and frequently raise false alarms.²¹ However, such agencies do provide adequate and reliable information in *special cases*.²² The information provided by Othello constitutes one such special case. Othello notified Tybalt that the probability of conjunction was high, with the satellites estimated to be within 0.5 kilometers of each other, at a radial miss distance less than 100 meters.²³ These parameters are considered to be emergency situations by leading space agencies.²⁴ Hence, Tybalt had an obligation to act on this information. Further, Verona submits that its loss of control over Juliet-1 and 2 does not preclude Tybalt's obligation to undertake a collision avoidance maneuver. An operator is still at fault for not maneuvering his satellite to avoid a known "dead" or "inert" satellite²⁵ as he must account for all dangers of navigation and any special circumstances, including the limitations of the vessels involved.²⁶ As Tybalt was aware that Juliet-2 was temporarily out-of-control and thus, unmaneuverable,²⁷ it had an obligation to undertake an avoidance maneuver. Thus, Tybalt is at fault for knowingly not initiating collision avoidance maneuvers.

b) Tybalt's failure to obtain information from independent sources before disregarding Othello's information constitutes fault.

An operator's awareness of the risk of harm must not only take into account whether the operator was *in fact* aware, but also whether an operator under the specific circumstances *should have been aware* of the risk.²⁸ In addition to a duty to act upon known information, due diligence requires an operator to acquire adequate information.²⁹ An analogy may be drawn to maritime law, which has extensive rules governing collisions between two vessels.³⁰

21 T.S. Kelso, et al., *Improved Conjunction Analysis via Collaborative Space Situational Awareness*, 5 EUROPEAN CONFERENCE ON SPACE DEBRIS, (2009).

22 IADC WORKING GROUP IV, *Support to IADC Debris Mitigation Guidelines*, 26 (2006) http://www.iadc-online.org/Documents/IADC-WD-00-03_v4_rev8.doc.

23 Compromis §10.

24 DUANE BIRD, UNITED STATES STRATEGIC COMMAND, SHARING SPACE SITUATIONAL AWARENESS DATA 2 (2010); Peter de Selding, *Satellite Collision Avoidance Methods Questioned after Space Crash*, (February 29, 2009). <http://www.space.com/2386-satellite-collision-avoidance-methods-questioned-space-crash.html>.

25 R. Lee, *The Liability Convention and Private Space Launch Services: Domestic Regulatory Responses*, 31 ANNALS AIR & SPACE L. 351 (2006).

26 Rule 2, Convention on the International Regulations for Preventing Collisions at Sea entered into force July 15, 1977, 1050 U.N.T.S. 24 [hereinafter, COLREGS].

27 Compromis §9.

28 Rep. of the Int'l Law Comm'n, 53rd session, April 1-June 1, July 2-August 10, 2001, 151 U.N.Doc. (A/56/10); GAOR, 56th Sess., Supp No. 10 (2001) [hereinafter, Transboundary Harm Articles].

29 Blomeyer-Bartenstein, *supra* note 14, at 140.

30 Paul Dembling, *Establishing Liability for Outer Space Activities*, 13 I.I.S.L PROC. 87, 92 (1970); J.H. Williams, *The Law of the Sea: A Parallel for Space Law*, 22 MIL. L. REV., 155 (1965).

The Convention on the International Regulations for Preventing Collisions at Sea, requires vessels to use *all available means* to determine if a risk of collision exists.³¹ No assumptions may be made on the basis of scant information.³² State practice shows that this principle also applies to collisions in outer space. On being alerted of a possible collision by Space Situational Awareness Agencies such as Othello, space agencies take recourse to ground based radar and optical systems before deciding whether to employ collision avoidance maneuvers.³³ Verona submits that Tybalt should have taken further steps to verify the accuracy of Othello's findings and its failure to do so constitutes fault.

3 *Montague is at fault.*

Montague is responsible for Tybalt's fault [a]. Furthermore, the contract between Tybalt and Capulet substantially penalizes Tybalt for *any* shortened lifespan of satellites within the Romeo constellation.³⁴ Montague's failure to prevent the inclusion of such a clause in the contract constitutes fault [b]. Montague is also at fault for failing to register the Romeo Satellite system, which would have allowed Verona to avoid placing the Juliet satellites within 1 kilometer of the orbit of Montague's satellites[c].

a) Montague is responsible for Tybalt's fault.

Per Art. III, LIAB a launching state is liable for the fault of the persons it is responsible for. In outer space, a state is internationally responsible for the activities conducted by its nationals.³⁵ Tybalt is a company registered under the laws of Montague,³⁶ and is a national of Montague.³⁷ Hence, Montague is responsible for Tybalt's fault.

b) Montague's failure to prevent the inclusion of the penalty clause constitutes fault.

States are obligated to *continuously supervise* the activities of non-governmental entities in outer space.³⁸ Montague *authorized* Tybalt to enter into a contract with Capulet. Hence, it was also obliged to *supervise* the contract. If a heavy penalty for *any* shortening of lifespan of satellites is imposed on an operator, it is highly improbable that an operator will decide in favor of

31 Rule 7, COLREGS.

32 *Id.*

33 Comm. on the Peaceful Uses of Outer Space, Report on National Research on Safety of Space Objects, U.N. Doc. A/AC.105/978 (Dec. 2, 2010); IADC WORKING GROUP IV, *Support to IADC Debris Mitigation Guidelines*, 26 (2006) http://www.iadc-online.org/Documents/IADC-WD-00-03_v4_rev8.doc.

34 Compromis §11

35 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, *entered into force* Oct. 10, 1967, Article VI, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter OST].

36 Compromis §3.

37 Case Concerning the Barcelona Company, Limited (Belgium v. Spain)(Second Phase) 1970 I.C.J. 4, 42 (Feb. 5).

38 Article VI, OST.

an avoidance maneuver unless absolutely necessary. Since there exists an obligation upon active satellites to take evasive action in case of possible collisions with inactive satellites,³⁹ to acquiesce to a contractual term that disincentivizes evasive action amounts to a breach of the obligation to *continuously supervise* Tybalt's activities. The breach of an international obligation constitutes fault under Article III, LIAB.⁴⁰ Hence, Montague is at fault for allowing the inclusion of the penalty clause.

c) Montague's failure to register constitutes fault.

Each State has a legitimate interest in knowing the orbital parameters of objects launched by other states.⁴¹ The Registration Convention performs the important function of providing this data. This is essential to regulate orbital traffic,⁴² so that orbits can be coordinated to avoid collisions.⁴³

Montague failed to register the Romeo-22, in contravention of the provisions of REG.⁴⁴ This failure to register resulted in the lack of notice to Verona about the orbital positioning of the Romeo constellation. As a result, Verona was precluded from placing its Juliet constellation at a safe orbital distance from the Romeo system,⁴⁵ which could have prevented the collision. Hence, Montague is at fault for failing to register the Romeo constellation because the consequent lack of notice resulted in the collision between Romeo-22 and Juliet-1.

D Verona is not at fault because it was not obligated to divulge sensitive information to Tybalt.

Montague may contend that Verona is at fault for failing to divulge information about the loss of control or relevant orbital parameters of the Juliet Constellation. However, Verona submits that its decision not to divulge information to Tybalt is justified on account of legitimate state security concerns.

The right of a state to withhold information that it perceives to be of importance to its security interests was recognized in *Corfu Channel*.⁴⁶ Under Article

39 Elmar Vitt, *Questions Of International Liability In The Case Of Collisions Suffered By Satellites In The Geostationary Orbit* 37 GER. J. AIR & SPACE L. 46, 55 (1988).

40 Hackett, *supra* note 8, at 184.

41 C. S. Sheldon, B. M. De Voe, *United Nations Registry of Space Vehicles*, 13 I.I.S.L. PROC. 127, 129 (1970).

42 Comm. on the Peaceful Uses of Outer Space, Legal Subcomm. 741st mtg. at 5, COPUOS/LEGAL/T.741 (10th April 2006).

43 H. Da Cunha Machado, *Introductory Report on "Matricula" Register of Space Objects*, 12 I.I.S.L. PROC. 115, 119 (1969); Ad Hoc Comm. on the Peaceful Uses of Outer Space, Legal Comm. Rep. on its Working Group, U.N. Doc. A/AC.98/C.2/WP.5 (June 4, 1959).

44 Compromis §29. Convention on Registration of Objects Launched into Outer Space, *entered into force* Sept. 15, 1976, 28 U.S.T. 695, 1023 U.N.T.S. 15 [hereinafter REG].

45 Compromis §2&3.

46 *Corfu Channel* (UK v. Albania)(Merits) 1949 I.C.J. 4, 32 (Apr. 9).

XI of OST, the obligation to disclose exists *only* to the extent that it is “*feasible*” and “*practicable*”.⁴⁷ Further, the existence of a national security exception is confirmed by Subsequent State practice in the form of instruments such as the ESA Convention.⁴⁸ Hence, Verona’s non-disclosure to Tybalt was justified as it operates the Romeo Constellation to gather information regarding Verona’s global military operations for Capulet,⁴⁹ a state with whom Verona shares a history of hostile relations.⁵⁰

In any event, Verona’s non-disclosure is justified as Tybalt is a *third party*,⁵¹ and State practice demonstrates that information relevant to *state* security concerns is not disclosed to private third parties.⁵²

ii Verona Has No Duty To Perform End-Of-Life Debris Mitigation Measures.

Montague contends that Verona is obligated to de-orbit and passivate the Juliet satellites at the end of their lives.⁵³ Verona submits that no such obligation exists under OST [A]. Further, neither has any custom evolved to that effect in Outer Space [B], nor can such an obligation be read into the duty to prevent transboundary harm [C].

A Verona is not obligated to perform end-of-life debris mitigation measures under OST.

Admittedly, Article IX Sentence 2 obligates States to undertake appropriate measures while conducting studies and exploration of outer space to avoid harmful contamination of outer space. Verona submits that the contamination avoidance rule does not apply to the Juliet satellites as they “*use*” outer space [1]. In any case, the debris mitigation measures are not “*appropriate*” [2].

1 The contamination avoidance rule does not apply to the Juliet Satellites as they “use” outer space

The obligation in Article IX Sentence 2 applies only to *studies and exploration* of outer space. This is a departure from the language employed Article I and Article IX Sentence 1 OST which extends to the “*use*” of outer space. This omission indicates that the obligation to avoid harmful contamination does not extend to activities which amount to the *use* of outer space.⁵⁴

47 J.F.Mayence and Thomas Reuter, *Article XI* in 1 COLOGNE COMMENTARY ON SPACE LAW, 189, 197 (Stephan Hobe et al eds., 2009).

48 Art. III.1, Convention for the Establishment of a European Space Agency, *entered into force* Oct. 30, 1980, 1297 U.N.T.S. 186.

