Remote Sensing for Human Rights Treaty Enforcement

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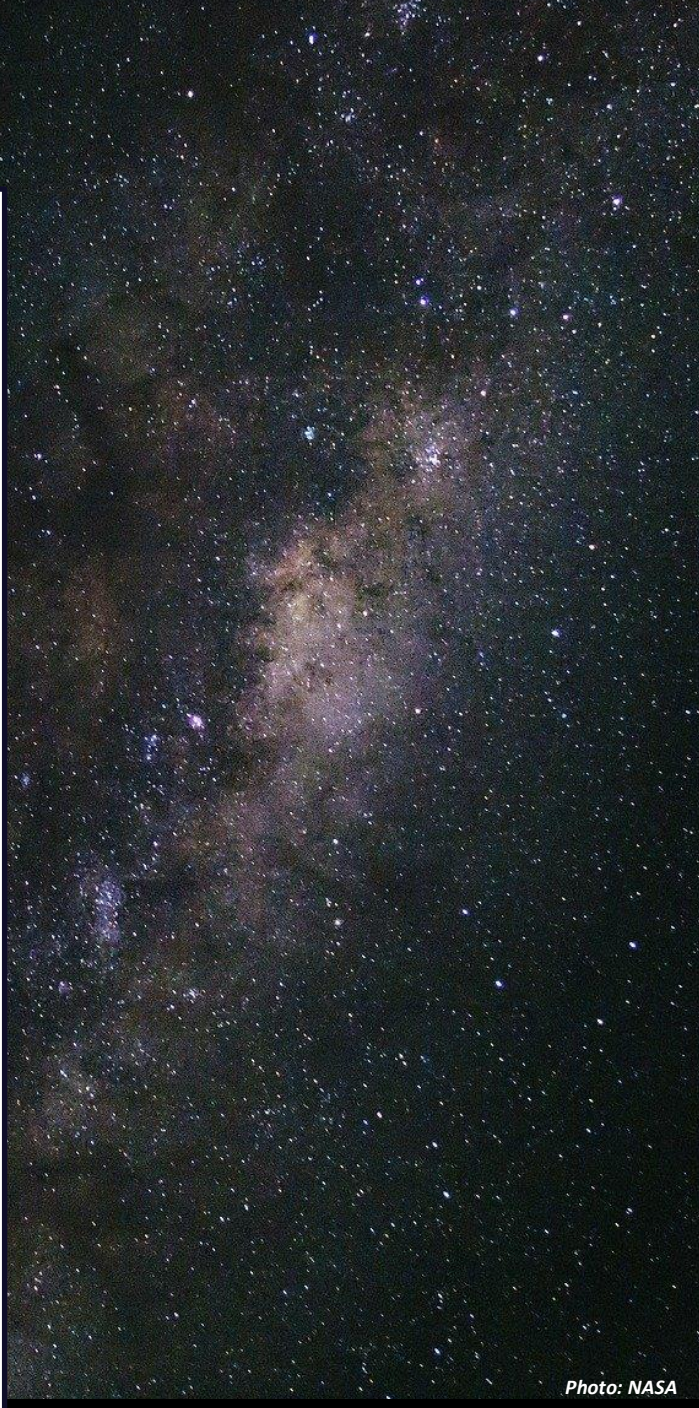

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Abstract

The use of remote sensing satellites for treaty verification is by no means a novel concept. However, its application has been limited to non-proliferation and multilateral environmental treaties. With the advent of commercial remote sensing satellites, the availability of open-source information has increased exponentially.

In addition to the obvious benefit this offered to scientific and commercial ventures, this has opened avenues for the monitoring of human rights abuses by non-government organizations.

This paper explores the value of remote sensing for human rights treaty compliance, verification, and enforcement; arguing for the establishment of a remote sensing verification commission to operate as a specialized UN agency.

I. Introduction

In June 2010, following the overthrow of Prime Minister Kurmanbek Bakiev, riots overtook areas of Kyrgyzstan where tensions ran hot.[1] This escalated into a violent conflict in the city of Osh - the city's inhabitants bearing large SOS signs as they begged for any available aid.[2] Rather than directing their signs toward social media channels documenting images of the developing, the citizens of Osh faced their pleas toward the sky.[3] Throughout the city, the letters SOS were emblazoned on roads and in fields in a futile attempt to alert anyone of their plight.[4] These acts "served as both a clear sign of the fear and insecurity faced by the people of Osh, and the implicit assumption that the target audience for SOS signs were observing from above."[5]

The victims in Osh, Kyrgyzstan represent just a small number of the millions of people who have become victims of human rights violations. Unsurprisingly, absolutist regimes pose a significant challenge to the very foundation of human rights, resting upon the notion that there exist certain universal and inalienable liberties that all humans are entitled to.[6] Despite the rich body of International Human Rights Law (IHRL), which seeks to protect the rights of all peoples regardless of race, sex or gender, religion, nationality, socio-economic status, etc., the international community has proven to both systematically perpetrate such abuses *and* fail to adequately enforce human rights treaties.

Is all hope lost for the realization of IHRL? Thankfully no. While the treaty regime fostered through the United Nations (UN) has created a roadmap of rights, often so widely accepted as reach the status constitute customary international law,[7] the lack of compliance, verification and enforcement mechanisms render this treaty regime useless. The issue of how to "fix" international human rights treaties call for a modern solution: looking up.

[1] Inga Sikorskaya, *A brief history of conflict in Kyrgyzstan*, PEACE INSIGHT (Sept. 9, 2015), https://www.peaceinsight.org/en/articles/a-brief-history-of-conflict-in-kyrgyzstan/?location=kyrgyzstan&theme=.
[2] Scott Edwards & Christoph Koettl, *Looking to the Sky: Monitoring Human Rights through Remote Sensing*, 32 HARVARD INT'L. REV. 66,66 (2011).
[3] *Id.*
[4] Douglas Fox, *Human rights: Use satellite 'spy' camera for proof and prevention*, CHRISTIAN SCI. MONITOR (Apr. 13, 2011), https://www.csmonitor.com/Technology/Tech/2011/0413/Human-rights-Use-satellite-spy-camera-for-proof-and-prevention.
[5] Edwards & Koettl, *supra* note 2, at 66.
[6] Frans Viljoen, *International Human Rights Law: A Short History*, UN, https://www.un.org/en/chronicle/article/international-human-rights-law-short-history (last accessed Nov. 2, 2021).
[7] *Id.*

Remote sensing, specifically satellite remote sensing, offers a viable mechanism for the documenting of human rights abuses and continuing enforcement of human rights treaties. Herein, the collection and analysis of remote sensing data supports the protection of human rights - providing leaders and policymakers with updated information, and advancing their ability to institute informed policy and diplomatic measures.

Part II of this article defines remote sensing within the scope of this research, identifies historical examples and arguments for the implementation of remote sensing for treaty verification, and explains the current role remote sensing plays in the administration of IHRL. Part III discusses the dual human rights legal regime within the UN and explores the root causes of the failure of compliance and enforcement in international law. Finally, Part IV proposes the implementation of a UN Specialized Agency on remote sensing for human rights.

II. Remote Sensing for Human Rights

Remote sensing is a broad term that can describe any type of data acquisition from a distance.[8] For decades, scientists have utilized remote sensing technology to document meteorological and geographic changes over time (i.e. coastal erosion), in the monitoring of natural disasters (earthquakes, hurricanes), and to map remote areas.[9] In addition to its scientific benefits, remote sensing technologies play a unique role in international governance. Herein, satellite remote sensing is uniquely situated to offer both State and non-State actors the ability to monitor human rights abuses on a global scale.

A. Satellite Remote Sensing: Scope & Evolution

While academia generally associates remote sensing with satellites and airplanes, the practice of capturing aerial imagery traces its roots back to 1858.[10] Far from modern-day satellite imagery captured from thousands of miles above the Earth's surface,[11] the earliest remotely sensed images were captured by cameras affixed to balloons.[12] In the century-and-a-half since those first balloons, remote sensing has evolved into a diverse field of data collection.

i. Remote Sensing Defined

For the purposes of this article[13], remote sensing is defined as "the sensing of the Earth's surface from space by making use of the properties of electromagnetic waves emitted, reflected or diffracted by the sensed objects, for the purpose of improving natural resources management, land use and the protection of the environment."[14]

There are two types of remote sensing satellites: 1) Passive sensors; and 2) Active sensors.[15] Whereas passive sensors observe and measure the electromagnetic radiation emitted by an object, active sensors project

[8] *See* Fabio Tronchetti, *Legal aspects of satellite remote sensing*, *in* HANDBOOK OF SPACE LAW 501, 502 (Frans von der Dunk ed., 2015).
[9] *What is remote sensing?*, NOAA (Feb. 26, 2021), https://oceanservice.noaa.gov/facts/remotesensing.html.
[10] Tronchetti, *supra* note 8, at 502.
[11] *What is remote sensing?* NASA (Dec. 6, 2021), https://earthdata.nasa.gov/learn/backgrounders/remote-sensing.
[12] Tronchetti, *supra* note 8, at 502.
[13] The term remote sensing is also used to describe data collection by both unmanned aerial vehicles (drones) and crewed aircraft, however these methods are outside the scope of this article. For a more detailed discussion, *see* George Cho, *Unmanned Aerial Vehicles: Emerging Policy and Regulatory Issues*, 22 J. L. INFO. & SCI. 201 (2013).
[14] Principles Relating to Remote Sensing of the Earth from Outer Space, GA RES 41/65 (1986).
[15] Ram Jakhu, *International Law Governing the Acquisition and Dissemination of Satellite Imagery*, 29 J. SPACE L. 65, 66 (2003).

electromagnetic radiation onto an object.[16] Active sensors then measure the reflected "backscatter" of waves.[17] Once this information is collected by the sensor, it must be transmitted and processed into an image.[18] Thus, remote sensing is not a singular act, but rather a set of processes that, when combined, produce an image. While the variety in remote sensing methods has led to difficulty in pinpointing a singular definition, the UN Principles on Remote Sensing have defined "remote sensing activities" as "the operation of remote sensing space systems, primary data collection and storage stations, and activities in processing, interpreting and disseminating the processed data."[19]

ii. The Evolution of Remote Sensing Activities

Remote sensing has numerous applications, for both military and civilian ventures. From crop monitoring, weather monitoring, environmental protection, and resource management, to reconnaissance and treaty verification. Remote sensing technology thus performs an integral role in the very functioning of modern developed societies.[20]

Satellite remote sensing comprises much of outer space activities.[21] Initially, satellite remote sensing took the form of government surveillance.[22] Like much of space law, satellite technology evolved out of the Cold War. In the three years after the launch of *Sputnik I* in 1957, the US placed into service the world's first photoreconnaissance satellites.[23] In August 1960 Project CORONA was launched, representing a joint effort between the Central Intelligence Agency and the Air Force.[24] Operating between1960 to 1972, the program provided invaluable intelligence data to the US during the Cold War.[25]

