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A Vision for Future Mobility: Hyperloop One and the Submerged Floating Tunnel from Estonia and Finland

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A VISION FOR FUTURE MOBILITY: HYPERLOOP ONE & THE SUBMERGED FLOATING TUNNEL FROM ESTONIA AND FINLAND

INTRODUCTION

Are you tired of long-haul flights? We are about to experience the most advanced transportation technology in history, known as the hyperloop technology, but not just yet. The idea of the hyperloop technology traces back to when Shervin Pishevar and Elon Musk shared the idea of moving vehicles at high speeds through low-pressure tubes when they were traveling together on a humanitarian mission to Cuba in January 2013.[1] Since then, there has been substantial progression in the development of new technologies for transportation purposes. One of the most striking yet problematic developments is the introduction of Hyperloop One Technology, which moves vehicles at high speeds through low-pressure tubes via underwater tunnel.[2] The co-founders, Josh Giegel and Shervin Pishevar, introduced Hyperloop One Technology through an American transportation technology company that they started in a garage, known as the Hyperloop One.[3]

A few months after a humanitarian mission to Cuba, Shervin Pishevar urged Elon Musk at a technology conference to share the idea with the public.[4] In August 2013, Elon Musk published the Hyperloop Alpha white paper, which Shervin Pishevar presented to President Obama.[5] President Obama, excited by the industry development, agreed to support the development and said, "[l]et me know how I can help you."[6]

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[1] *Seeding the Idea*, VIRGIN HYPERLOOP ONE, https://hyperloop-one.com/our-story#seeding-the-idea (last visited Feb. 11, 2019); *Shervin Pishevar & Elon Musk: Racing to Build the First Hyperloop*, ASK REPORTER (Sept. 4, 2018) http://askreporter.com/2018/09/shervin-pishevar-elon-musk-racing-to-build-hyperloop/ [hereinafter VIRGIN HYPERLOOP ONE, *Racing to Build the First Hyperloop*]; *Can Shervin Pishevar's Dream Project – Hyperloop One – Revolutionize Cargo Transport?*, WINGS J. (May 4, 2018), https://www.wingsjournal.com/shervin-pishevar-hyperloop-one [hereinafter *Shervin Pishevar's Dream*].

[2] *Seeding the Idea*, *supra* note 1; Leanna Garfield, *Remarkable Images That Show the 200-Year Evolution of the Hyperloop*, BUS. INSIDER (Feb. 20, 2018, 3:17 PM), https://www.businessinsider.com/history-hyperloop-pneumatic-tubes-as-transportation-2017-8; Anmar Frangoul, *Hyperloop: The Revolutionary Technology That Could Change Transport Forever*, CNBC (Sep. 14, 2018, 3:12 AM), https://www.cnbc.com/018/09/14/hyperloop-the-revolutionary-tech-that-could-change-transport-forever.html.

[3] *Hyperloop Technologies*, VIRGIN HYPERLOOP ONE, https://hyperloop-one.com/our-story#hyperloop-technologies (last visited Feb. 11, 2019).

[4] *Seeding the Idea*, *supra* note 1; *Shervin Pishevar's Dream*, *supra* note 1.

[5] *Hyperloop White Paper*, VIRGIN HYPERLOOP ONE, https://hyperloop-one.com/our-story#hyperloop-white-paper (last visited Feb. 11, 2019); VIRGIN HYPERLOOP ONE, *Racing to Build the First Hyperloop*, *supra* note 1; *Shervin Pishevar's Dream*, *supra* note 1.

[6] *Hyperloop White Paper*, *supra* note 5.

The idea of hyperloop technology development became more concrete as the executives of Hyperloop One joined European dignitaries and policymakers at the Vision for Europe Summit on June 6, 2017.[7] At the Summit, the Hyperloop One executives and European dignitaries and policymakers discussed transforming transportations across the continent with the Hyperloop One Technology.[8] Hyperloop One proposed various routes across the globe for the Hyperloop One Technology, which included a route from Estonia and Finland.[9] Following the Vision for Europe Summit, on September 1, 2017, Estonia and Finland signed a letter of intent with Hyperloop One to build a ninety-two kilometer rail line in a tunnel underneath the Baltic Sea connecting Tallinn and Helsinki.[10] Hyperloop One is considering three different forms of underwater tunnel construction for the Hyperloop One Technology that connects Estonia and Finland,[11] including: (1) Subsea bored rock tunnel; (2) Immersed tunnel; and (3) Submerged Floating tunnel.[12] The company wants to use the submerged floating tunnel form when building the underwater tunnel that will carry the hyperloop technology that connects Estonia and Finland.[13]

Building a submerged floating tunnel from Estonia and Finland, without engineering solutions, would potentially violate current international law. By introducing and explaining the various existing international conventions, treaties, and regulations, this Comment demonstrates how the construction of the submerged floating tunnel potentially violates the existing international legislation related to the sea. This Comment argues that while the construction of the submerged floating tunnel meets the majority of the existing laws such as the United Nations Convention on the Law of the Sea, 1982 (UNCLOS), Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992 ("Helsinki Convention"), International Seabed Authority Regulations

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[7] *Hyperloop One's Vision for Europe Summit: Unveiling 9 Routes Spanning the Continent as Part of its Global Challenge,* VIRGIN HYPERLOOP ONE (Jun. 6, 2017), https://hyperloop-one.com/hyperloop-ones-vision-europe-summit-unveiling-9-routes-spanning-continent-part-its-global-challenge [hereinafter VIRGIN HYPERLOOP ONE, *Hyperloop One's Vision*].

[8] *Id.*

[9] VIRGIN HYPERLOOP ONE, *Hyperloop One's Vision*, *supra* note 7; David Szondy, *Hyperloop One Reveals Nine Potential European Routes*, NEW ATLAS (Jun. 6, 2017), https://newatlas.com/hyperloop-one-routes-europe/49910/.

[10] GCR Staff, *Estonia Signs "Symbolic" Agreement to Build Hyperloop Link with Helsinki*, GLOBAL CONSTRUCTION REV. (Sep. 6, 2017), http://www.globalconstructionreview.com/news/estonia-signs-symbolic-agreement-build-hyperloop-l/; *Estonia, Hyperloop One Sign Letter of Intent*, BALTIC COURSE (Sep. 1, 2017), http://www.baltic-course.com/eng2/transport/?doc=132810.

[11] Blake Cole, *Run Silent, Run Deep: The Case for a Subsea Hyperloop*, VIRGIN HYPERLOOP ONE (Jul. 20, 2016), https://hyperloop-one.com/blog/run-silent-run-deep-case-subsea-hyperloop.

[12] *Id.*

[13] *Id.*

(ISA), European Union Maritime Spatial Planning Directive, United Nations Economic Commission for Europe (UNECE), and the Convention on the Protection and Use of Transboundary Watercourses and International Lake ("the Water Convention"), it potentially violates the Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnel in the Trans-European Road Network. Thus, it is insufficient to permit the construction of the submerged floating tunnels in Estonia and Finland and the interpretation of existing laws should be expanded to allow such a venture.

This Comment proceeds in three parts. Part I discusses the three forms available for the construction of underwater sea tunnel in Estonia and Finland in detail and explains that Hyperloop One seeks to utilize the submerged floating tunnel form. Part II explores the existing international conventions, treaties, and regulations related with the sea that are both compatible and incompatible with Hyperloop One Technology. Part III then argues that the construction of submerged floating tunnel as is, without engineering solutions, is not permitted as it potentially violates existing international legislation, and, that because of the violation, the interpretation of the existing law should be expanded to include the submerged floating tunnel.

I. UNDERSTANDING UNDERWATER TUNNEL CONSTRUCTION: THREE FORMS

The proposed development of Hyperloop One Technology to operate in an underwater environment involves the construction of subsea tunnels.[14] Hyperloop One has aspired to develop subsea floating tunnels since November 2014; advancement in building of subsea tunnels, including its engineering, materials, and design has since grown at a rapid rate.[15] The prospect of building tunnels through water, which was once viewed as impossible and complex, has now become possible, even faster, and at a lower cost than before.[16]

Hyperloop One explained that the construction of subsea tunnels falls into three distinct categories:[17]

A. Subsea Bored Rock Tunnel

The most conventional form of subsea tunnel construction is the Subsea Bored Rock Tunnel, a methodology that replaced the terrestrial bored-rock

[14] *Id.*
[15] *Id.*
[16] *Id.*
[17] *Id.*

tunneling.[18] This construction process involves excavating a tunnel in rock that is under the sea.[19] The process requires the use of tunnel boring machines (TBM), which are huge machines specifically designed for building tunnels.[20] The TBM consist of a large rotating steel cutter-head at the front of the shield that enables excavation and removal of excavated materials and, at the same time, installation of permanent reinforced concrete lining of the tunnel.[21] This tool allows tunnels to be built through soil, rock, or a mixture of both.[22]

Before the tunnel can be built, the TBM is moved underground in pieces and reassembled at the beginning of the tunnel by the launching shaft.[23] As the TBM bores, it installs the precast segmental lining to make a permanent tunnel, collects all of the excavated materials to the back of the machine, and transports them to the ground surface via the launching shaft.[24] Upon completion of the tunnel construction, the TBM is disassembled at the retrieval shaft at the tunnel end.[25]

The TBM is one of the most effective methods for subsea tunnel construction because it is extremely efficient—it is capable of performing two functions simultaneously—and it reduces noise, dust and vibration since the construction takes place entirely underground.[26] Furthermore, it helps minimize the impact to the environment, community, and traffic as it reduces risks of settlement and maintains the structural safety of the buildings in the vicinity.[27]

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[18] *Id.*; *see* Grant Prior, *See How the Tube was Built 150 years Ago*, CONSTRUCTION ENQUIRER (Jan. 9, 2013), http://www.constructionenquirer.com/2013/01/09/see-how-the-tube-was-built-150-years-ago/ (for brief background to terrestrial bored-rock tunneling. A common example of terrestrial bored-rock tunneling is the Channel Tunnel from the United Kingdom to France.); Jennifer Rosenberg, *How the Channel Tunnel Was Built and Designed*, THOUGHT CO. (Nov. 27, 2018), https://www.thoughtco.com/the-channel-tunnel-1779429. The digging of the Channel Tunnel involved use of tunnel boring machines that cut through the chalk, collected the debris, and transported the debris behind it using conveyor belts. *Id.* The debris was hauled up to the British side of the tunnel via the surface of the railroad wagons and to the French side through a pipeline. *Id.*

[19] William Harris, *Tunnel Construction: Soft Rock and Underwater*, HOW STUFF WORKS, https://science.howstuffworks.com/engineering/structural/tunnel4.htm (last visited Mar. 28, 2020); *Wonderpolis's How Do You Build a Tunnel Underwater*, WONDEROPOLIS, https://www.wonderopolis.org/wonder/how-do-you-build-a-tunnel-underwater (last visited Mar. 28, 2020).

