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Imagery and Expectations for International Disaster Response

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ABSTRACT

This Article examines the development and contributions of the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (Charter). As a voluntary mechanism among spacefaring nations and transnational entities, the Charter provides remote sensing data and information for international disaster response efforts. Over the past fifteen years, the Charter members have continued to contribute and cooperate in an effective manner, in spite of increasing legislative and economic controls over the access and distribution of data at the State level. This Article finds that the behaviors of Charter members largely fall outside of traditional, geopolitical rationales over security and commercial interests, and argues that the guiding dynamics of the Charter stem from a historical construct of actions and ideals from actors within scientific and technical communities. Drawing from normative concepts within international relations theory, the Article concludes that the Charter has become a progressive case for the potential influence of non-binding legal frameworks on interstate cooperation.

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Remote sensing activities shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic, social or scientific and technological development, and taking into particular consideration the needs of the developing countries. – Principle II

Remote sensing shall promote the protection of mankind from natural disasters. – Principle XI

I. INTRODUCTION

By now, the benefits of satellite remote sensing[1] for disaster management are well known within global relief networks. Among other things, remote sensing data and information are used to direct aid, monitor flooding, and make detailed damage assessments. In the immediate aftermath of a major disaster, the sharing of these data across borders is crucial. However, disjointed policy objectives and the increase of regulatory measures at the state level can obstruct the open exchange of data among global stakeholders. To overcome these obstacles, the *Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disaster*[2] has emerged as an international effort, which brings together public and private actors from relevant sectors to provide rapid and effective technical assistance to any state or community immediately affected by large-scale disasters. The Charter's members operate on a voluntary basis and have consistently pooled the necessary space resources together to respond to some 450 plus incidents in over 110 countries.[3] Through a growing network of national space agencies, private entities, and cooperating bodies, the Charter is steadily becoming a compelling model for addressing global issues through cross-sectoral cooperation.

One of the Charter's greatest achievements has been the ability to navigate many of the political barriers that stifle international aid and remote sensing activities alike. To date, the signatories to the

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1. In the broadest sense, satellite remote sensing refers to the acquisition of satellite-derived imagery through passive (optical) or active (radar) sensing techniques. Furthermore, unless specified, this paper focuses on non-military, high or very-high resolution remote sensing activities.

2. Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disaster, Apr. 25, 2000 [hereinafter Charter Text], https://www.disasterscharter.org/web/guest/home [http://perma.cc/PNJ8-3Z2X] (archived Sept. 3, 2015).

3. *Activations*, INT'L CHARTER SPACE & MAJOR DISASTERS (2015) [hereinafter Charter Activations], https://www.disasterscharter.org/web/guest/activations [http://perma.cc/A47K-R7BT] (archived Sept. 3, 2015).

Charter include state agencies from nearly every major geopolitical powerhouse.[4] Their ability to effectively cooperate and willingness to contribute on a non-discriminatory basis is as commendable as it is puzzling, particularly when considering the inherent security implications and commercial interests that accompany remote sensing technologies. This Article, then, attempts to provide a possible explanation for these behaviors. It views the overall activities of the Charter outside of the geostrategic interests of states, and asks the question: why do states sanction these efforts?

To begin, this Article will provide a general overview of the field. It will argue that historically, many of the policy trends surrounding both space and aid initiatives within Charter member states appear to clash with these states' ongoing and implicit backing of Charter activities. This would suggest that the developments leading up to the Charter have been driven instead by a number of individuals from the scientific and technical communities, which interact within what John Ruggie identifies as the *global public domain*.[5] Here, the *rational* interests and subsequent behaviors of the member states are not predefined; rather, they are shaped and reshaped through dialogues, ideas, beliefs, and expectations among state and non-state actors, within and across borders. Building from normative approaches in *constructivism*, this Article will argue that over time, the expertise and beliefs of these actors have helped shape a number of international and domestic legal principles and policies, which, in turn, have aided in the establishment of the Charter. Lastly, this Article will discuss the influence of these social and legal normative processes on the efforts and achievements of the Charter, and will offer some reflection on the future role of non-binding legal norms.