The advent of satellite imagery brought about a knowledge revolution, initially for state actors like the US and the Soviet Union, and later for commercial actors as well. Presently, satellites are operated and used by a variety

[16] David H. Staelin & John Kerekes, *Remote Sensing Capabilities*, *in* HEAVEN AND EARTH: CIVILIAN USES OF NEAR EARTH SPACE 163, 165 (Dorinda Dallmeye & Kosta Tsipis eds., 1997).
[17] Jakhu, *supra* note 15, at 66.
[18] JANA KRISTIN HETTLING, SATELLITE IMAGERY FOR VERIFICATION AND ENFORCEMENT OF PUBLIC INTERNATIONAL LAW 10 (2008).
[19] Principles Relating to Remote Sensing of the Earth from Outer Space, GA RES 41/65 (1986). It is important to note that the Principles narrowly define remote sensing to exclusively include activities "for the purpose of improving natural resources management, land use and the protection of the environment." *Id.*
[20] Jakhu, *supra* note 15, at 72.
[21] Tronchetti, *supra* note 8, at 501.
[22] *CORONA Fact Sheet*, NRO, https://www.nro.gov/History-and-Studies/Center-for-the-Study-of-National-Reconnaissance/The-CORONA-Program/Fact-Sheet/ (last accessed April 20, 2021).
[23] *Id.*
[24] *Id.*
[25] *Id.*

of actors. While some are government owned and operated, others are government owned and privately operated – with the emergence of entirely private satellites occurring from the 1980s onward.[26] What began as a government tool quickly became a commercial venture, and by 1972 satellite imagery became commercially available thanks to the US Earth Resources Technology Satellite.[27] In 1986 the French Système Probatoire d'Observation de la Terre (SPOT) entered the commercial market, offering satellite imagery with a ten-meter resolution.[28] Just one year later, the Soviet Union became a market competitor with five-meter resolution imagery.

The US initially attempted to privatize its satellite industry via the 1984 *Land Remote Sensing Commercialization Act*.[29] The act allowed a private company to lease the government-owned Landsat system, effectively authorizing private use but not ownership of remote sensing systems. The subsequent 1992 *Land Remote Sensing Policy Act* opened remote sensing capabilities to private companies and gave the US Secretary of Commerce the task of issuing licenses.[30]

The rise in commercially available remote sensing data has improved public accessibility to the benefits of such technology – in increasing the volume of remotely sensed images and lowering the cost of such images. High-resolution commercial images became readily available in the early 2000s with the launch of QuickBird-2.[31] The new market for remotely sensed images included non-governmental actors focused on human rights and humanitarian advocacy. These groups were now able to gain access to once-classified imagery, and in some cases obtain new images from private companies.[32]

[26] Hettling, *supra* note 18, at 13.
[27] Hettling, *supra* note 18, at 2.
[28] *Id.*
[29] 15 U.S.C. § 4201 *et. seq.*
[30] 15 U.S.C. § 5601 *et. seq.*
[31] Brad Townsend, *The Remote Sensing Revolutions Threat,* 15 STRATEGIC STUDIES QUARTERLY 69, 71 (2021).
[32] Ben Yunmo Wang et. al., *Problems from hell, solution in the heavens?: Identifying obstacles and opportunities for employing geospatial technologies to document and mitigate mass atrocities*, 53 INT. J. SEC. DEV. 1,1 (2013).

B. Remote Sensing for Treaty Verification

The act of verifying a State's compliance with treaty terms can be extremely difficult. However, without property verification treaties are nearly impossible to enforce.[33] The concept of treaty verification by satellite imagery is by no means novel. Verification by national technical means (NTM) first arose in relation to the Cold War arms control talks and treaties between the US and the Soviet Union in the 1970s. In recent years, support of remote sensing for treaty verification has expanded into the realm of multilateral environmental treaties (MEAs).

i. National Technical Means of Verification for Arms Control Treaties

Доверяй, но проверяй (*doveryai no proveryai*) or "trust, but verify" entered the American vernacular following talks between US President Ronald Reagan and Soviet Premier Mikhail Gorbachev in 1986.[34] Upon hearing the old Russian proverb, Reagan adopted it as his philosophy for engagement with the Soviet Union. Accordingly, the act of negotiation and signing treaties suggested the US would trust the Soviets to honor their agreements, and the use of technology-enabled treaty verification methods ensured as much.[35]

The 1972 Strategic Arms Limitation Talks (SALT I) talks culminated in an agreement between the two sides, including that "[f]or the purpose of providing assurance of compliance with the provisions of this Interim Agreement, each Party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law."[36] The Parties further agree "not to interfere with national technical means of verification of the other Party."[37] The 1974 Anti-Ballistic Missile (ABM) Treaty, which was in effect until 2002, marked the first formal use of the NTM language in a binding treaty.[38]

[33] Lewin Bormann, *Technical Aspects of Verification*, RWTH AACHEN 1, 2 (2021).
[34] Barton Swaim, *'Trust, but verify': An untrustworthy political phrase,* WASHINGTON POST (Mar. 11, 2016), https://www.washingtonpost.com/opinions/trust-but-verify-an-untrustworthy-political-phrase/2016/03/11/da32fb08-db3b-11e5-891a-4ed04f4213e8_story.html.
[35] Kenneth W. Abbott, *"Trust But Verify": The Production of Information in Arms Control Treaties and Other International Agreements*, 26 CORNELL INT'L. J. 1, 4 (1993).
[36] Interim Agreement Between the United States of America and the Union of Soviet Socialist Republics on Certain Measures with Respect to the Limitation of Strategic Offensive Arms (SALT I), art. V(1), May 26, 1972, 944 U.N.T.S. 13445.
[37] *Id.* at art. V(2).
[38] Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty), art. XII, May 26, 1972, 23 U.S.T. 3435.

What actual constitutes NTM is intentionally vague within the treaty language. In fact, both the US and Soviet Union sought to leave the term undefined for the following reasons:

> *"[T]o protect the sources of sensitive information; to protect the methods used to gather such information; to permit maximum flexibility in what methods are used to gather information; to create uncertainty on the other side about specific capabilities being used as a deterrent against cheating; and to allow flexibility to introduce new technological innovations."*[39]

Using satellite remote sensing, ballistic missile launchers that would otherwise have been nearly impossible to detect were identified, and "NTM helped to freeze the number of strategic missile launchers."[40]

While treaties signify a binding obligation between parties under international law, the words of the treaty alone are rarely sufficient to ensure compliance.[41] In the arms control context, verification methods were traditionally limited to "national" means carried out independents by States party to a treaty. However, as satellite imagery became more readily available, non-State actors took a more active role in treaty verification.[42] This opened the field beyond the traditional State-controlled national means toward the even more expansive international technical means "independently operated and conducted by an international government or non-governmental organization."[43] For example, a non-governmental organization called the Landmine and Cluster Munition Monitor[44] acts as the verification body for the Mine Ban Treaty[45] and the Convention on Cluster Munitions.[46] With the advent of more broad avenues of treaty verification, supporters of remote sensing for treaty verification emphasize its application and utility beyond the arms control context.[47]

[39] Michael P. Gleason & Luc H. Reisbeck, *Noninterference with National Technical Means: The Status Quo Will Not Survive*, AEROSPACE 1, 2 (2020), *available at* https://aerospace.org/sites/default/files/2020-01/Gleason_NTM_20200114.pdf.
[40] Hettling, *supra* note 18, at 119.
[41] Jana K. Hettling, *The use of remote sensing satellites for verification in international law*, 19 SPACE POL'Y 33, 34 (2003).
[42] *Id.*
[43] *Id.* at 34-35.
[44] *See Landmine and Cluster Munition Monitor*, THEMONITOR.ORG, http://www.the-monitor.org/en-gb/home.aspx (last accessed Dec. 10, 2021).
[45] Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, Sept. 18, 1997, *available at* https://www.refworld.org/docid/3ae6b3ad0.html.
[46] Convention on Cluster Munitions, May 30, 2008, *available at* https://www.clusterconvention.org/files/2011/01/Convention-ENG.pdf.
[47] *See* Hettling, *supra* note 41, at 35.

ii. Multilateral Environmental Agreements

The notion of treaty verification arose in the security context.[48] While environmental treaties are not typically couched within those terms, discussions of implementing remote sensing for treaty verification has grown over the last several decades. Supporters point to the benefits remote sensing data would offer MEAs in both the negotiation and implementation phases.[49] The 1992 *UN Framework Convention on Climate Change* sought to contain the growing issue of greenhouse gasses in Earth's atmosphere.[50] However, the Convention did not provide any measurable goals or limitations on global climate emissions. The 1997 *Kyoto Protocol* expanded upon the Convention's goals by mandating that the States listed in Annex I of the Convention[51] commit to reducing their emissions of greenhouses gases "by at least 5 per cent below 1990 levels in the commitment period of 2008-12."[52] Further, Article 10 of the Protocol addresses emissions monitoring, holding that States Party shall "[c]ooperate in scientific and technical research and promote the maintenance and the development of systematic observation systems and development of data archives."[53] Given the vast network of military, civil, and commercial satellites, the use of remote sensing to monitor emissions was clearly viable.[54]

Like the Kyoto Protocol, the 2015 *Paris Agreement* sought to mitigate the growing issue of global warming.[55] To achieve the treaty's goal of "[h]olding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels,"[56] States party "shall, as appropriate, engage in adaptation planning processes and the implementation of actions, including the development or enhancement of relevant plans, policies and/or contributions, which may include:… Monitoring and evaluating and learning from adaptation plans, policies, programmes and actions."[57]

[48] *Id.*
[49] Karen Kline & Kal Raustiala, *International Environmental Agreements and Remote Sensing Technologies* 1,1 (Workshop on Remote Sensing & Environmental Treaties: Building More Effective Linkages, SEDAC, 2000).
[50] United Nations Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107.
[51] Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Denmark, European Economic Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, *id.* at annex I; Croatia, Czech Republic, Liechtenstein, Monaco, Slovakia, and Slovenia were added by amendment entered in force on Aug. 13, 1998, COP.3 4/CP.3.
[52] Kyoto Protocol to the United Nations Framework Convention on Climate Change, art. 3(1), Dec. 10, 1997 2303 U.N.T.S. 148.
[53] *Id.* at art. 10(d).
[54] The Kyoto Protocol's second commitment period ended Dec. 31, 2020.
[55] Conference of the Parties, Adoption of the Paris Agreement, Dec. 12, 2015, U.N. Doc. FCCC/CP/2015/L.9/Rev/1.
[56] *Id.* at art. 2(1)(a).
[57] *Id.* at art. 7(9)(d).

On November 2, 2021, the European Space Agency and the European Union's Copernicus program announced a new mission to track greenhouse emissions at the UN Climate Change Conference (COP26).[58] The mission is a new satellite constellation, the European CO2 Monitoring and Verification Support Capacity (CO2MVS) on anthropogenic emissions, "will measure concentration of the two most common greenhouse gasses, carbon dioxide and methane, in unprecedented detail and in near real time."[59] Considering the recent developments at COP26, remote sensing represents a useful and integral tool for MEA verification.

