MANFRED LACHS SPACE LAW MOOT COURT COMPETITION 2012

Team No. 2

IN THE INTERNATIONAL COURT OF JUSTICE

AT THE

PEACE PALACE, THE HAGUE

Case Concerning On-orbit Collision, Non-cooperative Satellite Removal, and Damages

The Republic of Verona

v.

The Commonwealth of Montague

ON SUBMISSION TO THE INTERNATIONAL COURT OF JUSTICE

MEMORIAL FOR THE APPLICANT

THE REPUBLIC OF VERONA

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QUESTIONS PRESENTED

1. Whether Montague is liable to Verona for the damage done to Juliet-1 in its collision with Romeo-22?
2. Whether 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. Whether Montague unlawfully removed Juliet-2 from orbit and is liable for the same?
4. Whether Montague is liable for the deaths, terrestrial property loss, and environmental poisoning suffered in Verona during the 2012 monsoonal storm?

STATEMENT OF FACTS

1. THE BACKGROUND

The Republic of 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 destructive border wars. The Commonwealth of Montague, a small island nation, while not allied by treaty with Capulet, shares close ties and trade relations, a common language, and integrated cultural and scientific institutions.

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 efforts of the monsoons, Verona orbited five earth observation satellites, Juliet 1-5, in slightly elliptical polar orbits, with a nominal mean altitude of 851 kilometers, to monitor weather conditions and obtain information needed by its civil defense forces. The Juliet satellites are some of the largest earth observation satellites ever put into orbit, with in-orbit dimensions of 52 x 10 x 5 meters, and a mass of 16220 kilograms each. They were registered pursuant to the Registration Convention.

Montague 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. Montague obtains all of its space hardware and services from Tybalt Enterprises, an independent stockholder company under the laws of Montague. Tybalt enterprises designed, built, and launched the Romeo system. It continues to perform daily

maintenance, operations, and replenishes the constellation as each of the original satellites reaches their end-of-life.

The Romeo constellation achieved full operational capability in mid 2007. It was not registered pursuant to the Registration Convention. In order to continue the present peace between Capulet and Verona and to offset its own expenditures on the Romeo System, Montague licensed Tybalt Enterprises to provide satellite services to Capulet. Capulet contracts with Tybalt Enterprises to use the Romeo system to monitor Verona's global military operations.

2. VERONA TEMPORARILY LOSES CONTROL OVER THE JULIET SATELLITES

In early January 2011, Verona lost control over Juliet 1-5 while integrating a new software patch into their operating systems. Despite troubleshooting, Verona was unable to determine the exact cause of the malfunction. Verona waited for the system to reset automatically, but the system did not restore Verona to control. Verona did not inform the international community of its problem with the Juliet constellation as it believed that the problem was temporary and could be speedily resolved. It also considered the loss of control to be an internal security matter.

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. This conclusion was verified by Tybalt Enterprises. However, Montague did not disclose its detection of the problem to others for it was averse to Verona and other countries discovering the extent of its intelligence capabilities.

3. ROMEO-22 & JULIET-1 COLLIDE IN OUTER SPACE

In early May 2011, Romeo-22 collided with Juliet-1. Seventy two hours prior to the collision, the Othello Space Situational Awareness Sharing Center ("Othello Center") on the Isle of Macbeth, an independent State, had warned Tybalt Enterprises of a collision between the two satellites. Othello is an independent agency providing 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.

Tybalt Enterprises chose not to maneuver Romeo-22, in part because the collision avoidance maneuver suggested would have shortened the life of the Romeo-22 satellite by 10 percent. Tybalt enterprises' contract with Capulet substantially penalizes it financially for any shortened lifespan of satellites within the Romeo constellation. In addition to the commercial reason, Tybalt Enterprises, through independent analysis concluded that the risk of collision was much lower than Othello Enterprises had projected. They concluded that there was acceptable risk associated with not maneuvering before the Juliet-1/Romeo-22 conjunction. Tybalt Enterprises attempted to coordinate their conclusion by communicating their findings to Verona. Tybalt Enterprises telephoned Verona's global military space center, and sent emails to Verona's space operators 48 hours before the risk of collision was to materialize.

Verona does not subscribe to the Othello Center services and thus 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. For security reasons, Verona does not share or discuss data produced by its military space surveillance network with third parties. Hence, Verona did not acknowledge the communications by Tybalt Enterprises. However, later in October 2011, Verona's information minister, Ms. Lago admitted 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*." Also, at the time of collision, the Juliet satellites were still relaying health and status information. Tybalt Enterprises' orbital 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 they considered an unexpected, low probability event.