[20] *Tunnel Boring Construction Method*, SHATIN TO CENT. LINK (Jun. 2013), www.mtr-shatincentrallink.hk/pdf/multimedia…/general_newsletter_062013.pdf; *Tunnel Boring Machine (TBM)*, RAILSYSTEM (2015), http://www.railsystem.net/tunnel-boring-machine-tbm/.

[21] *Tunnel Boring Construction Method*, *supra* note 20; *Tunnel Boring Machine (TBM)*, *supra* note 20.

[22] *Id.*

[23] *Tunnel Boring Construction Method, supra* note 20.

[24] *Id.*; *Tunnel Boring Machine (TBM)*, *supra* note 20.

[25] *Id.*

[26] *Id*.

[27] *Tunnel Boring Construction Method, supra* note 20.

Despite TBM's advantages, it is extremely expensive to construct, difficult to transport, and requires significant backup systems;[28] nonetheless, thousands of subsea tunnels that are constructed across borders have been built using TBM.[29] With recent advancements and construction techniques, Hyperloop One could easily develop subsea hyperloop technology via a bored-rock tunnel.[30]

B. Immersed Tunnel

The second form of underwater tunnel construction that Hyperloop One explained is the immersed tunnel.[31] This is the most recent and prevalent development in place..[32] The immersed tunnel, also known as the Sunken Tube, is built on land and submerged under the water to its final position.[33] This method was pioneered by an American engineer named W.J. Wilgus in the Detroit River in 1903 for the Michigan Central Railroad.[34] This process has been widely used and more than 150 immersed tunnels have been constructed worldwide.[35] The common use for this process is to serve as road or rail tunnels to cross a body of shallow water, but it can also be used for water supply and electric cables.[36]

The traditional method of constructing an immersed tunnel is to establish one or more casting basins as open excavations where the individual tunnel segments are constructed.[37] The tunnel elements are composed of segments, including a tunnel roof and two tubes, each with three lines in each direction sufficient in height to include tunnel signs, fans, surveillance systems, and lightning.[38] When the tunnel elements are completed, they are sealed in temporary bulkheads, which become the casting bins that are flooded one by one to their intended locations underwater.[39] Once the casting binds are flooded to

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[28] *Tunnel Boring Machine (TBM)*, *supra* note 20.

[29] Cole, *supra* note 11.

[30] *Id.*

[31] *Id.*

[32] *Id.*

[33] Skriv Ut, *An Immersed Tunnel*, STATENS VEGVESEN (Feb. 7, 2014), https://www.vegvesen.no/Ferdigprosjekt/Bjorvika/In+English/An+immersed+tunnel; *Immersed Tube Tunnel*, RAILSYSTEM (2015), http://www.railsystem.net/immersed-tube-tunnel/.

[34] Ut, *supra* note 33; RICHARD LUNNISS & JONATHAN BABER, IMMERSED TUNNELS 8 (2010).

[35] *Immersed Tube Tunnel*, *supra* note 34; *Immersed Tunnels,* RAMBOLL GROUP, https://ramboll.com/services-and-sectors/transport/major-crossings-bridges-and-tunnels/immersed-tunnels (last visited Feb. 11, 2019).

[36] Ut, *supra* note 33; RAMBOLL GROUP, *supra* note 35.

[37] Ut, *supra* note 33.

[38] *Id.*

[39] *Id.*; *Immersed Tunnels,* WSP https://www.wsp.com/en-US/services/immersed-tunnels (last visited Feb. 11, 2019).

their intended locations, they are immersed into their positions on the seabed in the dredged trench and are linked together.[40] The backfill materials are placed on the sides and over the tunnel to fill the trench and to permanently bury the tunnel. [41]

The construction of the immersed tunnel is extremely effective because it is cost efficient and quick to construct.[42] It is also safer to construct as the work involved is done in a dry dock as opposed to boring beneath the river. In addition, it is extremely effective because there is minimal disruption to the environment.[43] Despite its advantages, immersed tunnels contain significant risks as it involves direct contact with water.[44] Risks that may occur include water leaks in the tunnel and also leaks in the tube that may have an ecological impact on the sea and the seabed as a result of the pollutants leaking out.[45] Nonetheless, this method of construction has been widely used and the most famous example is the Oresund Bridge Tunnel between Denmark and Sweden.[46] Similar to the subsea bored rock tunnel method, Hyperloop One would be able to deliver a subsea hyperloop technology via an immersed tunnel with recent developments and the right environmental conditions.[47]

C. Submerged Floating Tunnel

The third and final form of underwater tunnel construction that Hyperloop One explained is the submerged floating tunnel.[48] The submerged floating tunnel, also called Archimedes' Bridge,[49] uses a tube, which has an ability to float in a liquid or to rise in a fluid by itself, with stabilizing tension cables, to travel across the underwater environment at a fixed distance below the surface.[50] The submerged floating tunnel concept was first introduced in the beginning of

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[40] Ut, *supra* note 33; WSP, *supra* note 39.

[41] Ut, *supra* note 33; WSP, *supra* note 39; Jayant R. Row, *Immersed-tube Method of Underwater Tunnel Construction*, BRIGHT HUB ENGINEERING (Aug. 13, 2010), https://www.brighthubengineering.com/structural-engineering/82174-build-a-tunnel-on-land-and-float-it-into-place/.

[42] Ut, *supra* note 33; *Immersed Tube Tunnel*, *supra* note 34.

[43] Ut, *supra* note 33.

[44] *Id.*; LUNNISS & BABER, *supra* note 34.

[45] Ut, *supra* note 33; LUNNISS & BABER, *supra* note 34; *see also* INTERNATIONAL TUNNELING AND UNDERGROUND SPACE ASSOCIATION, IMMERSED TUNNELS IN THE NATURAL ENVIRONMENT.

[46] Cole, *supra* note 11; *Engineering Feat of the Month: Oresund Bridge and Drogden Tunnel*, ENGINEERING PRO BLOG (Mar. 22, 2016), https://www.fircroft.com/blogs/engineering-feat-of-the-month-resund-bridge-and-drogden-tunnel—68222851127.

[47] Cole, *supra* note 11.

[48] *Id.*

[49] Juan Samaniego, *Archimedes or the Challenge of Building a Floating Underwater Tunnel*, FERROVIAL BLOG (Jan. 19, 2018), https://blog.ferrovial.com/en/2018/01/floating-underwater-tunnel/.

[50] Cole, *supra* note 11.

the century, but no actual project took place until recently.[51] This concept is an innovative concept that involves a tube like structure made of steel and concrete utilizing the law of buoyancy[52] to support the structure at a moderate and convenient depth.[53] The tube is supported on columns or held in place by tethers attached to the sea floor or pontoons floating on the surface.[54]

The construction of the submerged floating tunnel can be done in two ways.[55] First, it can be done by building tubes in sections in a dry dock and then floating the tubes in sections to the construction site and sinking them into place while sealed.[56] Once the sections are fixed to each other, the seals are then broken.[57] The tube is held by pontoons that are mounted on top of the tunnel and anchored to the sea surface.[58] Another possibility is to build the sections unsealed and weld them together, pump the water out so that there is approximate hydrostatic equilibrium, thereby ensuring that the tunnel is roughly the same overall density as the water.[59] This process would require the submerged floating tunnel to be anchored to the seabed area to keep it in place with tethers.[60]

The construction of the submerged floating tunnel has great advantages that have not been identified before. The submerged floating tunnel is unaffected by undulations and obstacles on the sea floor and avoids the highly turbulent surface layer of the sea as it remains in place at the bottom of the sea.[61] Further, it provides significant savings of fuel and energy use.[62] Nevertheless, it faces many engineering challenges because of its complexity and novelty.[63] The submerged

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[51] *Submerged Floating Tunnel*, RAILSYSTEM, http://www.railsystem.net/submerged-floating-tunnel/ (last visited May 23, 2020); Amol B. Kawade & Shruti P. Meghe, *Submerged Floating Tunnel*, CIV. ENGINEERING PORTAL, https://www.engineeringcivil.com/submerged-floating-tunnel.html (last visited May 23, 2020).

[52] The law of buoyancy states that anybody completely or partially submerged in fluid or gas at rest is acted upon by an upward, or buoyant, force the magnitude of which is equal to the weight of the fluid displaced by the body. Glenn Elert, *Buoyancy*, PHYSICS HYPERTEXTBOOK, https://physics.info/buoyancy/summary.shtml (last visited Jan. 11, 2018). If the weight of the object is less than the fluid, the object rises. *Id.* If the weight of the object is heavier than the amount of the fluid, then the object sinks. *Id.*

[53] RAILSYSTEM, *supra* note 51; Kawade & Meghe, *supra* note 51.