[58] Tereza Pultarova, *Europe announces new satellite constellation to track human-made greenhouse gas emissions*, SPACE.COM (Nov. 2, 2021), https://www.space.com/europe-greenhouse-gas-monitoring-satellite-constellation.
[59] *Id.*

C. The Human Rights Context

Human rights violations often occur in regions and times of often violent conflict. Thus, it is typically very difficult to obtain documentation of such abuses.[60] Additionally, the evidence that is collected is often limited to eyewitness accounts of horrifying atrocities that, while extremely useful, fail to paint a comprehensive and objective picture of the situation.[61]

OHCHR has utilized satellite data to map refugee displacement and movement.[62] The use of remote sensing data has allowed OHCHR to "[track] the affected communities and physical as well as environmental impact on the infrastructure at the refugee camps."[63] Moreover, this data provides necessarily and difficult to obtain information about population and food requirements and location.[64]

Non-governmental organizations (NGOs) have long acted as the monitors of human rights violations. While NGOs have been instrumental in the documentation of human rights abuses, their status under international law as non-governmental actors have limited the effectiveness of prosecution at the state level. Nathaniel Raymond, former-Director of Operations at the Satellite Sentinel Project, identifies three approaches non-governmental space projects can take when documenting international human rights abuses:[65]

I) In the "detection posture," projects use satellite data to identify possible locations where abuses might occur "by identifying signs indicating the build-up of forced and related infrastructure."[66]

II) In the "deterrence posture," these projects work to provide as much information as possible to civilians in potential zones of conflict, in an effort to both warn them of danger and "[deny] potential perpetrators the twin elements of surprise and impunity."[67]

III) Finally, the "documentation posture" concerns the acquisition of evidence of human rights abuses to use for prosecution.[68]

[60] *See* Edwards & Koettl, *supra* note 2, at 66.
[61] *Id.* at 67.
[62] Ram Avtar et. al., *Remote Sensing for International Peace and Security: Its Role and Implications*, MDPI 1,6 (2021).
[63] *Id.*
[64] *Id.*
[65] Wang et al., *supra* note 32, at 3.
[66] *Id.*
[67] *Id.*
[68] *Id.*

Among others, the American Association for the Advancement of Science (AAAS) and Amnesty International have paved the way for the use of remotely sensed data by human rights organizations. When faced with an accusation of a human rights violation, many States devolve into "a sequential and nearly standardized series of responses."[69] If outright denial proves ineffective, many States work to minimize the validity of the NGO calling their actions into question.[70] In the face of deniers, NGOs have turned to satellite imagery to provide comprehensive and authoritative proof of these violations.[71]

i. The Case of Sudan

Darfur, a remote region in western Sudan, has historically been a region of relatively harmonious ethnic diversity.[72] Like much of Africa, Sudan fell victim to colonialism, which resulted in intense political instability.[73] Upon independence in 1956, Sudan was plagued by civil wars and region conflicts throughout the country, which "can be attributed to the deeply rooter regional, political, and economic inequalities that have persisted throughout Sudan's colonial and post-colonial history."[74] Although sporadic violence was already occurring throughout Darfur, a rebel attack at the al-Fashir airport in April 2003 set a new bloody conflict into motion.[75] The Sudanese government by exacerbating existing tensions to incite internal proxy wars between the ethnic groups in the region.[76]

The international outcry regarding the atrocities in Darfur led to a government-mandated isolation.[77] While the estimated death toll in the region ranged from 200,000 to 400,000, "the government of Sudan claims that no more than 10,000 have died as a result of the conflict, and that other estimates are exaggerations by 'Western media and NGOs.'"[78] In response the AAAS, Amnesty International, Human Rights Watch, and the Genocide Intervention Network began monitoring the conflict in 2006.[79]

[69] Edwards & Koettl, *supra* note 2, at 67.
[70] *Id.*
[71] *Id.* at 68.
[72] Ahmad Sikainga, *'The World's Worst Humanitarian Crisis,'* ORIGINS (Feb. 5, 2009), https://origins.osu.edu/article/worlds-worst-humanitarian-crisis-understanding-darfur-conflict.
[73] *Id.*
[74] *Id.*
[75] *Id.*
[76] *Id.*
[77] Edwards & Koettl, *supra* note #, at 68.
[78] *Id.*
[79] *High-Resolution Satellite Imagery and the Conflict in Chad and Sudan*, AAAS, https://www.aaas.org/resources/high-resolution-satellite-imagery-and-conflict-chad-and-sudan (last accessed Nov. 5, 2021).

Using satellite images taken at 28 locations[80] within Darfur and in the neighboring country Chad, the human rights organizations compiled damning evidence of abuses.[81] The project obtained data from both commercial satellites and governmental sources like the US State Department.[82] Private companies including GeoEye and DigitalGlobe provided images from their Ikonos and QuickBird satellites respectively.[83] The project additionally obtained data from Orbimage's Orbview and ImageSat International's ErosB satellites.[84]

The project compared images from 2003-04, before the conflict had reached the 28 documented locations, to images from 2006-07. These images were "visually analyzed for structural damage, evidence of village burning or abandonment, expansion and/or growth of camps of internally displaced persons (IDP), and any other features that indicate an attack has occurred in the target location or nearby."[85] The resulting data revealed that "[s]eventy-five percent of the imagery pairs showed that destruction of villages and/or growth of camps of [IDP] had occurred within the time period indicated."[86] The fact that the remaining twenty-five percent did not reveal damage or movement was "attributed to imperfections in the satellite imagery, such as cloud cover, and difficulties in locating attacked towns, and finally to ambiguities in source information."[87]

These remotely sensed images were published on the now defunct "Eyes on Darfur" website created by Amnesty International.[88] The website made the evidence of violence and destruction readily available. It acted as "a signal that the commonly-held assumption that the fog of war could mask widespread violations of humanitarian law was no longer true…and that strategies or denial, minimization, and deferral would—ultimately—fail."[89]

ii. The Humanitarian Remote Sensing Process

The utilization of remote sensing data is a lengthy and technical process that requires the collection of raw data and the interpretation and analysis of that data. Humanitarian remote sensing projects typically bear three commonalities: "(1) they usually involve a combination of different actors, including the provider of images, (2)

[80] Abu Gudul, Donkey Dereis I, Donkey Dereisa II, Ishma, Ligeidiba, Tigla, Ungabo, Bir Maza, Jonjona, ShangilTobay/Shadad, Um Sidir, Bir Kedouas, Maduoa, Dago, Deribat, Jawa, Shek Hassan, Bornyo, Dar-al-Salam, Helif Sany, Katur, Tabarat, Tawila, Turra, Krinding, Koloy, Marena, and Tiero.
[81] *Id.*
[82] *Id.*
[83] *Id.*
[84] *Id.*
[85] *Id.*
[86] *Id.*
[87] *Id.*
[88] *Id.*
[89] Edwards & Koettl, *supra* note 2, at 69.

they consist of imagery analysis experts partnering with an advocacy organization, and, (3) typically, the funder is directly involved with the project."[90]

In 2010, the Satellite Sentinel Project (SSP) was founded by George Clooney and John Prendergast following a visit to South Sudan "to prevent the return of all-out civil war between South Sudan and Sudan."[91] Funding for SSP was provided by Not on Our Watch, an NGO founded by several Hollywood figures including Clooney, Don Cheadle, Matt Damon, Brad Pitt, and Jerry Weintraub.[92] SSP functions by using private funds to obtain satellite imagery from DigitalGlobe.[93] Specifically, "DigitalGlobe's high-resolution commercial satellites, known as QuickBird, WorldView-1, and WorldView-2, pass over Sudan and South Sudan in order to understand the impact [of the atrocities] on civilians."[94] DigitalGlobe analysts then partner with Enough Project—another human-rights nonprofit founded by Prendergast—to interpret the data their satellites collected.[95] Then, "*[i]f* experts detect human rights abuses, then the project releases a report to the press and policymakers to generate a rapid response."[96]

For projects like SSP to function, many moving parts need to fit together seamlessly. It requires a funding source (Not on Our Watch), and advocacy platform (Enough Project), a source of satellite imagery (DigitalGlobe), and an independent analysis body (Harvard Humanitarian Initiative).[97] Despite these many hurdles, SSP started documenting abuses in Sudan and South Sudan "in near real-time."[98] SSP used the "before-and-after" data collection method to show intent to commit atrocities and the "likely intent to conceal reported mass graves."[99] In doing so, the project relied on the repeated collection of satellite imaged from the same sites to build a broader narrative not only of the damage caused but also of the perpetrators' plans.[100]

[90] Avtar et. al., *supra* note 62, at 17.
[91] Mark Benjamin, *George Clooney's Satellite Project Captures Sudan Violence in Real Time*, TIME (May 25, 2011), https://nation.time.com/2011/05/25/george-clooneys-satellite-project-captures-sudan-violence-in-real-time/#ixzz1NNjwECmV.
[92] In 2019, Not on Our Watch announced that it had merged with The Sentry, another NGO co-founded by Weintraub, *see Not On Our Watch and The Sentry have merged*, THE SENTRY (Mar. 20, 2019), https://thesentry.org/2019/03/20/2498/not-watch-sentry-merged/.
[93] Avtar et. al., *supra* note 62, at 17.
[94] *Id.*
[95] *Id.*
[96] *Id.* (emphasis added).
[97] Wang et al., *supra* note 32, at 12.
[98] *Id.*
[99] *Id.* at 13.
[100] *Id.*

The use of remote sensing is not without its challenges. While the benefits are great, the cost is often prohibitive for all but the largest NGOs and humanitarian organizations.[101] SSP often utilizes imagery that retails for approximately $400,000 per image.[102] Additionally, by its very nature, remote sensing is heavily dependent on atmospheric conditions like cloud cover.[103] Satellites can also be constrained by their orbits, with those stationed in low-earth orbit able to only pass over a single spot at set times.[104] This means that often, "people must make do with photographing crime scenes rather than watching or intervening in events as they unfold."[105] Another limitation of remote sensing for human rights is the variety of possible observables.[106] The evidence necessary to show a human rights abuse may be as obvious as a completely obliterated village, but it could also be the presence of vehicle tracks that suggest mass population movement or military mobilization.[107] The useability of remotely sensed data thus depends heavily on proper collection and analysis, supported by intelligence gathered from a variety of sources.

