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A Brave New World: Using the Outer Space Treaty to Design International Data Protection Standards for Low- Earth Orbit Satellite Operators

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A BRAVE NEW WORLD: USING THE OUTER SPACE TREATY TO DESIGN INTERNATIONAL DATA PROTECTION STANDARDS FOR LOW-EARTH ORBIT SATELLITE OPERATORS

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I. INTRODUCTION

THE MODERN SATELLITE communications industry was but a flicker of an idea prior to World War II, yet today, communications satellites serve as crucial hubs in the transmission of vital data that help shrink the world.[1] Technological innovation in the industry after the Soviet Union's 1957 launch of *Sputnik I*, the first satellite to successfully orbit the Earth, progressed so rapidly that by 1964, satellites were used to televise portions of the Tokyo Olympics.[2] Furthermore, the rapid development in the years following the launch of *Sputnik I* possessed an extremely international flavor.[3] As the satellite communications industry grew through a combination of efforts from governmental entities and private enterprise, so too did the burgeoning sector's need for governance and regulation become apparent, both on a domestic and international level.[4]

Paralleling the rapid and pervasive adoption of satellite communication technology in the latter half of the twentieth century is the explosive growth of internet consumption and the drastic increase in the commoditization of internet users' personal data over the first two decades of the twenty-first century.[5] With data privacy regulations recently promulgated in both California and Europe, companies of all sorts face an additional regulatory requirement that calls for constant attention in the face of penalties.[6] The General Data Protection Regulation (GDPR)[7]

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[1] *See* Hugh Richard Slotten, *Satellite Communications, Globalization, and the Cold War*, 43 TECH. & CULTURE 315, 315 (2002) (discussing the impact of global communications).

[2] *See* Stephen E. Doyle, *Communication Satellites: International Organization for Development and Control*, 55 CALIF. L. REV. 431, 432 (1967); David J. Whalen, *Communications Satellites: Making the Global Village Possible*, NAT'L AERONAUTICS & SPACE ADMIN., https://www.hq.nasa.gov/office/pao/History/satcomhistory.html [https://perma.cc/FW8U-NE4Y] (last updated Nov. 30, 2010).

[3] *See* Doyle, *supra* note 2, at 432; Whalen, *supra* note 2.

[4] *See* Slotten, *supra* note 1, at 325–31.

[5] *See* Elizabeth deGrazia Blumenfeld, *Privacy Please: Will the Internet Industry Act to Protect Consumer Privacy Before the Government Steps In?*, 54 BUS. LAW. 349, 350–51 (1998); Paul M. Schwartz, *Property, Privacy, and Personal Data*, 117 HARV. L. REV. 2056, 2057–58 (2004) (stating that data "privacy [i]s the result of legal restrictions and other conditions . . . that govern the use, transfer, and processing of personal data.").

[6] *See, e.g.*, Daisuke Wakabayashi, *California Passes Major Online Privacy Law*, N.Y. TIMES (June 29, 2018), https://www.nytimes.com/2018/06/28/technology/california-online-privacy-law.html [https://perma.cc/9DL5-2QUW].

[7] *See generally* General Data Protection Regulation 2016/679, 2016 O.J. (L119/1) (EU).

enacted by the European Union (E.U.) imposes restrictions on satellite telecommunications players—especially regarding direct-to-home broadcasting, the flow of data to and from a satellite, and the provision of geolocation services.[8] However, the reach of the GDPR is limited and protects mainly European end users of satellite telecommunications infrastructure from the unauthorized use and collection of their personal data by third-party actors.[9] Thus, when viewed outside the scope of the GDPR, the current regulatory landscape concerning the privacy and protection of data transmitted from Earth to one or more satellites and back again lacks comprehensiveness and clarity. Because of the nature of satellite communication, globalization, and inadequate current regulations, the world needs a set of uniform principles to govern the protection of personal data when it is beamed to and from satellites.

For ease of reading and the purpose of clarity, this Comment will be divided into sections. Section II will cover background information about the satellite telecommunications industry. This includes a brief overview of the technology inherent to satellite communications and a detailed discussion of the current state of the industry and its future outlook. Section III will discuss the regulatory bodies and relevant law governing the satellite telecommunications industry from both a U.S. and international perspective. This section will also highlight the E.U. data privacy regulations and discuss their impact on satellite telecommunications providers. Section IV will analyze the shortcomings of current regulations covering the satellite telecommunication industry and advocate for an international framework blending existing United Nations (U.N.) treaties with data privacy liability and compliance frameworks. Finally, the conclusion will tie all the parts together and reinforce the rationale behind adopting a multilateral approach to the issue of data privacy and protection when information is processed, transmitted, or stored using communication satellite infrastructure.

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[8] *See* Adrienne Harebottle, *GDPR Is Here but, What Does It Really Mean for Satellite?*, VIA SATELLITE (May 30, 2018), https://www.satellitetoday.com/business/2018/05/30/gdpr-is-here-but-what-does-it-really-mean-for-satellite/ [https://perma.cc/W4ED-URY3]; *see also* Magda Cocco & Helena Correia Mendonça, *GDPR for Satellite Operators: What You Need to Know*, VIA SATELLITE (July 2018), http://interactive.satellitetoday.com/via/july-2018/gdpr-for-satellite-operators-what-you-need-to-know/ [https://perma.cc/8TKA-MKJ9].

[9] *See* Harebottle, *supra* note 8.

II. HISTORY AND BACKGROUND OF SATELLITE COMMUNICATIONS

A. Satellite Communications from a Historical Perspective

Satellite communication grew from the dreams of Arthur Clarke who, in 1945, wrote an article envisioning manned space satellites distributing television feeds.[10] After the Soviets successfully launched *Sputnik I*, "satellites were primarily used by the United States and the Soviet Union for maintaining peace and security."[11] However, private entities such as AT&T spearheaded research into the technological hurdles presented and financial opportunities afforded by a push towards satellite communication.[12] To have an informed view of the proposed changes to the modern satellite communication regulations requires an understanding of the Communications Satellite Act of 1962.[13]

In the Communications Satellite Act, nearly all of which is now replaced, Congress authorized the United States to "sponsor a global satellite consortium to provide nondiscriminatory service to all nations."[14] The United States subsequently ratified a treaty in 1971 that established the International Telecommunications Satellite Organization (INTELSAT).[15] For the next two decades, the United States "effectively guaranteed the success of INTELSAT's single global system," through a series of regulatory controls.[16] The United States' signatory body to INTELSAT was the Communications Satellite Corporation (COMSAT), a private corporation to "provide for high quality and economical satellite communications," and it essentially served as a conduit

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[10] *See* Whalen, *supra* note 2.

[11] Sarah M. Mountin, *The Legality and Implications of Intentional Interference with Commercial Communication Satellite Signals*, 90 Int'l L. Stud. 101, 109 (2014).

[12] *See* Whalen, *supra* note 2.

[13] *See* Communications Satellite Act of 1962, Pub. L. No. 87-624, 76 Stat. 419; Doyle, *supra* note 2, at 432–34.

[14] Bert W. Rein & Carl R. Frank, *The Legal Commitment of the United States to the INTELSAT System*, 14 N.C. J. Int'l L. & Com. Reg. 219, 219 (1989).

[15] *See id.*; *see also* Agreement Relating to the International Telecommunications Satellite Organization "INTELSAT," Aug. 20, 1971, 23 U.S.T. 3813, 1220 U.N.T.S. 22; Operating Agreement Relating to the International Telecommunications Satellite Organization "INTELSAT," Aug. 20, 1971, 23 U.S.T. 4091, 1220 U.N.T.S. 149.