[54] *Id.*

[55] *Id.*

[56] *Id.*

[57] *Id.*

[58] Bernt Jakobsen, *Design of the Submerged Floating Tunnel Operating Under Various Conditions*, SCI. DIRECT (2010), https://ac.els-cdn.com/S1877705810005047/1-s2.0-S1877705810005047-main.pdf?_tid=e9421319-87e8-4548-880a-7ca9d6b50650&acdnat=1547254894_42800f0a56f4e53abd748c789440e791.

[59] RAILSYSTEM, *supra* note 51; Kawade & Meghe, *supra* note 51.

[60] *Id.*

[61] Cole, *supra* note 11.

[62] L. AADNESEN ET. AL, THE CASE FOR FLOATING SUBMERGED TUNNELS 32, 33 (1999).

[63] Cole, *supra* note 11.

floating tunnel still has to deal with waves and currents, changes in water density and local variations in buoyancy.[64] Additionally, the tunnel has to deal with possible water leaks, corrosions, and collisions with ships and submarines.[65]

Hyperloop One is considering building its underwater tunnel from Estonia to Finland in the form of a submerged floating tunnel because of the savings in fuel and energy use.[66] Further, if the tunnel is successfully built, it will make history.[67] The submerged floating tunnel is a totally new concept and if successful, it will be the first transportation of its kind.[68]

II. INTERNATIONAL CONVENTIONS, TREATIES, AND REGULATIONS THAT ARE BOTH COMPLATIBLE AND INCOMPATIBLE WITH HYERLOOP ONE TECHNOLOGY

The proposed development of the Hyperloop One Technology, which involves the construction of the submerged floating tunnel must not violate the current existing international conventions, treaties, and regulations related to the sea to be permissible for construction across international borders. Here, this Comment will explore the current existing international conventions, treaties and regulations related to the sea that Hyperloop One must abide by in order to implement the Hyperloop One Technology across Estonia and Finland. To be in accordance with international law of the sea, Hyperloop One will need to comply with: (A) UNCLOS; (B) the Helsinki Convention; (C) International Seabed Authority Regulations; (D) European Union (EU) Maritime Special Planning Directive; (E) the Water Convention; and (F) Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network.

A. United Nations Convention on the Law of the Sea (UNCLOS)

The first component of international law with which Hyperloop One must comply in its construction is the UNCLOS. UNCLOS is the key legal framework for all activities in oceans.[69] It is widely recognized as reflecting customary

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[64] *Id.*

[65] *Id.*; *Submerged Floating Tunnel*, CIV. ENGINEERING SEMINAR BLOG (Jun. 22, 2016), http://civilenggseminar.blogspot.com/2016/06/submerged-floating-tunnel.html.

[66] Cole, *supra* note 11.

[67] *Id.*

[68] *Id.*; *Submerged Floating Tunnel*, *supra* note 51.

[69] Esa Paasirvirta, *The European Union and the United Nations Convention on the Law of the Sea*, 38 FORDHAM INT'L L. J., 1045, 1045 (2015); *UNCLOS*, FED. PUB. SERV. HEALTH, FOOD CHAIN SAFETY & ENV'T, https://www.health.belgium.be/en/unclos (last updated Dec. 1, 2016); *Law of the Sea*, WORLD OCEAN REV. (2010), https://worldoceanreview.com/en/wor-1/law-of-the-sea/a-constitution-for-the-seas/.

international law and is usually referred to as the "Constitution for the Oceans."[70] "UNCLOS was negotiated in the 1970s and early 1980s when major developments in the law of the sea took place."[71] "Its 320 articles and nine annexes cover almost all aspects of international law relating to the oceans,"[72] and it is critically important "for the peaceful use of the oceans."[73] It is also "the central instrument for ocean policy" for "those States that are not parties to the Convention," such as the United States.[74]

UNCLOS is binding on all States that are parties to this international agreement.[75] The EU, however, is not a State, but a supranational body composed of member states.[76] Despite it not being a state, it may still contract as a party to international agreements.[77] Therefore, EU member states are parties to the UNCLOS as well and must act in a uniform manner to UNCLOS.[78] This coordination is a well-established practice by all participants in the EU.[79]

Today, UNCLOS lays down the rules and principles not only in relation to what can happen in the sea, but to the rights and obligations that depend on where the maritime activities take place.[80] The existence of such variety of rules with respect to the law of the sea demonstrates that "international law relating to the seas does not give the States the same degree of power" that it usually enjoys "over its own territory."[81] UNCLOS contains rules with respect to internal waters and "territorial seas (Articles 2–32), contiguous zones

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[70] Paasirvirta, *supra* note 69, at 1045–46; *see also Law of the Sea*, *supra* note 69; *see also EU Statement at the United Nations General Assembly: Biological Diversity Beyond National Jurisdiction and Fisheries*, EUR. UNION (May 12, 2017), http://eu-un.europa.eu/articles/en/article_15840_en.htm.

[71] Paasirvirta, *supra* note 69, at 1046; Jeremy Rabkin, *The Law of the Sea Treaty: A Bad Deal for America*, COMPETITIVE ENTERPRISE INST. 1, 3 (2016), http://cei.org/pdf/5352.pdf.

[72] Paasirvirta, *supra* note 69, at 1046; *see also* James E. Hickey, Jr., *The United Nations Convention on the Law of the Sea*, *in* OCEAN & COSTAL LAW & POLICY 419, 424 (2015); *see also* International Law of the Sea, GERMANY'S FEDERAL FOREIGN OFFICE, https://www.auswaertiges-amt.de/en/aussenpolitik/themen/internatrecht/einzelfragen/seerecht.

[73] Paasirvirta, *supra* note 69, at 1046; *see generally* A Constitution for the Oceans (Dec. 1982) (remarks of T.T.B. Koh, President of the Third United Nations Conference on the Law of the Sea).

[74] Paasirvirta, *supra* note 69, at 1046. *Cf.* A Constitution for the Oceans, *supra* note 73; *see also* Shirley C. Scott, *The LOS Convention as a Constitutional Regime for the Oceans, in* STABILITY AND CHANGE IN THE LAW OF THE SEA: THE ROLE OF THE LOS CONVENTION 9, 11 (Alex G. Oude Elferink, ed., 2005); *see also* Hickey, Jr., *supra* note 72.

[75] *See* GERMANY'S FEDERAL FOREIGN OFFICE, *supra* note 72.

[76] *See About the EU*, EUROPEAN UNION, https://europa.eu/european-union/about-eu_en (last visit4ed May 23, 2020).

[77] Paasirvirta, *supra* note 69, at 1046; *Cf.* GERMANY'S FEDERAL FOREIGN OFFICE, *supra* note 72.

[78] Paasirvirta, *supra* note 69, at 1047.

[79] *Id.* at 1046–47; Consolidated Version of the Treaty on European Union art. 4(3), 2010 O.J. C 83/01.

[80] Paasirvirta, *supra* note 69, at 1046; WORLD OCEAN REV., *supra* note 69; Hickey, Jr., *supra* note 72.

[81] Paasirvirta, *supra* note 69, at 1068.

(Article 33), the continental shelf (Articles 76–85), the exclusive economic zone (Articles 55–75), the high seas (Article 86–20), the area of deep seabed (Articles 133–191), international straits (Article 34–45), and archipelagic waters (Article 46–54)."[82]

The construction of the submerged floating tunnel for the Hyperloop One Technology is subject to rules with respect to the high seas or the area of deep seabed depending on which method Hyperloop One Technology uses to construct the underwater tunnel. First, if the submerged floating tunnel is held by the pontoons that are mounted on top of the tunnel and anchored to the sea surface, it will be governed by Articles 86–120, which defines the parts of the sea that are considered the high seas, describes the "[f]reedom of the high seas," the "[r]eservation of the high seas for peaceful purposes," the "[i]nvalidity of claims of sovereignty over the high seas" and the "[r]ight to lay [submarine] cables and pipelines."[83] Second, if the submerged floating tunnel is supported by the tethers anchored to the seabed, it will also be governed by Article 133–191, which governs the legal status of seabeds.[84]

Under UNCLOS Article 87, generally, "[t]he high seas are open to all States," however "[n]o State may validly purport to subject any part of the high seas to its sovereignty" based on UNCLOS Article 89.[85] UNCLOS also describes permissible purposes for which a State may use the high seas.[86] Article 88 of UNCLOS provides that generally, "[t]he high seas be reserved for peaceful purposes," but States "are entitled to lay submarine cables and pipelines on the bed of the high seas beyond the continental shelf," according to Article 112.[87] It describes the current "[l]egal status of the [deep seabed area] and its resources," the "[g]eneral conduct of the States in relation to the [deep seabed area], the use of the deep seabed area and its restrictions, and the rights and obligations associated to the States with respect to the deep seabed area."[88]

Under UNCLOS Article 137, generally, "[n]o state shall claim or exercise sovereignty . . . over any part of the [zone under the deep seabed area]."[89] It further states that "[a]ll rights in the resources of the [deep seabed area] are

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[82] *Id.*; *see also Law of the Sea*, *supra* note 69; *see also* Hickey, Jr., *supra* note 72; *see also* GERMANY'S FEDERAL FOREIGN OFFICE, *supra* note 72.

[83] United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397.

[84] *Id.* at 445–77.

[85] *Id.* at 432–33.

[86] *Id.* at 433, 440.

[87] *Id.* at 433, 440.

[88] *Id.* at 446–77.