49 Compromis §6.

50 Compromis §5.

51 Compromis §13.

52 U.S.C. § 2274 (2010).

53 Compromis §29.

54 Delbert Smith, *the Technical, Legal and Business Risks of Orbital Debris*, 6 N.Y.U. ENVTL. L. J. 50, 58 (1997-1998).

Reference to the *travaux*⁵⁵ clarifies *exploration* to be an activity aimed at gathering knowledge of outer space, whereas *use* is the application of this knowledge.⁵⁶ Weather satellites such as the Juliet system transmit information based on which States prepare to predict storms to mitigate the damage that they wreck on Verona. Like telecommunication satellites, they *use* outer space, and fall outside the scope of Article IX, Sentence 2.⁵⁷ Hence, Verona submits that the obligation to take appropriate measures to avoid contamination of outer space does not extend to earth observation satellites like Juliet.

2 In any event, the mitigation measures are not “*appropriate*”. Even if the obligation to avoid harmful contamination extends to the Juliet satellites, it only requires States to take *appropriate measures* to prevent contamination.⁵⁸ The appropriateness of measures is based on the importance of the activity, the economic viability of the activity as against the costs of prevention, and the contribution of affected States to the costs of prevention.⁵⁹ In the instant case, the storm prediction function of the Juliet satellites serves an important purpose to Verona, which is especially vulnerable during annual monsoons.⁶⁰ Moreover, the cost of performing passivation and de-orbiting measures is prohibitive as it diminishes the life span of a satellite by at least four months.⁶¹ Lastly, there is no cost-sharing mechanism between States. Hence, passivation and de-orbiting measures do not qualify as *appropriate measures*. In any event, the term “*appropriate*” must be interpreted consistently with the meaning of “*appropriate*” in Article IX Sentence 3. State practice in the respect to Anti-satellite-missile tests establishes that states have significant leeway in deciding the appropriateness of prior consultations.⁶² Hence, Verona may exercise discretion in determining the appropriateness of passivation and de-orbiting as means of debris mitigation.

B There is no custom that obligates passivation and de-orbiting.

Neither the requisite state practice [1] nor *opinio juris* [2], essential for the existence of a customary norm in International Law, are present in case of passivation and de-orbiting.

55 Art. 32, VCLT.

56 Comm. on the Peaceful Uses of Outer Space, Legal Subcomm., Summary Record of the 57th Mtg., at 16, Jul. 12, 1986, 5th Session, UN.Doc. A/AC.105/C.2/SR.57 (Oct. 20, 1966).

57 Smith, *supra* note 54.

58 Article IX, OST.

59 Transboundary Harm Articles, *supra* note 28, Article 10.

60 Compromis §2.

61 Martha Kaiser, *Taking Garbage Outside: Geostationary Orbit and Graveyard Orbits*, 48 I.I.S.L PROC. 5.14, 3 (2006).

62 Art. 31(3)(b) VCLT, Michael Mineiro, *FY-1C and U.S.A 193, ASAT intercepts an assessment of legal obligations under Article IX of the Outer Space Treaty*, 34 J. SPACE L. 321, 352 (2008).

1 There is no uniform State Practice.

Firstly, state practice must be collectively uniform, i.e. different states must not have engaged in substantially different practices.⁶³ The failure to perform end-of-life debris mitigation measures in five out of twelve satellites in Geo-Stationary Orbit in 2010 shows that this requirement is not met.⁶⁴ *Secondly*, state practice must be internally consistent, i.e. each state must have behaved in the same way on virtually all occasions that it encountered a similar situation.⁶⁵ This requirement is not fulfilled either. For instance, China, a *major* space faring state, despite adopting debris mitigation measures,⁶⁶ has intentionally created space debris in Low-Earth-Orbit.⁶⁷ Hence, State practice lacks consistency and uniformity.

2 There is a clear lack of Opinio Juris.

Opinio juris is essential to distinguish between actions resulting from the perception of being bound by legal obligation and those resulting from considerations of fairness or morality.⁶⁸ Thus, to establish a rule imposing legal obligations, it is not sufficient to just show that states acted in a manner required by the alleged rule, but also that states regarded their actions as obligatory under law.⁶⁹ Sometimes, actions are accompanied by *clear* disclaimers, or *opinio non juris*, that automatically discount their contribution to the creation of custom.⁷⁰ With respect to debris mitigation measures, *opinio non juris* is self-evident. Even the General Assembly, while adopting debris mitigation guidelines, specifically described them as being *voluntary*.⁷¹ It was accepted by states in the COPUOUS that debris mitigation practices “*remain voluntary and should be carried out through national mechanisms . . . It would not be legally binding under International Law.*”⁷²

Hence, in the absence of consistent state practice or *opinio juris* no such duty exists under customary International Law.

63 Maurice Mendelson, *The Formation of Customary International Law*, 272 RECUEIL DES COURS 155, 212 (1998).

64 Comm. on the Peaceful Uses of Outer Space, Scientific & Technical Subcomm, Towards Long-term Sustainability of Space Activities: Overcoming the Challenges of Space Debris a Report of the International Interdisciplinary Congress on Space Debris, at 35, 7-18 February 2011, 48th session, U.N. Doc. A/AC.105/C.1/2011/CRP.14 (Feb. 3, 2011) [hereinafter, IICSD Report].

65 Mendelson, *supra* note 63.

66 Interim Instrument of Space Debris Mitigation and Management (2008)(Chi.).

67 Mineiro, *supra* note 62.

68 Maurice Mendelson, *the Subjective Element in Customary International Law*, 66 BRIT. YB. INT'L. L. 195 (1996).

69 MICHAEL AKEHURST, MODERN INTRODUCTION TO INTERNATIONAL LAW, 41 (Malanczuk ed., 7th ed., 1997).

70 *Id.*

71 G.A. Res. 62/217, U.N. GAOR, 62nd Sess., at 6, U.N. Doc. A/RES/62/217 (2008)

72 Comm. on the Peaceful Uses of Outer Space, Scientific & Technical Subcomm, Report on 47th Session, at 40, 21 Feb-4 Mar, 2005, U.N. Doc. A/AC.105/848 (Feb. 25, 2005).

C Passivation and De-orbiting fall outside the scope of the duty to prevent transboundary harm.

The duty to prevent transboundary harm does not apply to outer space [1]. Even if it does, measures of passivation and de-orbiting fall outside the scope of this duty [2].

1 The duty to prevent transboundary harm does not apply to outer space.

Admittedly, under Customary International Law, States are obligated to respect areas of the environment outside their control.⁷³ However, the duty to prevent transboundary harm in the form expressed under Principle 21, Stockholm Declaration departs significantly from existing customary International Law laid down in the *Trail Smelter Case* by extending its application even to territories not under any state's control, i.e. the global commons.⁷⁴ The duty is customary only to the extent indicated by subsequent state practice and *opinio juris* with respect to specific parts of the environment, separately.⁷⁵ Since the duty has never been invoked with respect to *global commons* in the absence of a specific treaty regime,⁷⁶ it cannot apply to outer space in the absence of any specific treaty.⁷⁷

2 In Any Event, Passivation and De-Orbiting fall outside the scope of the duty to prevent transboundary harm.

Even if the duty to prevent transboundary harm under Customary International Law extends to outer space, States are only obligated to adopt *appropriate measures* in order to prevent transboundary harm.⁷⁸ This Court intentionally departed from the duty as framed under Principle 21, by stating that there only exists a duty to “respect” the environment,⁷⁹ implying that the obligation is broader and more imprecise than the standard of due diligence.⁸⁰ Further, the standard of due diligence differs across treaty regimes, depending on the balance drawn by each treaty between exploitation and conservation of *that* environment.⁸¹ It is clear from the imprecise wording of Article IX, OST, as well as the

73 Legality of the Threat or Use of Nuclear Weapons (Advisory Opinion) 1996 ICJ 226, 242 (Jul. 8).

74 Hackett, *supra* note 8, at 143.

75 M. Bothe, *Environment, Development, Resources*, 318 RECUEIL DES COURS, 323, 423 (2005).

76 *Id.*

77 Hackett, *supra* note 8, at 145.

78 Transboundary Harm Articles, *supra* note 28, Article 2.

79 Legality of the Threat or Use of Nuclear Weapons (Advisory Opinion) 1996 ICJ 226, 242 (Jul. 8).

80 Edith Brown-Weiss, *Opening The Door To The Environment And Future Generations in INTERNATIONAL LAW, THE INTERNATIONAL COURT OF JUSTICE AND NUCLEAR WEAPONS*, 340 (Laurence Boisson De Chazournes & Philippe Sands eds., 1989).

81 PATRICIA BERNIE & ALAN BOYLE, *INTERNATIONAL LAW AND THE ENVIRONMENT*, 146 (3rd ed. 2009).

pre-eminence of the freedom to use outer space under Article I, OST, that the obligation, *if* it applies to outer space, must favor the right to utilize outer space. Given the prohibitive costs of passivation and de-orbiting, and the important weather observation function of the Juliet satellites, these measures are not appropriate.⁸² Further, *specific* appropriate measures can only be decided after consultations with states.⁸³ No such consultations have been undertaken with respect to space activities.

Hence, Verona submits that de-orbiting and passivation cannot be obligatory under the duty to prevent transboundary harm.

III **Montague Is Liable to Verona for the Loss of Juliet-2 as It Was Unlawfully Removed from Orbit**

Any conduct attributable to a state in breach of its international obligations is an internationally wrongful act.⁸⁴ In October 2011, Tybalt deployed Escalus-1 to remove Juliet-2 from its orbit at Montague's behest.⁸⁵ In outer space, a state incurs responsibility for all activities conducted by their nationals.⁸⁶ As Tybalt is a national of Montague,⁸⁷ Juliet-2's removal is attributable to it. Verona submits that Montague breached international obligations by removing Juliet 2 [A]. Further, Montague's actions cannot be precluded from wrongfulness [B]. Hence, Montague is liable to compensate Verona for the loss of Juliet-2.

A Montague breached international obligations by removing Juliet-2.

States are obligated not to usurp the jurisdiction exercisable by other states.⁸⁸ States are also obligated to not cause damage to the property and territory of other states.⁸⁹ Verona submits that Montague breached both these obligations by removing Juliet-2 because: the authority to de-orbit and remove Juliet-2 is confined to Verona, the state of registry [I]; Assuming that such a right does accrue in certain circumstances, the preconditions for its exercise were not fulfilled [II].

1 The Authority to remove Juliet-2, is confined only to Verona, the State of Registry.

Article VIII grants permanent ownership and jurisdiction over space objects, and does not authorize exceptions allowing for the removal of space objects

82 *Supra* 2(A)(II).

83 Transboundary Harm Articles, *supra* note 28, at Article 9.

84 Rep. of the Int'l Law Comm'n, 53rd session, April 1-June 1, July 2-August 10, 2001, Article I, 137, U.N. Doc. (A/56/10); GAOR, 56th Sess., Supp No. 10 (2001) [hereinafter, Responsibility Articles].

85 Compromis §21.

86 Article VI, OST. Michael Gerhard, *Article VI in 1 COLOGNE COMMENTARY ON SPACE LAW*, 103, 116 (Stephan Hobe et al eds., 2009).