[16] Rein & Frank, *supra* note 14, at 220.

for Earth stations and INTELSAT to provide "'end to end' services between domestic carriers and foreign entities."[17]

The Federal Communications Commission (FCC) was charged with regulating the satellite communications industry in the wake of the Communications Satellite Act and the INTELSAT Agreement.[18] However, as an indicator of the impending privatization of the industry, the FCC encouraged competition between private entities through an "open skies" policy, which allowed and continues to permit domestic satellite licenses for "legally, financially, and technologically qualified applicants."[19] This initial allowance of competition opened the door for further inroads and authorizations in both domestic and international privatization, as independent, international satellite systems were eventually deemed not to pose significant, economic harm to INTELSAT.[20] By the 1990s, INTELSAT's near-monopoly status had withered and "technological progress, deregulation and globalization fueled a huge rise in demand for satellites . . . . From 1990 to 1996 . . . there were more satellites launched (130) than during the preceding three decades."[21] By the year 2000, Congress desired to effectuate the policy goal of increasing global satellite communication competition by passing the Open-Market Reorganization for the Betterment of International Telecommunications Act (ORBIT Act),[22] which sought full privatization of INTELSAT.[23]

After the FCC certified that INTELSAT successfully met the ORBIT Act criteria, it transferred its assets to a private Bermuda-incorporated holding company.[24] A Government Accountability Office (GAO) Report indicated that market-access improvements in the three years after the privatization were somewhat offset by legacy relationships that crystallized in the decades

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[17] Guy Krogh, Note, *The Satellite Competition Debate: An Analysis of FCC Policy and an Argument in Support of Open Competition*, 40 SYRACUSE L. REV. 867, 870–71 (1989).

[18] *See id.* at 871.

[19] *See id.* at 873.

[20] *See id.* at 885.

[21] Daya Kishan Thussu, *Lost in Space: Privatizing the World's Satellites May Widen the Information Gap Between North and South*, 124 FOREIGN POL'Y 70, 70 (2001).

[22] *See* Open-Market Reorganization for the Betterment of International Telecommunications Act, Pub. L. No. 106-180, 114 Stat. 48 (2005).

[23] *See* U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-04-891, TELECOMMUNICATIONS: INTELSAT PRIVATIZATION AND THE IMPLEMENTATION OF THE ORBIT ACT 1 (2004).

[24] *See id.* at 8.

prior.[25] Despite the perceived market-access issues, the historical trend clearly demonstrates that the stage was set for the post-privatization landscape to expand competition and overall growth of the satellite communications industry.[26]

B. The Recent History, Current State, and Future Outlook

As the entire space industry has recently boomed to over $300 billion invested annually, with well-known entrepreneurs such as Elon Musk and Richard Branson making splashy investments, economists consider the utilization of a private corporation established by the Communication Satellites Act of 1962 as the template for the now-decentralized space industry.[27] When narrowing the focus to solely the satellite industry within the whole space economy, private entities appear keenest to capitalize on orbital launch, remote sensing (which involves providing images of the Earth), and satellite data and analytics.[28] Consequently, outside investment in space-focused start-ups totaled $2.5 billion between 2015 and 2016.[29] Of the three primary growth sectors for the current satellite industry, remote sensing, satellite data,[30] and analytics have readily apparent interplays with modern data privacy regulation. Launch servicing companies, remote sensing companies, and data access and analytics firms all share a desire to capitalize on the development and growth primarily in low-Earth orbit (LEO) satellites.[31]

Instructive to an understanding of the current rise and projected emergence of LEO technology is a brief overview of the various orbital altitudes for telecommunications satellites and the different uses associated with those altitudes. Geosynchronous communications satellites placed roughly 22,000 miles above the Earth "appear from the surface to be stationary" and

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[25] *See id.* at 13–15.

[26] *See, e.g.*, Thussu, *supra* note 21, at 71.

[27] *See* Matthew Weinzierl, *Space, the Final Economic Frontier*, 32 J. Econ. Persps. 173, 173–77 (2018).

[28] *See id.* at 177.

[29] *See id.*

[30] *See id.* at 177–78.

[31] *See id.* at 178; *see also The Coming of Low-Earth Orbit Satellites*, Economist (Dec. 8, 2018), https://www.economist.com/leaders/2018/12/08/the-coming-of-low-earth-orbit-satellites [https://perma.cc/9TQA-L52V].

take one day to circuit the globe.[32] Since they have unimpaired access to vast swaths of the Earth's surface and provide for "cost-effective communications across vast distances, geostationary satellites have proven ideal for the distribution of broadcast signals to large regions. They are also convenient platforms for various types of remote sensing."[33] While they serve key purposes, geosynchronous satellites have crowded the orbital plane on which they operate to an extent that limits the availability of useful telecommunications slots.[34]

The FCC categorizes commercial telecommunication satellites differently based on usage and orbital altitude.[35] Fixed, geosynchronous satellites, both domestic and international, "are used for voice, data, and video communications between earth stations at fixed points," and are categorized distinctly from: (1) direct broadcast satellites, which distribute data directly to individual antennas; (2) mobile satellites, which function similarly to fixed satellites but transmit signals to mobile antenna receivers; and (3) radiodetermination satellites providing navigation and geolocational services.[36]

Even though geosynchronous satellites are key for data sensing, surveillance, and communications, the current trend of economic development indicates that LEO satellite constellations are poised to be the solution that completes the global village.[37] A main disadvantage of the current industry standard, geostationary satellites—which "send[ ] a signal that far requir[ing] a hefty antenna and a lot of power,"—is that they are prohibitively costly to launch and build.[38] In addition to the infrastructural demands, the distance required increases latency, impacting voice communications and real-time data collection.[39] LEO satellites, on the other hand, "are lighter, less expensive to

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[32] *See* Lawrence D. Roberts, *A Lost Connection: Geostationary Satellite Networks and the International Telecommunication Union*, 15 BERKELEY TECH. L.J. 1095, 1099 (2000).

[33] *Id.* at 1100.

[34] *See id.* at 1101.

[35] *See* Pamela L. Meredith & Franceska O. Schroeder, *Privately-Owned Commercial Telecommunications Satellites: Licensing and Regulation by the Federal Communications Commission*, 27 CAL. W. L. REV. 107, 110–11 (1990).

[36] *Id.* at 111–12.

[37] *See Satellites May Connect the Entire World to the Internet*, ECONOMIST (Dec. 8, 2018), https://www.economist.com/briefing/2018/12/08/satellites-may-connect-the-entire-world-to-the-internet [https://perma.cc/5P9A-2R8S]. *See generally* Whalen, *supra* note 2.

[38] *See Satellites May Connect the Entire World to the Internet*, *supra* note 37.

[39] *See id.*

launch and require less operating power . . . [and] can receive communications from smaller and weaker earth transmitters since the satellites are closer to the earth."[40] Since they are in constant motion, LEO satellites must utilize overlapping orbits or LEO satellite "constellations" to maintain continuous connectivity.[41]

As a result, LEO has become a key driver in the private space economy of the twenty-first century.[42] The lucrative vision of providing global internet connectivity using LEO technology is projected to account for roughly $400 billion of space industry growth by 2040.[43] Since 2000, private companies from around the globe, such as Starlink by SpaceX, OneWeb, and Iridium, have ramped up their efforts and are increasingly obtaining approvals for and launching LEO constellations.[44] Projections based on FCC approvals for LEO launches indicate that for the years 2020–2027, market participants "will have put more satellites into orbit by themselves than the total launched to date."[45] Furthermore, derivative industries like data processing and cloud computing are heavily investing in and betting on rapidly improving LEO infrastructure and technology to further goals of latency reduction and easier access to ground centers.[46] A recent corporate partnership announcement noted that Amazon's cloud computing and "data storage services will be integrated into Lockheed Martin's worldwide antenna network," at least in part to support and service ongoing satellite launches for internet-focused LEO constellation projects by SpaceX and OneWeb.[47] Many of the implications from increased human interaction with outer space are not yet known. Although attempts at fashioning rules and procedures to prospectively govern humankind's interaction with space may yield unforeseen externalities and could have anticompetitive effects, many argue that such efforts benefit society more than a set of hastily drawn re-

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[40] Ted Stevens, Comment, *Regulation and Licensing of Low-Earth-Orbit Satellites*, 10 SANTA CLARA COMPUTER & HIGH-TECH. L.J. 401, 403 (1994).

[41] *See id.*; *see also Satellites May Connect the Entire World to the Internet*, *supra* note 37.

[42] *See The Coming of Low-Earth Orbit Satellites*, *supra* note 31.

[43] *Id.*

[44] *See Satellites May Connect the Entire World to the Internet*, *supra* note 37.