[89] *Id.* at 446.

vested in mankind as a whole."[90] UNCLOS also describes how a State must act or behave in relation to the deep seabed area. Article 138 provides that "[t]he general conduct of States in relation to the [deep seabed area] shall be in accordance with . . . the Charter of the United Nations and other rules of international law in the interests of maintaining peace and security."[91]

UNCLOS further specifies permitted and limited uses of the deep seabed area by the States. It provides in Article 140 that any "[a]ctivities in the [deep seabed area should] be carried out for the benefit of mankind as a whole."[92] It also explains in Article 141 that the deep seabed area should be "open to use exclusively for peaceful purposes by all States."[93] Contrastingly, Article 145 places limits on state activities by mandating that states take "[n]ecessary measures" to protect "the marine environment from harmful effects."[94] Furthermore, it provides in Article 146 that, "[w]ith respect to activities in the [deep seabed area], necessary measures shall be taken to ensure effective protection of human life."[95] These provisions prevent the States from performing any activities, including construction of transportation processes under the deep seabed area, that endanger human life and the marine environment.

UNCLOS sets out the specific rights and obligations of the States and coastal States with respect to the deep seabed area. Article 139 of the UNCLOS demonstrates that the State parties are responsible for any activities that are carried out by the State parties, state enterprises, or judicial persons; the State will also be held liable for damages that occur from such activities in the deep seabed area.[96] Article 142 of the UNCLOS also explains that activities in the deep seabed area should be conducted with due regard to the rights and legitimate interests of any coastal States across whose jurisdiction such deposits lie.[97]

B. Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992 ("Helsinki Convention")

The second component of international law with which Hyperloop One must comply in its construction is the Helsinki Convention. The Helsinki Convention

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90 *Id.*
91 *Id.*
92 *Id.* at 447.
93 *Id.*
94 *Id.* at 449.
95 *Id.*
96 *Id.* at 447.
97 *Id.*

is an international convention encompassing various measures for the prevention and elimination of pollution of the Baltic Sea.[98] Denmark, Finland, West Germany, East Germany, Poland, the USSR, and Sweden signed the first Convention on the Protection of Marine Environment of the Baltic Sea Area in 1974, which entered into force on May 3, 1980.[99] This marked the first time all pollution sources around an entire sea became subject to a single convention.[100] A few years later in 1992, the European Community and all the states bordering the Baltic Sea that consisted of Czechoslovakia, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, and Sweden signed the Helsinki Convention as a supplement to the 1974 convention, in light of political changes and developments in international environmental and maritime law.[101]

The Helsinki Convention is still in force today and continues to lay down rules and regulations for binding State parties to prevent and eliminate pollution of the marine environment of the Baltic Sea Area.[102] Article 4 of the Helsinki Convention defines the Baltic Sea Area as comprising "the water-body and the seabed including their living resources and other forms of marine life."[103] This Convention protects the Baltic Sea Area from being polluted by harmful substances from exploration and exploitation in its seabed area.[104] The enforcement of the Convention illustrates that the State parties must reserve caution when pursuing certain activities on and under the deep seabed, and States do not hold complete sovereignty in exercising their rights over their coastal line and the Seas.

Article 4 of the Helsinki Convention specifically sets out that each contracting party shall implement the provisions of the Convention within its territorial sea and its internal waters.[105] It further sets out the principles and obligations of States in relation to the deep seabed area and their duties to inform other contracting parties and the public on pollution incidents.[106] The Helsinki

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[98] Convention on the Protection of the Marine Environment of the Baltic Sea Area, Mar. 22, 1974, 1507 U.N.T.S. 166; *The Helcom Convention*, EUROPEAN COMMISSION ENV'T (Jan. 7, 2016), http://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/helcom/index_en.htm.

[99] Convention on the Protection of the Marine Environment of the Baltic Sea Area, *supra* note 98.

[100] *Helcom Convention*, *supra* note 98.

[101] *Id.*

[102] BALTIC MARINE ENVIRONMENT PROTECTION COMMISSION, CONVENTION ON THE PROTECTION OF THE MARINE ENVIRONMENT OF THE BALTIC SEA AREA (1992) [hereinafter BALTIC MARINE ENVIRONMENT PROTECTION COMMISSION].

[103] *Id.*

[104] *Id.*

[105] Convention on the Protection of the Marine Environment of the Baltic Sea Area, *supra* note 98; The Helcom Convention, *supra* note 98.

[106] BALTIC MARINE ENVIRONMENT PROTECTION COMMISSION, *supra* note 102; *Helcom Convention*, *supra*

Convention mandates in Article 12 that each party take all measures to prevent pollution of marine environment of the Baltic Sea Area resulting from the exploration or exploitation of its part of the seabed.[107] Further, it requires each party to use principles of Best Available Technology and Best Environmental Practices to prevent and eliminate pollution from exploration or exploitation.[108]

Additionally, the Helsinki Convention mandates that specific actions be taken by the Contracting Parties in the event of a possible pollution incident. As provided in Article 7 of the Convention, States that are parties to the Convention are obligated to notify each other when an environmental impact of proposed activity is likely to cause significant adverse impact on the marine environment of the Baltic Sea Area.[109] The environmental impact is assessed with respect to the importance of the area for birds and marine mammals, the importance of the area as fishing or spawning grounds for fish and shellfish, the recreational importance of the area and the composition of sediment, and the abundance and diversity of hydrocarbon content.[110] Not only are the States required to notify each other, but the States are also required to notify any Contracting Parties whose interests are affected or likely to be affected, without delay.[111]

Moreover, the States are required to regularly report to the Baltic Marine Environment Protection Commission on the legal, regulatory and other measures taken to implement the provisions of the Convention as stated in Article 16.[112] They are also required to ensure that the information regarding the condition of the Baltic Sea; the waters in the deep seabed area; and current and future protection measures are made available to the public according to Article 17.[113]

C. International Seabed Authority Regulations

The third component of international law that Hyperloop One must comply with in its construction is the International Seabed Authority Regulations. The International Seabed Authority (ISA) is an international organization established under the December 10, 1982 revision of the UNCLOS.[114] The ISA became fully

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note 98.

107 *Id.*

108 *Id.*

109 *Id.*

110 BALTIC MARINE ENVIRONMENT PROTECTION COMMISSION, *supra* note 102.

111 *Id.*

112 *Id.*

113 *Id.*

114 *About the International Seabed Authority*, INT'L SEABED AUTHORITY, https://www.isa.org.jm/

operational in June 1996 and has its headquarters in Kingston, Jamaica.[115] The ISA is composed of three principal organs: (1) the Assembly; (2) the Council; and (3) the Secretariat; along with two specialized organs: (1) the Legal and Technical Commission; and (2) the Finance Committee.[116] The powers and functions of the ISA are expressly conferred by UNCLOS.[117] From these organs, the Council plays the major decision-making role.[118] The ISA was established with the responsibility to organize, regulate, and control all mineral-related activities, including exploitation and exploration in the international seabed area beyond the limits of national jurisdiction.[119]

Just like the UNCLOS and the Helsinki Convention, the ISA regulation is enforced today and provides for rules and regulations related to exploitation and exploration in the international seabed area.[120] The ISA regulations further define what "exploitation" and "exploration" means in context.[121] According to the ISA, "exploitation" means "the recovery for commercial purposes of polymetallic nodules and cobalt crusts in the deep seabed area and the extraction of minerals therefrom, including the construction and processing of transportation systems."[122] Similar to exploitation, "exploration" involves the concept of construction of transportation systems and is defined as "searching for deposits of polymetallic nodules and cobalt crusts in the deep seabed area with exclusive rights and the construction, operation of mining, processing of facilities and transportation systems."[123] The creation of specialized

authority (last visited Feb. 13, 2020); Press Release, Int'l Seabed Authority, International Seabed Authority to Continue its Work on Mining Code at Kingston, Jamaica, 17–28 August, U.N. Press Release SEA/1591 (Aug. 14, 1998); Marta C. Ribeiro, *What is the Area and International Seabed Authority?*, 2013 INST. OCEANOGRAPHIQUE, at 1.

115 *About the International Seabed Authority*, *supra* note 114; Ribeiro, *supra* note 114, at 2.

116 *Id.*

117 Ribeiro, *supra* note 114, at 2.

118 *Id.*

119 *About the International Seabed Authority*, *supra* note 114; Ribeiro, *supra* note 114, at 2.

120 *Frequently Asked Questions*, Int'l Seabed Auth., https://www.isa.org.jm/frequently-asked-questions-faqs (last visited Feb. 9, 2020); *see The United Nations Convention on the Law of the Sea (A Historical Perspective)*, OCEANS & LAW OF THE SEA: UNITED NATIONS, https://www.un.org/Depts/los/convention_agreements/convention_historical_perspective.htm (last visited Feb. 9, 2020); *see The HELCOM Convention*, EUR. COMMISSION, https://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/helcom/index_en.htm (last visited Feb. 9, 2020).

121 *See, e.g.*, Int'l Seabed Authority [IAS], *Decision of the Council of the International Seabed Authority Relating to Amendments to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area and Related Matters*, at 3, ISBA/19/C/17 (July 22, 2013) [hereinafter *Prospecting and Exploration for Polymetallic Nodules*]; Int'l Seabed Authority [IAS], *Decision of the Assembly of the International Seabed Authority Relating to the Regulations on Prospecting and Exploration for Cobalt-Rich Ferromanganese Crusts in the Area*, at 2, ISBA/18/A/11 (Oct. 22, 2012) [hereinafter *Prospecting and Exploration for Cobalt Crusts*].