87 Compromis §4.

88 *Corfu Channel (UK v. Albania) (Merits) 1949 I.C.J. 4 (Apr. 9).*

without the owner's consent.⁹⁰ Such an interpretation is confirmed by Article VIII Sentence 3, which obligates states parties to "return" an object "found" beyond the borders of the state of registry.⁹¹ The *finding* of an object presupposes abandonment and loss of control over that object, by the state of registry. Hence, by imposing an obligation to return under Article VIII, the drafters envisaged continuing rights over the object, despite loss of control. In fact, this obligation was absent in the original draft and was deliberately included to preclude the application of the doctrine of *res derelicta* -which granted States the right to remove abandoned objects from the High Seas if they posed a threat to navigation.⁹² Ownership over an object in outer space is unaffected by loss of control. The OST does not distinguish between space objects on the basis of control or functionality.⁹³ Hence, rights exercised over both uncontrollable and controllable space objects are identical. State practice in application of the treaty confirms this. In 1984, Palapa B2, an Indonesian satellite became uncontrollable after launch. Sattel Inc. [U.S.A] entered into a contract with the owners authorising its retrieval, tacitly acknowledging the Indonesians' continuing title over it, despite abandonment.⁹⁴ It is also clear from the circumstances surrounding the formation of the OST, that emergencies requiring salvage and non-cooperative removal were contemplated,⁹⁵ but deliberately left out.⁹⁶ Hence, under Article VIII, Verona as the state of registry, owns and has exclusive jurisdiction over Juliet-2 and has the sole authority to remove it from outer.

2 Assuming Res Derelicta objects can be removed from outer space, the preconditions for the exercise of such a right were not fulfilled in this case.

Assuming that the doctrine of *res derelicta* applies to outer space, the removal of Juliet-2 would still be unlawful. Even in the High Seas, *public* vessels such

89 Trail Smelter Arbitration (U.S. v. Canada) 1938/1941, R.I.A.A. 1905 (Mar. 11).

90 Baker, *supra* note 8, at 70; James Rendleman, *Non-Cooperative Space Debris Mitigation*, 53 I.I.S.L. PROC. 4.12 (2010); V.D. Bordunov, *Rights of States as Regards Outer Space Objects*, 24 I.I.S.L. PROC. 89 (1981).

91 Article VIII, OST; See also, Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, *entered into force* Dec. 3, 1968, Article V(3), 19 U.S. T. 7570, 672 U.N.T.S. 119.

92 R. Cargill Hall, *Comments on Salvage and Removal of Man-Made Objects from Outer Space*, 9 I.I.S.L. PROC. 116, 118 (1967); Diedriks-Verschoor, *Harm Producing Events Caused by Fragments of Space Objects (Debris)*, 25 I.I.S.L. PROC. 1, 3 (1982).

93 Y.M. Kolossov, *Legal Aspects of Outer Space Environmental Protection*, 23 I.I.S.L. PROC. 103 (1980); Bernard Schmidt-Tedd & Stephen Mick, *Article VIII* in 1 COLOGNE COMMENTARY ON SPACE LAW, 146, 150 (Stephan Hobe et al. eds., 2009).

94 Article 31(3)(b) VCLT; BEN EVANS, *SPACE SHUTTLE CHALLENGER: TEN JOURNEYS INTO THE UNKNOWN*, 110 (2007).

95 Article 32, VCLT

96 Craig Fishman, *Space Salvage: A Proposed Treaty Amendment to the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Space*, 26 VA. J. INT'L L. 965 (1985-1986).

as Juliet-2 enjoy complete immunity from foreign jurisdiction and cannot be removed without prior consent, even if abandoned.⁹⁷

In any event, an object can only be *abandoned* if the owner relinquishes all hope and all intention of recovering it.⁹⁸ Verona never abandoned Juliet-2 and always considered the loss of control to be a temporary glitch, which would be repaired speedily.⁹⁹ In her Press Conference, Minister Lago stated that Verona was endeavouring to resolve those issues and had a good chance of doing so.¹⁰⁰ The fact that Juliet -3, 4 and 5 were recovered subsequently,¹⁰¹ confirms this.

B Montague's actions cannot be precluded from wrongfulness.

Montague's removal of Juliet-2 cannot be precluded from wrongfulness as it is not justified as a valid countermeasure [1], a legitimate exercise of the right to self-defence [2], or necessity [3], especially as Verona did not consent to any such operation.

1 The Removal was not a valid Countermeasure.

Verona is not obligated to perform end-of-life debris mitigation measures.¹⁰² In the absence of any breach, the right to countermeasures does not arise.¹⁰³

In any event, countermeasures can only be exercised if certain procedural conditions are fulfilled. Montague had an obligation to not only notify such a decision, but also offer to negotiate it with Verona.¹⁰⁴ It is clear from the diplomatic demarche that the communication was an ultimatum and *not* an offer to negotiate.¹⁰⁵ Further, a counter-measure must "*induce*",¹⁰⁶ and "*facilitate*",¹⁰⁷ a State in breach, to perform its obligations. By removing Juliet-2, Montague made it impossible for Verona to perform end-of-life debris mitigation measures on the satellite, assuming it was obligated to do so. Hence, it was not a valid countermeasure.

In any event, States cannot use force while resorting to countermeasures.¹⁰⁸ The definition of use of *force* is very wide, and includes the use of "*any elements at the disposal of States which are capable of destroying life and property.*"¹⁰⁹

97 Hall, *supra* note 92.

98 Nandasiri Jasentuliyana, Regulations for Space Salvage Operations, Possibilities for the Future, 22 J. SPACE L. 5, 17 (1994).

99 Compromis §8.

100 Compromis §22, 23.

101 Compromis §24.

102 *Supra* 2.

103 Responsibility Articles, *supra* note 84, Article 49.

104 Responsibility Articles, *supra* note 84, Article 52.

105 Compromis §20.

106 Responsibility Articles, *supra* note 84, Article 49.

107 Responsibility Articles, *supra* note 84, Article 51.

108 JAMES CRAWFORD, THE INTERNATIONAL LAW COMMISSION'S ARTICLES ON STATE RESPONSIBILITY, 284 (2002).

109 Question of defining Aggression, Memorandum submitted by Richard Alfaro, May 30, 1951, at 37 U.N. Doc. A/CN.4/L.8.

Escalus-1 is clearly an element used to destroy Juliet-2, the property of Verona, by de-orbiting it. Therefore, Montague's actions cannot be regarded as a valid countermeasure as it amounts to use of force.

2 The Removal was not a legitimate exercise of the right to self-defence.

Under Article 51, UN Charter, the Right to Self-Defence can only be exercised in cases of an armed attack.¹¹⁰ Even if a customary right were to exist outside of Article 51, it has evolved to include such a prohibition.¹¹¹ The possibility of Juliet-2 colliding with a Romeo satellite owned by Montague, does not amount to an armed attack, as it is not a "*massive armed aggression against the territorial integrity and political independence*" of Montague.¹¹² Hence, Verona submits that Juliet-2's removal cannot be justified as Self-Defence.

3 The Removal is not justified by necessity.

Under Customary International Law, states can breach international obligations on the grounds of necessity to safeguard their *essential interests* against a *grave and imminent peril*.¹¹³ However, necessity can only be invoked in exceptional cases and the threshold for judging the validity of claims is very high.¹¹⁴ Hence, the term "*essential interest*" must be interpreted narrowly, and the *preservation of property* in outer space cannot qualify as Montague's "*essential interest*".

Moreover, as the prohibition on the use of force is a *jus cogens* norm,¹¹⁵ necessity cannot be invoked to justify incursions into it.¹¹⁶ Further, the doctrine of necessity cannot be invoked when there is an alternative means to safeguard the interest, even if it is costlier.¹¹⁷ Verona submits that Montague had the alternative of performing collision-avoidance manoeuvres.¹¹⁸ They could have also approached the Security Council to settle the dispute.¹¹⁹ In any event, given the important storm prediction function performed by the Juliet Satellites, the *balance of interests* would fall in Verona's favour, suggesting a course of action that did not lead to their destruction. Hence, the removal cannot be justified even on the grounds of necessity.

110 Ian Brownlie, *Use of Force in Self-Defense*, 37 BRIT. Y. B. INT'L L. 183, 209 (1961); Oil Platforms (Iran v United States of America) (Merits) 2003 ICJ 161, 187 (Nov. 6).

111 *Id.*

112 ANTONIO CASSESE, INTERNATIONAL LAW, 354 (2005).

113 Responsibility Articles, *supra* note 85, Article 33.

114 Robert Sloane, On the Use and Abuse of Necessity in the Law of State Responsibility, 51 (Boston University School of Law, Working Paper No. 11-16, 2011).

115 Military and Paramilitary Activities in and against Nicaragua (Nicaragua v USA) (Merits) 1986 ICJ 14, 100 (Jun. 27).

116 Article 26, Responsibility Articles, *supra* note 84; Corfu Channel (UK v. Albania) (Merits) 1949 I.C.J. 4 (Apr. 9), Judge Kyrlov, 'dissenting opinion'.

117 Case Concerning the Gabčíkovo-Nagymaros Project (Hungary v. Slovakia) (Merits) 1997 ICJ 7, 43 (Sep. 25).

118 Compromis §17.

119 U. N. CHARTER, art. 34.

A state that is internationally responsible for a wrongful act is obligated to make full reparation for the injury, caused by that act.¹²⁰ Therefore, Verona is entitled to be made good by Montague for the loss of Juliet-2.

IV Montague Is Liable for the Damage Suffered in Verona during the 2012 Monsoonal Storm.

The collision between Juliet-1 and Romeo-22 followed by the removal of Juliet-2 by Escalus-1 left Verona without sufficient advance warning of the 2012 monsoonal storm. Thousands of lives and homes were claimed by the storm.¹²¹ Had Juliet-1 and Juliet-2 remained intact, Verona could have adequately prepared for the storm and prevented the loss of life, property and environmental damage that it occasioned.¹²² Hence, Verona submits that Montague is liable under LIAB [A], Article VII, OST [B], and General International Law [C] for this damage.

A Montague is liable under Article II, LIAB.

A State is *absolutely liable* under Article II, LIAB for damage suffered on the surface of the Earth if - *firstly*, the claim is brought against the “*launching state*” of a space object; *secondly*, there is “*damage*” as defined by Article I(a), LIAB; and *thirdly*, the damage was caused by that space object.¹²³

Montague is liable for the damage occasioned by the storm as it is the launching State of Romeo-22 and Escalus-1 [1], loss of life, loss of property and environmental damage are compensable under Article I(a), LIAB [2], and the damage was *caused* by its space objects [3]. Finally, Montague is not exonerated from liability under Article VI [4].

1 Montague is the launching State of Romeo-22 and Escalus-1.

Admittedly, Montague does not own Escalus-1.¹²⁴ However, it was launched with Montague’s express permission and on its initiative.¹²⁵ Hence, under Article I(c), LIAB Montague is the “*launching state*” as it “*procured*” the launch of Romeo-22,¹²⁶ and Escalus-1.