The current financial and technical challenges involved in implementing satellite remote sensing point to the need for greater structure and governmental support.[108] Because projects like SSP are few and far between, remote sensing projects are often too underfunded to provide the data necessary to enact change on the international level. This is particularly true in the human rights context where the frequent lack of effective verification mechanisms, combined with diplomatic resource and enforcement, within IHRL jurisprudence renders the authority and administration of law ineffective.[109]

[101] *Id.* at 18.
[102] Wang et al., *supra* note 32, at 5.
[103] Fox, *supra* note 4.
[104] *Id.*
[105] *Id.*
[106] Wang et al., *supra* note 32, at 6.
[107] *Id.*
[108] *Id.* at 15.
[109] *See* Oona Hathaway, *Do Human Rights Treaties Make a Difference?*, 111 Yale L.J. 1936 (2002)

III. The International Human Rights Framework

Human rights law as it exists today is a product of the evolutionary process of global democratization. The notion that humans have an inherent right to peace is found in the very foundations of international law, extending far past modern legal structures. Theorists including Hugo Grotius, Samuel von Pufendorf, and Emmerich de Vattel conceptualised a "natural right to peace."[110] Throughout modern international law, we can see the echoes of past interpretations of human rights law. The 1948 *Universal Declaration of Human Rights* (UDHR)[111] traces the origins of Articles 1-4 to the Cyrus Cylinder, a clay cylinder constructed by Cyrus the Great in 539 BCE upon the conquering of Babylon, which freed all slaves, established freedom of religion, and guaranteed racial equality.[112] In the Western world, the 1215 Magna Carta (or Charta) provided the framework for concept of "Rule of Law," and limited the powers of the government.[113] The Magna Carta has since served as the inspiration for numerous documents like the English Bill or Rights and the US Constitution.

It is important to note that IHRL and international humanitarian law (IHL) represent are in fact different bodies of law that govern distinct, yet related topics. While both seek to protect human dignity, the starting point and methodology is different. Human rights law always applies regardless of the circumstances. The purpose of human rights law is to protect people from arbitrary behavior by the State.[114] IHL is different in that it is a special system of law that comes into effect during times of armed conflict. It is specifically designed to implement a supplementary set of rules to protect victims of war and to regulate hostilities. During times of conflict, some human rights like the freedom of movement for example can be suspended, and thus IHL seeks to protect "core" human rights.[115]

A. The Foundation of International Human Rights Law

The modern study of human rights as a legal construct can be traced to the 18th century.[116] Modeled after the French Revolutionary cry of "*Liberté, Egalité, Fraternité*", scholars have identified three "generations" of human

[110] Cecilia M. Baillet, *Peace is the Fundamental Value that International Law Exists to Serve*, ASIL PROCEEDINGS 309, 310 (2017).
[111] Universal Declaration of Human Rights, G.A. Res. 217 (III) A, U.N. Doc. A/RES/217(III) (Dec. 10, 1948).
[112] Marco Sutto, *Human Rights evolution, a brief history*, COESPU (2019), https://www.coespu.org/index.php/articles/human-rights-evolution-brief-history.
[113] *A Brief History of Human Rights: The Magna Carta (1215)*, HUMAN RIGHTS, https://www.humanrights.com/what-are-human-rights/brief-history/magna-carta.html (last accessed Nov. 3, 2021).
[114] *International Humanitarian Law and International Human Rights Law*, ICRC 1, 1 (2003).
[115] *Id.*
[116] Viljoen, *supra* note 6.

rights law.[117] The first generation of rights focused on liberation from government oppressors, and in particular, of monarchical regimes.[118] This early iteration sought to guarantee basic freedoms of speech, religion, and voting rights.[119] Largely in response to the rapid industrialization of the eighteenth and nineteenth centuries, the second generation of rights took a socio-economic focus.[120] In response to the increasingly globalized world which emphasized the shared global struggles of poverty, the third generation of rights focused on "the rights to a healthy environment, to self-determination and to development," among others.[121]

While the notion of human rights has certainly played a role in both domestic and international law for millennia, the development of an international legal regime to protect against human rights abuses is a relatively new construction. Following the atrocities of the Second World War, the UN was founded in 1945 to serve as the central global organization "[t]o maintain international peace and security."[122] The system of human rights that developed out of the UN has a distinct structure that relies on two central bases, which can be described as the Charter System and the Treaty System.[123]

i. The Charter System

Within the UN Charter human rights are referenced numerous times. However the Charter fails to identify what specific rights humans are entitled to.[124] Instead, Article 68 of the Charter mandates the Economic and Social Council to establish the Commission on Human Rights (CHR or the Commission), which was created in 1946.[125] The CHR was successful in not only supervising the creation of three human rights instruments, but also in garnering widespread international acceptance.[126]

Absent any clear guidance within the UN Charter itself, the concept of human rights as an integral facet of international law can be traced to the UDHR.[127] Like the UN itself, the UDHR was manifestly a declaration born in reaction to the horrors of war. At its core, the UDHR and its progeny human rights instruments seek to create

[117] *Id.*
[118] *Id.*
[119] *Id.*
[120] *Id.*
[121] *Id.*
[122] UN Charter, art. 1(1).
[123] Viljoen, *supra* note 6.
[124] *See id.* at preamble, art. 1(3), art. 13(1)(b), art. 55(c), art. 62(2), art. 68, art. 76(c).
[125] *Id.* at art. 68.
[126] Viljoen, *supra* note 6.
[127] G.A. Res. 217 (III) A (Dec. 10, 1948).

peace and prevent "the scourge of war."[128] While non-binding, the UDHR is "recognized as a universal yardstick of State conduct" and has largely reached customary international law status.[129]

The core responsibilities of the CHR were "to examine, monitor and publicly report either on human rights situations in specific countries or territories…or on major phenomena of human rights violations worldwide."[130] The first two decades of the Commission focused primarily on the global promotion of human rights.[131] In response to the human rights violations in apartheid South Africa, the Commission took on a more active role investigating abuses.[132]

In 2005, then-UN Secretary-General Kofi Annan published a report titled *Larger Freedom: Towards Development, Security and Human Rights for All*, where he called for the restructuring of the CHR into a smaller council to "be built on the principle of universal scrutiny."[133] The following year, the UN General Assembly established the Human Rights Council ("HRC" or "Council") to replace the CHR.[134]

Unlike the CHR, the HRC operates as a subsidiary organ of the UN General Assembly. It is also smaller, with 47 States elected by an absolute majority of Member States in the General Assembly (97 States).[135] To ensure a more equitable representation, States on the HRC are limited to two consecutive three-year terms, and the General Assembly may vote to suspend a Councilmember that is engaging in human rights violations.[136] Another significant difference between the HRC and the former CHR is that the Council meets no fewer than three times per year, in comparison to one single six-week session.[137] Via Resolution 5/1, the HRC established both the complaint procedure and the Universal Periodic Review, which implemented a review process of each Member

[128] *Id.* at preamble.
[129] Viljoen, *supra* note 6; for an explanation of the contents of the UDHR, *see* A. O. Adede, *International Human Rights Law: Lessons for Treaty-Making and Implementation*, 3 Afr. Y.B. Int'l L. 99, 101 (1995).
[130] *Background information*, UN Human Rights Council, https://www.ohchr.org/EN/HRBodies/CHR/Pages/Background.aspx (last accessed Nov. 1, 2021).
[131] Viljoen, *supra* note 6.
[132] *Id.*
[133] U.N. Doc. A/59/2005/Add/3 (Mar. 21, 2005).
[134] G.A. Res. 60/251 (Mar. 15, 2006).
[135] *Id.* at para. 7-8 ("the membership shall be based on equitable geographical distribution, and seats shall be distributed as follows among regional groups: Group of African States, thirteen; Group of Asian States, thirteen; Group of Eastern European States, six; Group of Latin American and Caribbean States, eight; and Group of Western European and other States, seven").
[136] *Id.*
[137] *Id.* at para. 10.

State every four-and-a-half years.[138] Like the CHR, the HRC contains mechanisms to either address human rights violations on the State[139] or thematic level.[140]

The Office of the United Nations High Commissioner for Human Rights (OHCHR) serves as the Secretariat for HRC.[141] The OHCHR was established following the 1993 World Conference on Human Rights, which adopted the Vienna Declaration and Programme of Action.[142] The OHCHR functions as a department of the UN Secretariat tasked with protecting the rights guaranteed under the UDHR.[143] The OHCHR publishes roadmaps outlining the most important priorities every four years. The 2018-21 Management Plan[144] details six thematic pillars:

- Enhance equality and counter discrimination…
- Increase implementation of the outcomes of the international human rights mechanisms…
- Strengthen the rule of law and accountability for human rights violations…
- Enhance participation and protecting civil space…
- Prevent violations and strengthen protection of human rights, including in situations of conflict and insecurity…[and]
- Advance sustainable development through human rights.[145]

The OHCHR additionally identified four "shift" areas to help reach its human rights goals, including "[p]romoting human rights in the context of frontier issues such as…digital space and emerging technologies."[146]

The overarching mandate of the Charter System is to broadly protect human rights around the globe. The Charter bodies are implemented under the UN Charter itself rather than through subsequent treaties. As a result, the Charter System evolved relatively slowly.[147]

[138] HRC Res. 5/1 (2007).
[139] *See Country Mandates*, OHCHR, https://spinternet.ohchr.org/ViewAllCountryMandates.aspx (last accessed Nov. 3, 2021).
[140] *See Thematic Mandates*, OHCHR, https://spinternet.ohchr.org/ViewAllCountryMandates.aspx?Type=TM (last accessed Nov. 3, 2021).
[141] G.A. Res. 48/141 (Dec. 20, 1993).
[142] U.N. Doc. A/CONF.157/23 (Jul. 12, 1993).
[143] G.A. Res. 48/141, para. 3(a) (Dec. 20, 1993).
[144] OHCHR, *Management Plan 2018-2021*, *available* at https://www.ohchr.org/Documents/Publications/OMP-2018-2021-Short-English.pdf.
[145] *Our Roadmap*, OHCHR, https://www.ohchr.org/EN/AboutUs/ManagementPlan/Pages/Roadmap.aspx (last accessed Nov. 7, 2021).
[146] *Id.*
[147] Viljoen, *supra* note 6.

ii. The Treaty System

The Charter System functions in tandem with the expansive body of multilateral treaties on a variety of human rights issues. Presently there are nine central human rights treaties, as well as nine corresponding optional protocols.[148] The first treaty, the 1965 International Convention on the Elimination of All Forms of Racial Discrimination (ICERD),[149] expands upon the principle of nondiscrimination found within both the UN Charter[150] and the UDHR.[151] The UDHR also provides the foundation the 1966 International Covenant on Civil and Political Rights (ICCPR)[152] and the 1966 International Covenant on Economic, Social and Cultural Rights (ICESCR).[153] These three treaties focus broadly on the rights of all people regardless of status, whereas the subsequent six treaties pay particular attention to certain groups of people.