122 *Id.*

123 *Id.*

international organizations and transportation system regulations concerning the deep seabed area conveys the importance of States that are interested in pursuing deep seabed activities. States should make efforts to recognize the existence of such regulations, comply with them prior to initiating its desired projects, and avoid violating existing international law.

The ISA regulations mandate that any construction and transportation systems underneath the deep seabed area by a State Party must be approved by the ISA before being implemented and enforced.[124] The ISA has discretion to deny approval of mineral exploration/exploitation activities.[125]

The ISA regulations mandate in Regulation 10 that a State Party wishing to perform "exploitation" or "exploration" activities, which involve the construction of transportation systems under the deep seabed area, must submit an application to the Secretary-General.[126] Once the application has been submitted, the Secretary-General will notify the members of the Legal and Technical Commission of the application.[127] Once the Commission is notified, it will hold a meeting to determine whether the proposed plan of work for exploration and/or exploitation will meet three important requirements.[128]

The requirements are that the proposed plan of work for exploration and/or exploitation: (1) provide for effective protection of human health, (2) provide for effective protection and preservation of the marine environment, and (3) ensure that installations are not established where it may interfere with the use of recognized sea lanes essential to international navigation or in an area of intense fishing activity.[129] If the Commission determines that the proposed plan of work for exploration and/or exploitation meets the three important requirements, it will recommend approval of the plan of work and pass it to the Council for its final approval.[130] On the other hand, if the Commission determines that the proposed plan of work for exploration and/or exploitation substantially evidences risk of serious harm to marine environment, the Commission will not recommend approval of the plan.[131] The applicant may, within forty-five days of such notification, amend its application.[132] If the

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124 *Id.*
125 *Id.*
126 *Id.*
127 *Id.*
128 *Id.*
129 *Id.*
130 *Id.*
131 *Id.*
132 *Id.*

Commission finds after further consideration that it should not recommend the approval of the plan of work for exploration or exploitation, it will inform the applicant and provide the applicant with a further opportunity to make representations within thirty days.[133]

D. European Union Maritime Spatial Planning Directive

The fourth component of international law that Hyperloop One Technology must comply with in its construction is the EU Maritime Spatial Planning Directive. This directive establishes a framework for maritime spatial planning proposed for development of marine areas and the use of marine resources.[134] It was implemented on July 23, 2014 because of the rapidly increasing demand for maritime space for different purposes. [135] Such purchases included installations for renewable energy production; oil and gas exploration and exploitation; maritime shipping and fishing activities; and transportation.[136] This directive is binding on all members of the EU and lays down legal obligations for States to meet when establishing maritime planning process that results in a maritime spatial plan.[137]

This directive defines "maritime spatial planning" as a process by which Member State's authorities analyze and organize human activities in the marine areas to achieve ecological, economic, and social objectives.[138] It also defines "marine waters" as the waters, seabed, and subsoil on the seaward side of the baseline from which the extent of territorial waters is measured.[139] Marine waters extend to the outmost reach of the area where a Member state has and/or exercises jurisdictional rights in accordance with UNCLOS.[140]

Under Article 8 of this directive, Member States' interests in maritime spatial planning may include the (1) installation and infrastructure for transportation routes and traffic flows; and (2) exploration, exploitation, and extraction of oil, gas, and other minerals.[141] However, when establishing and implementing maritime spatial planning, Member States must take into account

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133 *Id.*

134 Directive 2014/89, of the European Parliament and European Council of 23 July 2014 on Establishing a Framework for Maritime Spatial Planning, 2014 O.J. (L 257) 135, 139 [hereinafter Directive 2014/89].

135 *Id.* at 135.

136 *Id.* at 135.

137 *Id.* at 135.

138 *Id.* at 140.

139 Directive 2008/56, of the European Parliament and European Council of 17 June 2008 on Establishing a Framework for Community Action in the Field of Marine Environmental Policy, 2008 O.J. (L 164) 19, 19.

140 *Id.*

141 Directive 2014/89, *supra* note 134, at 142.

economic, social, environmental, and safety aspects as provided in Article 5 and 6.[142]

Additionally, this directive mandates for Member States to designate an authority or commission that will be responsible for the implementation and regulation of all activities related to maritime spatial planning as stated in Article 13.[143] It also requires Member States to submit copies of all maritime spatial plans, including relevant explanatory material, to the established Commission within three months of the publication.[144] According to Article 14, the Commission must then submit a report outlining the progress to the European Parliament and European Council one year after the deadline of establishment of maritime spatial plans, at the latest .[145] Furthermore, it requires Member States to conform with existing domestic and international legislative instruments, such as UNCLOS as stated in Article 2.[146]

E. United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes (The Water Convention)

The fifth component of international law that Hyperloop One Technology must comply with in its construction is the United Nations Economic Commission for Europe (UNECE) Convention on the Protection and Use of Transboundary Watercourse and International Lakes ("The Water Convention"). The Water Convention is the key legal framework and intergovernmental platform for sustainable management of water resources in the pan-European region.[147] This Convention was signed in Helsinki on March 17, 1992 and entered into force on October 9, 1996.[148] It is binding on the European Union and thirty-eight countries from the UNECE region, which include both Estonia and Finland.[149] It also provides obligations for parties to the convention to prevent, control and reduce transboundary impact, and lays out rules to regulate water resource utilization in a reasonable and equitable way so as to ensure sustainable management.[150]

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142 *Id.* at 141.

143 *Id.* at 144.

144 *Id.*

145 *Id.*

146 *Id.* at 140.

147 UN DEP'T ECON. & SOC. AFF., WATER FOR LIFE, http://www.un.org/waterforlifedecade/water_cooperation_2013/water_convention.shtml (last visited Feb. 11, 2019).

148 *Id.*

149 *Id.*

150 *Id.*

The Water Convention sets out provisions on monitoring, research and development, consultations, warning and alarm systems, mutual assistance, access to information by the public with respect to transboundary watercourses, and defines "transboundary waters."[151] Under Article 1 of this convention, "transboundary waters" is defined as any surface waters which mark, cross, or are located on boundaries between two or more States.[152] Furthermore, "transboundary impact" is described as any significant adverse effect on the environment.[153] Such effects on the environment may include effects on human health, safety, water, and socio-economic conditions that result from change in any of the aforementioned factors.[154] They must take all appropriate measures to control pollution of waters causing or likely to cause environmental harm to other areas of the environment.[155]

Additionally, Article 3 of the Water Convention requires the Parties to develop and implement a number of safeguards to prevent environmental harm and promote sustainable water-resources management. These safeguards include "legal, administrative, economic, and financial measures, along with utilizing environmental best practices. . . ."[156] Further, it requires the Parties to establish programs and authorities for monitoring the conditions of the transboundary waters; the Parties are also held responsible and liable according to Articles 4 and 7.[157]

F. Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network

The final component of international law that Hyperloop One Technology must comply with in its construction is the Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network. This directive establishes a framework for tunnel safety issues and sets out specific safety requirements for the construction of tunnels of the Trans-European Road Network.[158] It was implemented on April

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[151] *Id.*

[152] Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Mar. 17, 1992, 1936 U.N.T.S. 269.

[153] *Id.*

[154] *Id.*

[155] *Id.*

[156] *Id.*

[157] *Id.*

[158] *Road Infrastructure & Tunnel Safety*, EUR. PARLIAMENT, 1, 1 (2018), http://www.europarl.europa.eu/RegData/etudes/BRIE/2018/611028/EPRS_BRI(2018)611028_EN.pdf.

29, 2004 to ensure a minimum level of safety for road users in tunnels and to reduce road deaths in Europe.[159]

This Directive that aims to ensure a minimum level of safety applies to all tunnels that have lengths of over 500 meters but not deeper than 70 meters whether they are in operation, under construction, or at the design stage.[160] It also provides criteria for deciding whether to build a single- or twin-tube tunnel depending on traffic volume and safety.[161] In a case where the traffic volume will exceed 10,000 vehicles, a twin-tube tunnel is needed.[162] Furthermore, the directive provides that the same number of lanes need to be maintained inside and outside the tunnel.[163]

Additionally, longitudinal gradients above 5% are not permitted in new tunnels and if it is a tunnel with gradients higher than 3%, additional measures need to be taken according to Annexes I 2.2.2 and 2.2.3.[164] It also requires normal lighting, a mechanical ventilation system, and a water supply to be provided in the tunnel.[165]

II. EXPAND IT: AN ARGUMENT FOR PLAUSIBLE VIOLATION OF INTERNATIONAL LAW

Without engineering solutions, construction of the submerged floating tunnel for the Hyperloop One Technology potentially violates current international law. The existing legislation is not fit for neither today's reality nor the development of Hyperloop One Technology. Because of this, this Comment proposes that for the submerged tunnel construction to be permissible under international law, the existing legislation should be expanded to include the new form.

A. Submerging Floating Tunnel's Compliance with UNCLOS

Because Hyperloop One Technology's construction of the submerging floating tunnel involves either the mounting of the pontoons at the sea surface

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159 *Id.*

160 Directive 2004/54, of the European Parliament and of the Council of 29 April 2004 on Minimum Safety Requirements for Tunnels in the Trans-European Road Network, 2004 O.J. (L 167) 39, 45 [hereinafter Directive 2004/54].

161 *Id.* at 62.

162 *Id.*

163 *Id.*

164 *Id.* at 63.