II. THE POLICY FIELD

4. *Charter Members*, INT'L CHARTER SPACE & MAJOR DISASTERS (2015) [hereinafter Charter Members], https://www.disasterscharter.org/web/guest/charter-members [https://perma.cc/XMW5-HQE3] (archived Sept. 21, 2015). It should be pointed out that nation-states are not direct parties to the Charter. However, this article uses the term *Charter state(s)* as the contributions by Charter members are ultimately state-sanctioned activities. Under public international law (and subsequently the domestic legal frameworks of all satellite operating nations), the rights and obligations of both state and non-state actors, in terms of their ability to acquire and distribute data nationally and across borders, fall within the legal (and political) authority of the state. *See* Treaty on Principles Governing the Activites of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, art. VI, Dec. 19, 1966, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty]. Moreover, while both state and non-state actors participate in the Charter, the signatory parties (primarily satellite operators and data providers) are state entities. Charter Members, *supra*.

5. John Ruggie, *Reconstituting the Global Public Domain—Issues, Actors, and Practices*, 10 EUR. J. INT'L REL. 499, 507 (2004).

In order to understand what dynamics presently guide the actors in this field, this Part divides the policy developments leading up to the phenomena of international, space-derived disaster assistance into two parts. The first will provide a brief overview of the strategic interests of spacefaring nations over the last half century, and the second will draw attention to another set of actors, which emerged in the same period, and whose interests and actions generally escape the rational assumptions within domestic and international politics.

The road to establishing an International Charter on Space and Major Disasters has been long and rutted with competing interests within and among states. From as early as the Space Race between the United States and the former Soviet Union, concerns over national security, geopolitical mobility, and commercial competitiveness have continued to influence international cooperative efforts for the development and use of space resources. This is particularly true for satellite earth observation technologies originally developed for reconnaissance and weather monitoring purposes.[6] Remote sensing has long since been the double-edged sword of spacefaring nations; the need to monitor the natural environment has been juxtaposed with the state's ability to monitor its neighbors. This duality, along with the commercialization of the industry, has ensured that national policy objectives remain divided.[7]

At present, the operational and political settings for remote sensing activities vary to some degree across borders. However, most states have embraced public-private partnership (PPP) models, which facilitate domestic needs and buttress global market competitiveness.[8] Advances in technology and new actors in the field have also resulted in domestic regulatory trends prioritizing security concerns and profit maximization over civil services such as environmental monitoring. Within nearly every remote sensing capable state, these interests translate into rigid licensing and monetary controls.[9] In the global disaster context, data policies and intellectual property laws detailing who can access data and for what purposes increasingly insulate these data at the national level.

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6. *See, e.g.*, Fabio Tronchetti, *Legal Aspects of Satellite Remote Sensing*, *in* HANDBOOK OF SPACE LAW 501, 506 (Frans von der Dunk & Fabio Tronchetti eds., 2015) [hereinafter Tronchetti, *Legal Aspects*].

7. *See id.* at 526–43. *See generally* Working Grp. on Nat'l Legislation Relevant to the Peaceful Expl. & Use of Outer Space, Schematic Overview of Nat'l Regulatory Frameworks for Space Activities, U.N. Doc. A/AC.105/C.2/2014/CRP.5 (2014); JOANNE GABRYNOWICZ, THE LAND REMOTE SENSING LAWS AND POLICIES OF NATIONAL GOVERNMENTS: A GLOBAL SURVEY (2007).

8. *See generally* GABRYNOWICZ, *supra* note 7 (explaining that the concepts *commerical* and *private* differ nationally and that the type of PPP arrangments can vary considerably from state to state); Tronchetti, *supra* note 6, at 526–43.

9. *See generally* GABRYNOWICZ, *supra* note 7. This point is particularly true for high-resolution data. Medium and low-resolution data are regulated less rigidly.

Moreover, the economic value of high-resolution data reduces the incentives for charitable or lower-cost contributions by public and private satellite operators and data distributors. In the case of the Charter, for example, data contributions from commercial operators have little or nothing to do with corporate philanthropy. Rather, these entities receive government subsidies and, through various contractual arrangements, agree (or in some cases are obligated) to provide data.[10] Ultimately, the question has become *why give data when you can sell it*, especially if it means selling the data back to the state. It is a win-win scenario, but one that does not explain why states would earmark these resources for international disaster relief in the first place.