Romeo-22 and Juliet-1 were both damaged by the collision, are uncontrollable, and cannot be returned to operational status. The Othello Center issued a report which concluded that both satellites had remained essentially intact after the collision and only one additional debris fragment larger than 10 cm was generated by the collision. It also concluded that Juliet-1 and the debris fragment remain in orbit that poses continuing conjunction and collision hazards to the 29 remaining Romeo satellites, and to other satellite systems.

The large, uncontrolled Juliet satellite constellation will pose conjunction and collision hazards to the Romeo constellation and to other space systems and objects. Sometime in the next 50 years, without debris mitigation measures, there is a high probability that one or more Juliet satellites will suffer a catastrophic collision. 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.

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 break ups after end-of-life. These events were caused by explosions in battery or propulsion systems, which Verona was unable to secure and make safe at end-of-life.

4. MONTAGUE REMOVES JULIET-2 FROM OUTER SPACE

In late May 2011, Tybalt's analysts concluded that Verona was not attempting to recover the Juliet system and the sophistication of its indigenous satellite industry and its long-standing industrial 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 system. Tybalt also concluded that 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 that they were properly secured when the system loss occurred. Such breakup events would pose conjunction and collision hazards. It confirmed with the Othello Centre that 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. In its report, it also stated that 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 the risks of a collision, which would reduce Romeo satellites' maximum life by more than 15 percent.

Montague had two possible alternatives. It could operate in the current environment and replenish the Romeo system with satellites at a much faster rate than planned, or it physically remove the Juliet system from orbit using Tybalt Enterprises' Escalus-1 satellite.

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 perceived threat. Montague's foreign minister, Caesar Brutus convened a press conference to describe the demarche and its reasoning, and issued an ultimatum that Montague would remove Juliet-2 if Verona failed to act as demanded in order to defend its national interests.

In October 2011, Tybalt Enterprises launched Escalus-1. It was not registered pursuant to the Registration Convention. Two weeks after its launch, Escalus-1 de-orbited Juliet-2 that caused it to burn up in the atmosphere.

Immediately after the destruction of Juliet-2, Verona's minister of information, Desdemona Lago, held a press conference and announced that Verona was endeavouring to resolve issues associated with the lost control and its engineers 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 had been effectuated without Verona's consent. As Verona was normally very secretive about its military and space activities; Lago acknowledged that Verona had not revealed its Juliet problems and recovery operations because of "significant" state security concerns.

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.

5. JULIET -3, -4, -5 ARE RECOVERED

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.

6. THE 2012 MONSOONAL STORM

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 take appropriate precautionary measures. Five thousand Verona citizens, several hundred international visitors perished, thousands were injured, thirty thousand homes and businesses were destroyed and the Large Beatrice Chemical plant in Verona was destroyed as the damage was amplified because of the inadequate warning. This led to the leaking of deadly toxins into Verona's coastal waters, and the toxins damaged Verona's fisheries.

Had both Juliet-1 & -2 also remained operational there is a high probability that sufficient warning data would be available for Verona to mitigate the damage caused. With Juliet-1 destroyed had 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.

7. PARTIES' CLAIMS

Both Verona and Montague have agreed to submit their dispute for binding resolution by the International Court of Justice. Before the Court:

1. Verona asks the court to declare that:
    a. Montague is liable to Verona for the damage done to Juliet-1 in its collision with Romeo-22.
    b. Montague is liable to Verona for the loss of the Juliet-2 satellite as it was unlawfully removed from orbit.
    c. Montague is liable for the deaths, terrestrial property loss and environmental poisoning suffered in Verona during the 2012 monsoonal storm.
2. Montague asks this court to declare that:
    a. Verona is liable to Montague for the damage done to the Romeo-22 satellite in its collision with Juliet-1.
    b. Montague is not liable for the loss of Juliet-2. 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.

c. Montague is not liable for the deaths, terrestrial property loss and environmental poisoning suffered in Verona during the 2012 monsoonal storm.

8. THE RELEVANT TREATIES

Verona and Montague are both parties to the Outer Space Treaty, the Return and Rescue Agreement, the Liability Convention, Registration Convention and the ITU Convention. Verona is party to the Vienna Convention on the Law of Treaties. Montague has only signed the Vienna Convention. Both states are members of the United Nations.