[45] *Id.*

[46] *See* Aaron Gregg, *Amazon's Plan to Profit from Space Data*, WASH. POST (Nov. 30, 2018), https://www.washingtonpost.com/business/2018/11/30/amazons-plan-profit-space-data/ [https://perma.cc/DQ58-9QJY].

[47] *Id.*

medial principles effectuated to correct market failures that accumulated in an underregulated environment.[48]

Thus, in the twenty-first century, as the space economy surges and LEO-supported global internet connectivity moves from an aspiration to a reality, domestic and international legislators and scholars must consider important legal issues ranging from monopolies and competition, to the licensing of launches,[49] to liability apportionment for space debris damage.[50] This Comment narrows its focus to the interplay between the rise in LEO-supported internet connectivity and data privacy and protections. To do so requires an understanding of the key regulatory players and guiding legislative authority, both domestically and globally, with respect to satellite telecommunications and data privacy.

III. STATE OF THE LAW

A. The Law Governing Satellite Telecommunications

From a U.S. perspective, the FCC is the regulatory agency tasked with the licensure and regulation of satellites pursuant to the Communications Act of 1934.[51] Within the FCC, the Satellite Radio Branch handles most licensure requests for satellites.[52] The FCC delineates LEO satellites into two categories based on their radio frequency requirements.[53] Next, the FCC assigns a specific radio frequency to the satellite, and once assigned, the entity "must petition the FCC for a license to construct, launch and operate a proposed satellite."[54]

While it is true that the FCC assigns radio frequencies to domestic applicants, U.S. treaty obligations shed authoritative light on the actions and procedures of the FCC.[55] The Outer Space Treaty "forms the basis of international space law," and "it sup-

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[48] *See* Weinzierl, *supra* note 27, at 185.

[49] *See generally* Stevens, *supra* note 40, at 402.

[50] *See generally* Emily M. Nevala, Comment, *Waste in Space: Remediating Space Debris Through the Doctrine of Abandonment and the Law of Capture*, 66 Am. U. L. Rev. 1495 (2017).

[51] *See* Meredith & Schroeder, *supra* note 35, at 108–09. *See generally* 47 U.S.C. §§ 151–163 (2016).

[52] *See* Meredith & Schroeder, *supra* note 35, at 109.

[53] *See* Stevens, *supra* note 40, at 403 (these two categories are "small LEO satellites" that "operate below 1 gigahertz (GHz)," and "large LEO satellites" that "require portions of the radio frequency above 1 GHz").

[54] *Id.* at 404–05.

[55] *See* Meredith & Schroeder, *supra* note 35, at 112. *See generally* Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer

ports the use of outer space for the benefit and interests of all countries."[56] Deserving attention in the realm of data privacy as it pertains to LEO-based internet connectivity is Article VI of the Outer Space Treaty, which states that "[t]he activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty."[57] Importantly, as currently constructed, the Outer Space Treaty delegates supervision of private space-operating entities to state signatories rather than to an international body.[58]

As the primary international regulatory body that governs the activities of humans in outer space, the U.N. incorporated the International Telecommunications Union (ITU) as a specialized agency in 1947.[59] The ITU "allocates the radio frequency spectrum and requires the registration of frequency assignments by each member country."[60] Along with managing the frequency spectrum, the ITU is tasked with managing geosynchronous orbital positioning, conducting research, and promoting telecommunication aid in the developing world.[61] These functions uniquely position the ITU as a prospective leader in the enforcement of data privacy rules on LEO-supported global internet providers and processors who essentially aspire to operate in every jurisdiction.[62] At the 2012 revision of the International Telecommunication Regulations, some member nations sought the inclusion of cybersecurity provisions "so that the ITU can impose new regulations and establish itself as the organizational home for international cybersecurity policymaking."[63] Although these measures ultimately were not implemented,[64] commentators noticed that the two principles set forth by the Outer Space Treaty—that space is a common province for all mankind and

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Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

[56] Erin C. Bennett, Note, *To Infinity and Beyond: The Future Legal Regime Governing Near-Earth Asteroid Mining*, 48 TEX. ENVT'L L.J. 81, 84 (2018).

[57] Outer Space Treaty, *supra* note 55, art. VI.

[58] *Id.*

[59] *See* Roberts, *supra* note 32, at 1107–08, 1107 n.77, 1108 n.78.

[60] Stevens, *supra* note 40, at 405–06.

[61] *See* Roberts, *supra* note 32, at 1109–10.

[62] *Cf.* Patrick S. Ryan, *The ITU and the Internet's* Titanic *Moment*, 2012 STAN. TECH. L. REV. 8, 13 (2012).

[63] *Id.* at 33.

[64] Sheetal Kumar, *Cybersecurity: What's the ITU Got to Do with It?*, FREEDOM ONLINE COALITION (July 9, 2015), https://freedomonlinecoalition.com/working-groups/working-group-1/blog7/ [https://perma.cc/DMV3-HTFL].

that individuals may own but take full responsibility for objects launched into space—could provide insight for structuring an ITU regulatory scheme covering the internet.[65]

As a result of the regulatory structure resulting from developments dating back to the Communication Satellites Act of 1962, the current international regulatory scheme for satellite telecommunication is uniquely suited to merge the regulation of satellite telecommunications and cybersecurity, especially given ever-increasing globalization and the internet's dependence on satellites for a truly ubiquitous global scale.[66] Thus, after reviewing the international regulatory structure for satellite telecommunications and that structure's pertinence to domestic licensure and regulation, one must grasp the theories, approaches, and policy justifications behind data privacy to determine a best method for interspersing the two disciplines.

B. An Overview of Data Privacy Theories and Approaches

Words and phrases like cybersecurity and data privacy are often thrown around without settled definitions, causing difficulties in the creation and enactment of coordinated, international policy recommendations.[67] No discussion of data privacy could commence without a brief mention of the internet's prominence facilitating international data transfers and new markets, such as "the collection, organization, and sale of personal information."[68] The commodification of personal information has created a huge upside for criminals and led to data breaches at well-known corporations such as Target and LinkedIn that released the information of hundreds of millions of people.[69] Although there is no express constitutional right to data privacy in the United States, the idea of the basic right to

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[65] *Id.* at 68–71.

[66] *See generally* Martin M. Zoltick & Jenny L. Colgate, *The Application of Data Protection Laws in (Outer) Space: Data Protection 2019*, *in* Data Protection Laws and Regulations 2019 (Tim Hickman & Detlev Gabel eds., 2019) (ebook), https://iclg.com/practice-areas/data-protection-laws-and-regulations/2-the-application-of-data-protection-laws-in-outer-space [https://perma.cc/9FFJ-DL8M].

[67] *See* Oona A. Hathaway et al., *The Law of Cyber-Attack*, 100 Calif. L. Rev. 817, 823 (2012).

[68] *See* Ryan Moshell, Comment, . . . *And Then There Was One: The Outlook for a Self-Regulatory United States Amidst a Global Trend Toward Comprehensive Data Protection*, 37 Tex. Tech. L. Rev. 357, 360 (2005).

[69] Seth Fiegerman, *The Biggest Data Breaches Ever*, CNN (Sept. 7, 2017), https://money.cnn.com/2017/09/07/technology/business/biggest-breaches-ever/index.html [https://perma.cc/9622-NFL9].

control one's personal information has solidified over the course of history.[70] Data privacy applies general privacy principles to the sphere of information technology.[71] Three primary approaches for protecting data privacy include: (1) the comprehensive model, which creates general laws governing the use, storage, and transmittal of personal data with an oversight body to enforce those laws; (2) the sectoral model, which narrows its scope to industries already determined to have substantial data privacy concerns; and (3) the self-regulation model, which allows involved industry players to establish governance codes and police themselves.[72]

Data privacy protections have recently been enacted against this backdrop of varying approaches to regulating the satellite communications industry. The E.U.'s GDPR[73] adopts a comprehensive approach, enforced by a regulatory body that is headed by the Data Protection Supervisor.[74] The GDPR "grants extensive data privacy and protection rights to E.U. citizens, particularly through its material and territorial scope provisions," which define personal data broadly and extend the GDPR's jurisdiction to data processors and controllers outside the E.U. if these entities interact with the data of European citizens.[75] Due to the broadened jurisdictional reach of the GDPR, its impact is already being felt by the international satellite telecommunications community, even though the GDPR does not reach every operator worldwide.[76] Since satellite telecommunications providers are inherently involved in processing data,[77] and potentially could be defined as data controllers under the legislation,[78] these companies face immense civil liability should

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[70] *See* Moshell, *supra* note 68, at 373–75.