165 *Id.* at 67–69.

or the anchoring of the tethers deeply into the deep seabed to hold the structure, it will be subject to UNCLOS. If the submerging floating tunnel's construction of the uses the mounting of the pontoons at the sea surface, it will be governed by Articles 86–120 of UNCLOS.[166] The Articles explain that high seas are open to all States. [167] But the freedom of the high seas is subject to other rules of international law and the high seas are reserved for peaceful purposes.[168]

The UN declares an action to be *contra* peace and security when a country illegally goes to war or otherwise takes an action that is a crime against peace.[169] Because the submerging floating tunnel endeavor creates a transportation link between Estonia and Finland that increases trade and opportunities for exchange between the two countries, it is not an adverse action to peace and security. Instead, it further encourages European peace and security as it results in an increase in the employment rate among both countries by creating a larger labor market.[170] It is also anticipated that the cargo and passenger rate of usage will double, which will in return lead to a total economic benefit of 5000 million euros.[171] Since the construction of the submerging floating tunnel achieves a peaceful purpose, it will not be a violation of UNCLOS.[172]

If the construction of the submerging floating tunnel is done through the anchoring of the tethers deeply into the deep seabed, it will be governed by Articles 133–191 of UNCLOS as the construction occurs within the area of the deep seabed.[173] Article 138 explains that conduct with respect to the deep seabed must be done in accordance with the Charter of the United Nations and with the interest of maintaining peace and security.[174] In addition, Article 141 explains that the deep seabed area be open exclusively for peaceful purposes.[175] Again, as the construction of the submerging floating tunnel is not for military or war purpose, but rather benefits European peace and security, it would be in

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166 United Nations Convention on the Law of the Sea, *supra* note 83.

167 *Id.*

168 *Id.*

169 Rex J. Zedalis, Note, *"Peaceful Purposes" And Other Relevant Provisions of the Revised Composite Negotiating Text: A Comparative Analysis of the Existing and the Proposed Military Regime for the High Seas*, 7 SYRACUSE J. INT'L L. & COM., 1,4 (1979).

170 *Helsinki-Tallinn Transport Link Feasibility Study – Final Report*, FINEST LINK 1, 55 (2018), http://www.finestlink.fi/wp-content/uploads/2018/02/FinEst-link-REPORT-FINAL-7.2.2018.pdf.

171 Kari Ruohonen, *Study Results of the FinEst Link Project*, FINEST LINK 1, 18 (2018), http://www.railbaltica.org/wp-content/uploads/2018/04/Kari_Ruohonen_RBGF2018_Day1.pdf.

172 Cole, *supra* note 11.

173 Paasirvirta, *supra* note 69; *Law of the Sea*, *supra* note 69; Hickey, Jr., *supra* note 72; GERMANY'S FEDERAL FOREIGN OFFICE, *supra* note 72.

174 United Nations Convention on the Law of the Sea, *supra* note 83, at 446.

175 *Id*. at 447.

accordance with United Nation's interest in maintaining peace and security. [176] Thus, the conduct will be permissible under UNCLOS.[177]

Articles 145 and 146 explain that activities in the deep seabed area must ensure the protection of the marine environment and human life.[178] States are required to take all necessary measures to prevent, reduce, and control marine pollution using the best practical means at their disposal.[179] They must also take all necessary measures to protect and preserve "rare and fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life."[180] Furthermore, States are required to develop pollution contingency plans and conduct environmental impact assessments (EIA).[181]

The construction of the submerged floating tunnel will be permitted despite *some* harm to the marine environment, as long as reasonable precautions are taken to preserve and prevent significant negative impacts on the marine environment. The marine environment will be harmed from the sediments that are spilled from the dredging work of placing the tethers in the deep seabed and floating the built tubes into the water.[182] The marine environment will also be harmed by the turbidity of the water that occurs as a result of the premade materials that originate from dredging activities or excavation areas.[183] The insertion of tethers and sediment spill reduces the amount of sunlight penetrable to the water and thus affects plant growth and food availability for the fish and birds.[184] It also affects oxygen depletion in the water and alters the nutrient level causing algae growth.[185]

Despite these environmental concerns, the construction will not violate UNCLOS as Estonia and Finland have taken precautionary measures to address the environmental concerns. They have established a Joint Commission on EIA to monitor the maritime environment and produce the Balticonnector Environmental Impact Assessment Report.[186] They have also started the process

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176 Cole, *supra* note 11.

177 *Id.*

178 United Nations Convention on the Law of the Sea, *supra* note 83, at 449.

179 Suzanne Lalonde, *Protection of the Marine Environment: The International Legal Context*, DALHOUSE UNI. 1, 5 (2016), https://cirl.ca/files/cirl/s-lalonde_2016_hfx_en.pdf.

180 *Id.*

181 *Id.*

182 *Immersed Tunnels in the Natural Environment*, INT'L TUNNELING & UNDERGROUND SPACE ASS'N 1, 2 (2006), https://about.ita-aites.org/publications/wg-publications/1398-immersed-tunnels-in-the-natural-environment.

183 *Id.* at 4.

184 *Id.*

185 *Id.*

186 *Environmental Impact Assessment Report*, BALTICCONNECTOR 1, 51 (2015), https://www.envir.ee/

of Strategic Environmental Assessment (SEA) to develop land use plans along with special construction and circumvention programs to eliminate geological risk related to ground-water resources in Estonia and Finland.[187]

Not only did Estonia and Finland conduct reports, but those reports have shown that the construction of the submerged floating tunnel's negative impact on the environment is insignificant. According to the Balticconnector Environmental Impact Assessment Report, the impact of the harmful substances is insignificant because the sediments rise up to five meters from the sea bottom and prevail and can remain in the water for a maximum of only five days.[188] This will not adversely impact the fish in the Baltic Sea. [189] Looking at the population level, fish swimming higher in the water column will not be influenced and the impact will only be temporary and insignificant for those fish and fish eggs near the deep seabed.[190] Further, there is little impact on the marine environment because the increased concentration of toxic substances in the water is unlikely.[191] It has been tested that the concentrations detected at the construction sites were significantly lower than the detection limit of 1μm/kg.[192] Since the harmful concentrations detected at the construction sites from the new subsea tunnel construction method is significantly low, there is only a small probability that the water columns in the sea will be filled with increased concentration of toxic substances. This impact of harmful substances on the fish, birds, and plants is ultimately insignificant.[193] The assessment from the Report demonstrates that the environmental concerns are merely hurdles, not impossible barriers. They may be overcome and easily addressed through maritime monitoring and engineering solutions.

Despite it being prone to various accidental scenarios that impact human life, the construction of submerging floating tunnel will also be permitted as long as there is substantial economic growth. That is, where the economic rate of return exceeds 5% and reasonable precautions are taken so that the tunnel is safe in the face of most of these accidents.[194] The tunnel may be subjected to collision with

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sites/default/files/balticconnector_yva_estonia_eng_48.pdf

187 *Helsinki – Tallinn Tunnel Task Force Report of the Main Findings*, MINISTRY TRANSPORT & COMM., HELSINKI 1, 17 (2018), https://api.hankeikkuna.fi/asiakirjat/86f6e89d-cfcc-4dfb-aed8-923a7688588e/e0449964-ad60-4421-b83d-51f57691b399/RAPORTTI_20180515085000.PDF.

188 *Environmental Impact Assessment Report*, *supra* note 186, at 187.

189 *Id.*

190 *Id.*

191 *Id.*

192 *Id.*

193 *Id.*

194 Bernt Jakobsen, *Design of the Submerged Floating Tunnel Operating Under Various Conditions*, SCI.

sinking ships, submarines, and hooking of trawling gears and anchor lines.[195] Further, the tunnel may be subjected to internal fire and explosion, massive water filling, and water level changes from landslide generated waves, winds, and tides.[196]

Despite these concerns of accidental scenarios that impact human life, the construction of the submerging floating tunnel will not violate UNCLOS because Estonia and Finland conducted studies to determine that significant economic growth that outweighs the risk of human life.[197] The countries have also taken precautionary measures to ensure that the tunnel is safe in the face of most of these plausible scenarios.[198] Through these studies, it has been outlined that the structural design of the submerged floating tunnel will provide the utmost protection.[199] This design will also prevent potential leakage and massive water filling because of the installed tube ventilation and spherical bulkheads and basins that function to collect water leaks.[200] The likelihood of submarine collision is extremely low because the tunnel will be constructed significantly below the submarine routes.[201] Furthermore, any potential collisions with the tunnel are unlikely because there will be restrictions placed by the shipping industry to ensure all routes in the sea are secure.[202]

With respect to the economic impact, it has been determined that the economic rate of return of building the tunnel will be 6.7% annually, exceeding the required limit of 5%.[203] It has also been estimated that the Gross Domestic

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DIRECT 71, 77 (2010), https://ac.els-cdn.com/S1877705810005060/1-s2.0-S1877705810005060-main.pdf?_tid=32a25252-a00c-4ef1-96a2-61a0b772aa75&acdnat=1547349144_0174ee2d229c454a7c8eb6beec3a0e83; Rolf Magne Larssen & Svein Erik Jakobsen, *Submerged Floating Tunnels for Crossing of Wide and Deep Fjords*, SCI. DIRECT 171, 176 (2010), https://ac.els-cdn.com/S1877705810005175/1-s2.0-S1877705810005175-main.pdf?_tid=f9065c7c-dda5-49c2-8216-c5ff01d7c7b3&acdnat=1547345787_d8dd4e99f2125018a99c1e6e79e5b8bf; Christian Ingerslev, *Immersed and Floating Tunnels*, SCIENCE DIRECT 51, 56 (2010), https://ac.els-cdn.com/S1877705810005047/1-s2.0-S1877705810005047-main.pdf?_tid=72ba2127-4f3a-40e2-94e5-5ed6a899e962&acdnat=1547346950_fa84e163ab7b66ff7e12914cdbaa2980.

195 *Id.*

196 *Id.*

197 Portia Kentish, *The Tallinn-Helsinki Tunnel: Europe's Boldest Project in Years*, EMERGING EUROPE (Nov. 26, 2019), https://emerging-europe.com/intelligence/tunnel-vision/.