2 Loss of Life, Loss of Property and Environmental Damage are compensable under LIAB.

The loss of life and property amount to damage under Article I(a) LIAB. Hence, the deaths of three thousand citizens and the destruction of houses and

120 Responsibility Articles, *supra* note 84, Article 34.

121 Compromis §25.

122 Compromis §26.

123 Article II, LIAB; Stephen Gorove, *Cosmos 954: Issues of Law and Policy*, 6 J. SPACE L. 137, 139 (1978).

124 Compromis §18.

125 Compromis §19, 20.

126 *Supra* 1(B).

businesses in Verona are compensable under LIAB. Article VIII (2), LIAB also allows Verona to present a claim for the loss of lives of international visitors in its territory.¹²⁷

The storm also led to a leak of toxins into Verona's coastal waters, resulting in the loss of fisheries.¹²⁸ Verona submits that this environmental damage is recoverable under LIAB.¹²⁹ Although the term *environmental damage* is not explicitly included in the definition of "damage", it is encompassed by the term "loss of property".¹³⁰ This may be inferred from the fact that the environment *per se* is recognized as having independent value,¹³¹ and damage caused to it is understood as a loss thereof.

Further, any ambiguity in the interpretation of "loss of property" must be resolved in favor of the victim.¹³² An interpretation that excludes environmental damage would be inconsistent with the victim oriented purpose of the LIAB, reflected in the principle of "full and equitable reparation" under Article XII,¹³³ which seeks to wipe out all consequences of the damaging act and restore the victim to the state he was in prior to occurrence of the damage.¹³⁴

3 The damage suffered during the 2012 monsoonal storm was caused by Montague's space objects.

Verona submits that the indirect nature of the damage does not bar recovery of compensation under LIAB [a] and that the test for causality is that of proximate cause [b]. In the facts of this case, Montague's space objects, Romeo-22 and Escalus-1 are the proximate cause of the damage suffered in Verona [c].

a) The indirect nature of the damage does not bar recovery of compensation under LIAB.

Admittedly, the damage suffered in Verona as a result of the monsoonal storm is indirect, i.e. separated from the initial event by intermediary links.¹³⁵ Montague may contend that such indirect damage cannot be recovered, as only

127 Article VIII(2), LIAB.

128 Compromis §25.

129 H.E. Qizhi, *Environmental Effects of Space Activity and Measures of International Protection*, 16 J. SPACE L. 117, 124 (1988).

130 PHILIPPE SANDS, *PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW*, 897 (2nd ed., 2003).

131 Bernie & Boyle, *supra* note 81, at 122; Francisco Vicuna, *Final Report prepared for the Eighth Committee of the Institute of International Law by the Rapporteur on the subject of Environmental Responsibility and Liability* 10 GEORGE. INT. ENV'T'L. L. REV. 279, 299-300 (1998).

132 N.M. MATTE, *AEROSPACE LAW: FROM SCIENTIFIC EXPLORATION TO COMMERCIAL UTILIZATION*, 169 (1977).

133 Article XII, LIAB; Preamble, LIAB; Article 31(1) VCLT; Article 31(2), VCLT; A.A. Cocca, *From Full Compensation to Total Responsibility*, 26 I.I.S.L PROC. 157, 158 (1983).

134 *Factory at Chorzow* (Ger. v. Pol)(Merits) 128 P.C.I.J (ser. A) No.17 at 47; Christol, *supra* note 11, at 358.

135 Christol, *supra* note 11, at 360.

damage caused directly by physical impact is compensable under LIAB. However, the indirect nature of the damage does not bar recovery of compensation under LIAB.¹³⁶ A literal interpretation of the term “*caused by*” in Article II only requires a causal link between the space object and the damage caused.¹³⁷ The *travaux* clearly indicates that these words were chosen specifically to avoid the conclusion that the treaty was restricted to cases of physical impact.¹³⁸ The LIAB must be interpreted in light of principles of International Law,¹³⁹ where the distinction between direct and indirect damage has been rejected as fanciful, arbitrary and unintelligible.¹⁴⁰ Such a rigid distinction would defeat the object and purpose of the treaty, which is to restore the victim to *status quo ante*.¹⁴¹ Hence, Verona submits that the indirect nature of the damage does not preclude its recovery under LIAB.

b) The test of causality in LIAB requires proof of ‘proximate causation’.

Even if LIAB allows compensation for indirect damage, it permits recovery only if the damage is a reasonably *proximate* result of the initial act.¹⁴² The test of proximate causation is twofold.¹⁴³ *Firstly*, the initial act must be the *cause in fact* of the damage, i.e. the damage must be such that it would not have occurred “*but for*” the initial act.¹⁴⁴ *Secondly*, the act must be the *legal cause* of the damage.¹⁴⁵ An act is the legal cause of damage if the damage flows from

136 Article 31 (1), VCLT; B.D. Kofi Henaku, *Liability of the GNSS Space Segment Provider*, 21 ANNALS AIR & SPACE L. 143, 166-167 (1996); Ricky Lee, *Reconciling International Space Law with the Commercial Realities of the Twenty First Century* 4 SING. J. INT. COMP. L. 194, 225 (1994).

137 Christol, *supra* note 11, at 369-370; W.F. Foster, *The Convention on International Liability for Damage Caused by Space Objects*, 10 CAN. YB. INT’L. L. 137, 161 (1972).

138 Comm. on the Peaceful Uses of Outer Space, Legal Subcomm, Rep. on its 7th Sess., 94th mtg., June 4-13, 1968, UN. Doc. A/AC.105/C.2/SR.94 (Jul.22, 1968).

139 Article 31(3)(c) VCLT.

140 South Porto Rico Sugar Company (US. v. Ger) 7 R.I.A.A, 44, 62-63 (1923); Lusitania (US v. Ger) 7 R.I.A.A 23, 39 (1923); Rep. of the Int’l Law Comm’n, 30th session, May 1-July 7 1971, 40-42, UN Doc. A/CN.4/SER.A/1961/Add.1 (1961) [hereinafter, Ago Report]; Clyde Eagleton, *Measuring Damages in International Law*, 39 YALE L. J. 52, 66-75 (1929-1930).

141 Preamble, LIAB; Factory at Chorzow (Ger. v. Pol)(Merits) 128 P.C.I.J (ser. A) No.17 at 47.

142 Paul Dembling, *Cosmos 954: Space Treaties*, 6 J. SPACE L. 129, 135 (1978); CARL Q. CHRISTOL, THE MODERN INTERNATIONAL LAW OF OUTER SPACE, 97 (1982); B.D. Kofi Henaku, *Liability of the GNSS Space Segment Provider*, 21 ANNALS AIR & SPACE L. 143, 166-167 (1996).

143 Rep. of Int’l Law Comm’n, 53rd sess., April 23-June 1, July 2-Aug 10, 2001, U.N. Doc; GAOR, 56th Sess., Supp. No.10 (2001).

144 H.L.A.HART & T.HONORE, CAUSATION IN THE LAW 114-121 (1985); Glanville Williams, *Causation in Law*, 19 CAM. L. J 62, 63 (1961).

145 Hart & Honore, *supra* note 144, at 110.

the act as a “*normal and natural consequence*” or is a “*reasonably foreseeable*” consequence of the original act.¹⁴⁶

c) Romeo-22 and Escalus-1 have proximately caused the damage.

Verona submits that Romeo-22 and Escalus-1 have proximately caused the damage as they rendered the Juliet Satellites non-operational [i]. Alternatively, assuming Juliet-1 and Juliet-2 were already non-operational, Romeo-22 and Escalus-1 impeded the successful recovery of functionality of the satellites [ii].

i. Romeo-22 and Escalus-1 have proximately caused damage by rendering the Juliet Satellites non-operational

It has been previously submitted that despite loss of control Juliet-1 and Juliet-2 were *still functional*.¹⁴⁷ *But for* the collision and de-orbiting that rendered them non-functional, they would have continued to transmit weather observation data, which would have effectively warned Verona of the impending storm.¹⁴⁸ It is *reasonably foreseeable* that physical damage to weather observation satellites would result in their non-availability for crucial prediction purposes. Hence, Romeo-22 and Escalus-1 are the proximate causes of the damage to Verona.

ii. Alternatively, assuming Juliet-1 and Juliet-2 were already non-operational, Romeo-22 and Escalus-1 impeded the successful recovery of functionality of the satellites.

Even if Juliet-1 and Juliet-2 were non-operational by virtue of being out of control, at the time of collision and de-orbiting respectively, the functionality of the satellites could have been restored in the immediate future. *But for* Romeo-22 and Escalus-1, the damage due to the 2012 monsoonal storm would not have occurred as Juliet-1 and Juliet-2 would have been recovered in time to predict the severity of the monsoonal storm.

The near-certainty of recovery is proven by the fact that Verona was *always* attempting to recover the Juliet constellation¹⁴⁹ and that all the remaining satellites in the constellation, suffering from the same problem, were recovered in December, 2011.¹⁵⁰

Montague may rely on Tybalt’s report to contend that chance of recovery was low,¹⁵¹ and hence, the damage was not *reasonably foreseeable*. Even in that case, Verona submits that the damage was *reasonably foreseeable* as in case of ultra-hazardous activities, the test of *reasonable foresight* is fulfilled if the risk

146 Administrative Decision No. II (U.S. v. Ger.) 7 R.I.A.A 23, 30 (1930); Dix Case (U.S. v. Ven.) 9 R.I.A.A 119, 121 (1903); Special Rapporteur on State Responsibility, *Second Report of the Special Rapporteur*, 16-17, UN Doc. A/CN.4/425 & Corr.1 and Add.1 & Corr.1 (Jun.9, 22, 1989) (by Mr. Gaetano Arangio-Ruiz); Rep. of the Int’l Law Comm’n, 58th session, May 1-June 9, July 3-August 11, 2006, 157 U.N.Doc. (A/56/10); GAOR, 61th Sess., Supp No. 10 (2006) [hereinafter, Liability Articles]; Hart & Honore, *supra* note 144, at 254-290.

147 *Supra* note 1(B).

148 Compromis §26.

149 Compromis §8, 22.

150 Compromis §24.

151 Compromis §17(a), 17(b).

of loss, however small, was inherent in the activity [a]. Alternatively, the mere denial of the opportunity to recover satisfies the test of proximate causation [b].

ii.a. The test of reasonable foresight is fulfilled if the risk of loss, however small was inherent in the activity

The standard of reasonable foresight is contingent on the nature of liability imposed. The standard of absolute liability is applied in Article II, LIAB because outer-space activities are *ultra-hazardous* and ordinarily pose a *low risk* of causing *disastrous* harm.¹⁵² If the occurrence of a *low probability contingency* were not considered *reasonably foreseeable*, liability would be precluded in every case unless there is intentional harm or gross negligence, defeating the object and purpose of the treaty.¹⁵³ Hence, in case of ultra-hazardous activities, any damage should be considered *reasonably foreseeable* if it can be proven that the risk of loss, however small, did in fact exist and was by its nature, *a risk inherent in the activity*.¹⁵⁴ The *travaux* supports such an interpretation. States agreed that a falling satellite would be considered the cause of damage even when it was forced off its controlled path upon being struck by lightning.¹⁵⁵ They disregarded the fact that the damage would not have occurred if this low probability event had not materialized, as lightning *did* strike the satellite. Thus, damage was considered recoverable even if a low probability event materializes,¹⁵⁶ as such risks are inherent in space activities.