These treaties include: the 1979 Convention on the Elimination of All Forms of Discrimination against Women (CEDAW),[154] the 1984 Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT),[155] the 1989 Convention on the Rights of the Child (CRC),[156] the 1990 International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (CMW),[157] the 2006 International Convention for the Protection of All Persons from Enforced Disappearance (CED),[158] and the 2006 Convention on the Rights of Persons with Disabilities (CRPD).[159] With the exception of the CMW and CED, all human rights treaties have at least 171 States Party.[160] All UN Member States have signed at least one human rights treaty, and 80% of Member States have ratified at least four.[161]

In total, there are ten individual treaty bodies composed of committees of independent experts for the purposes of verification and treaty compliance. Nine bodies—the Committee on the Elimination of Racial Discrimination

[148] For the text of all treaties and protocols, *see The Core International Human Rights Instruments and their monitoring bodies*, OHCHR, https://www.ohchr.org/en/professionalinterest/pages/coreinstruments.aspx (last accessed Nov. 5, 2021).
[149] International Convention on the Elimination of All Forms of Racial Discrimination, Dec. 21, 1965, 660 U.N.T.S. 195.
[150] U.N. Charter, art. I.
[151] G.A. Res. 217 (III) A (Dec. 10, 1948).
[152] International Covenant on Civil and Political Rights, preamble, Dec. 16, 1966, 999 U.N.T.S. 171.
[153] International Covenant on Economic, Social and Cultural Rights, Dec. 16, 1966, 993 U.N.T.S. 3.
[154] Convention on the Elimination of All Forms of Discrimination against Women, Dec. 18, 1979, 1249 U.N.T.S. 13.
[155] Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment, Dec. 10, 1984, 1465 U.N.T.S 85.
[156] Convention on the Rights of the Child, Nov. 20, 1989, 1577 U.N.T.S. 3.
[157] International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families, Dec. 18, 1990, A/RES/45/158.
[158] International Convention for the Protection of All Persons from Enforced Disappearance, Dec. 20, 2006, A/RES/61/177.
[159] Convention on the Rights of Persons with Disabilities, Jan. 24, 2007, A/RES/61/106.
[160] States Party as of Jun. 18, 2021: ICERD (182), ICCRP (173), ICESCR (171), CEDAW (189), CAT (171), CRC (196), CMW (56), CED (63), and CRPD (182); *see Status of Ratification Interactive Dashboard*, OHCHR https://indicators.ohchr.org/ (last accessed Nov. 5, 2021).
[161] *Human Rights Bodies*, OHCHR, ohchr.org/en/hrbodies/Pages/HumanRightsBodies.aspx (last accessed Nov. 5, 2021).

(CERD),[162] the Committee on Economic, Social and Cultural Rights (CESCR),[163] the Human Rights Committee (CCPR),[164] the Committee on the Elimination of Discrimination Against Women (CEDAW),[165] the Committee Against Torture (CAT),[166] the Committee on the Rights of the Child (CRC),[167] the Committee on Migrant Workers (CMW),[168] the Committee on the Rights of Persons with Disabilities (CRPD)[169] and the Committee on Enforced Disappearances (CED)[170]—specifically monitor treaty implementation. The remaining body, the Subcommittee on the Prevention of Torture (SPT), is charged with monitoring places of detention.[171]

As with international law more broadly, States party to human rights treaties commit to the treaty's terms. States are additionally obligated to submit initial and periodic reports to the treaty body outlining their implementation and compliance with the treaty.[172] There are four monitoring procedures outlined within human rights treaties: reporting, individual communications, inquiries, and inter-State communications.[173] However, "governments can choose to recognize or reject the jurisdiction of [the] committees and to implement or ignore their recommendations."[174] In large part, "[t]he *ad hoc* development of the treaty body system over the years has led to many variations in practice and procedure between the treaty bodies which create confusion for States parties and other actors engaged in the system."[175]

[162] *See Committee on the Elimination of Racial Discrimination*, OHCHR, https://www.ohchr.org/EN/HRBodies/CERD/Pages/CERDIndex.aspx (last accessed Nov. 5, 2021).
[163] *See Committee on Economic, Social and Cultural Rights*, OHCHR, https://www.ohchr.org/en/hrbodies/cescr/pages/cescrindex.aspx (last accessed Nov. 5, 2021).
[164] *See Human Rights Committee,* OHCHR, https://www.ohchr.org/EN/HRBodies/CCPR/Pages/CCPRIndex.aspx (last accessed Nov. 5, 2021).
[165] *See Committee on the Elimination of Discrimination Against Women,* OHCHR, https://www.ohchr.org/en/hrbodies/cedaw/pages/cedawindex.aspx (last accessed Nov. 5, 2021).
[166] *See Committee Against Torture,* OHCHR, https://www.ohchr.org/en/hrbodies/cat/pages/catindex.aspx (last accessed Nov. 5, 2021).
[167] *See Committee on the Rights of the Child,* OHCHR, https://www.ohchr.org/EN/HRBodies/CRC/Pages/CRCIndex.aspx (last accessed Nov. 5, 2021).
[168] *See Committee on Migrant Workers*, OHCHR, https://www.ohchr.org/EN/HRBodies/CMW/Pages/CMWIndex.aspx (last accessed Nov. 5, 2021).
[169] *See Committee on the Rights of Persons with Disabilities*, OHCHR, https://www.ohchr.org/EN/HRBodies/CRPD/Pages/CRPDIndex.aspx (last accessed Nov. 5, 2021).
[170] *See Committee on Enforced Disappearances*, OHCHR, https://www.ohchr.org/en/hrbodies/ced/pages/cedindex.aspx (last accessed Nov. 5, 2021).
[171] *See Subcommittee on the Prevention of Torture*, OHCHR, https://www.ohchr.org/EN/HRBodies/OPCAT/Pages/OPCATIndex.aspx (last accessed Nov. 5, 2021).
[172] *Monitoring the core international human rights treaties*, OHCHR, https://www.ohchr.org/EN/HRBodies/Pages/WhatTBDo.aspx (last accessed Nov. 5, 2021).
[173] *Monitoring implementation of the international human rights instruments: an overview of the current treaty body system,* Background conference document prepared by the OHCHR (2005), 5.
[174] Emilie M. Hafner-Burton & Kiyoteru Tsutsui, *Justice Lost! The Failure of International Human Rights Law to Matter Where Needed Most*, 44 J. PEACE RES. 407, 410 (2007).
[175] *Monitoring implementation of the international human rights instruments, supra* note 173, at 15.

In reality the prosecution of human rights violations is difficult if not impossible. When implemented, the inquiry process can take anywhere from months to years to compile.[176] These investigative measures are designed in part to aid States in the domestic prosecution of human rights abuses.[177] In cases where States "are unwilling or unable to address international crimes committed in their jurisdictions, the International Criminal Court (ICC) is well placed to play a complementary role."[178] Under its founding document, the 1998 Rome Statute, the ICC has limited jurisdiction over four main crimes: 1) Genocide; 2) Crimes against humanity; 3) War crimes; and 4) Crimes of aggression.[179] While certain rights abuses enumerated by the core human rights treaties fall within ICC jurisdiction, this remains a developing area within IHRL jurisprudence.

[176] *See* Navanethem Pillay, *Establishing Effective Accountability Mechanism for Human Rights Violations*, UN, https://www.un.org/en/chronicle/article/establishing-effective-accountability-mechanisms-human-rights-violations (last accessed Nov. 4, 2021).
[177] *Id.*
[178] *Id.*
[179] Rome Statute of the International Criminal Court, art. 5, Jul. 17, 1998, 2187 U.N.T.S.

B. Why Human Rights Treaties Fail

An international treaty's function may be measured by its degree of effectiveness, compliance, and implementation. Effectiveness is "the degree to which a given regime induces changes in behavior that further the goals of the regime; the degree that a regime improves the state of the underlying environmental problem it addresses; the degree that a regime achieves its policy objective."[180] Compliance, on the other hand, "is measured by reference to the standards set down in an agreement, but it says nothing about the wisdom or applicability of those standards."[181] Thus, compliance is a tool to carry out the effectiveness of a treaty. Finally, implementation "refers to the process of putting international commitments into practice."[182]

Despite the established IHRL framework tasked with identifying, outlawing, condemning, and prosecuting human rights abuses, the prevalence of these abuses continues. Unlike other areas of law, the problem with international human rights law is not lack of treaties but rather a lack of ongoing enforcement. In recent years, academics and policymakers have sought to explore the shortfalls of human rights treaties and propose novel measures to improve their functions.[183] During a 2002 study, Oona Hathaway came to the grim, albeit accurate, conclusion that human rights treaties do little to combat the atrocities they seek to prevent.[184]

i. The Hathaway Study

Professor Oona Hathaway's 2002 study posed a simple, yet remarkably complicated question: "Do human rights treaties make a difference?"[185] To answer this question, Hathaway's study is comprised of a quantitative analysis of the relationship between States' human rights practices and the treaties they have signed onto.[186] Hathaway examined 166 nations over a four-decade period, and across the following five areas of human rights law: genocide, torture, fair and public trials, civil liberties, and political representation of women.[187] This methodology piqued broad interest given the ongoing prominence of the first four areas within IHRL jurisprudence, and the contentious and emergent nature of political representation and human rights in the international community.

[180] Kline & Raustiala, *supra* note #, at 10.
[181] Avtar et. al., *supra* note 62, at 10.
[182] *Id.* at 11.
[183] *See* Hafner-Burton & Tsutsui, *supra* note 170: Hathaway, *supra* note # 109; Martha Finnemore & Kathryn Sikkink, *International Norm Dynamics and Political Change*, 52 INT'L ORG. 887 (1998); *see also* ERIC A. POSNER, THE TWILIGHT OF HUMAN RIGHTS LAW (2014).
[184] Hathaway, *supra* note 109, at 1936.
[185] *Id.*
[186] *Id.* at 1938.
[187] *Id.* at 1939.

Hathaway posed two questions: A) "Do countries comply with or adhere to the requirements of human rights treaties they have joined?"; and B) "Do these human rights treaties appear to be effective in improving countries' human rights practices—that is, are countries *more* likely to comply with a treaty's requirements if they have joined the treaty than would otherwise be expected?"[188] What she finds is that while States that have ratified human rights treaties typically have better human rights practices across the board, there is nonetheless widespread noncompliance and in some cases "treaty ratification is not infrequently associated with worse human rights ratings than otherwise expected."[189]

Hathaway then outlines several existing theories about treaty compliance, which she then applies to her case study. She first discuses variants of the Rational Actor Model, which hold "at their heart a shared belief that states and the individuals that guide them are rational self-interested actors that calculate the costs and benefits of alternative courses of action in the international realm and act accordingly."[190] Conversely, Normative Models take a broader approach to international law by arguing that the rational models focus too deeply on individual State interests and require "an understanding of the influence and importance of ideas."[191] Where the Rational Actor Model presupposes self-interest, Normative Models suggest that States abide by treaty terms out of a sense of internalized obligation.[192] Consequently, Hathaway argues that both rationalists and normative scholars overlook the role treaty ratification plays in the public sphere.[193] She argues that "we cannot fully understand the relationship between human rights treaty ratification and human rights practices unless we understand that treaties operate on more than one level simultaneously."[194]

To explain this phenomenon, Hathaway points to the nature of treaties as "both instrumental and expressive instruments."[195] The instrumental purpose of a treaty is to bind countries to a legal document with the intent of shaping behaviors around those treaty terms, whereas the expressive function of treaty is the process of making public the support of those terms.[196] In effect, "[t]he position taken by countries in such instances can be sincere, but it need not be."[197] While treaties have an inherent sanctioning function in that they legally bind parties to