198 *Helsinki-Tallinn Tunnel: Checking in with the World's Most Ambitious Rail Link*, FINESTBAY AREA DEVELOPMENT (Jun. 5, 2019), https://finestbayarea.online/helsinki-tallinn-tunnel-checking-worlds-most-ambitious-rail-link.

199 *Underwater Concrete, Anchored to Seabed, Railway Tunnel between Helsinki and Estonia*, ANKURTUNNEL 1, 3 (2017), https://www.uudenmaanliitto.fi/files/21553/1a_ANKURTUNNEL_entry.pdf.

200 *Id.*

201 *Helsinki-Tallinn Transport Link Feasibility Study – Final Report*, *supra* note 172, at 79.

202 *Id.*

203 *Pre-feasibility Study of Helsinki-Tallinn Fixed Link Final Report*, TALSINKIFIX 1, 93 (2015), https://www.hel.fi/static/kanslia/Julkaisut/2015/TALSINKIFIX_Final_Report.pdf.

Product (GDP) per capita for both countries will increase anywhere from 1 to 3% annually.[204] The assessment from the preliminary studies demonstrates that the concerns regarding impact on human life are merely hurdles that are similar to environmental concerns; they may be overcome through engineering solutions.

B. Submerging Floating Tunnel's Compliance with the Helsinki Convention

Since the construction of the submerging floating tunnel for the Hyperloop One Technology occurs within the Baltic Sea area, it will be subject to the Helsinki Convention. The Helsinki Convention requires binding parties to protect the water-body and the seabed area from being polluted by harmful substances that originate from exploration and exploitation.[205] The construction of the submerging floating tunnel will be permissible under the Helsinki Convention despite some of the environmental harm that it causes, as long as reasonable precautions are taken. Similar to the environmental harms outlined in UNCLOS section, the construction of the tunnel will pollute the Baltic Sea by spilling sediments into water and causing turbidity in the water.[206] It will also alter the oxygen depletion and nutrient level in the water, causing algae growth that will impact the plant growth and food availability for the fish and birds of the Baltic Sea.[207]

Despite these environmental concerns, the construction will not violate the Helsinki Convention as Estonia and Finland have taken reasonable precautionary measures to prevent environmental harm and to preserve the marine environment. As stated, Estonia and Finland have established a Joint Commission on EIA to monitor the maritime environment and generated the Balticconnector Environmental Impact Assessment Report ("Balticconnector Report").[208] They have also started the process of Strategic Environmental Assessment (SEA) to develop land use plans along with special construction and circumvention programs to eliminate geological risk related to ground-water resources in Estonia and Finland.[209] As outlined in the Balticconnector Report, the environmental impact is insignificant with respect to the area for birds and marine mammals because the detected harmful construction substances that will

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204 *Id*. at 78.

205 BALTIC MARINE ENVIRONMENT PROTECTION COMMISSION, *supra* note 102.

206 *Immersed Tunnels in the Natural Environment*, *supra* note 182.

207 *Id.* at 4.

208 *Environmental Impact Assessment Report*, *supra* note 186.

209 *Helsinki – Tallinn Tunnel Task Force Report of the Main* Findings, *supra* note 187.

be transported below to the water is minimal.[210] Additionally, the possibility of fishes and other species being impacted by the sediment spills is unlikely due to minimal concentrations of toxic substances.[211]Even more, the construction of the tunnel will not interfere with fishing activities because the construction is only temporary and the amount of fishing activities occurring at the Baltic sea have significantly decreased by approximately 50% in recent years.[212] Furthermore, Estonia and Finland have complied with Article 17 of the Convention by making the reports that address the feasibility of the tunnel and proposed planned measures available to the public.

C. Submerging Floating Tunnel's Compliance with International Seabed Authority

If the construction of the submerging floating tunnel for the Hyperloop One Technology is done through anchoring the tethers in the area of the deep seabed, it will also be subject to ISA regulations; the ISA is responsible for organizing, regulating, and controlling all mineral related activities including exploration and exploitation in the international seabed area.[213]

According to ISA regulations, exploration and exploitation involve the construction of transport systems, including tunnels.[214] The ISA has the discretion to approve or deny the construction of the tunnels.[215] The ISA will approve the construction of tunnel for transport systems if it provides for effective protection of human health, there is no risk of serious harm to the marine environment, and it does not interfere with international navigation or intense fishing activity.[216]

The construction of the submerging floating tunnel will meet the requirements of ISA regulation for proposed plan of work of exploration and exploitation because it will protect human health, preserve the marine environment, and will not interfere with fishing activities.[217] The construction of the tunnel will protect human health as the tunnel will be built with all

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[210] *Environmental Impact Assessment Report*, *supra* note 186, at 187.

[211] *Id*.

[212] *Id.* at 209.

[213] *About the International Seabed Authority*, *supra* note 114; Ribeiro, *supra* note 114, at 2.

[214] *Prospecting and Exploration for Polymetallic Nodules*, *supra* note 121; *Prospecting and Exploration for Cobalt Crusts*, *supra* note 121.

[215] *Id.*

[216] *About the International Seabed Authority*, *supra* note 114.

[217] *Prospecting and Exploration for Polymetallic Nodules*, *supra* note 121; *Prospecting and Exploration for Cobalt Crusts*, supra note 121.

necessary precautionary measures to ensure that it is safe in vulnerable accidental scenarios.[218] The structure and design of the submerged floating tunnel will consist of tube ventilation and spherical bulkheads and basins that will collect any water leaks.[219] The construction of the tunnel will also preserve the marine environment as tests will be conducted to detect the level of harmful substances prior to the pontoons or tethers being mounted to the sea.[220] The Balticconnector Environmental Impact Assessment Report has shown that the detected level of harmful substances is extremely low.[221] But if the level exceeds the limit, the pontoons and tethers will not be transported and will be on hold until further risk assessment is completed and the problem is resolved.[222] Additionally, the construction of the tunnel will not interfere with fishing activities because the construction will be of short-term local duration and the amount of fishing activities occurring at the Baltic sea decreased by approximately 50% in recent years.[223]

D. Submerging Floating Tunnel's Compliance with European Union Maritime Spatial Planning Directive

According to the derivative, "Maritime Spatial Planning" encompasses the construction of submerging floating tunnel either in the waters or in the seabed area.[224] Since the construction of the submerging floating tunnel for the Hyperloop One Technology is part of "maritime spatial planning," it will be subject to the European Union Maritime Special Planning Derivative. Articles 5 and 6 of the derivative state that when establishing and implementing maritime spatial planning, Member States must take into account economic, social, and environmental aspects.[225] After considering the various aspects, if the total harm is less, then the maritime spatial planning should be implemented.[226]

The construction of the submerging floating tunnel complies with the derivative requirement as the construction does not result in greater economic,

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218 *Underwater Concrete, Anchored to Seabed, Railway Tunnel between Helsinki and Estonia*, *supra* note 199.

219 *Id.*

220 Jakobsen, *supra* note 194; Larssen & Jakobsen, *supra* note 194; Ingerslev, *supra* note 194.

221 *Environmental Impact Assessment Report*, *supra* note 186, at 187.

222 *Finest Bay Area – Railway Tunnel Between Finland Estonia*, FINEST BAY AREA DEVELOPMENT OY (2018), 170, 177, https://finestbayarea.online/sites/default/files/2019-02/Finest%20Bay%20Area_Railway%20tunnel_between_Finland_and_Estonia_EIA_program_FINAL_WEB.pdf.

223 *Environmental Impact Assessment Report*, *supra* note 186, at 209.

224 Directive 2014/89, *supra* note 134.

225 *Id.* at 141.

226 *Id.*

social, and environmental harm than what currently exists.[227] With respect to the environmental aspect, the building of the tunnel may cause *some* environmental harm, but it is permitted to do so as long as precautionary measures are taken.[228] Estonia and Finland have already achieved this by studying the potential environmental impact and determining the feasibility of the tunnel.[229] They have also complied with directive by establishing commissions that will address activities related to maritime spatial planning.[230]

The construction of the submerging floating tunnel also does not result in greater economic harm. Although the construction accumulates a cost of at least $130 billion dollars,[231] because it increases the overall socio-economic state of both European countries by increasing trade and the employment rate through expanding the labor market.[232] The cost of $130 billion dollars is a one-time cost that is involved with the construction of the tunnel whereas the expected economic rate of return of building the tunnel will be 6.7% annually[233] along with an estimated GDP per capita increase for both countries from 1 to 3% annually.[234] In addition, the construction of the submerging floating tunnel is in compliance with the directive because it conforms with existing domestic and international legislative instruments, such as UNCLOS.

E. Submerging Floating Tunnel's Compliance with The Water Convention

Because the construction of the submerging floating tunnel for the Hyperloop One Technology requires the use of water resources in the pan-European region, it will be subject to the Water Convention. The Water Convention obliges parties to prevent, control, and reduce transboundary impact on the transboundary waters between Finland and Estonia.[235] The convention defines transboundary impact as any significant adverse effect on the environment, which includes effects on human health, water, and socio-economic conditions.[236] The construction of the submerging floating tunnel does

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227 *The Biggest Challenges That Stand in the Way of Hyperloop*, INTERESTING ENGINEERING (Jun. 29, 2017), https://interestingengineering.com/biggest-challenges-stand-in-the-way-of-hyperloop.

228 Directive 2014/89, *supra* note 134, at 141.

229 *Helsinki-Tallinn Transport Link Feasibility Study – Final Report*, *supra* note 170

230 *Id.*

231 *The Biggest Challenges That Stand in the Way of Hyperloop*, *supra* note 227.