Similarly, in the facts of this case, the risk of a collision damaging a satellite capable of being recovered, is inherent in space activities. Further, recovery of control is a dynamic process, naturally subject to numerous vagaries and it is not uncommon that it may at a certain point be considered a low probability outcome, only to be considered a high probability instance later.¹⁵⁷ Thus, States persist in attempting to recover satellites even when the probability of success is very low at a given point.¹⁵⁸ Hence, damage caused through interference with a recovery process, is *reasonably foreseeable*.

ii.b. Alternatively, the mere denial of the opportunity to recovery, satisfies the test of proximate causation

It is a general principle of law that the denial of a valuable *opportunity* (loss of chance) to avoid serious damage, no matter how low the probability of

152 Transboundary Harm Articles, *supra* note at 28, Article 2(a).

153 Article 31(1), VCLT.

154 Special Rapporteur on International Liability, *Third Report of the Special Rapporteur*, Int'l L. Law Comm., 58, U.N. Doc DA/CN.4/360 (Jun.28, 1982) (by Robert Quentin-Baxter).

155 Comm. on the Peaceful Uses of Outer Space, Legal Subcomm, Rep. on its 4th Sess., 50th mtg., September 28, 1965, 7-10, U.N. Doc. A/AC-105/C.2/SR.50 (Nov. 30, 1965).

156 *Id.*

157 Y. Murata, *HALCA's Operating Efficiency and Lifetime*, PROC. OF THE VSOP SYMPOSIUM, 9 (2000); Robert Dudley, *Rescue in Space*, 95(1) AIRFORCE-MAGAZINE.COM (January 2012) <http://www.airforce-magazine.com/MagazineArchive/Pages/2012/January%202012/0112space.asp> DAVID M. HARLAND AND RALPH D. LORENS, SPACE SYSTEMS FAILURES, 281 (2005).

recovery, fulfills the test of proximate cause.¹⁵⁹ The destruction of Juliet-1 and Juliet-2 by Romeo-22 and Escalus-1 respectively denied Verona of the valuable opportunity to recover these satellites, establishing an adequate causal link. Hence, Montague is liable under Article II.

4 Montague is not exonerated from the standard of absolute liability.

A launching state is exonerated from absolute liability if the claimant has been *grossly negligent*.¹⁶⁰ In such a case, the standard of liability decreases to fault.¹⁶¹ The standard for establishing such gross negligence is onerous and significantly higher than the standard for establishing ordinary negligence.¹⁶² Only highly reckless conduct that completely disregards all the consequent danger can be said to constitute gross negligence.¹⁶³

Montague may contend that Verona was grossly negligent in failing to employ any alternative weather prediction mechanisms to replace the Juliet satellites and avert the disaster arising from the storm. Verona submits that it never abandoned conventional methods of weather prediction as the Juliet Constellation was only meant to *support* efforts to predict the storms.¹⁶⁴

Montague may contend that Verona could have replaced the Juliet Satellites. However, the prediction capacity of the Juliet satellites was highly unique and advanced and not easily replaceable. This is clear from the fact that the Juliet satellites were *some of the largest* earth observation satellites weighing sixteen tons,¹⁶⁵ and twice the size of Envisat, one of the most advanced weather prediction satellites.¹⁶⁶ Verona was prejudiced by the absence of the capacity of these satellites to render a warning *sufficiently in advance*.¹⁶⁷

Even if Verona was grossly negligent, Montague is not exonerated from the standard of absolute liability as Montague is at fault for the collision and de-orbiting as previously submitted.¹⁶⁸

158 EUROPEAN SPACE AGENCY, *ESA declares end of mission for Envisat*, http://www.esa.int/esaCP/SEM1SXSWT1H_index_0.html; BBC NEWS, *Scientists find lost satellite*, <http://news.bbc.co.uk/2/hi/science/nature/140994.stm>; BBC NEWS, *Stricken Mars probe Silent*, <http://www.bbc.co.uk/news/science-environment-15698439>.

159 CHRISTIAN VON BAR ET AL, *THE INTERACTION OF CONTRACT LAW AND TORT AND PROPERTY LAW IN EUROPE* 83-86 (2004); Helen Reece, *Losses of Chances in Law*, 59 MOD. L. REV. 188 (1996).

160 Article VI, LIAB.

161 *Id.*

162 See K. Wiewiorowska, *Some Problems of State Responsibility in Outer Space Law*, 7 J. SPACE L. 23, 35 (1979).

163 Cecil A. Wright, *Gross Negligence*, 33 U. TORONTO L.J. 184, 189 (1983); 65 CJS 'gross negligence' §8(4).

164 Compromis §1.

165 Compromis §2.

166 Peter b. de Selding, *European Space Agency declares Envisat satellite lost* (May 9, 2012) http://www.spacenews.com/earth_observation/120509-envisat-declared-lost.html.

167 Compromis §25.

168 *Supra* 1, 2.

B Montague is liable to Verona under Article VII, OST.

The OST holds a launching State internationally liable for the “*damage*” “*caused by*” its space object on the surface of the earth under Article VII.¹⁶⁹ The loss of life and property suffered by Verona is “*damage*” within the meaning of the OST.¹⁷⁰ In addition, the OST does not restrict “*damage*” by a strict definition, and allows compensation for environmental damage.¹⁷¹ Further, the treaty establishes a regime of strict liability,¹⁷² only requiring proof of a causal link.¹⁷³ It has already been established that the damage has been caused by Romeo-22 and Escalus-1. Hence, Verona submits that Montague is liable for the damage under Article VII, OST.

C Montague is liable under Customary International Law.

International Law holds the “*operator*” of an *ultra-hazardous activity* that poses a risk of serious damage *strictly liable* for the *harm caused to another country’s property* by property in its control.¹⁷⁴ Admittedly, there is no consensus on the liability of the “*state*” for the damage caused by a private operator undertaking an ultra-hazardous activity within its territory.¹⁷⁵ The standard of liability is alternatively proposed as strict, or as based on due diligence.¹⁷⁶ However, if the state itself is the operator of the activity, it is clear that the state is *strictly liable for damage caused*.¹⁷⁷

As Space activity is presumed to be ultra-hazardous,¹⁷⁸ Verona submits that Montague is the operator of Romeo-22 and Escalus-1. In International Law, the owner of an undertaking, or the entity in charge of its daily maintenance, or an entity in ultimate control of the undertaking is the operator.¹⁷⁹ Montague owns Romeo-22.¹⁸⁰ Escalus-1 was launched with Montague’s permission and at its behest.¹⁸¹ Thus, Montague is thus the operator of both these satellites. Hence, as Montague is the operator of the space objects that caused damage to Verona,¹⁸² it is *strictly liable* for the same.

169 Article VII, OST.

170 Armel Kerrest & Lesley Jane Smith, *Article VII, in 1 COLOGNE COMMENTARY ON SPACE LAW*, 126, 141 (Stephan Hobe et al. eds. 2009).

171 Gorove, *supra* note 123, at 143.

172 Paul. Dembling, *A Liability Treaty for Outer Space Activities*, 19 AM. U.L. REV 33, 38 (1970).

173 Kerrest, *supra* note 170, at 163.

174 Liability Articles, *supra* note 146, at 116; Robert Rosenstock, *The Fiftieth Session of the International Law Commission*, 93 AM. J.INT’L.L. 236, 241-242 (1996).

175 *Id.*

176 M. FITZMAURICE et al., *RESEARCH HANDBOOK ON INTERNATIONAL ENVIRONMENTAL LAW*, 182, 289, 325 (2010); Julio Barboza, *International Liability for the Injurious Consequences of Acts Not Prohibited by International Law and Protection of the Environment*, RECUEIL DES COURS 247, 291 (1994).

177 *Id.*

178 Jenks, *supra* note 16.

179 Liability Articles, *supra* note 146, at 138-139.

180 Compromis §3, 4.

181 Compromis §19, 20.

182 *Supra* 4(A)(II).

Submissions to the Court

For the foregoing reasons, the Republic of Verona, Applicant, respectfully requests this Court to adjudge and declare that:

1. Montague is liable to Verona for the damage to the Juliet-1 satellite due to its collision with the Romeo-22 satellite.
2. Verona is not obligated to take actions to preserve the space environment by minimizing the potential threat to the use of outer space by arranging for the de-orbit of satellites in its Juliet system at the end-of-life, and by securing each satellite's battery and propulsion system to substantially reduce risks of explosion at end-of-life.
3. Montague is liable for the loss of the Juliet-2 satellite as it was unlawfully removed from orbit.
4. Montague is liable for the deaths, terrestrial property loss, and environmental poisoning suffered in Verona during the 2012 monsoonal storm.

Memorial for the Respondent the Commonwealth of Montague

National & Kapodistrian University of Athens, Greece.

Ms. Aikaterini Pitsoli, Ms. Melina-Asimina Stroungi, Ms. Stefania Vlachou

Faculty Advisor: Dr. Georgios Kyriakopoulos.

ARGUMENT

I Verona Is Liable to Montague for the Damage Done to Romeo-22 in Its Collision with the Juliet-1

Verona is liable to Montague for the damage caused to Romeo-22 in its collision with Verona's Juliet-1, under article III of the Liability Convention. The fault of Verona is based on breaching its obligation of informing under the OST and violated the Clean Hands Doctrine¹ as well, while Montague was unable and not obliged to perform any collision avoidance maneuvers.

A Verona is liable for the destruction of Romeo-22, under article III of the Liability Convention

According to Article III of the Liability Convention, in the event of damage being caused elsewhere than on the surface of the Earth to a space object of a launching State by a space object of another launching State, the latter shall be liable only if the damage is due to its fault.

1 Juliet-1 and Romeo-22 are space objects.

The Juliet 1-5 as well as the 30 Romeo satellites are space objects, since the term is used to cover space crafts, satellites, and in fact anything that human beings launch or attempt to launch into space². It is therefore clear that Juliet-1 and Romeo-22 are indeed space objects.

2 Verona and Montague are launching States.

Both Verona and Montague are launching States, since in terms of article I(c) of the Liability Convention, a State is characterized as launching when it *inter alia* launches or procures the launching of a space object. As it is stated in the agreed

1 As to why principles of international public law are used in the present memorial, Article III of the OST lays down one of the fundamental principles of space law, namely the principle of applicability of international law, which due to its wide acceptance and long standing practice can be considered a general principle of international law.

2 B.Cheng, "Liability/Responsibility", p.297.

facts, Verona indeed launched the Juliet satellites in order to detect weather conditions and to receive necessary information for its civil defense forces³, and therefore is the launching State of the Juliet constellation. Montague, on the other hand, procured the launching of the Romeo constellation through Tybalt Enterprises, a private entity under the laws of Montague⁴, and thus constitutes a launching State as well.

3 Juliet-1 caused damage to Romeo-22 in outer space.

According to article I(a) of the Liability Convention, damage means among others, loss of, or damage to property of States. Applying theory to facts, the Juliet-1/Romeo-22 collision took place in LEO, therefore “elsewhere than on the surface of the Earth”, between two space objects of launching States: Juliet-1 of Verona and Romeo-22 of Montague. As a result of the collision, immense damage was caused to Romeo-22, rendering it no longer functional⁵.