SUMMARY OF ARGUMENTS

1. MONTAGUE IS LIABLE FOR THE DAMAGE CAUSED TO JULIET-1 IN ITS COLLISION WITH ROMEO-22 UNDER ARTICLE III, LIABILITY CONVENTION

A. Montague is the Launching State of Romeo-22 by virtue of having procured its launch from Tybalt Enterprises and thus having been actively involved in it.

B. It is clear from the facts that while the Juliet Satellites were uncontrollable , they were still functional as they were relaying health and status information at the time of the collision, they were still functional. Hence, Juliet-1 is a space object for the purpose of the Liability Convention (LIAB).

C. Tybalt is at fault for causing the collision. Fault is defined as a breach of the duty of due diligence. Due diligence requires of an operator to make provisions for acquiring information to be able to foresee harm and subsequently to take actions to prevent such foreseeable harm. Montague is at fault because it failed to perform a collision-avoidance maneuver on being notified of it and additionally for not confirming Othello's information from independent sources before disregarding it.

Montague is at fault because it is responsible for the faults of Tybalt. Further, it is at fault because it failed to discharge its obligation of authorizing and supervising the space activities of Tybalt because it acquiesced to the inclusion of a penalty clause in the contract that effectively prevented Tybalt from undertaking an evasion maneuver. Moreover, Montague's failure to register the Romeo constellation resulted in a lack of notice of their orbital positioning to Verona. As a result of this failure, Verona was prevented from placing the Juliet constellation at an orbit at a safe distance from that

of the Romeo constellation thereby preventing a collision. Therefore, Montague is at fault.

D. Verona is not at fault because it was not obliged to divulge sensitive information to Tybalt, because this withholding is justified on account of legitimate state security concerns given that Tybalt operates the Romeo constellation on behalf of the hostile state of Capulet to perform surveillance of the global military operations of Verona and also because it is a third party.

2. <u>VERONA HAS NO DUTY TO PERFORM PASSIVATION AND DE-ORBITING MEASURES.</u>

A. Art. IX, Sentence 2 that requires States Parties to take 'appropriate measures' to prevent contamination of outer space during the 'studies' and 'exploration' of outer space. It does not apply to the operation of the Juliet constellation which constitutes a 'use' of outer space. . In any case, the specific mitigation measures of passivation and de-orbiting are not 'appropriate measures' because the appropriateness of measures is based on the importance of the activity, the economic viability of the activity in relation to the costs of prevention, and the contribution of the affected States to the costs of prevention whereas the mitigation measures in question do not satisfy these requirements.

B. There is no custom that obligates passivation and de-orbiting of satellites because neither the requisite state practice nor *opinio juris* (being essential for the existence of a customary norm in international law) are present in the case of these measures.

C. It is also submitted that the debris mitigation measures of passivation and de-orbiting fall outside the scope of the duty to prevent transboundary harm because this duty does not apply to outer space. Even if this duty does extend to outer space, the

specific measures in question cannot be necessitated by it because such measures can only be decided after consultation with the states involved.

3. MONTAGUE IS LIABLE TO VERONA FOR THE LOSS OF THE JULIET-2 AS IT WAS UNLAWFULLY REMOVED FROM ORBIT.

A. Under Art. VIII, OST, the state of registry has permanent and exclusive jurisdiction over its space objects. Therefore, the unauthorized removal of the Juliet-2 by Tybalt is a breach of the international obligation of states to not cause damage to the property and territory of other states. In any case, even if such a right exists, , it may be invoked only if a satellite has been abandoned. Given that Juliet-2 was never abandoned by Verona, Montague did not have the right to de-orbit Juliet-2..

B. Montague's actions are not precluded from wrongfulness as they do not constitute a justified countermeasure, a legitimate exercise of the right of self-defence or necessity.

4. MONTAGUE IS LIABLE FOR THE DAMAGE SUFFERED IN VERONA DURING THE 2012 MONSOONAL STORM.

A. Montague is liable under Art. II, LIAB given that the loss of life, property and environmental damage occasioned by the storm are covered under the definition of 'damage' in Art. I(a), LIAB and the test for causality is proximate cause, which is satisfied in the present circumstances. Montague "caused" the damage to Verona as it damaged the fully functional Juliet satellites that were capable of prediction of the storm. Even if the satellites were not functional, it impeded with their successful recovery. Finally, Montague is not exonerated from the standard of absolute liability

because the actions of Verona in the events leading up the damage suffered in the 2012 monsoonal storm do not amount to gross negligence.

B. Montague is liable to Verona under Art. VII, OST because the term ‘damage’ in the Treaty includes within its scope environmental damage and establishes a regime of strict liability, only requiring proof of a causal link to hold a state liable.