[71] Roslyn Layton & Julian Mclendon, *The GDPR: What It Really Does and How the U.S. Can Chart a Better Course*, 19 FEDERALIST SOC'Y REV. 234, 235 (2018).

[72] *See* Moshell, *supra* note 68, at 366–67.

[73] *See generally* General Data Protection Regulation, *supra* note 7.

[74] *See id.* arts. 5, 68; Layton & Mclendon, *supra* note 71, at 235.

[75] Matthew Humerick, *Taking AI Personally: How the E.U. Must Learn to Balance the Interests of Personal Data Privacy & Artificial Intelligence*, 34 SANTA CLARA HIGH TECH. L.J. 393, 402–04 (2018); *see also* General Data Protection Regulation, *supra* note 7, arts. 2(1), 3.

[76] *See generally* Harebottle, *supra* note 8; Cocco & Mendonça, *supra* note 8.

[77] *See* General Data Protection Regulation, *supra* note 7, art. 4(8). A "processor" is "a natural or legal person, public authority, agency or other body which processes personal data on behalf of the controller." *Id.*

[78] *See id.* art. 4(7). A "controller" determines "the purposes and means of the processing of personal data." *Id.*

they fail to comply with the GDPR's mandates.[79] The GDPR's brave attempt at imposing uniform data privacy standards has been met with much criticism.[80] However, the E.U.'s promulgation of this legislation serves as a useful guidepost for any attempt to propose international regulations to specifically govern data privacy standards and the imposition of liability for satellite communications industry players.[81]

IV. ANALYSIS

A. Justifications for International Regulation of Satellite Telecommunication Data Privacy

Many legal scholars have debated the costs and benefits of international and multilateral approaches to the exploration and use of outer space.[82] As previously mentioned, the most influential of the international treaties governing this field is the Outer Space Treaty.[83] At its core, the Outer Space Treaty allows all nations to freely use and explore outer space, and it forbids these nations from appropriating space by means of "sovereignty, by means of use or occupation, or any other means."[84] Thus, as a result of the Outer Space Treaty and its ratification by nation-states, countries have a legal duty to the global community to use space with an eye towards "maintaining international peace and security and promoting international co-operation and understanding."[85] While the drafters of the Outer Space Treaty likely could not have imagined the current scope and drastic growth of the satellite telecommunications industry, especially with respect to LEO constellations aimed at providing global connectivity, they did address the use of space by nongovernmental entities by mandating that civilian space activities be licensed and regulated by national governments.[86]

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[79] *See* Humerick, *supra* note 75, at 404.

[80] *See generally, e.g.*, Layton & Mclendon, *supra* note 71.

[81] *Cf.* Bennett, *supra* note 56, at 85 (noting that the Outer Space Treaty could be the vehicle for the enactment of international legislation governing asteroid mining).

[82] *See, e.g.*, Michael Viets, *Piracy in an Ocean of Stars: Proposing a Term to Identify the Practice of Unauthorized Control of Nations' Space Objects*, 54 Stan. J. Int'l L. 159, 163 (2018).

[83] *See id.* at 166.

[84] Outer Space Treaty, *supra* note 55, art. II.

[85] *Id.* art. III.

[86] *See id.* art. VI; *see also* Rachel Mitchell, Note, *Into the Final Frontier: The Expanse of Space Commercialization*, 83 Mo. L. Rev. 429, 433 (2018).

Because the structure of the Outer Space Treaty can be interpreted as ordaining both international cooperation as well as national regulation of a state's own space activities, nations have taken an expansive view of their freedom to use space in ways that benefit the individual nation more than the international community at large.[87] This practice is exemplified by the FCC's licensure and regulation of domestic satellites[88] overlaid by the ITU's registration of orbital positions and frequencies.[89] The ITU's regulatory structure also creates an ad hoc dispute resolution scheme that allows parties to turn to "any of a wide variety of techniques, including negotiation, settlement in accordance with non-ITU dispute resolution agreements . . . or any other mechanism agreed upon by the parties."[90] Clearly, while the drafters of the Outer Space Treaty envisioned a world where a privatized space economy exists, the broad language and gaps in the treaty created serious shortcomings and interpretive confusion regarding the regulation of the global satellite telecommunication industry.

A key interpretive gray area for entrants and existing players in the satellite telecommunications arena is the delegation of specific satellite radio frequency licensing by individual nations after overall radio frequency and orbital allocation from the ITU.[91] This international regulatory scheme causes confusion for two primary reasons: (1) the delegation of specific orbital locations and frequencies to nation-states appears to be an improper appropriation of space in contravention of the agreed-upon principles of the Outer Space Treaty;[92] and (2) the emergence and prospective growth of LEO satellite constellations obfuscates the need for a two-step international and national licensing procedure.[93]

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[87] *Cf.* Mitchell, *supra* note 86, at 438 (stating that the 2015 U.S. SPACE Act provision granting property rights to space minerals potentially violates the Outer Space Treaty).

[88] *See, e.g.*, Stevens, *supra* note 40, at 406–07.

[89] *See, e.g.*, Roberts, *supra* note 32, at 1112–13.

[90] *Id.* at 1114.

[91] *See* Stevens, *supra* note 40, at 406–07 (noting that the international allocation of frequencies is controlled by the ITU, but national regulatory bodies control the assignment of specific frequencies to satellites).

[92] *See* Susan Cahill, Note and Comment, *Give Me My Space: Implications for Permitting National Appropriation of the Geostationary Orbit*, 19 WIS. INT'L L.J. 231, 241–42 (2001).

[93] *See* Ryan, *supra* note 62, at 36.

First, regarding the reconciliation of the Outer Space Treaty with the current ITU licensing and delegation structure, Article II of the Outer Space Treaty prevents any nation from appropriating "[o]uter space, including the moon and other celestial bodies . . . by means of use or occupation, or by any other means."[94] Furthermore:

> It is important to note that the ITU process does not, strictly speaking, allocate the frequencies or orbital positions that it registers. Authority to place a satellite into orbit and employ frequencies for its use rests with each sovereign state. The ITU acts as an efficiency-enhancing resource through which sovereign states attempt to avoid potential usage conflicts and as a convenient forum for resolving disputes that arise. Nevertheless, the economic incentives perpetuated by the process as well as the legal preferences accorded to successful applicants have a significant impact on the development and operation of geostationary systems.[95]

Because each sovereign state possesses its own authority to launch satellites, coupled with the ITU's efficiency-inducing approval and recording functions, one could easily conclude that each sovereign state actually allocates the portion of space in which its satellites (both government and commercial) are continuously orbiting through the tacit approval of the other member states of the ITU.[96] In the United States, "ITU regulations have been implemented in the [FCC's] rules codified in the Code of Federal Regulations."[97] This codification of international law supports the theory that the United States, along with every other nation that supports its own governmental or commercial satellite industry, is actually appropriating outer space with worldwide approval. This interpretation cannot be squared with a literal reading of the Outer Space Treaty because the allocation of orbital slots to individual nations via an approval by a consensus of ITU member states should fall under the ambit of "national appropriation" of outer space either through "use or occupation" or the catchall "by any other means."[98] Bin Cheng, a space law expert, states that space is "*territorium extra commercium*, or 'territory outside commerce,' i.e., territory which belongs to no State and is, under international law, not subject to

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[94] Outer Space Treaty, *supra* note 55, art II.

[95] Roberts, *supra* note 32, at 1111.

[96] *Cf.* Cahill, *supra* note 92, at 247–48.

[97] Meredith & Schroeder, *supra* note 35, at 118; *see* 47 C.F.R. pt. 25.