4 The destruction of Romeo-22 is due to Verona’s fault

As it concerns the fault prerequisite of article III of the Liability Convention, it is clearly Verona’s. Fault constitutes of any act or inaction which violates an obligation⁶. In the present case, Verona’s fault is fulfilled since it violated its obligation arising from article XI of the OST.

Under the aforementioned article, “*while promoting international cooperation in the peaceful exploration and use of outer space, States - Parties to the Treaty conducting activities in outer space, including the Moon and other celestial bodies, agree to inform the Secretary-General of the United Nations as well as the public and the international scientific community to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities*”. The obligation which, therefore, derives from the wording of article XI of the OST is that, of informing the international community about space activities⁷.

Verona was absolutely aware of the fact that the Juliet constellation it launched was rendered completely uncontrollable and unable of returning to functional status⁸. Until the collision between Juliet-1 and Romeo-22, the Juliet constellation still broadcasted satellite health and status information to Verona⁹, constantly re-affirming that the five Juliet satellites had not yet reset automatically as was hoped by Verona, in order to continue their mission. Nevertheless, Verona refrained from informing anyone at all, characterizing the issue as “*an internal security matter*”¹⁰.

3 Compromis, paragraph 1, 16.

4 Compromis, paragraph 3, 4.

5 Compromis, paragraph 14.

6 B.Cheng, “General Principle of Law”, p.225.

7 R.Bender; R.S.Jakhu, p.12.

8 Compromis paragraph 7, 8.

9 Clarification no. 2.

10 Compromis paragraph 8.

By further expecting for a whole year¹¹ the system to reset, Verona wittingly ignored the high risk of collisions within LEO, the most “populated” Earth orbit, and the subsequent threat such a voluminous uncontrolled constellation could pose to the rest of the international community, both in outer space and the surface of the Earth¹².

By this behavior, Verona clearly breached its international obligation deriving from article XI of the OST and actually set the basis of its fault as it concerns the collision between its satellite and Montague’s Romeo-22.

B Verona breached the Clean Hands Doctrine.

By acting in a manner that was not fair, equitable and honest¹³ Verona has clearly breached the Clean Hands Doctrine. According to the aforementioned doctrine, “an injured party’s wrong-doing may limit its claim to reparation¹⁴”, since as it is graphically put “its ‘hands’ are not clean¹⁵”. The “wrong-doing” consists of Verona’s breaching of the OST and simultaneous fault over the collision, consequently leading to Verona’s exclusion from any compensation claims.

C Montague itself holds no liability over the collision.

On the contrary, Montague was under no way obliged to maneuver any of its satellites.

This is based upon the interpretation of the *common interest* principle, found in article I of the OST¹⁶, according to which, the only use of space exercised under the notion of “common interest” is that which targets at each State’s economic benefits resulting from the exploitation of outer space¹⁷. Since by moving any of its satellites, Montague would undergo not only economic, but also objective damage as this maneuver would decrease its satellites lifespan and endanger their mission, Montague did not have any obligation of performing any conjunction avoidance maneuvers, especially when the collision was regarded as of extremely low probability, according to its scientists¹⁸.

In any case, Montague would have not been able to perform any kind of maneuver after Verona’s non-cooperation during Montague’s efforts to communicate¹⁹. This is due to the fact that according to numerous collision estimation

11 Compromis, paragraph 7, 24.

12 Compromis paragraph 2.

13 P.C.Tobin, p.60; A.Shapovalov, p.856; UN Yearbook 2008.

14 L.J.Laplante, p.65.

15 P.Malanczuk, p.269.

16 Article I of the OST States that “The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind”.

17 M.Benkö, W.de Graaff, G.C.M.Reijnen, p.74.

18 Compromis, paragraph 11.

19 Compromis, paragraph 13.

and avoidance Guidelines²⁰, the time left was not enough in order for a maneuver to be organized, uploaded into the satellites' software and executed correctly.

It is consequently clear that since all prerequisites of article III of the Liability Convention are fulfilled and Montague could have done nothing on its behalf, in order to prevent this highly unlikely collision from taking place, Verona is indeed liable to Montague for the damage caused to Romeo-22 in its collision with Juliet-1.

II Montague Is Not Liable for the Loss of the Juliet-2 Satellite. Verona Is under a Duty to Take Actions to Preserve the Space Environment by Minimizing the Potential Threat to the Use of Outer Space by Arranging for the De-Orbit of Satellites in Its Juliet System at the End-of-Life, and by Securing Each Satellite's Battery and Propulsion System to Substantially Reduce Risks of Explosion at End-of-Life

Montague is not liable for the loss of Verona's Juliet-2 satellite, because its de-orbit by Montague's Escalus-1 robotic system was the only solution in order to protect all other space faring States' systems located in outer space.

The Juliet constellation, including Juliet-2, after the malfunction occurred, constitutes space debris. Thus, Verona should have de-orbited its satellites, due to its obligation of preserving the space environment and minimizing the threat to the use of outer-space²¹. *Per contra*, Verona continued acting in the same irresponsible manner and refrained from fulfilling its customary obligation. In any case, Verona, after being informed about Montague's plans of safeguarding the space environment and protecting its own property, tacitly acquiesced to them.

A The Juliet constellation satellites pose a grave and imminent peril to space objects in orbit.

1 Juliet-2 constitutes space debris

The Juliet constellation, including Juliet-2, constitutes "space debris". According to the UN COPUOS Debris Mitigation Guidelines and numerous scholars, any non-functional man-made object located in Earth orbit or re-entering the atmosphere, such as an uncontrolled satellite, is characterized as space debris²².

20 Protecting the Space Shuttle from Meteoroids and Orbital Debris (1997), Commission on Engineering and and Technical Systems, NASA Flight Rule A4.1.3-6; NASA Collision Avoidance Maneuver Guidelines; ESA process for the identification and assessment of high-risk conjunction events; JAXA Collision Estimation.

21 F.Lyall, P.B.Larsen, p.303.

22 UN COPUOS Space Debris Mitigation Guidelines, p.1; L.Perek, p.43; H.Klinkrad, p.27; N.N.Smironov, p.1-229; L.Anselmo, p.1003.

The Juliet satellites meet all the aforementioned conditions, being man-made objects located in LEO, and also non-functional, since their inoperability was indeed determined by their State of Registration, Verona, through its behavior²³. Consequently, it comes without any doubt that Verona's Juliet-2 satellite does indeed fall within the notion of space debris.

2 The Juliet-2 space debris endangers the space environment and the safe use of outer space

Since the commencement of human activity in outer space in 1957, an augmenting number of man-made objects have been introduced in the region. Several of the objects launched to space are now space debris, moving in orbits around the Earth at speeds that render them constantly hazardous towards other operating space objects and manned space crafts, let alone the hazard on Earth²⁴.

The increasing presence of space debris will consequently enlarge the number of collisions, therefore creating more space debris in a process called the *Kessler Syndrome*²⁵. According to it, the escalating amount of debris in orbit could eventually render space exploration, even the mere use of satellites, "too prone to loss to be feasible for many generations"²⁶.

Following the events of September 2011 and March 2012 when the ISS was threatened by space debris generated either by collisions or by *res derelictae*²⁷, the necessity of taking measures is more than evident.

Bearing under consideration the fact that the uncontrolled Juliet constellation consists of the largest Earth observation satellites ever put into orbit²⁸, the grave peril and necessity to act are more than obvious. If, for instance, a collision should take place between the ISS and any of the Juliet satellites, the result would be such an amount of cascading space debris that LEO could be rendered practically impassable. Therefore, the de-orbiting of the Juliet satellites, which are no longer functional space objects, is the only effective means to keep LEO clean and safe²⁹.

23 Compromis, paragraph 7, 8; Clarification no. 2.

24 Examples of collisions with operating space objects are those of the Kosmos 1275 and Kosmos 1484; possible collisions with manned space crafts occurred inter alia in the STS-48, STS-53, STC-72 and STC-82 Space Shuttle Missions; a characteristic example of what could have happened on Earth is the 2003 Columbia disaster, where large parts of the space craft reached the surface of the Earth.

25 M.T.Savage 149; J.Schefter, p.48; W.S.Wong, J.Ferguson, p.69.

26 S.Tkatchova, p.213.

27 International Space Station Crew Forced to Evacuate, The Telegraph, 28 June 2012; Space Evasion: debris threatens ISS in www.rt.com, 29 September 2011; Near Miss: ISS narrowly escapes debris disaster in www.rt.com, 24 March 2012.

28 Compromis, paragraph 2.

29 R.Jehn, p.451.

B In order to minimize the threat to the use of outer space, Verona should have de-orbited Juliet-2 by adopting debris mitigation measures.

Given the danger posed to all space faring States' systems located in outer space by Verona's satellites, it is clear that Verona must fulfill its international obligations of preserving the space environment and securing the use of outer space. According to articles VI³⁰ and VII³¹ of the OST, as well as article III of the Liability Convention, it is clear that no other State but Verona is obliged to take initiatives in order to mitigate the threat. These steps, consist of taking debris mitigation measures³² the adoption of which has been already characterized as emerging international customary law³³.

1 Debris mitigation measures as emerging customary law

Verona should have adopted debris mitigation measures regarding its Juliet constellation, as this obligation is of customary nature.

The emerging customary character of the aforementioned measures derives beyond any doubt from the activity of the UN/GA, as well as from rich State practice³⁴.

The UN General Assembly Resolution 60/99³⁵, as well as the UN UN COPUOS Debris Mitigation Guidelines GA/RES/26/217³⁶ reflect an *opinio juris* of States on that matter. This is because it is accepted that guidelines adopted by UN Resolutions reflect a strong expectation that members of the international community will abide by them³⁷.

30 Article VI of the OST States the following: "State Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities ...".

31 Article VII of the OST States that "Each State Parties to the Treaty that launches or procures the launching of an object into outer space, including the moon and other celestial bodies, (...) is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in the air or in outer space, including ...".

32 D.H.Kim, p.322; F.Alby, p.283-290; Orbital Debris. p.125-128; ISS Debris Protection Techniques, p.8191-8200; E.Levin, p.100-108; J.Mason, p.1643-1655.

33 M. Mejia-Kaiser, "Debris Mitigation"; K.Gable, p.4.

34 Article 38(1)(b), ICJ Statute; I.H.P.Diederiks-Verschuur, V.Kopal, p.9-10; A.Perreau-Saussine, J.B.Murphy, p.274; H.W.A.Thirlway, p.1-158; P.Malanczuk, p.39 and 68.

35 International Cooperation in the Peaceful uses of Outer Space, UN GA/RES/60/99 (2005), paragraph 27: "*The General Assembly [...] considers that it is essential that Member States pay more attention to the problem of collisions of space objects ... with space debris, and other aspects of space debris, calls for the continuation of national research on this question, ... and agrees that international cooperation is needed to expand appropriate and affordable strategies to minimize the impact of space debris on future space missions*".