232 *Helsinki-Tallinn Transport Link Feasibility Study – Final Report*, *supra* note 170.

233 *Pre-feasibility Study of Helsinki-Tallinn Fixed Link Final Report*, *supra* note 203.

234 *Id.* at 78.

235 UN DEP'T ECON. & SOC. AFF., *supra* note 147.

236 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, *supra* note 152.

not violate the Water Convention in a similar manner as other existing international regulations because it does not negatively impact the marine environment, human health, or economy of both European countries. The construction provides for the country's economic growth by creating more job opportunities through increased labor markets and increased GDP.[237] It also aims to reduce pollution of the marine environment by developing cost efficient and energy saving transportation technology.[238] Further, it does not adversely affect water conditions, but rather improves the current water situation: special construction programs to tackle the existing geological risks that are affecting the ground-water resources in Estonia and Finland.[239]

F. Submerging Floating Tunnel's Compliance with Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network

The construction of the submerging floating tunnel for the Hyperloop One Technology requires a tunnel that is at least 70 meters deep and 1000 kilometers long.[240] The current Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network, which sets out specific safety requirements for the construction of tunnels, aim to ensure a minimum level of safety for tunnels over 500 meters, but not deeper than 70 meters, whether they are in operation, under construction, or at the design stage.[241]

The construction of the submerging floating tunnel is problematic and potentially violates this directive because the current existing regulation does not fit within the current developments; no existing legislation guarantees a minimum level of safety for tunnels deeper than 70 meters.[242] It also potentially violates this directive because the current existing regulation's definition of modes of vehicle transportation does not include the newly proposed hyperloop tube or capsule.[243] The existing legislation must be expanded to include tunnels that will be built deeper than 70 meters and hyperloop tubes or capsules as permitted technology to travel on the submerged floating tunnel.

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237 *Helsinki-Tallinn Transport Link Feasibility Study – Final Report*, *supra* note 170, at 9.
238 *Immersed Tunnels in the Natural Environment*, *supra* note 182.
239 *Helsinki – Tallinn Tunnel Task Force Report of the Main Findings*, *supra* note 187.
240 Cole, *supra* note 11.
241 Directive 2004/54, *supra* note 160.
242 *Id.*
243 *See id.*

Not only does the construction of the submerged floating tunnel propose safety problems that violate international regulations, but so does the hyperloop tube capsule.[244] The first major security risk of the hyperloop tube is leakage of cabin air reducing cabin pressure leading to a catastrophic implosion.[245] The effect would be similar to the railroad tank car vacuum implosion.[246] The second major security risk of the hyperloop tube would be decompression which would lead the tube quickly accelerating as air continuously rushes in.[247] Decompression would not only ruin the system, but also lead to death of all those riding in the tube at the time of the accident.[248] The last major security risk is the threat of terrorist attack, which has severe impact on human life.[249] The implementation of a hyperloop tube that is hundreds of kilometers long and transports hundreds of people gives rise to a real possibility of terrorist attack.[250] Although agencies could employ security measures, it would dramatically increase the already expensive running cost and thus, make the endeavor ineffective.[251]

III. PROPOSAL

Hyperloop One has suggested building its underwater tunnel from Estonia to Finland in the form of a submerged floating tunnel. While the construction of such an innovative tunnel meets most of the existing legislations of international law, it potentially violates the minimum safety requirements for tunnels in the Trans-European Road Network. For the construction of the tunnel to fully comply with international law, the Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network must be expanded to include the submerged floating tunnel form. Below, Section A describes the proposed revised legislation; Section B discusses any foreseeable concerns of the proposed revised legislation.

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244 INTERESTING ENGINEERING, *supra* note 229.

245 *Id.* Mike Overton & Michael C. Sarin, *Complex Hyperloop Capsule Safety Requirements and Risk Mitigations*, HYPERLOOP TRANSPORTATION TECH. 2 (2018), https://www.system-safety.org/issc2018/wp-content/uploads/2018/05/ISSC_2018_Submitted_Hyperloop_Capsule_Safety.pdf.

246 *See The Biggest Challenges That Stand in the Way of Hyperloop*, *supra* note 227.

247 *Id.*

248 *See id.*; Overton & Sarin, *supra* note 244, at 3.

249 T*he Biggest Challenges That Stand in the Way of Hyperloop*, *supra* note 227.

250 *Id.*

251 *Id.*

A. Proposed Amendment to the Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network

The potential violation of the construction of the submerged floating tunnel on the Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network can easily be fixed by amending the Directive to include tunnels over 500 meters and deeper than 70 meters. This amendment will allow the Hyperloop One Technology to meet the minimum safety requirements as the proposed Hyperloop One Technology requires a tunnel that exceeds distances of 100 kilometers and drills deeper than 70 meters. [252] Further, the Directive must be amended to include the "Hyperloop tube" or "Hyperloop capsule" as modes of permissible tunnel transportation other than vehicles.

With this proposal, the construction of the submerged floating tunnel will comply with current international law regulations, and both Estonia and Finland will be able to receive permission from the European Parliament and of the Council to initiate the development of the tunnel. The proposed amendment to the Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network will allow the construction of long tunnels over 500 meters in length and deeper than 70 meters to facilitate communication between Estonia and Finland. Additionally, the project will play a decisive role in the functioning and development of economies of both countries; the tunnel increases European peace and security.[253]

B. Potential Concerns of Proposed Revised Legislation

The inclusion of the submerged floating tunnel in the proposed revised legislation raises two concerns that were not present before. First, Article 12 of the Directive requires that the tunnels be inspected by the Inspection Entities every six years—at the least—to verify their compliance with the provisions of the Directive.[254] The proposed revised legislation allows flexibility for inspection that may significantly impact the safety of the tunnel and those riding in the Hyperloop tube or capsule. Because the tunnel is subject to internal fire,

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[252] Cole, *supra* note 11.

[253] Directive 2004/54, *supra* note 160.

[254] ENRICO PASTORI, ICF INT'L, STUDY ON THE IMPLEMENTATION AND EFFECTS OF DIRECTIVE 2004/54/EC ON MINIMUM SAFETY REQUIREMENTS FOR ROAD TUNNELS IN THE TRANS-EUROPEAN ROAD NETWORK 21 (2015). https://ec.europa.eu/transport/sites/transport/files/tunnel_final_report.pdf.

explosion, massive water filing, and water leakage,[255] it is imperative that the tunnel be subject to maintenance and inspection as many times as possible in a given year. This protocol would protect the surrounding marine environment and human life from potential danger.

Second, the Directive requires the refurbishment of tunnels to be carried out and completed according to a specific schedule.[256] As with previous tunnels, the cost of refurbishment has been the main factor hampering the implementation of the Directive.[257] The cost of refurbishing a tunnel is extremely costly and for a submerged floating tunnel, the cost to refurbish can be at least $130 billion dollars, the same cost as constructing a new submerged floating tunnel.[258] The cost of refurbishing the tunnel is not the only concern; the time that it takes to construct the submerged floating tunnel is a factor, as well. As the construction of the submerged floating tunnel takes several years to complete and to repair, the economies of both Estonia and Finland will be impacted with delayed trades and its citizens not being able to commute to work. Overall, this will affect the peace and security between the two nations.

CONCLUSION

The construction of the submerged floating tunnel is a fascinating development that will change future modes of transportation, but there is still a serious concern that it has yet to be fully compliant with international law. Although it meets majority of the existing international conventions and regulations, the construction of the submerged floating tunnel is not fully compliant with international law as potentially violates one existing legislation of international law. It is in the best interest of Hyperloop One, Estonia, and Finland that the current existing legislation regarding the Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network to be expanded to include the proposed submerged floating tunnel to permit the transportation of various cargos and people using Hyperloop One Technology.

The proposed submerged floating tunnel form, as it stands, is compatible with UNCLOS as it increases European peace and security among Estonia and Finland by increasing trade, opportunities for exchange, and the labor market. It is also compatible with the Helsinki Convention, the International Seabed

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255 Jakobsen, *supra* note 194; Larssen & Jakobsen, *supra* note 194; Ingerslev, *supra* note 194.

256 Directive 2004/54, *supra* note 160, at 53.

257 PASTORI, *supra* note 254.

258 *The Biggest Challenges That Stand in the Way of Hyperloop*, *supra* note 227.

Authority Regulations, the European Union Maritime Spatial Planning Directive, and the Water Convention because it protects human health by structuring and designing the tunnel in the safest form possible to reduce accidental scenarios. Further, it is compatible with the following international regulations and conventions as it preserves the marine environment by taking necessary precautions that prevent the elimination of fishes and other species and any interference with fishing activity in the Baltic Sea.

However, the construction of the submerged floating tunnel form, as it stands, without engineering solutions is incompatible with the Directive of the European Parliament and of the Council on Minimum Safety Requirements for Tunnels in the Trans-European Road Network. It potentially violates this directive because the directive provides a minimum level of safety for tunnels over 500 meters but not deeper than 70 meters. But the proposed Hyperloop One Technology requires a tunnel that is over distances of 1000 kilometers and deeper than 70 meters. It also potentially violates this directive because the permitted "vehicles" in the tunnel do not include a "Hyperloop tube" or "Hyperloop capsule." Because the construction of the submerged floating tunnel potentially violates this directive, it does not fully comply with international law and requires the directive to be amended to incorporate this new form.

By expanding the current existing international legislation to include the new form, the Estonia-Finland submerged floating tunnel will be a life-changing innovation and the first of its kind. With this new tunnel, it will be possible to travel to another country and even to another continent in a few hours using a technology that carries people at high speeds through low-pressure tubes. With one slight change in the legislation, an entirely different future filled with new developments in transportation technology is soon approaching.

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