[98] *See* Outer Space Treaty, *supra* note 55, art. II.

appropriation by States or their nationals, though its resources are."[99]

Therefore, the appropriation of orbital slots in space to communications satellites that transmit both internationally and domestically rests on unsettled legal grounds.[100] Though international law dictates that space may not be appropriated by any nation or entity, the nature of geosynchronous satellite telecommunications creates issues of scarcity within useful orbital planes and incentivizes the allocation and use of the most attractive locations.[101] The delegation of licensing and regulation of satellites to member nations allows those individual nations to inject their individual laws into outer space with every launch and to create a firmly entrenched international regulatory agency and scheme that calls for the partitioning and appropriation of outer space—in direct contravention of the Outer Space Treaty.[102] The lack of harmony between the international governance of satellite telecommunications and the foundational source of international space law has created confusion about the governance of telecommunications satellites.[103] The ITU's mechanisms promote efficiency, reduce harmful interference, and resolve disputes, since adherence by member states is guided by their perceptions of the ITU's legitimacy. At the same time, the ITU mechanisms necessarily imply the principle that distinct areas in outer space *are* suitable for allocation.[104]

Member states weigh the ITU's authority using their perceptions of its legitimacy and efficiency,[105] but the ITU's authority also depends on the nature of geosynchronous satellite telecommunications. Since geosynchronous satellites are commonly used for communication signaling that does not place high importance on the speed or latency of the signal reception, much of the new growth tilts towards the LEO sector because they "are a better choice when latency matters," including for "telecommunication, machine-to-machine connectivity and data transfer

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[99] Viets, *supra* note 82, at 167 (quoting Bin Cheng, *The Commercial Development of Space: The Need for New Treaties*, 19 J. SPACE L. 17, 22 (1991)) (emphasis added).

[100] *See supra* notes 92–95 and accompanying text.

[101] *Cf.* Roberts, *supra* note 32, at 1101.

[102] *See* Outer Space Treaty, *supra* note 55, art. II.

[103] *See id.*

[104] *See* Roberts, *supra* note 32, at 1117.

[105] *See id.* at 1114–16.

and analysis."[106] The current trends regarding LEO satellites will likely diminish the importance of the ITU in its current form.[107] Major hegemons, such as the United States and the E.U., have submitted many reservations to the ITU's resolutions, which undercuts the legal force of the ITU's regulations against them.[108] The ITU derives much of its efficacy from nations determining that consensus in the satellite telecommunication industry creates fiscal and logistical benefits that would otherwise not accumulate under a fully market-driven approach.[109]

With respect to the future of LEO satellites, the ITU will only play a critical role in their regulation and management if it promotes efficiency within the increasingly privatized industry and creates benefits otherwise unreachable without government intervention.[110] Since LEO satellites must appear in constellations to provide broad or global connectivity, recordation of their frequency bandwidth and orbital location by the ITU is a potential area for the agency to continue to assert power, promoting efficiency and creating benefits for private entities.[111] By specifically performing the initial recordation and voluntary allocation of the orbital location of LEO satellites, the ITU would respect the rules of the Outer Space Treaty by reducing the impact of domestic or regional sources of data privacy law on the satellite telecommunications industry. As satellites of smaller size and mass are deployed in greater quantities at lower altitudes with the aim of "providing low-latency broadband with pervasive connectivity,"[112] the imposition of domestic data privacy law onto a fully globalized sector would reduce rather than promote efficiency.[113] Current international space law lacks a "comprehensive regulatory scheme for commercial activities,"[114] and is vague or silent on issues specifically relating to data privacy and the

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[106] Simeon Rusanov, *Satellite Industry's Tipping Point*, SEEKING ALPHA (Aug. 3, 2017), https://seekingalpha.com/article/4094178-satellite-industrys-tipping-point [https://perma.cc/GZ8R-6JEQ].

[107] *See* Ryan, *supra* note 62, at 34, 36.

[108] *See id.* at 24.

[109] *See id.* at 24–25 (quoting ROB FRIEDEN, INTERNATIONAL TELECOMMUNICATIONS HANDBOOK 60 (1996)).

[110] *See id.* at 36.

[111] *Cf.* Tony Pallone, *5 Trends in Satellite Communications on the Horizon*, ITU NEWS (Aug. 7, 2018), https://news.itu.int/satellite-communications-trends/ [https://perma.cc/W248-TXCY].

[112] *Id.*

[113] *See* Joel R. Reidenberg, *Resolving Conflicting International Data Privacy Rules in Cyberspace*, 52 STAN. L. REV. 1315, 1336–38 (2000).

[114] *Id.*

satellite industry's role within the information technology sector.

The ambiguity created by the tensions between the Outer Space Treaty and the current ITU system of delegation for frequency and orbital slot allocation weakens the informal set of international principles that have allowed enterprising nations to engage in de facto appropriation of orbital locations in contravention of the *territorium extra commercium* theory that underpins the Outer Space Treaty.[115] While the issue of orbital allocation deserves its own consideration, the coinciding commodification of outer space (especially at low altitudes) and of personal data illustrates that the Outer Space Treaty must be altered or a new international agreement must be enacted to match present commercial realities.[116]

B. Proposed Alterations to the Current International Scheme

Even though the ITU carries significant weight in the global satellite telecommunications industry, its lack of truly formal mechanisms may render it a weak option for the promulgation of international data privacy regulations and compliance standards.[117] On the other hand, the Outer Space Treaty is widely ratified.[118] Furthermore, the Convention on International Liability for Damage Caused by Space Objects (Liability Convention)[119] was adopted by the same signatories as the Outer Space Treaty in response to satellite crashes, and it could prove to be a fitting source for international data privacy law.[120] In the pertinent part, the Liability Convention builds on Article VII of the Outer Space Treaty and reads that a "launching State shall be absolutely liable to pay compensation for damage caused by its

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[115] *See* Viets, *supra* note 82, at 167.

[116] *See* P.J. Blount, *Renovating Space: The Future of International Space Law*, 40 Denv. J. Int'l L. & Pol'y 515, 522–24, 527–28 (2012).

[117] *See* Ryan, *supra* note 62, at 26–27, 36 (noting that national decisions often differ from ITU recommendations and non-binding coordination attempts).

[118] *See* Comm. on the Peaceful Uses of Outer Space, Rep. of the Legal Subcomm. on Its Fifty-Eighth Session, Status of International Agreements Relating to Activities in Outer Space as at 1 January 2019, U.N. Doc. A/AC.105/C.2/2019/CRP.3, at 5–10 (Apr. 1, 2019).

[119] Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention].

[120] *See* Bennett, *supra* note 56, at 85–87 (arguing for the use of the Liability Convention to protect Earth while promoting asteroid mining).

space object on the surface of the earth or to aircraft in flight."[121] Similarly, Article VII of the Outer Space Treaty creates absolute liability for signatory nations for damages to "another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space."[122]

When read in conjunction with one another, the Liability Convention and Articles VI and VII of the Outer Space Treaty impose total liability on signatory nations "to pay compensation for personal injury and property damage caused by its space objects on the surface of the Earth, or to aircraft."[123] The launching state[124] assumes liability for damages caused by both its government and private space launch entities by "ratifying or acceding to either the Outer Space Treaty of 1967, or the Liability Convention of 1972."[125] While the intent of the drafters of the Liability Convention centered on the apportionment of damages and liability for satellite crashes,[126] the two treaties can be interpreted expansively to create a source of international data privacy law regarding satellite data transmission. As a result of the Outer Space Treaty, "[s]tates assume direct responsibility for all actions connected or linked to them, including that of non-governmental entities; all acts causing damage by such private entities are deemed to be acts of the State."[127]

Additionally, the express obligation found in Article VI of the Outer Space Treaty that signatories regulate and supervise national space exploration[128] fits nicely with its liability apportionment provisions and the international claims process outlined in the Liability Convention. Signatories would have an affirmative treaty obligation to regulate their internal conduct and serve as

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[121] *See* Liability Convention, *supra* note 119, art. II. The Liability Convention defines "damage" as "loss of life, personal injury or other impairment of health; or loss of or damage to property of States or persons, natural or juridical." *Id.* art. I.

[122] *See* Outer Space Treaty, *supra* note 55, art. VII.