[188] *Id.*
[189] *Id.* at 1940.
[190] *Id.* at 1944.
[191] *Id.* at 1955.
[192] *Id.* at. 1956.
[193] *Id.* at 1962.
[194] *Id.* at 2002.
[195] *Id.* at 1941.
[196] *Id.*
[197] *Id.*

treaty terms, the expressive function operates a form of position-taking.[198] Thus, treaties "work by expressing the position of the community of nationals as to what conduct is and is not acceptable; they tell the international community what are the norms and code of conduct of civilized nations."[199] In addition, "treaties also have an expressive function that arises from what membership in a treaty regime says about the parties to the treaties."[200]

Ultimately, Hathaway concludes that treaties serve a normative function past their value as a tool for the enforcement of international law.[201] In the context of human rights treaties in particular, the enforcement comes less from the treaty itself and more from external pressures. This is very apparent when considering examples like AAAS, Amnesty International, and various NGO's use of remote sensing to highlight human rights abuses.[202] While human rights treaties may appear ineffective in many respects, they provide the public face for which external forces can hold parties accountable. As Hathaway points out, treaty reform is a valuable end goal—particularly reform through monitoring and compliance provisions.[203]

ii. Evidence of Failure

In theory, the threat to a State's reputation alone should ensure compliance. However, the ineffectiveness of the human rights treaty system means that there are few procedural requirements and even fewer repercussions.[204] Hathaway's extensive study arrives at the unfortunate conclusion that human rights treaties largely fail.[205] Failure herein refers to both the failure of a State to comply with the treaty terms, as well as the failure of the monitoring system to sanction noncompliance.[206] Rather than preventing human rights abuses or holding violators responsible, the human rights treaty system is largely performative.[207]

Effective implementation of a human rights treaty would involve strict, comprehensive, and ongoing compliance by States with the treaty terms. Under the umbrella of implementation, there are two main flaws that contribute

[198] *Id.*
[199] *Id.* at 2005.
[200] *Id.*
[201] *Id.* at 2020.
[202] *See* discussion *supra* Part I(C).
[203] Hathaway, *supra* note 109, at 2025.
[204] *Id.* at 2016.
[205] *Id.* at 2002.
[206] *Id.*
[207] Hathaway, *supra* note 109, at 2009 ("Consequently, treaty ratification may become a substitute for, rather than a spur to, real improvement in human rights practices").

to the failure of the treaty. First, many human rights treaties contain insufficient terms.[208] There is effectively a "Catch-22" that takes place with many human rights treaties. Because these treaties encapsulate "nonderogable norms of international law," there is already an assumption that a violation of these treaty terms is a violation of customary international law and therefore the treaty itself "impose[s] little additional legal obligation on countered that are parties."[209] In effect, "[j]oining these treaties thus entails only acceptance of relatively minimal additional reporting requirements."[210]

Second, the compliance of human rights treaties are largely contingent upon the self-reporting of State parties.[211] The concept of self-reporting in international law evolved as a part of the framework of international law.[212] Upon the formation of the UN, "state reporting was a way for the United Nations to collect information for law development in the first place."[213] While the process and function of self-reporting has evolved over the years, the practice is currently implemented in the framework of the nine treaty bodies charged with monitoring compliance with the human rights treaties.[214] In practice, the self-reporting system has been critiqued "as inadequate, ineffective, and even 'in crisis.'"[215]

The OHCHR maintains a database detailing the States who have presently failed to comply with the reporting obligations.[216] As of December 9, 2021 there were a total of 606 overdue reports (initial and periodic) to the various treaty bodies, and only 23 States had no overdue reports.[217]

Even where States do submit reports to the proper treaty body, the content is often incomplete or in some cases "present[s] information in a way that obscures the situation on the ground, or ignore[s] the concerns or questions posed by the treaty body."[218] Essentially, there is no incentive to submit the required self-reporting

[208] *Id.* at 2014.
[209] *Id.* at 2014.
[210] Cosette D. Creamer & Beth A. Simmons, *Ratification, Reporting, and Rights: Quality of Participation in the Convention against Torture*, 37 HUMAN RIGHTS QUARTERLY 579, 584 (2015). The authors also suggest that an additional factor for consideration is a State's capacity to produce a quality report due to cost. *Id.* at 588.
[211] Hathaway, *supra* note 109, at 2009.
[212] Cosette D. Creamer & Beth A. Simmons, *The Proof is in the Process: Self-Reporting Under International Human Rights Treaties*, 2145 Faculty Scholarship Penn. L. 1, 9 (2020).
[213] *Id.*
[214] *Id.* at 14; *see* discussion, *supra* Part III(A)(ii).
[215] *Id.* at 18.
[216] *Late and non-reporting States*, OHCHR, https://tbinternet.ohchr.org/_layouts/15/TreatyBodyExternal/LateReporting.aspx (last accessed Dec. 9, 2021).
[217] *Id.*
[218] Creamer & Simmons, *supra* note 210, at 584.

documents as States are almost never sanctioned for their failure to adequately participate.[219] Further, the failure of self-reporting also impacts effective treaty enforcement. The low submission rate, coupled with the absence of standardization regarding the report's contents, makes it incredibly difficult to both identify and punish treaty violators.[220] The final factor is the lack of "horizonal deterrence"[221] – whereby States acting individually are often unwilling "to take on the burden to of engaging in such enforcement activity."[222]

It is unsurprising that, lacking a cohesive monitoring or enforcement mechanism, human rights treaties are often ineffective. Despite their flaws, amid an increasingly anarchic international environment, the international human rights treaty system presents the greatest potential to achieve its desired effect of upholding the inherent rights of peoples around the globe.

[219] Hathaway, *supra* note 109, at 2008.
[220] *Id.* at 2023.
[221] *Id.* at at 2007 (quoting Louis Henkin).
[222] *Id.* (emphasis added).

IV. The Case for a Treaty Verification Commission

As discussed, the downfall of the human rights treaty system is largely attributed to inadequate reporting and the subsequent failure to enforce. The international human rights framework is in dire need of support in if there is possibility of future enforcement. Where the rise of commercialized remote sensing has drastically increased the availability of satellite images and the popularity of human rights abuse documentation by non-State sources, this highlights the possibility for future uses of satellite data in treaty verification.[223] However, this process has been largely decentralized.

Presently, remote sensing is tool with massive yet unorganized potential. Realizing the full potential of satellite imagery in the human rights forum requires the establishment of a structured system with standardized processes for data collection and analysis.[224]

A. The Evidentiary Problem

One major issue with the utilization of remotely sensed data to document and prosecute human rights abuses is its admissibility as evidence.[225] As remotely satellite imagery becomes more readily available, there is a pressing need, "[t]o establish the legitimacy of using satellite data in legal proceedings, it is important to create universal standards for the interpretation and validation of data across different courts worldwide."[226]

In 2012, at the request of the European Space Agency, the London Institute of Space Policy and Law (the London Institute) published a report titled "Evidence From Space" studying the admissibility of satellite imagery in international legal proceedings.[227] When considering the admissibility of satellite imagery as evidence, the London Institute outlined the following factors:

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[223] *See* Wang et al., *supra* note 32, at 15.
[224] *Id.*
[225] While it is not relevant for this study, privacy concerns are often cited as a limitation of the admissibility of remotely sensed data. For a discussion of the privacy implication of remote sensing, *see* Harlan Onsrud, *Protecting Personal Privacy in Using Geographic Information Systems*, LX(9) PHOTOGRAMMETRIC ENG'G & REMOTE SENSING 1083 (1994); Catherine Doldirina, *Privacy, Earth Observations and Legal Ways to Reconcile the Two*, 50 PROC. INT'L INST. SPACE L. 633 (2014).
[226] Avtar et. al., *supra* note 62, at 16.
[227] *Evidence from Space*, LONDON INST. SPACE POL'Y & L., ESA-ISPL/EO76/final (2012), *available at* https://www.spaceinstitute.org/app/uploads/1342722048_Evidence_from_Space_25_June_2012_-_No_Cover_zip.pdf.[hereinafter Evidence from Space].

1. Authenticity; e.g. that an image is a true representation of the building at issue;
2. Accuracy of the data; e.g. proof that a machine has been properly calibrated;
3. The chain of custody during processing, to show that the source and the end product can be linked; and
4. The people involved in dealings with the data, the applications used, and the business processes and procedures applied to it. This will also help overcome the perception by some that digital data is particularly susceptible to alteration.[228]

In addition to the process of authentication, verification, and preservation; "there is commonly a need for ground truth evidence from the relevant location."[229] Researchers from the London Institute found that in certain circumstances, satellite data would be admissible when paired with evidence collected from the actual location in question, as opposed to "above it".[230]

There is an important distinction to be made here between the raw data and the subsequently produced image. In their truest form "satellite pictures are not really pictures, but rather they constitute data."[231] It is thus possible for satellite data to be modified or altered in a way that is virtually unrecognizable, contributing to ongoing contemporary issues surrounding fake news and AI generated imagery.[232] Additionally, where the usability of raw is contingent upon interpretation, this opens up the added possibility of human error.[233]

Ultimately, the most effective way to circumvent the evidentiary limitations of remotely sensed data is through standardization.[234] Moreover, satellite imagery "and its handling, including through human agency, must adhere to rigorous audit and documentation, authenticity, chain of custody and monitoring procedures, so as to elicit confidence in its accuracy and reliability."[235] This implementation of quality control and verification systems would not only streamline the process of transforming raw data into a useable image, but also provider a more reliable foundation for the admission of satellite imagery in legal proceedings.

[228] *Id.* at 15.
[229] *Id.* at 20.
[230] *Id.* (giving the example of satellite imagery of an oil spill requiring supplemental ground truth to confirm the chemical makeup of the purported oil).
[231] Ana Cristina Nuñez, *Admissibility of remote sensing evidence before international and regional tribunals,* Innovations in Human Rights Monitoring Working Paper 1, 3 (2012).
[232] *Id.*
[233] *Id.; see also* Evidence from Space, 19 (stating that interpretation of satellite imagery likely requires an expert witness interpretation).
[234] Nuñez, *supra* note 231, at 4.
[235] Evidence from Space, 43.