However, these developments have been accompanied by a third policy area in remote sensing, which emerged from early environmental monitoring projects and worked to promote broader civil-based objectives. Within the United States and the former Soviet space programs, the ability to observe changes in the weather and environment from space was a major catalyst for advancing satellite technologies. Almost immediately, the management of these applications became a battle of interests. For instance, following the establishment of the National Aeronautics and Space Administration (NASA) in 1958, the scientific and technical staff found themselves lobbying against the Department of Defense (DOD) for control over the design and use of space resources for scientific exploration and civil services.[11] But remote sensing was first and foremost a technical activity, which gave the scientists and engineers designing and operating the systems significant authority over how and what the technology should be used for. These efforts helped set a new global precedent for space agencies, and eventually led to national land monitoring programs such as Landsat (1972) in the United States, SPOT (1986) in France, and the IRS-IA (1988) in India.[12] Although commercial interests would play some part in each of these programs over time,[13] a deeper normative understanding had emerged, providing that these assets should be used for scientific exploration and for the protection of the environment and humankind. Today,

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10. *See, e.g.*, *National Geospatial-Intelligence Agency Commercial Archive Data*, NASA (last updated Oct. 9, 2014), http://cad4nasa.gsfc.nasa.gov [http://perma.cc/H65T-YCV3] (archived Sept. 4, 2015) (detailing the NextView contractual arrangement between DigitalGlobe and the U.S. government).

11. PAMELA E. MACK, VIEWING THE EARTH: THE SOCIAL CONSTRUCTION OF THE LANDSAT SATELLITE SYSTEM 11 (1990).

12. ATSUYO ITO, LEGAL ASPECTS OF SATELLITE REMOTE SENSING 10–11 (2011).

13. For example, the Landsat commercial history. *See* Joanne Gabrynowicz, *American Perspectives on the Use of Geospatial Data: Landsat and Beyond* (Aug. 8, 2015), at 18, http://www.espi.or.at/images/stories/dokumente/Presentations_2015/17_june_2015/2015_Gabrynowicz_Geospatial_ESPI.pdf [http://perma.cc/6Y4F-9L4P] (archived Sept. 3, 2015).

these programs and others like them primarily function to provide open access to tasked and archived data from lower resolution satellites for scientific, academic, and recreational purposes.

Early on, the scientific and technical communities within the space sector also recognized the benefits of sharing knowledge and resources across borders. Throughout the Cold War era, actors within the United States and Soviet space programs worked together to establish bilateral and multilateral partnerships.[14] While some efforts, such as *Apollo-Soyuz*, were meant to ease political tensions, other projects were driven by more pragmatic, ideational motives. A good example is COSPAS-SARSAT, an international search and rescue program established by Canada, France, the Soviet Union, and the United States in 1979.[15] The system is still in service today, and uses satellite-aided tracking to locate airplanes or ships in distress. In a similar vein, a number of transnational partnerships and organizations have emerged in recent years to share resources and expertise, and promote the use of satellite-derived information for disaster management purposes. The Group on Earth Observation (GEO), for instance, is working to establish a set of global data-sharing principles to facilitate the open exchange of data among relevant entities.[16] On the operational side, the Committee on Earth Observation Satellites (CEOS) is coordinating a Recovery Observatory where remote sensing data and information will be collected and used in a systematic manner for long-term, post-disaster recovery objectives.[17]

Interestingly, outside of the space sector, identical groups of scientific and technical experts have been promoting international disaster aid initiatives from as early as the International Geophysical Year.[18] Proponents for a global alliance for addressing natural disasters began to spill over from emerging humanitarian initiatives comprised of NGOs, the International Committee of the Red Cross (ICRC), various UN bodies, and actors from the scientific, technical,

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14. *See, e.g.*, U.S. OFFICE OF TECH. ASSESSMENT, OTA–ISS–618, U.S.–RUSSIAN COOPERATION IN SPACE 12 (1995).

15. *Search and Rescue Satellite Aided Tracking*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. [NOAA], http://www.sarsat.noaa.gov/background.html [http://perma.cc/W63X-ENUZ] (archived Sept. 3, 2015).

16. *GEO Data Sharing Principles Implementation*, GRP. ON EARTH OBSERVATIONS [GEO], https://www.earthobservations.org/geoss_dsp.shtml [http://perma.cc/FE2U-8E37] (archived Sept. 3, 2015).

17. *Recovery Observatory*, COMM. ON EARTH OBSERVATION SATELLITES [CEOS], http://ceos.org/ourwork/workinggroups/disasters/pilots/ [http://perma.cc/9E5Q-V565] (archived Sept. 3, 2015).