[123] Paul Stephen Dempsey, *National Laws Governing Commercial Space Activities: Legislation, Regulation, & Enforcement*, 36 NW. J. INT'L L. & BUS. 1, 8–9 (2016).

[124] *See* Liability Convention, *supra* note 119, art. I(c) (defining "launching State" as the state that launches, procures the launch, or from whose territory a space object is launched).

[125] Dempsey, *supra* note 123, at 10.

[126] *See id.* at 9–10.

[127] *Id.* at 13 (citing Bin Cheng, *Article VI of the 1967 Space Treaty Revisited: "International Responsibility," "National Activities," and "The Appropriate State,"* 26 J. SPACE L. 7, 12 (1998)).

[128] *See* Outer Space Treaty, *supra* note 55, art. VI.

the enforcement body for the satellite industry's compliance with international data privacy regulations promulgated in the form of amendments to (or broadened interpretations of) the Outer Space Treaty and Liability Convention.[129]

Treaty-based data privacy regulation of the satellite telecommunications industry already exists if one takes a widened view of Article VII of the Outer Space Treaty, which says that signatories are absolutely liable for damages caused to the "natural or juridical persons" of another state "by such object or its component parts on the Earth, in air space or in outer space."[130] If data privacy violations or breaches are encompassed within the term "damage" as used in Article VII of the Outer Space Treaty, advocates for treaty-based international data privacy regulation of satellite telecommunications can argue that signatory nations have already acceded to the authority of the Liability Convention to govern international claims and disputes over the unauthorized access of personal data during transmission to and from communications satellites.[131] Article XXV of the Liability Convention allows for the proposal and majority-approved adoption of amendments.[132] Thus, a series of amendments could be added into the Liability Convention that mirror the GDPR, making necessary alterations to fit the unique global satellite communications subset of the larger information technology industry.

C. Combining the GDPR, the Liability Convention, and the Outer Space Treaty

Crucial to understanding the rationale behind adding GDPR-like protections to the U.N. treaties governing space use and exploration is a recognition of the theoretical similarities between space law and cyber law.[133] The rapid growth of the space industry after the launch of *Sputnik I* is readily analogous to the

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[129] *See* Liability Convention, *supra* note 119, arts. IX–XXI.

[130] *See* Outer Space Treaty, *supra* note 55, art. VII.

[131] *See* Viets, *supra* note 82, at 202, 211 (proposing that the Outer Space Treaty and Liability Convention could be the basis for claims similar to those defined by the ITU).

[132] *See* Liability Convention, *supra* note 119, art. XXV; *cf.* Bennett, *supra* note 56, at 87 (proposing, for example, an amendment to the Liability Convention that would define the term "space objects" in support of asteroid mining initiatives).

[133] *See, e.g.*, David S. Weitzel, *Where No Lawyer Has Gone Before? What a Cyberspace Attorney Can Learn from Space Law's Legacy*, 10 CommLaw Conspectus 191, 192–95 (2002); *see also* Ryan, *supra* note 62, at 27–28.

growth of the internet industry.[134] However, one key difference between the growth of the two respective industries is that commercialization emerged much later in the space exploration age compared to the internet age.[135] Though the commercialization of the two industries occurred at different stages within their respective life cycles, it is clear that they are converging toward privatization.[136]

The two key principles behind the U.N.'s array of space treaties are that space is a *res communes*, or the common heritage of mankind, and that individuals may own objects launched into outer space, though they must take responsibility for such objects.[137] Similarly, "the Internet is an open *res communes* that includes objects (servers, web properties, proprietary systems) that are owned by private entities."[138] Furthermore, the jurisdictional issues arising within the field of space law and cyberspace law are also similar.[139] While objects like satellites travel through outer space, "border crossings in cyberspace are rarely considered to be a threat unless the electronic transaction under way is itself illegal. Nevertheless, the sanctity and protection of one's borders is considered to be one of the defining aspects of sovereignty."[140] Additionally, for "cybercrimes and cyberpiracy, the application of universality principles, like those applied to sea and air piracy should be considered."[141]

The globalization and privatization of the once government-dominated satellite industry, combined with a rapid technological innovation rate of the internet, calls for a set of universal principles for protecting personal data during transmission and for apportioning liability to negligent or otherwise at-fault actors within the satellite telecommunications industry.[142] When considering incorporating GDPR principles into either the Outer Space Treaty or the Liability Convention, one must take into account the implications of classifying satellite telecommunications providers as either data "processors" or "controllers."[143] As mentioned, processors under the GDPR merely process data on

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[134] *See* Weitzel, *supra* note 133, at 192–95.
[135] *See id.* at 201.
[136] *See id.* at 192, 201.
[137] *See* Ryan, *supra* note 62, at 28–29.
[138] *Id.* at 73.
[139] *See* Weitzel, *supra* note 133, at 203, 205.
[140] *Id.* at 195–96.
[141] *Id.* at 205.
[142] *Cf.* Zoltick & Colgate, *supra* note 66.
[143] *See* General Data Protection Regulation, *supra* note 7, art. 4.

behalf of the controller, while controllers determine the purposes and means of such processing of personal data.[144] The two categorizations are not mutually exclusive and depend on the actions taken by the entity with respect to the data.[145]

When combining the GDPR's core tenets with a U.N. space-related treaty, satellite companies would seem to occupy the role of data processors more often than data controllers. Incorporating the GDPR into a U.N. treaty would require that both terms be defined because the GDPR dictates different standards of conduct based on the two categorizations.[146] Eliminating all controller requirements on satellite telecommunications providers could simplify compliance and increase verifiability by industry players, and it could diminish nations' "reluctan[ce] to adopt new treaties relating to space activities."[147] Because no sovereign space actor will likely constrain its freedom to act in outer space unless it can verify the other signatories' compliance, one key for applying GDPR-like principles to a U.N. space-related treaty will be the ability to detect and pinpoint breaches or noncompliance that occur during the transmission of information to and from a satellite.[148] Since the basis for international regulation would be ratification by nations party to the Outer Space Treaty, the transmission of data to and from the satellite serves as the jurisdictional hook requiring private entities' compliance.[149]

Without the ability to detect hacks or breaches during the data transmission cycle with the satellite, any attempt at crafting international data privacy legislation through the Outer Space Treaty would be unsupportable.[150] However, recent evidence shows that cybersecurity firms and governments are able to detect unauthorized access of data at the transmission stage.[151]

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144 *See id.*

145 *See id.*

146 *See id.* arts. 4, 24–41.

147 *See* Blount, *supra* note 116, at 528.

148 *See id.*

149 *See* Outer Space Treaty, *supra* note 55, art. VI.

150 *See* Viets, *supra* note 82, at 173–74.

151 *See* Chris Bing, *Chinese Hacking Group Resurfaces, Targets U.S. Satellite Companies and Systems*, CyberScoop (June 19, 2018), https://www.cyberscoop.com/symantec-thrip-satellite-hacking-trojans/ [https://perma.cc/4WHP-QCVY]; Herbert Lin, *Attribution of Malicious Cyber Incidents* 2 n.1 (Hoover Inst., Aegis Paper Series No. 1607, 2016), https://www.hoover.org/sites/default/files/research/docs/lin_webready.pdf [https://perma.cc/2727-UYSK]; William G. Rich, *The US Leans on Private Firms to Expose Foreign Hackers*, WIRED (Nov. 29, 2018), https://www.wired.com/story/private-firms-do-government-dirty-work/ [https://perma.cc/AHQ9-E9CZ].