C. Montague is liable under customary international law because 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 and in the present circumstances, Montague is the operator of Romeo-22 and Escalus-1.

ARGUMENTS ADVANCED

1. 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.

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[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]; Armel 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 **[I]** and the damage caused by Romeo-22 to Juliet-1 is the fault of Tybalt **[II]** and Montague **[III]**.

I. FAULT IS A BREACH OF THE DUTY OF DUE DILIGENCE

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[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.

"*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, 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]

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[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).

[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).

II. 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 exits 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 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

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[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);
[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.

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*" satellite[25] 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, unmaeuverable,[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

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[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].

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] 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.

III. 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,

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[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).
[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.

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 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

[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.
[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).

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.

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[40] Hacket, *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.

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 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]

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[46] Corfu Channel (UK v. Albania)(Merits) 1949 I.C.J. 4, 32 (Apr. 9).
[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] 10 U.S.C. § 2274 (2010).

2. 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 has 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 **[I]**. In any case, the debris mitigation measures are not "*appropriate*" **[II]**.

I. 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]

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

[53] Compromis §29.
[54] Delbert Smith, *the Technical, Legal and Business Risks of Orbital Debris*, 6 N.Y.U. ENVT. L. J. 50, 58 (1997-1998).
[55] Art. 32, VCLT.

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.

II. 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

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[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).

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 [**I**] nor *opinio juris* **[II]**, essential for the existence of a customary norm in International Law, are present in case of passivation and de-orbiting.

I. 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.

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[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).
[63] Maurice Mendelson, T*he 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.

II. 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.

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 **[I]**. Even if it does, measures of passivation and de-orbiting fall outside the scope of this duty **[II]**.

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[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).

I. 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]

II. 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

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[73] Legality of the Threat or Use of Nuclear Weapons (Advisory Opinion) 1996 ICJ 226, 242 (Jul. 8).
[74] Hacket, *supra* note 8, at 143.
[75] M. Bothe, *Environment, Development, Resources*, 318 RECUEIL DES COURS, 323, 423 (2005).
[76] *Id*.
[77] Hacket, *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).

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 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.

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[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).

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

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

3. 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].**

I. THE AUTHORITY TO REMOVE JULIET-2, IS CONFINED ONLY TO VERONA, THE STATE OF REGISTRY

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

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

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[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).

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.

II. 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 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.

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[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).
[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.

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 **[I],** a legitimate exercise of the right to self-defence **[II],** or necessity **[III],** especially as Verona did not consent to any such operation.

I. 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 Iits 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*

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[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)

capable of destroying life and property."[109] 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.

II. THE REMOVAL WAS NOT A LEGITIMATE EXERCISE OF THE RIGHT TO SELF-DEFENSE

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.

III. 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*".

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

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.

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.

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[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 Gabcikovo-Nagymaros Project (Hungary v. Slovakia) (Merits) 1997 ICJ 7, 43 (Sep. 25).
[118] Compromis §17.
[119] U. N. CHARTER, art. 34.
[120] Responsibility Articles, *supra* note 84, Article 34.

4. 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 **[I],** loss of life, loss of property and environmental damage are compensable under Article I(a), LIAB **[II],** and the damage was *caused* by its space objects **[III].** Finally, Montague is not exonerated from liability under Article VI **[IV].**

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[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).

I. 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.

II. 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 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.

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[124] Compromis §18.
[125] Compromis §19, 20.
[126] *Supra* 1(B).
[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*

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]

III. 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 damage caused directly by physical impact is compensable under LIAB. However, the indirect nature of the damage does not bar recovery of

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Environmental Responsibility and Liability 10 GEORGE. INT. ENVT'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.

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. <u>The test of causality in LIAB requires proof of 'proximate causation'.</u>

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]

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[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.l05/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).

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 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]**.

C.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

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[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.
[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.

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.

C.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 constellation[149] 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 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].**

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

[149] Compromis §8, 22.
[150] Compromis §24.
[151] Compromis §17(a), 17(b).

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]

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[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. 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 Dudney, *Rescue in Space*, 95(1) AIRFORCE-MAGAZINE.COM (January 2012)

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*.

C.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 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.

IV. 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

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http://www.airforce-magazine.com/MagazineArchive/Pages/2012/January%202012/0112space.asp DAVID M. HARLAND AND RALPH D. LORENS, SPACE SYSTEMS FAILURES, 281 (2005).

[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.*

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]

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[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

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[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).

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.

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[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.