Despite the lack of universal standards, there exists precedent in the ICC, International Court of Justice (ICJ), the International Criminal Tribunal for the Former Yugoslavia (ICTY), and the Permanent Court of Arbitration (PCA) surrounding the admission of remote sensing data within judicial proceedings.[236]

In 2010, the ICC in *Prosecutor v. Germain Katanga and Mathieu Ngudjolo Chui* admitted satellite imagery into evidence.[237] The case concerned the alleged performance of war crimes by the defendants in the Democratic Republic of the Congo.[238] Here, the Prosecution utilized satellite images to identify the location of the accused's crimes.[239] Specifically, the Prosecution called visual technician Zoran Lesic regarding the creation of a 360-degree panorama of the village of Bogoro.[240] Lesic testified that he used "satellite images, photographs taken by the drone, and …photographs" taken with his camera to generate the subject image.[241]

Similarly, in the case *Georgia v. Russian Federation* (2008) concerning violations of the CERD, the ICJ permitted the admission of satellite imagery into evidence.[242] The imagery in question was part of a Human Rights Watch report "documenting villages destroyed by intentional burnings carried out by Russian forces."[243]

In 2001, the ICTY permitted the admission of "aerial reconnaissance" within *Prosecutor v. Radislav Krstić*, concerning a case of genocide.[244] This ruling marked the first genocide conviction at the ICTY.[245]

[236] Wang et. al., *supra* note # 32, at 17.
[237] Prosecutor v. Katanga, ICC-01/04-01/07-T-90, Trial Transcript (Jan. 26, 2010), *available at* https://www.icc-cpi.int/Transcripts/CR2010_00319.PDF.
[238] *Id.* (holding that Katanga is guilty of one count of crime against humanity (murder), and four counts of war crimes (murder, attacking a civilian population, destruction of property and pillaging). Mathieu Ngudjolo Chui was acquitted on 18 December 2012.)
[239] *Id.* at 24.
[240] *Id.*
[241] *Id.* at 25.
[242] Case Concerning Application of the International Convention on the Elimination of All Forms of Racial Discrimination (*Georgia v Russian Federation*), Verbatim Record (Sept. 8, 2008), *available at* https://www.icj-cij.org/public/files/case-related/140/140-20080908-ORA-02-00-BI.pdf.
[243] Wang et. al., *supra* note # 32, at 2.
[244] Prosecutor v. Radislav Krstić, IT-98-33-T, Judgment, ¶ 64 (Aug. 2, 2001), *available at* https://www.icty.org/x/cases/krstic/tjug/en/krs-tj010802e.pdf; *see also* David Rohde, *Evidence Indicates Bosnia Massacre*, CHRISTIAN SCI. MONITOR (Aug. 8, 1995), https://www.csmonitor.com/1995/0818/18012.html (confirming that "spy plane and satellite photos" were entered into evidence).
[245] Prosecutor v. Radislav Krstić, Judgment, ¶ 727; *see Krstić*, INT'L J. RES. CTR., https://ijrcenter.org/international-criminal-law/icty/case-summaries/krstic/ (last accessed Dec. 9, 2021)(noting that Krstić's sentence was later reduced).

Finally, in *Eritrea-Ethiopia Boundary Commission*, the PCA permitted the admission of satellite imagery into evidence, while simultaneously mandating its use in the settlement of a border dispute.[246] Here, the Court Eritrea invoked the Article 15 of the UDHR, that "no one shall be arbitrarily deprived of his nationality."[247] Per the PCA's decision, "the optimum means for implementation of Article I of the 1908 Treaty is to take a satellite image of the coastline of Eritrea…"[248]

Each of these cases outline the integral role that satellite imagery can play within international law, and in supporting the development of IHRL jurisprudence. There is strong precent in numerous international courts to support the introduction of remotely sensed data into evidence. Thus, the question is not whether satellite imagery can ever be admitted in international courts, but rather under what circumstances. The key challenge that the international community must thus overcome concerns the establishment of a widely accepted body to collect and analyze remotely sensed data.

[246] Eritrea-Ethiopia Boundary Commission, Decision, ¶ 6.21(Apr. 13, 2002), *available at* http://www.haguejusticeportal.net/Docs/PCA/Ethiopia-Eritrea%20Boundary%20Commission/Decision_13-4-2002.pdf.
[247] Eritrea-Ethiopia Claims Commission, Partial Award, Civilian Claims—Eritrea's Claims 15, 16, 23 & 27-32, ¶ 60 (Dec. 17, 2004)(quoting G.A. Res. 217 (III) A, art. 15, ¶ 2).
[248] Eritrea-Ethiopia Boundary Commission, Decision, ¶ 6.21(Apr. 13, 2002), *available at* http://www.haguejusticeportal.net/Docs/PCA/Ethiopia-Eritrea%20Boundary%20Commission/Decision_13-4-2002.pdf.

B. Creating An Effective Model

In examining the core human rights treaties, it is apparent that the words of the treaties themselves are not the problem; but rather the method of compliance, verification, and enforcement. While they largely lack any enforcement mechanism, the nine human rights treaties outline the inalienable rights to which all humans are guaranteed. From right to religious expression, to freedom from slavery, the values codified within these documents must be respected, protected, and fulfilled. The flaw in the human rights treaty regime stems from the disconnect between the expressive and instrumental functions of the treaties. Whereas States typically sign onto human rights treaties to show the façade of support, they often benefit from the lack of monitoring and enforcement. By contrast:

> *"Treaties that include substantial monitoring or enforcement mechanisms embody some guarantees that the expressive and instrumental roles of the treaty will operate in tandem…To the extent that monitoring and enforcement are effective, the expression of the commitment to the goals of such treaties is largely indivisible from the act of complying with the terms of the treaties*."[249]

The question is thus, how can we close the gap between the expressive and instrumental functions of human rights treaties?

While implementing concrete means of verification—like the use of remotely sensed data as an external check—into the treaty language represents the ideal approach, it is simply not a realistic suggestion for existing human rights treaties. First, the process of amending multilateral treaties is extremely time consuming and difficult. Second, it is clear that the lack of verification methods present within existing human rights treaties presents a significant incentive for States to ratify.[250] Renegotiating treaty terms runs the risk of pushing noncompliant States out of the treaty all together. Yet, how can we make human rights treaties more effective without altering the existing treaty regime?

The answer is simple: create a verification commission that complements but does not rely on the treaty regime itself. The international community needs a singular body to field data collection, to standardize the data analysis

[249] Hathaway, *supra* note # 32, at 2006.
[250] *See id.* (suggesting that fewer States would ratify human rights treaties if there was an effective enforcement mechanism in place).

process, and to maintain a data repository. The establishment of a singular hub for both State and non-State actors to submit data would not only allow for a better method of documentation, and avoid the collection of overlapping data where unnecessary, but also supports the standardization of data analysis.

The growing accessibility of digital information makes it impossible to avoid the growing voice and involvement of individuals and NGOs in international law. An effective verification commission must not only collect and analyze remotely sensed data obtained by NTM and ITM, as discussed regarding arms control agreements and MEAs,[251] but also utilize the vast public interest in documenting human rights abuses. Academics Christopher Stubbs and Sidney Drell argue that a new means of treaty verification is on the horizon: public technical means (PTM).[252]

PTM can be best described as public domain data analysis. It includes but is not limited to the use of open-source remote sensing data. While PTM is not a traditional approach to treaty verification, it can and should be utilized in a controlled environment. PTM is premised on individual and collective free choice, in that it "allows those members of the public who has a particular interest in treaty verification to allocate their resources (both funds and time) towards PTM objectives."[253] The idea here is that if people want to participate, and they are freely able to, then that participation ought to serve a greater purpose.

Additionally, PTM allows for greater competition which will in turn "pressure both [ITM] and NTM systems towards higher efficiency."[254] It provides an external and democratic check on government verification system. Moreover, PTM is uniquely equipped to aid in certain types of treaty verification.[255] For example, societal monitoring on the ground may further aid NTM in targeting the proper areas for surveillance and verification. In this way, PTM acts as a supplement to remote sensing. Finally, PTM offers "technical agility" and can rapidly adapt without the limitations of governmental lag or treaty provisions.[256]

The establishment of a verification commission dedicated to processing remotely sensed data is an essential step for several reasons. First, it pools resources - providing a clear avenue for collaboration between groups

[251] *See* discussion, *supra* Part II(B).
[252] Christopher W. Stubbs & Sidney D. Drell, *Public Domain Treaty Compliance Verification in the Digital Age*, 32 IEEE TECH. SOC. MAG. 57 (2013).
[253] *Id.* at 58.
[254] *Id.* at 59.
[255] *Id.*
[256] *Id.* at 60.

interested in funding remote sensing data projects and the parties engaging in collection and analysis is essential to maximize efficiency. Second, because a verification commission receives its data from a wide variety of sources, a system of redundancy is built into the process.[257]

Finally, this opens opportunities for 'citizen scientists' to productively channel their interests in human rights and actively take part in the documentation of abuses in a democratic, decentralized, and impartial manner. In order for a large-scale PTM project to be functional for treaty verification, it must operate as a project with cohesive goals, training and collaboration.[258] In fact, there is already evidence of the successes of citizen-run projects to analyze and classify satellite imagery.[259] The Galaxy Zoo project was launched in 2007 and is currently the largest platform for crowdsourced research.[260] Recognizing the sheer volume of astronomical data that needed to be analyzed, Galaxy Zoo's founders developed a training program for untrained participants to help in the classification of galaxies.[261] While analysis of remotely sensed data often requires an expert, utilizing uniformly-trained non-expert volunteers for initial data classification and organization would streamline the process, and ensure the timely processing of data.

There are two existing models that would provide the necessary structure to create a unified body for collecting and analyzing remotely sensed data. Both the UN-SPIDER model and the establishment of a UN Specialized Agency offer the necessary framework for a verification system to succeed.

[257] Stubbs & Drell, *supra* note #, at 65.
[258] *Id.* at 65.
[259] *Id.* at 64.
[260] *What is Zooniverse?*, ZOONIVERSE, https://www.zooniverse.org/about (last accessed Dec. 14, 2021).
[261] *The Science behind the Site*, GALAXY ZOO, https://www.zooniverse.org/projects/zookeeper/galaxy-zoo/about/research (last accessed Dec. 14, 2021).

i. The UN-SPIDER Model

The creation of a platform for collecting and analyzing remote sensing data already exists within the UN. Established via General Assembly Resolution 61/110, the "United Nations Platform for Space-based Information for Disaster Management and Emergency Response" (UN-SPIDER) is tasked with creating a centralized hub for space-based data.[262] UN-SPIDER is a UN-run program that operates under the UN Office for Outer Space Affairs (UNOOSA).