36 UN COPUOS Space Debris Mitigation Guidelines.

37 B.Cheng, "UN/RES on outer space", p.133.

By further endorsing, through GA/RES/26/217, the pre-existing IADC Guidelines on debris mitigation, the General Assembly also “agrees that the voluntary guidelines reflect the existing practices developed by a number of national and international organizations”³⁸. According to this, State practice is clearly demonstrated through several codes of conduct; national legislations on space debris mitigation; and the production of standards by the ISO³⁹, which are harmonized with the UN COPUOS and IADC Guidelines⁴⁰. In fact, the NASA Technical Standard⁴¹; the European Code of Conduct⁴²; the National Standard of the Russian Federation⁴³; the JAXA Debris Mitigation Standard⁴⁴; the Chinese Space Debris Mitigation Design Standards⁴⁵ and the ISO Space Debris Related Standards⁴⁶, demonstrate not only *opinio juris*, but also State practice, since through them, the UN COPUOS and IADC Guidelines have been incorporated within national legislations⁴⁷.

2 *Verona should have taken debris mitigation measures*

Debris mitigation is divided into two broad categories: cutting back on the generation of potentially harmful space debris in the near term, and limiting their generation over the longer term⁴⁸.

The first involves the reduction of the production of mission-related space debris and the avoidance of break-ups⁴⁹. The second concerns the end-of-life procedures that remove decommissioned space objects from populated space regions, such as LEO⁵⁰.

In order to fulfill the aforementioned obligation of performing debris mitigation, Verona should have, as it concerns the first category, implemented safe satellite designs. For example, propulsion systems should be designed in such a way so as to not allow propellants to cause an explosion that would fragment the satellite structure into a myriad of small pieces of debris⁵¹; and batteries should be evaluated and approved so as to not be characterized as able to cause a “catastrophic hazard”⁵². However, as it is stated in the agreed facts, Verona’s

38 UN GA/RES A/RES/62/217, paragraph 27.

39 M.Mejia-Kaiser, “Debris Mitigation, p.32.

40 M.Mejia-Kaiser, “Debris Mitigation, p.26; 4.

41 NASA-STD-8719.14.

42 ESA Requirements on Space Debris Mitigation for Agency Projects, ESA/ADMIN/IPOL (2008)2, Annex 1.

43 <http://lfvn.astronomer.ru/report/0000048//010/index.htm>.

44 Space Debris Mitigation Mechanism in Japan, presentation to the 48th Session of the Legal Subcommittee of the UN COPUOS.

45 <http://www.cnsa.gov.cn/n615708/n.676979/n676983/n886611/66292.htm>.

46 <http://www.iso.org>.

47 M.Mejia-Kaiser, “Debris Mitigation, p.26; J.Nie, p.4.

48 W.Rathgeber, p.185.

49 UN COPUOS Space Debris Mitigation Guidelines.

50 UN COPUOS Space Debris Mitigation Guidelines.

51 J.N.Pelton, R.S.Jakhu,p.123.

52 NASA Safety Requirements.

history of satellites' end-of-life explosions⁵³ proves that the said State has not complied with its obligations.

Furthermore, the end-of-life procedures which constitute the second category of debris mitigation have obviously been breached by Verona, since the State did not de-orbit the Juliet constellation satellites.

C Verona's behavior constitutes clear breach of the due diligence and sic utere tuo principles, justifying Montague's reaction

What is clear from all the above is that Verona did not demonstrate due diligence, a general principle of international law, and violated the *sic utere tuo, ut alienum non laedas* principle.

The due diligence duty of a State standardizes its conduct in such a way so as to protect the rights of other States and not violate them⁵⁴. At the core of the due diligence principle is the existence of injury to the property of another State. In the case at hand, Montague's property was obviously injured by Verona, since Romeo-22 was destroyed and the risk of further collisions between the remaining Juliet and Romeo satellites is ongoing⁵⁵.

Further support is to be found in the *sic utere tuo, ut alienum non laedas* principle, characterized as a "general rule" of international law⁵⁶, found in the *Trail Smelter Arbitration*⁵⁷, as well as the ICJ *Corfu Channel* case⁵⁸. According to the aforementioned principle, a State's property has to be used in such a way so as to not harm that of another State's⁵⁹.

It is however clear that Verona's actions and omissions led to immense damage and injury of Montague's property. Therefore, given Verona's own unwillingness to take the appropriate mitigation measures, it is more than clear that Montague had no other choice but to act. This action is legitimate and lawful according to international law.

D Given Verona's indifference and dangerous conduct, Montague had to take steps in order to safeguard the space environment

1 Montague acted in conformity with international law

Montague is accused as liable for the destruction of Juliet-2 after it's de-orbiting by Montague's Escalus-1 space object.

53 Compromis, paragraph 16.

54 L.Viikari, p.155 ; UN Yearbook 2000; T.Koivurova, p.1; X.Hanquin, p.162; L.M.Jurgielewicz,p.57; A.T.Gallagher, p.447.

55 Compromis, paragraph 1, 3.

56 *Nuclear Tests* case, p.389.

57 *Trail Smelter* case: "under the principles of international law...no State has the right to use or permit the use of territory in such a manner as to cause injury by fumes in or to the territory of another or the properties of persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.", in 35 AJIL 684 (1941).

58 According to the *Corfu Channel* case in p.22, "every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States".

59 G.T.Hacket, p.146.

Nevertheless, Montague rectified⁶⁰ the consequences of Verona's actions, by exercising self-help⁶¹. In any case, Montague was obliged to act, being in a state of necessity. According to article 25(1)(a) of the ILC Articles on State Responsibility, "necessity may not be invoked by a State as a ground for precluding the wrongfulness of an act [...] unless the act is the only way for the State to safeguard an essential interest against a grave and imminent peril". As stated by the ICJ in the *Gabcíkovo–Nagymaros* case, "the state of necessity is a ground recognized by customary international law for precluding the wrongfulness of an act"⁶².

In the present case, Montague's essential interest is to prevent potential collisions of the uncontrolled Juliet satellites with its system. The Romeo satellites' undisturbed operation had to be safeguarded against Verona's voluminous uncontrolled constellation, which could cause new conjunctions anytime within the next 50 years, commencing from Verona's complete loss over the satellites in early January 2011⁶³. Therefore, by acting under a state of necessity, it is clear that Montague's actions are lawful.

2 ***Montague acted with Verona's acquiescence***

In October 2011 Montague launched the Escalus-1 robotic satellite system, whose mission was to de-orbit Juliet-2⁶⁴. It has to be mentioned that the action chosen by Montague, which is removal through an Earth controlled system, such as the Escalus-1, is regarded as one of the most sufficient methods⁶⁵ of space debris mitigation.

Before de-orbiting Juliet-2, Montague issued a diplomatic demarche to Verona, mentioning the grave peril its satellites posed to Montague and demanding that Verona take action⁶⁶. At the same time, Montague's foreign minister, Caesar Brutus, convened a press conference and stated that if Verona failed to act as demanded, Montague would exercise its right of protecting its national interests and take steps to defend its space systems⁶⁷. Verona did not respond to either of Montague's briefings⁶⁸.

Montague considered that Verona, by refraining from a further reaction to the aforementioned statements, tacitly acquiesced to Montague's forthcoming actions. Indeed Verona consented to the de-orbit of Juliet-2 by Escalus-1, by "keeping quiet when a protest was called for"⁶⁹, given Verona's own

60 J.H.W.Verzijl, p.101; R.Lemkin, p. 145-151; J.Paulsson, p.110.

61 J.C.Barker; J.Brunée, "Academia".

62 *Gabcíkovo–Nagymaros* case (judgement), paragraph 51.

63 Compromis, paragraph 7, 15.

64 Compromis, paragraph 21.

65 M.Mejia-Kaiser, "Space Objects", p.4.

66 Clarification no. 5; Compromis, paragraph 20.

67 Compromis, paragraph 20.

68 Compromis, paragraph 20.

69 M.N.Shaw, p.84, 437; P.Malanczuk, p.154; I.McGibbon, "Acquiescence" p.143; I.McGibbon, "Protest in International Law", p.293.

international obligation of preserving the safety and the environment of outer space. Acquiescence is a unilateral manifestation of State will, well-recognized and accepted in international law⁷⁰, found *inter alia* in the Gulf of Maine⁷¹, the El Salvador v. Honduras⁷² and the Georgia vs. South Carolina⁷³ cases. As it has been rightfully considered “[...]’absence de protestation d’un gouvernement face à l’apparition d’une situation de fait ou de droit, susceptible d’avoir des incidences sur ses intérêts, est la plupart du temps considérée comme un acquiescement à la validité et l’opposabilité de cette situation à son égard, sur lequel il ne saurait revenir”⁷⁴.

Consequently, it is more than obvious that Montague is not liable for the loss of Verona’s Juliet-2, since it was Verona’s own duty under international customary law and the existing debris mitigation State practice, to de-orbit its own Juliet-2 space debris. By refusing to do so, Verona tacitly acquiesced to Montague’s actions of de-orbiting Juliet-2, while trying to preserve the safety and environment of outer space from grave and imminent peril.

III Montague Is Not Liable for the Deaths, Terrestrial Property Loss and Environmental Poisoning Suffered in Verona during the 2012 Monsoonal Storm

Montague is not liable for the deaths, terrestrial property loss and environmental poisoning caused by the monsoonal storm in Verona, because it is not connected to them in any possible way. This is due to the fact that Verona’s inability of predicting the storm is not attributable to Montague, but to Verona itself. By not being liable for the loss of the Juliet-1 and Juliet-2 satellites⁷⁵, Montague can not be held liable for the inadequacy of the remaining Juliet constellation to provide sufficient warning data to Verona on time, either. Last but not least, if Verona had taken all necessary precautionary and preventive measures as it should have, following the annual character of the monsoons, none of these catastrophes would have taken place.

A Montague is not connected to the monsoonal storm and the damages it caused.

Since it was not a fault of Montague’s that the entire Juliet constellation, which was supposed to monitor weather conditions⁷⁶, was rendered uncontrollable and inoperable since January 2011, Montague cannot be held liable either for

70 I.McGibbon, “Customary International Law”, p.115-131.

71 *Gulf of Maine* case, paragraph 130.

72 *El Salvador v. Honduras* case, paragraph 80.

73 *Georgia v. South Carolina* case.

74 P.M.Dupuy, p.342.

75 Memorial for the Respondent, p. 1-15.

76 Compromis, paragraph 1.

the Juliet constellation's inability of predicting the storm or the consequent damages the latter caused on Verona's surface.

1 The inoperability of the Juliet constellation is due to Verona's fault and not Montague's

In early January 2011, Verona lost complete control over the Juliet constellation satellites⁷⁷, as a result of the integration of a completely new software patch, which had been never tested before⁷⁸, into the operating system of the Juliet satellites.

Over the time period of a whole year⁷⁹, Verona proved to be unable of finding the solution. By doing nothing in order to resolve the Juliet constellation's technical problem, Verona demonstrated clear negligence over the matter, and failed to use due care in this given situation⁸⁰. Verona's gross negligence⁸¹, as far as the effective administration of the Juliet satellite constellation is concerned, is clearly proved by the fact that, the long-term unresolved Juliet control issue was in fact resolved effectively, only within a month, by Benedick Systems' engineers⁸².

Had Verona decided to cope on time with the technical malfunction of the Juliet satellites and perhaps contracted with Benedick Systems earlier, the evolution of facts would be different. Not only would the Juliet-1/Romeo-22 collision have been prevented, since it took place four months after the loss of control⁸³, but the de-orbiting of Juliet-2 would have been avoided as well, due to the inexistence of future conjunctions risk⁸⁴.