Furthermore, Iridium, an LEO constellation of sixty-six active satellites, is known by hackers to have obsolete, unencrypted security and satellite traffic that "remains vulnerable to passive eavesdropping by anyone with a software-defined radio, the Iridium toolchain, and some spare time."[152] Iridium's vulnerability to hacking is an apt illustration of the need for a GDPR-based approach to tackling international data breaches for LEO satellites.[153]

As LEO satellite technology permeates the market with the promise of global connectivity, any attempt at amending a U.N. space-related treaty to include a GDPR-style scheme must be assessed for its ability to govern the conduct of private entities. Because the Outer Space Treaty and Liability Convention apportion fault to the nation-state for the damages caused by commercial entities,[154] private entities would likely resort to researching the international marketplace to determine which national satellite licensing and regulation framework provides the most convenience.[155] Currently, Article VI of the Outer Space Treaty provides a way for nations to protect themselves from liability for damages caused by commercial actors.[156] Space law scholar Paul Larsen noted, "in order to obtain a launch license, nongovernmental operators can be and are required to purchase insurance coverage reimbursing the licensing government for damages caused. However, many implementing national laws permit satellite operators to limit the amount of insurance depending on exposure, and on available private insurance."[157] Therefore, the selection and designation of the state of registration by private satellite entities is a crucial step to the apportionment of liability to both governments and private actors.[158]

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[152] J.M. Porup, *It's Surprisingly Simple to Hack a Satellite*, VICE: MOTHERBOARD (Aug. 21, 2015), https://motherboard.vice.com/en_us/article/bmjq5a/its-surprisingly-simple-to-hack-a-satellite [https://perma.cc/JZ5N-BZV2].

[153] *See State of Cybersecurity Report 2018*, WIPRO 11, 29, 78 (2018), https://www.wipro.com/content/dam/nexus/en/service-lines/applications/latest-thinking/state-of-cybersecurity-report-2018.pdf [https://perma.cc/HDJ5-KVPJ].

[154] *See* Dempsey, *supra* note 123, at 13.

[155] *See* Paul B. Larsen, *Small Satellite Legal Issues*, 82 J. AIR L. & COM. 275, 290–91 (2017).

[156] *See id.* at 292.

[157] *Id.*

[158] *See id.* at 289–90.

The GDPR provides individuals with the right to lodge complaints[159] and the right to recover for damages suffered.[160] On the other hand, the Outer Space Treaty and Liability Convention allow for injured persons to "only recover under either treaty through action brought on their behalf by a government, usually their own government."[161] Reconciling these differences between the GDPR and the space-related treaties, the grievance process likely best suited to an international application involves delegating adjudicative authority to national regulatory bodies in a manner similar to the relationship between the FCC and ITU.[162] Should a treaty amendment incorporating GDPR-like data protection standards with respect to satellite data transmissions successfully pass through the ratification and enactment stage, national regulatory agencies would be tasked with the administration and enforcement of data protection standards that are uniform among signatory nations.[163]

Such a layered regulatory structure could operate in a manner that would: (1) allow for signatories to implement national procedures for individual citizens, private entities, or delegated agencies or commissions to bring forward claims of data misappropriation or noncompliance;[164] (2) allow signatory nations, through their regulatory bodies, to adjudicate the merits of their citizens' claims in order to apportion fault among the launching state or states involved;[165] (3) allow utilization of an international adjudicatory body such as the International Court of Justice to determine final judgments between states;[166] and (4) provide the ability for liable launching states to seek recourse and contribution from the at-fault private entities,[167] either through insurance requirements built into national

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159 General Data Protection Regulation, *supra* note 7, art. 77.

160 *Id.* art. 82.

161 Larsen, *supra* note 155, at 292.

162 *See* Catherine P. Heaven, Note, *A Proposal for Removing Road Blocks from the Information Superhighway by Using an Integrated International Approach to Internet Jurisdiction*, 10 MINN. J. INT'L L. 373, 398–99 (2001); *see also* Meredith & Schroeder, *supra* note 35, at 117–18 (discussing technical requirements imposed by the FCC on satellite operators).

163 *See* Zoltick & Colgate, *supra* note 66.

164 Frans G. von der Dunk, *Sovereignty Versus Space – Public Law and Private Launch in the Asian Context*, 5 SING. J. INT'L & COMP. L. 22, 30 (2001).

165 *Cf. id.* at 37–40.

166 *See* Viets, *supra* note 82, at 202–03 (discussing the extension of nations' jurisdictions to objects launched into space under Article VII of the Outer Space Treaty).

167 *Id.* at 202.

regulation or through their regular internal claims processes. A key provision of any combination of the GDPR and a space-related treaty would require international cooperation at the stage in the process where signatories attempt to apportion fault among the launching states. An alternative provision could include language that effectively allows any citizen of a signatory state to file a claim in the country of registry of the satellite operator or any launching state. Cooperation or reciprocity should naturally follow from Article IX of the Outer Space Treaty because, in space, signatories "shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities . . . with due regard to the corresponding interests of all other States Parties to the Treaty."[168]

This scheme stands in stark contrast to the current framework that has caused government competition to create the most favorable, internal legal regimes to govern satellite licensing and oversight.[169] By adding the principles of the GDPR into a U.N. treaty, signatory nations would have the treaty obligation to abide by and enforce a uniform set of protection standards for data transmission to their registered satellites. However, the claims adjudication process would differ drastically from the current formulation of the GDPR.[170] One downside of such a proposal could be that the multistep process and layering of international and national regulation will be too time consuming to redress the damages caused by the original data breach.[171]

On the other hand, because Article VIII of the Outer Space Treaty dictates that launching states retain jurisdiction and control over their satellites,[172] attempts to establish universal jurisdiction[173] to address the layering of national and international regulations with respect to data protection compliance for satellite transmissions will be viewed with extreme doubt.[174] A U.N. space-related treaty that requires national control of satellite communications licensing, management, oversight, and initial claims assessment would maintain compliance with Article VIII

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[168] Outer Space Treaty, *supra* note 55, art. IX.

[169] *Cf.* Larsen, *supra* note 155, at 292; Mitchell, *supra* note 86, at 445–46.

[170] *See* General Data Protection Regulation, *supra* note 7, arts. 77–84.

[171] *Cf.* Ryan, *supra* note 62, at 36.

[172] *See* Outer Space Treaty, *supra* note 55, art. VIII.

[173] *See, e.g.*, United States v. Shi, 525 F.3d 709, 722 (9th Cir. 2008) ("Universal jurisdiction is based on the premise that offenses against all states may be punished by any state where the offender is found.").

[174] *See* Viets, *supra* note 82, at 203–05.

because the satellites' nations of registry would retain jurisdiction and control over the space objects for which they are responsible,[175] while they would also demand that their private satellite operators adhere to a standardized set of data protection rules.

Nations have strong incentives to comply with the proposed data privacy reforms and enforce compliance by their private entities because the Liability Convention and Outer Space Treaty create an absolute liability standard on governments for damage caused by their sanctioned commercial satellite operations.[176] Additionally, "a realistic policy of space law-making should recognize that viable solutions to outer space issues can be found only through multilateral negotiations that lead to legal regimes of universal scope."[177] Universality is of immense importance due to the rapid and globalized growth of the satellite telecommunications sector because, as private LEO operators emerge as the industry's drivers, the viability of enacting a new governing law to cover each data breach diminishes.[178] P.J. Blount of the National Center for Remote Sensing, Air, and Space Law notes that "INTELSAT has spearheaded a movement wherein commercial actors will exchange information about the space environment in order that they may all operate more efficiently."[179]

The voluntary exchange of space-related information between competing commercial entities and the promulgation of a uniform set of data privacy rules by competing nations share a parallel goal: "increasing efficiency and guaranteeing operability. To this end, all the players, not just states will have important input, and such mechanisms will be adopted at a variety of levels."[180] As the LEO sector's emergence coincides with the growth of cloud data technology,[181] standardizing data protection mechanisms should ease compliance burdens and promote efficiency for multinational providers by: (1) eliminating the

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[175] *Cf.* Larsen, *supra* note 155, at 290–91, 295.

[176] *See* Bennett, *supra* note 56, at 86; *see also supra* notes 121–25 and accompanying text.

[177] Gennady M. Danilenko, *Outer Space and the Multilateral Treaty-Making Process*, 4 HIGH TECH. L.J. 217, 223 (1989).

[178] *See id.* at 221–23, 234, 241.

[179] Blount, *supra* note 116, at 530.

[180] *Id.*; *see also* Mitchell, *supra* note 86, at 451–52 ("there is no shortage of global interest in space and that could be harnessed to address the future of law and humanity beyond Earth").