In establishing UN-SPIDER, the General Assembly recognized the essential role that space technologies like telecommunications, earth observation, and navigation satellites perform in the predicting and tracking of natural disasters.[263] Further, while certain States possess the technology necessary to protect their citizens from these disasters, many did not. Thus, the General Assembly sought "to provide universal access to all countries and all relevant international and regional organizations…serving as a bridge to connect the disaster management and space communities and being a facilitator of capacity-building and institutional strengthening."[264] The goal of UN-SPIDER is to "[improve] actions to reduce disaster risk or support disaster response operations through knowledge sharing and the strengthening of institutions in the use of space technologies."[265]

UN-SPIDER operates out of three offices located in Austria, Germany, and China. The planform maintains a Knowledge Portal, which serves as the central database for news, training, research papers, and events relating to space-based disaster monitoring.[266] UN-SPIDER provides direct support to States through its Technical Advisory Support (TAS) function.[267] Under the TAS umbrella, UN-SPIDER offers three types of support: 1) Technical advisory missions; 2) Capacity building; and 3) Facilitating emergency support.[268]

The UN-SPIDER model is an effective comparison for human rights treaty verification. Namely, it provides an existing framework for the collection and analysis of remotely sensed data. Additionally, UN-SPIDER provides structured aid to States that have insufficient internal mechanisms. In regard to the present self-reporting

[262] G.A. Res. 61/110 (Dec. 14, 2006).
[263] *Id.* at preamble.
[264] *Id.* at ¶ 6.
[265] *United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER)*, UNOOSA, https://www.unoosa.org/oosa/en/ourwork/un-spider/index.html (last accessed Dec. 11, 2021).
[266] *UN-SPIDER Knowledge Portal*, UNOOSA, https://www.un-spider.org/ (last accessed Dec. 11, 2021).
[267] *Id.*
[268] *Advisory Support*, UNOOSA, https://www.un-spider.org/advisory-support (last accessed Dec. 11, 2021).

obligations in human rights treaties, a lack of capacity is often cited as a controlling reason for a State's unwillingness or inability to comply.[269]

In certain situations, UN-SPIDER has included non-State actors in its programs.[270] The 2010 technical advisory mission to the Dominican Republic resulted in the establishment of the Interinstitutional Geospatial Information Team, which utilized government, university, and non-governmental support.[271] Nevertheless, the UN-SPIDER model is largely focused on providing aid directly to State actors. This runs the risk of re-entrenching international human rights law in the same problems it already faces, wherein States control their own reporting procedures.[272]

ii. UN Specialized Agency Model

UN Specialized Agencies (SA) are independent international organizations that support UN.[273] The relationship between the SAs and the UN is established through "negotiated agreements."[274] Article 57 of the UN Charter gives the Economic and Social Council the authority to create SAs,[275] subject to the approval of the General Assembly.[276]

There are currently 17 SAs, each tasked with supporting different aspects of UN functioning.[277] All SAs work in tandem with the UN, each operated with its own governing body, funding, and internal procedures.[278] Some SAs like the International Telecommunication Union pre-date the UN and were brought under the UN umbrella years after its establishment.[279] In many cases, Specialized Agencies are established by UN Conference.

[269] *See* Hathaway, *supra* note # 109, at 1956.
[270] *New booklet highlights UN-SPIDER advisory support activities*, UNOOSA (Jun. 27, 2018), https://reliefweb.int/report/world/new-booklet-highlights-un-spider-advisory-support-activities.
[271] *UN-SPIDER Advisory Support*, UNOOSA 1, 6 (2018).
[272] *See* discussion, *supra* Part II(B)(ii).
[273] *UN Specialized Agencies*, UN, https://www.un.org/en/about-us/un-system (last accessed Dec. 11, 2021).
[274] *Id.*
[275] UN Charter, art. 57.
[276] *Id.* at art. 63.
[277] *UN Specialized Agencies*, UN, https://www.un.org/en/about-us/un-system (last accessed Dec. 11, 2021). It should be noted that some sources state that there are 15 SAs because the World Bank Group is technically comprised of three SAs.
[278] *Specialized Agencies of the United Nations*, GEORGETOWN U., https://guides.ll.georgetown.edu/c.php?g=365747&p=7141851(last accessed Dec. 12, 2021).
[279] 30 U.N.T.S. 316 (1949).

For example, the Chicago Convention established the International Civil Aviation Commission (ICAO).[280] Based out of Montreal, Canada, ICAO is tasked with "help[ing] States to achieve the highest possible degree of uniformity in civil aviation regulations, standards, procedures, and organization."[281] While ICAO does not have authority over States, it influences international civil aviation practices through the promulgation of Standards and Recommended Practices (SARPs).[282] Like civil aviation, the field of human rights is in dire need of a unified body to collect, analyze and disseminate information. Since its founding, there have been two UN Conferences on human rights: 1) The 1968 International Conference on Human Rights; and 2) The 1993 World Conference on Human Rights.[283]

The central challenge of this Specialized Agency framework is given the requirement for external funding and expertise.[284] This would require mass resource pooling amongst existing well-funded projects. The success of such a structure would largely be dependent on the organizational structure of the Specialized Agency and the power given to well-funded NGOs. Additional concerns also arise over the need and relevance for added bureaucracy, and the ability of such an Agency to possess sufficient international authority and capability in meeting its objectives.

Regardless, a verification commission would benefit from the Specialized Agency structure given its potential to re-orient the verification process away from States. This would acknowledge the growing importance of grassroots-based approaches, incorporating the voices and opinions of various civil society organizations and stakeholders. Because Specialized Agencies have their own governing mechanism and internal organization, a treaty verification commission could freely develop mechanisms to collect ITM and PTM data. This structure would allow a verification commission to capitalize on the existing role of NGOs in documenting human rights abuses. Further, the Specialized Agency structure would allow for growth of existing data sources to not only include PTM data but also the implementation of a citizen-run project.

[280] *Introduction,* ICAO <www.icao.mt/ChicagoConference/Pages/chicago- conference-mtroduction.aspx> (last accessed Dec. 5, 2021).
[281] *The History of the ICAO and the Chicago Convention*, ICAO, https://www.icao.int/about-icao/History/Pages/default.aspx (last accessed Dec. 5, 2021).
[282] *How ICAO Develops Standards*, ICAO, https://www.icao.int/about-icao/AirNavigationCommission/Pages/how-icao-develops-standards.aspx (last accessed Dec. 5, 2021).
[283] *Conferences | Human Rights*, UN, https://www.un.org/en/conferences/human-rights (last accessed Dec. 12, 2021).
[284] *Specialized Agencies of the United Nations*, GEORGETOWN U., https://guides.ll.georgetown.edu/c.php?g=365747&p=7141851(last accessed Dec. 12, 2021).

V. Conclusion

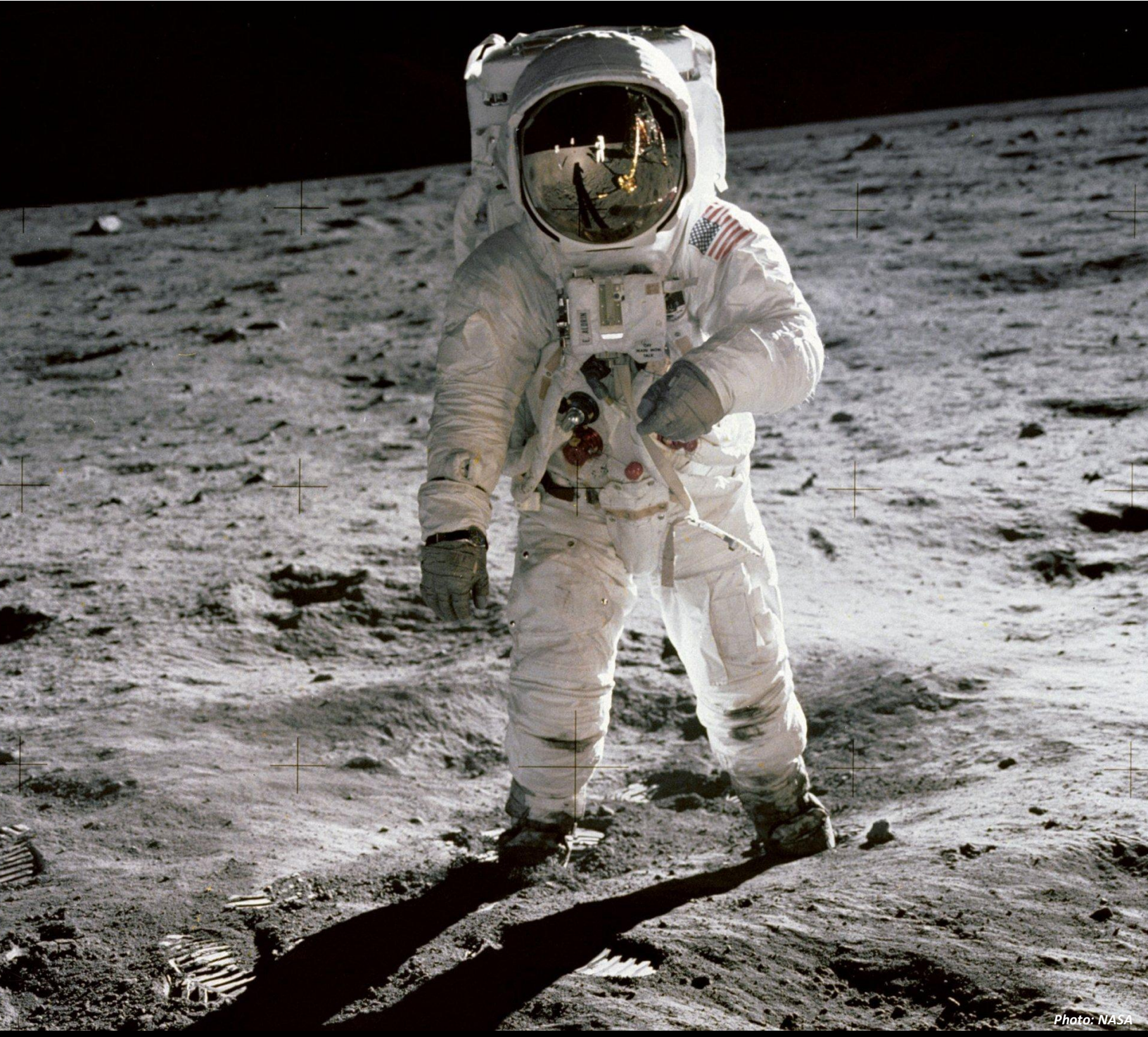
The use of remote sensing satellites for treaty verification bears significant potential for the future evolution of the international human rights framework, one which is contingent upon renewed international cooperation and commitment to the formation of a dedicated remote sensing verification commission as a specialized UN agency. This will help reinforce the international obligation of States to respect, protect, and fulfill human rights through the utilization of space applications.

Borrowing the UN Office for Disaster Risk Reduction's definition, UN-SPIDER defines disaster risk as "the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity."[285] By this definition, a potential for human rights abuses like genocide or mass population displacement would quality as a disaster risk. If there is such a clear interest in protecting humans from natural disasters, why not from human-made disasters?

As the study of human rights treaties has shown, there is presently a disconnect between the instrumental and expressive functions of the treaties.[286] There treaties bind States in name only and allow them to express their position through ratification. Because human rights treaties lack an effective verification mechanism, States are free to ratify human rights treaties, of which they carry no intention of complying with.[287] The establishment of an external verification commission aligns the instrumental and expressive functions by creating an avenue for publicizing a State's human rights abuses in a controlled forum, and effectively place States on trial before the court of international public opinion.

Modern problems call for modern solutions. Transitioning treaty verification mechanisms beyond the hands of State control represents the future of human rights jurisprudence. The establishment of a treaty verification commission supplements existing treaty obligations. without disrupting the present treaty regime. This neither increases nor decreases a State's present obligations, but rather acts as a supplementary avenue for improved compliance and added accountability. The addition of an international body dedicated to the collection and analysis of earth observation data would make it difficult for States to ignore their human rights obligations.

[285] *Disaster Risk Management*, UNOOSA, https://www.un-spider.org/risks-and-disasters/disaster-risk-management (last accessed Dec. 10, 2021).
[286] Hathaway, *supra* note 109, at 1940.
[287] *Id.*



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