Therefore, by insisting in using technologically inferior resources of its own production⁸⁵ and by not attempting, for a year, to revive the Juliet system, Verona is the sole liable for the inoperability of its own Juliet constellation satellites, and, consequently, for the absence of sufficient warning data as it concerns the 2012 monsoonal storm.

2 Montague is liable neither under the Liability Convention, nor according to the general rules on State responsibility, for the damages caused by the monsoon

a) Montague is not liable under article II of 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 [...]". According to the wording of the aforementioned

77 Compromis, paragraph 7.

78 Compromis, paragraph 7.

79 Compromis, paragraph 7, 24.

80 M.Mejia-Kaiser, "Iridium-Cosmos", p.4.

81 I.H.P.Diederiks-Verschoor,V.Kopal, p.38; L.Viikari, p.66; F.Lyall, P.B.Larsen, p.110.

82 Compromis, paragraph 24.

83 Compromis, paragraph 7, 10.

84 Compromis, paragraph 17.

85 Compromis, paragraph 17.

article, Montague is excluded from liability over the said damages, since the article is inapplicable in the present case. This is because liability under article II solely refers to direct damages caused by space objects on the surface of the Earth⁸⁶. However, the damages in question were caused neither by the Juliet-1/Romeo-22 collision, nor by the Juliet-2 de-orbit by Montague's Escalus-1. Instead, they were clearly caused by a natural phenomenon⁸⁷.

b) In any case Montague's liability is exonerated under article VI of the Liability Convention.

Whatever the case may be, due to Verona's aforementioned gross negligence, Montague is exonerated from liability regarding this matter in conformity with Article VI (1) of the Liability Convention, according to which, "[...] exoneration from absolute liability shall be granted to the extent that a launching State establishes that the damage has resulted [...] from gross negligence [...]".

c) Montague is not liable under the general rules on State responsibility.

Montague cannot be held liable not even under the rules on State responsibility: It did not commit any internationally wrongful act, as it is not liable neither for the satellite collision nor for the satellite de-orbiting, as it has already been explained *in extenso*⁸⁸.

It, consequently, comes without any doubt that Montague is not connected either to the non-acquisition of warning data regarding the monsoonal storm, or the unfortunate events that followed it.

B Verona is the sole liable for the deaths, terrestrial property loss and the environmental poisoning provoked by the monsoonal storm.

Historically, Verona has always suffered from annual monsoons⁸⁹. It is therefore obvious that intense weather conditions such as those presented in the case at hand come natural to Verona, which should have taken all necessary precautionary measures to mitigate the, always, disastrous effects of monsoons.

1 Verona failed to protect its people

Protecting the right to life is a general obligation of States under international law, which can be found in several legal texts, such as article 8 of the Universal Declaration of Human Rights; article 6 of the UN International Covenant on Civil and Political Rights and; article 12 of the European Convention of Human Rights.

86 I.H.P.Diederiks-Verschoor, V.Kopal, p.39 ; Soviet Space Programs.

87 Compromis, paragraph 25.

88 Memorial for the Respondent, p.1-15.

89 Compromis, paragraph 1.

Furthermore, the ECHR has held in the, similar to this case, *Budayeva v. Russia*⁹⁰, that the Russian Federation violated indeed its positive obligation of protecting the right to life, under Article II of the European Convention on Human Rights⁹¹, by failing to establish a legislative and administrative framework which would deter any threat to the right to life.

Under the said Article, there is a positive obligation of the State to safeguard the lives of people within its jurisdiction, depending both on the origin of the threat and the extent on which it can be mitigated. More specifically, the aforementioned obligations apply to imminent, clearly recurring natural calamities affecting a distinct area developed for human habitation⁹².

The monsoonal storm which struck Verona undoubtedly constitutes a natural disaster which recurrently takes place within the distinct area of its territory. This fact reveals that, just like the Russian Federation in the *Budayeva* case, Verona omitted to establish the required administrative and legislative framework in its territory in order to protect all human lives within its jurisdiction.

Furthermore, Verona breached its obligation of adequately informing foreign visitors within its territory, in order to protect them. This obligation derives from the ICJ *Corfu Channel* Case, where Albania was held internationally responsible for failing to inform the British ships about the sea-mines found in its territorial waters. *Mutatis mutandis*, Verona must also be held responsible for neither informing, nor preparing all people found within its territorial jurisdiction⁹³ for the occurrence of a monsoonal storm.

2 Verona failed to protect its property, as well as the land and sea environment

Verona failed to exercise due care⁹⁴, since it did not secure the Beatrice Chemical Plant which conducts extremely hazardous activities and upon which it has⁹⁵. Also given the annual character of the monsoons in Verona, its omission of exercising due care is more than obvious.

a) Verona failed to protect the environment from hazardous activities.

In the present case, while constructing the Plant, Verona was highly aware of the fact that monsoonal storms have always been a frequent, regularly occurring, meteorological phenomenon in its territory. However, it did not take the appropriate measures in order to secure the Beatrice Chemical Plant against the occurrence of a natural disaster. Since the aforementioned Plant was severely damaged by the flooding subsequent to the monsoonal storm, there is clear

90 *Budayeva* case, p.147-160.

91 European Convention.

92 *Budayeva* case.

93 Compromis, paragraph 25.

94 L.Viikari, p.156.

95 R.P.Barnidge, p.8.

evidence that Verona had never demonstrated an adequate environmental care, through the adoption of necessary preventive measures.

As it concerns the protection of the environment, a preventive approach is based on the idea that it is better to prevent environmental damage than to employ measures to restore the environment afterwards.

Prevention has been *la raison d'être* of environmental policy⁹⁶ and as the ICJ has repeatedly stressed, the importance of demonstration of vigilance regarding the adoption and implementation of measures concerning environmental protection is indispensable, due to the nature of the hazard involved. As it is highlighted in the *Gabčíkovo-Nagymaros* case, “*in the field of environmental protection, vigilance and prevention are required on account of the often irreversible character of damage to the environment and of the limitations inherent in the very mechanism of reparation of this type of damage*”⁹⁷.

Verona's aforementioned obligation is further expanded by the relatively new precautionary principle⁹⁸, which is based on the premise that action on environmental matters should be taken even if there is a lack of total scientific certainty⁹⁹. Through its acts and omissions, however, Verona has obviously breached the aforementioned principle as well.

Verona failed to protect the marine environment

The leakage of deadly toxins into Verona's coastal waters and the subsequent damage to Verona's fisheries constitutes contamination of the *marine* environment.

The 1982 LoSC¹⁰⁰ provides a series of articles applicable to the present dispute, concerning the balance between the human economic and technological development and natural environment. By crystallizing international customary law, specific rules of the Convention¹⁰¹ are binding upon Verona, which should act in good faith as a member of the UN¹⁰².

As far as the pollution of Verona's coastal waters is concerned, Article 192 of the LoSC introduces a general obligation for all States to protect and preserve the marine environment¹⁰³. Article 193 of the LoSC also provides for a “*duty to protect and preserve the marine environment*”, which is related to the concept of States' sovereign right to exploit their natural resources. The importance of its preservation is stressed by the fact that, according to Sub-Committee III of the Sea-Bed Committee, the said obligation must be combined with the sovereign right of States of exploiting natural resources, as also with the right to apply national environmental policies to the sea-bed exploration¹⁰⁴.

96 E.Louka, p.50.

97 *Gabčíkovo-Nagymaros* case, paragraph 78.

98 *Supra* note 5.

99 P.W.Birnie, A.E.Boyle, p.98; J.Cameroon, J.Abouchar; L.Gündling, p.23.

100 UN LoSC.

101 L.A.Malone, p.382.

102 *Compromis*, paragraph 29.

103 D.M.Ong, p.570.

104 LoSC Commentary, p.49.

The prescribed balance between these concepts is noticeably disturbed by Verona's practice, since the facts undoubtedly prove that the aforementioned State did nothing in order to secure that the Beatrice Plant would not be a menacing issue to the environment around its coastal waters.

In the same context, Verona also violated Article 196 of the LoSC, which stipulates that "*States shall take all measures necessary to prevent, reduce and control pollution of marine environment resulting from the use of technologies under their jurisdiction or control*". This article recognizes that States, in the context of preserving the aquatic environment and in particular preventing pollution by applying appropriate rules and measures, have to act demonstrating due diligence in respect to all activities taking place under their jurisdiction and control, which Verona has clearly never done.

The aforementioned provisions of the LoSC are also found in principles 6 and 7 of the Stockholm Declaration of 1972¹⁰⁵. These principles underline the necessity for States to take all possible steps so as to prevent pollution of the seas by hazardous substances, which harm living resources and marine life. The two aforementioned principles were obviously violated by Verona, which did not use the best practicable means in its disposal regarding the protection of the environment, in accordance with its capabilities, and thus broke the balance between its economic development and the preservation of the marine and human environment.

Moreover, it is indeed enlightening to underline the correlation between the damage to the large Beatrice Chemical Plant, because of the 2012 monsoonal storm, and the recent similar damage caused to the Fukushima Daiichi Nuclear Plant in Japan, because of a massive earthquake and *tsunami*, which hit this State on March 11, 2011¹⁰⁶. The common characteristics are several: both damages have been caused by a natural disaster and in both cases the factories were not secured against the possibility of a frequent, according to the special geographical characteristics of each area, natural disaster. As a result, both factories are currently leaking hazardous substances into sea water. The great difference is that while Japan issued a Parliamentary report stating that the incident was a "man-made disaster, which could have been prevented", Verona chooses to blame the Commonwealth of Montague for something which Montague is not even connected to. It is obvious that in the case of Verona, too, the pollution could have undoubtedly been prevented, since Verona was obliged to be prepared to face the 2012 monsoon, even if it occurred with short notice.

By showing negligence in taking the adequate measures in its territory in order to protect its people, terrestrial property and the environment, Verona is undoubtedly responsible for failing to exercise due care and diligence. In that way, Verona indeed reassured itself a place in the causal chain of the events which finally led to the damages caused by the monsoonal storm within its own territory and bears liability itself.

105 L.B.Sohn, p.423-425; A.Kiss, p.411-412; J.Brunée, p.67.

106 Charter on Cooperation.

SUBMISSION TO THE COURT

For all the above reasons, Respondent, the Commonwealth of Montague, respectfully requests the Court to adjudge and declare that:

1. Verona is liable to Montague for the damage done to Romeo-22 in its collision with Verona's Juliet-1
2. Montague is not liable for the loss of the Juliet-2 satellite. Verona was under a duty to take actions to preserve the space environment by minimizing the potential threat to the use of outer space by arranging for the de-orbit of satellites in its Juliet system at the end-of-life, and by securing each satellite's battery and propulsion system to substantially reduce risk of explosion at end-of-life
3. Montague is not liable for the deaths, terrestrial property loss and environmental poisoning suffered in Verona during the 2012 monsoonal storm.

Report prepared by:

Dr. Martha Mejía-Kaiser
Co-Chair
Manfred Lachs Space Law Moot Court Committee
IISL