18. *See* JOHN HANNIGAN, DISASTERS WITHOUT BORDERS: THE INTERNATIONAL POLITICS OF NATURAL DISASTERS 60–61 (2012). Note that the IGY took place between July 1957 and December 1958.

and academic communities.[19] In particular, growing research networks of geologists, meteorologists, and engineers worked to institutionalize scientific and technological cooperation into efforts such as the World Meteorological Organization (WMO) and the International Decade for Natural Hazard Reduction (IDNHR).[20] John Hannigan cites Paul Edwards (2006) and Clark Miller (2001), asserting that through these mechanisms, the scientific and technical community signaled the need for international collaboration, and solidified their future role in the shaping of global disaster policy.[21]

Over time, two broad categories of actors have emerged to influence the policy areas around global, space-based disaster assistance. This Article divides their motives and actions into two groups: rational interests and normative values.[22] Group one stems from *rational choice* assumptions, which regard the formation and functioning of international institutions such as the Charter as instrumental processes directed by states in pursuit of absolute or relative gains.[23] Whereas group two builds from *constructivism* which rejects the notion of the state as a self-standing, utility-maximizing organ, and sees state preferences being shaped by multiple actors with diverse interests and beliefs.[24] As discussed throughout the previous Part, both groups represent state and non-state actors whose roles need to be considered in the development of this field. However, this Article is particularly interested in the impact of the non-traditional state actors pursuing normative agendas. These actors are value-driven in the sense that they are motivated and/or guided by common social ideals that often fall outside geostrategic

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19. *Id.* at 50–51, 61, 76.

20. *Id.* at 61; *WMO in Brief*, WORLD METEOROLOGICAL ORG. [WMO], https://www.wmo.int/pages/about/index_en.html [http://perma.cc/5X95-7587] (archived Sept. 4, 2015) (noting that from its founding in 1873 until 1950, the WMO was known as the International Meteorological Association); U.N. Office for Disaster Risk Reduction [UNISDR], International Strategy for Disaster Reduction, http://www.unisdr.org/who-we-are/international-strategy-for-disaster-reduction [http://perma.cc/3JMD-RPFH] (archived Sept. 3, 2015).

21. HANNIGAN, *supra* note 18, at 61.

22. Kenneth W. Abbott & Duncan Snidal, *Law, Legalization and Politics: An Agenda for the Next Generation of IL/IR Scholars*, *in* INTERDISCIPLINARY PERSPECTIVES ON INTERNATIONAL LAW AND INTERNATIONAL RELATIONS: THE STATE OF THE ART 33, 41–44 (Jeffrey L. Dunoff & Mark Pollack eds., 2013).

23. For a summary of these positions as they relate to international law, see Ian Johnston, *Law-Making by International Organizations: Perspectives from IL/IR Theory*, *in* INTERDISCIPLINARY PERSPECTIVES ON INTERNATIONAL LAW AND INTERNATIONAL RELATIONS: THE STATE OF THE ART 266, 266–92 (Jeffrey L. Dunoff & Mark Pollack eds., 2013); Jutta Brunnée & Stephen J. Troope, *Constructivism and International Law*, *in* INTERDISCIPLINARY PERSPECTIVES ON INTERNATIONAL LAW AND INTERNATIONAL RELATIONS: THE STATE OF THE ART 119, 119–45 (Jeffrey L. Dunoff & Mark Pollack eds., 2013).

24. *Id.*

and economic rationales.[25] States begin to adopt these new norms not because they are obligated, but as a response to socialization processes and peer pressures, which prescribe expected or appropriate behaviors.[26] Furthermore, to strengthen and advance their agendas, normative actors often institutionalize and codify their beliefs into laws, rules, and organizations at the international level.[27] Within the space sector, these actors have a long record of using international social and legal forums to promote cooperation and the use of remote sensing as a public good. Thus, in the following Part, this Article explores how these beliefs emerged in a legal context and, subsequently, became guiding principles for remote sensing activities at international and domestic levels.