[181] *See, e.g.*, Gregg, *supra* note 46.

time spent interpreting divergent and often conflicting national requirements; and (2) reducing discrimination against foreign entities based on pervasive or industry-wide noncompliance issues in their home countries.[182]

Aside from the efficiency boost to private satellite operators in the LEO space resulting from GDPR-based standardization, developing countries that employ a *res communes* understanding of outer space also receive a benefit.[183] As satellites continue to decrease in size and component parts become standardized and cheaper, developing nations are no longer barred from entry into the satellite telecommunications market by high costs like they are for geosynchronous communication satellite launches and operations.[184]

In October of 2018, Iran's delegate to the U.N. noted at a committee meeting "that small-satellites missions are increasingly important for developing countries . . . they must not be subjected to an ad hoc legal regime that might impose limitations on their development."[185] He further observed that "existing regulations for the allocations of slots on the geostationary orbit are based on a 'first come, first served' basis . . . . many orbital slots are occupied by the most developed countries, leaving little chance for developing countries to enter outer space."[186] At the same meeting, Nigeria's representative noted the significance of nondiscriminatory practices regarding geospatial data availability.[187] However, Saudi Arabia's delegate disclosed the launch by his nation of seventeen LEO satellites and a telecommunications satellite partnership with Lockheed Martin, while Brazil's representative mentioned the successful launch of a joint remote-sensing satellite constellation with

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[182] *See* Reidenberg, *supra* note 113, at 1338–39; Paul M. Schwartz, *Legal Access to the Global Cloud*, 118 COLUM. L. REV. 1681, 1686–88 (2018)

[183] *Cf.* Michael J. Listner, *The Ownership and Exploitation of Outer Space: A Look at Foundational Law and Future Legal Challenges to Current Claims*, 1 REGENT J. INT'L L. 75, 86–87 (2003).

[184] *Cf.* Clay Dillow, *Here's Why Small Satellites Are So Big Right Now*, FORTUNE (Aug. 4, 2015), http://fortune.com/2015/08/04/small-satellites-newspace/ [https://perma.cc/H2HX-D7FT].

[185] Delegates Stress Need for Data to Help Anti-Climate Change Action by Developing Countries, as Fourth Committee Continues Debate on Peaceful Uses of Outer Space, U.N. Doc. GA/SPD/674 (Oct. 24, 2018), https://www.un.org/press/en/2018/gaspd674.doc.htm [https://perma.cc/4RJF-X8L2] [hereinafter 2018 UN Meeting Report].

[186] *Id.*

[187] *Id.*

China.[188] The comments made by Iran's delegate, along with the multitude of successful launches of LEO constellations, indicate an emerging consensus in the developing world in favor of reforming international regulations and ensuring standardized data protection.[189] The expansion of space programs by developing countries "is especially noteworthy because it reflects an emergent democratization of space, which is one of the most important factors in the changing distribution of power in the current international arena."[190]

As developing countries chase down the benefits of satellite technology, including "advanced communications, a platform for technology improvement, greatly enhanced geographic information," and "international prestige,"[191] the international standardization of data privacy regulations promotes innovation and satellite communications market entry by developing countries in a manner that is consistent with the requirements of the Outer Space Treaty.[192] Furthermore, insurance requirements within the national licensing schemes currently employed by developed nations relieve these states from the burden of joint and several liability and from bearing the full financial responsibility imposed on launching states by the Liability Convention and the Outer Space Treaty.[193]

Both developing countries and private entities in the LEO internet-connectivity sector should feel the positive impacts of combining a GDPR-based amendment with an existing space-related treaty. On the other hand, the United States historically remains hesitant to ratify new legal regimes and will preserve its "interests in a strategic manner, and not subsume them to new law unless there is an equally strong advantage."[194] In the case of amending a U.N. treaty to include data privacy standardization for satellite communications, the United States should view such an overhaul as a promotion of American capitalism.[195] Given the

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[188] *Id.*

[189] *Cf. id.*

[190] ROBERT C. HARDING, SPACE POLICY IN DEVELOPING COUNTRIES: THE SEARCH FOR SECURITY AND DEVELOPMENT ON THE FINAL FRONTIER 3 (Everett C. Dolman & John Sheldon eds., 2013).

[191] *Id.* at 4.

[192] *See* Heaven, *supra* note 162, at 391–92; *cf.* 2018 UN Meeting Report, *supra* note 185.

[193] *See Dempsey*, *supra* note 123, at 31.

[194] Blount, *supra* note 116, at 528; *see also* Mitchell, *supra* note 86, at 448–49.

[195] *See* Reidenberg, *supra* note 113, at 1343–46. *But see* Mitchell, *supra* note 86, at 448–49.

United States' current space industry dominance,[196] American commercial satellite operators enjoy significant economies of scale.[197] A likely result of enacting comprehensive satellite data privacy regulations is that American entities' existing competitive advantages will be supplemented and strengthened by compliance-cost reductions, services streamlining, and a risk-spreading structure that promotes cooperation among global competitors.[198]

V. CONCLUSION

Hackers' ease in penetrating the Iridium constellation in 2015[199] serves as an example of an incident that would clearly fall under the ambit of the proposed data protection amendments. Under the current regime, satellite data processors may continue to negligently leave end-user data vulnerable to malicious actors without any consequence, given the present complexities in identifying governing regulatory bodies, relevant law, and noncompliance by data processors and controllers.[200]

On the other hand, with the proposed framework, upon discovery of noncompliance, individuals or the FCC could theoretically institute an action against a company like Iridium, skipping any adjudicative process involving international tribunals and other nations, since Iridium is headquartered near Washington, D.C.,[201] to finally settle or adjudicate the financial penalty owed by Iridium.[202] Because the proposed framework would eventually guide the conduct of private parties, it would be more effective at promoting the cooperative principles of the Outer Space Treaty than does the status quo.[203]

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[196] *See, e.g.*, Greg Autry, *America's Investment in Space Pays Dividends*, FORBES (July 9, 2017), https://www.forbes.com/sites/gregautry/2017/07/09/americas-investment-in-space-pays-dividends/ [https://perma.cc/BYC9-LTB8].

[197] *See generally* Gregg, *supra* note 46.

[198] *See* Joseph Jerome, *The GDPR's Impact on Innovation Should Not Be Overstated*, CTR. FOR DEMOCRACY & TECH. (Apr. 1, 2019), https://cdt.org/insights/the-gdprs-impact-on-innovation-should-not-be-overstated/ [https://perma.cc/53E7-P4U6].

[199] *See* Porup, *supra* note 152.

[200] *See* Nazzal M. Kisswani, *The Reasonable Necessary for the Implement of Telecommunications Interception and Access Laws*, 45 INT'L LAW. 857, 876–77 (2011); Zoltick & Colgate, *supra* note 66.

[201] *Contact Us*, IRIDIUM 77, https://www.iridium.com/company-info/contact/ [https://perma.cc/7G85-GTME].

[202] *See* Viets, *supra* note 82, at 202–03 (discussing the extension of nations' jurisdictions to objects launched into space under Article VII of the Outer Space Treaty).

[203] *Cf.* Danilenko, *supra* note 177, at 223.

In addition to promoting international data exchange and cooperation, GDPR-based data privacy amendments would help to prepare international regulatory agencies for the continued rise of LEO constellations by creating compliance efficiencies and a framework for apportioning fault across jurisdictional lines. Furthermore, along with stimulating the already-burgeoning LEO industry, these proposed regulations would begin to bridge the relative gap in national space development that arose due to core rigidities within the ITU geostationary slot allocation framework.[204] Finally, this regulation would not be overly harmful to the United States' strategic interests and would have beneficial effects on American LEO operators in the form of promoting legal synergy and boosting the ease of compliance.[205] Thus, the overall benefits of enacting uniform amendments into international law should serve as an important legal and geopolitical check on "emerging space actors" who are "expanding their space assets to ensure that they can leverage them for maximum commercial and national security advantages."[206]

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[204] *See, e.g.*, *The Coming of Low-Earth Orbit Satellites*, *supra* note 31; 2018 UN Meeting Report, *supra* note 185.

[205] *See* Reidenburg, *supra* note 113, at 1336–39.

[206] HARDING, *supra* note 190, at 6. Prominent emerging space actors include: China, India, Japan, South Korea and Israel. *Id.*