III. INTERNATIONAL LEGAL ASPECTS

Within the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPOUS), a number of treaties and General Assembly resolutions containing principles and declarations have been adopted over the past fifty years to provide what is now regarded as the fundamental body of international space law.[28] From these instruments, remote sensing activities are specifically addressed within the *Principles Relating to Remote Sensing of the Earth from Outer Space* (*Principles*), and indirectly through the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies* (*Outer Space Treaty*).[29] Neither instrument imposes binding obligations specifically referencing remote sensing activities. However, the provisions in these documents reflect the consensus among rational and normative actors within and among states at the time of drafting and have had a significant impact on policies and practices relating to remote sensing over the last few decades. For these reasons, this Article will discuss the development and authority of each instrument in turn.

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25. Abbott & Sindal, *supra note* 22, at 41–44.

26. Martha Finnemore & Kathryn Sikkink, *International Norm Dynamics and Political Change*, 52 INT'L ORG. 887, 895 (1998).

27. *Id.* at 900.

28. Note this paper does not cover bilateral, multilateral or regional legal agreements, as these instruments do not apply to the Charter.

29. *See generally* Outer Space Treaty, *supra* note 4; G.A. Res. 41/65, Principles Relating to Remote Sensing of the Earth from Outer Space (Dec. 3, 1986) [hereinafter Remote Sensing Principles]. Remote sensing activities also fall under the 1972 Liability Convention and the 1975 Registration Convention. However, these instruments are outside the scope of this Article.

A. The Outer Space Treaty

The Outer Space Treaty entered into force on October 10, 1967 and provided the overarching framework for the legal rights and obligations of states engaged in the use and exploration of outer space. Leading up to the Treaty, growing concerns over the potential appropriation and weaponization of space had spurred the adoption of early draft resolutions by the General Assembly, which put forth the proposition that the use and exploration of outer space should be free and peaceful endeavors—sentiments that would eventually become the normative foundations of legal matters surrounding space activities.[30] In its final form, the Treaty did not address specific technical applications or stipulate enforcement procedures in detail,[31] but it did provide binding provisions which reflect many of the ideals that were later integrated and expanded upon within the Remote Sensing Principles, and, subsequently, the text and practices of the Charter. These include Article I, which guarantees the free use of outer space for the benefits and interest of all nations; as well as Articles I, III, IX, X, and XI on the promotion of international cooperation; Article XI on the importance of information sharing; and Article VI which provides that contracting states are internationally responsible for the national *space* activities of "government agencies and non-government entities."[32]

By the mid-1970s, an increase in remote sensing capable states and a prospective commercial market looming on the horizon saw the need for a more coherent international agreement for sensing activities. Negotiations among groups of state actors from western nations, the Soviet bloc, and lesser-developed countries (LDCs) were held within a working group of the UNCOPOUS Legal Subcommittee.[33] Within each delegation, a range of domestic interests were represented. For example, the U.S. contingent included a legal advisor from the Department of State and representatives from DOD, the Federal Communications Commission

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30. G.A. Res. 1962 (XVIII), Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space (Dec. 13, 1963); G.A. Res. 1721 (XVI), International Co-operation in the Peaceful Uses of Outer Space (Dec. 20, 1961); Paul G. Dembling & Daniel M. Arons, *The Evolution of the Outer Space Treaty*, 33 J. AIR L. & COMMERCE 419, 425 (1967).

31. Note that the Outer Space Treaty is part of public international law. Therefore whatever is applicable regarding enforcement at international law also applies to the Treaty. *See* Outer Space Treaty, *supra* note 4, art. III.

32. Outer Space Treaty, *supra* note 4, art. I, III, IX, X, XI, VI.

33. *See* Carol L. Butler & Joanne Irene Gabrynowicz, *Interview: S. Neil Hosenball*, *in* THE UNITED NATIONS PRINCIPLES RELATING TO REMOTE SENSING OF THE EARTH FROM SPACE: A LEGISLATIVE HISTORY—INTERVIEWS OF MEMBERS OF THE UNITED STATES DELEGATION 7–8 (Joanne Gabrynowicz ed., 2002) [hereinafter Hosenball Interview].

(FCC), and NASA.[34] However, in spite of the differences that may have existed among these actors, the drafting of the Principles largely revolved around one central issue: should states have prior consent to sense and distribute data relating to territories other than their own?[35] For commercial and scientific (and potentially security) purposes, such provisions would only hamper the progress of sensing states and, in fact, went against core principles stipulated in the Outer Space Treaty. Still, the LDCs wanted assurance that their sovereignty would not be violated, and argued that they should be afforded the same benefits as sensing States, as guaranteed by Article I of the Treaty. The compromise between these two positions would be found in the context of disasters.

B. The Remote Sensing Principles

On December 3, 1986, the Remote Sensing Principles were adopted by consensus by the UN General Assembly.[36] The provisions in the Principles reinforce ideals laid out in the Outer Space Treaty, such as the open and cooperative use of outer space (Principles II, IV, V, VIII, and XIII).[37] But more importantly, the Principles extend the uses and benefits of remote sensing to include environment monitoring (Principles I and X) and protection from natural disasters (Principle XI), and establish basic guidelines for the access and distribution of remote sensing data.[38] For instance, Principle XI provides that states "that have identified processed data and analysed information in their possession that may be useful to States affected by natural disasters, or likely to be affected by impending natural disasters, shall transmit such data and information to States concerned as promptly as possible."[39] Principle XII goes further, stipulating that a sensed state shall have immediate access to data and information concerning its territory on a "non-discriminatory basis and on reasonable cost terms."[40] Lastly, Principle XIV recalls Article VI of the Outer Space Treaty, making states the responsible parties for national remote sensing activities, regardless of whether these activities are carried out by state or non-state entities or through international organizations.[41]

Unlike the Outer Space Treaty, the Principles are regarded as a soft law instrument, which provide non-binding standards and,

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34. *Id.* at 16.
35. *Id.* at 4–10.
36. *See generally* Remote Sensing Principles, *supra* note 29.
37. *Id.* art. II, IV,V, VIII, XIII.
38. *Id.* art. I, X, XI.
39. *Id.* art. XI.
40. *Id.* art. XII.
41. *Id.* art. XIV; Outer Space Treaty, *supra* note 4, art. VI.

therefore, do not impose legal obligations, restrictions, or reparations.[42] What is more, the provisions within allow states a great deal of freedom in the reading. Any prescribed obligations to provide data can easily be dismissed when considering the qualifiers of terms like "as promptly as possible" and "on reasonable cost terms."[43] However, the universal acceptance and wide adoption of the Principles by states, both in practice and within domestic laws and policies and transnational agreements over time, has generated some accord among scholars that the Principles represent customary international law—or "general State practice"—as a result of perceived levels of legal obligation and appropriateness (i.e., *opinio juris*).[44] An analysis of the extent to which the Principles should or can be considered customary international law is beyond the scope of this paper, but their normative influence as a soft law instrument is important, as it has fed directly into the behaviors of remote sensing states and the establishment and ongoing efforts of the Charter. The next Part, then, begins with an operational overview of the Charter, and is followed by a discussion on the political and legal dynamics within Charter member states.

IV. THE CHARTER

The Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) was held in Vienna, Austria in July 1999. A select issue at the event was the role of space applications in different phases of the disaster management cycle.[45] A background paper prepared by experts from various national and regional space and civil protection agencies, the WMO, and the International Decade for Natural Disaster Reduction Secretariat (IDNDR) highlighted a number of transitional programs and proposals emerging to address the growing need for global, satellite-

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42. Steven Freeland, *For Better or For Worse? The Use of 'Soft Law' Within the International Legal Regulation of Outer Space,* 36 ANNALS AIR & SPACE L. 415 (2011).

43. Remote Sensing Principles, *supra* note 29, art. XII.

44. *See, e.g.,* Statute of the International Court of Justice, art. 38, ¶1; North Sea Continental Shelf (Fed. Republic of Ger./Neth.), Judgment, 1969 I.C.J. Rep., 3 (Feb. 20); Joanne Gabrynowicz, *The UN Principles Relating to Remote Sensing of the Earth from Outer Space and Soft Law, in* SOFT LAW IN OUTER SPACE: THE FUNCTION OF NON-BINDING NORMS IN INTERNATIONAL SPACE LAW 183, 186–89 (Irmgard Marboe ed., 2012) [hereinafter Gabrynowicz, *UN Principles*]; Tronchetti, *Legal Aspects*, supra *note* 6, at 518–519; Atsuyo Ito, *Issues in the Implementation of the International Charter on Space and Major Disasters*, 21 SPACE POLICY 141, 143 (2005).

45. *See generally* Third U.N. Conference on the Exploration and Peaceful Uses of Outer Space, *Disaster Prediction, Warning and Mitigation,* U.N. Doc. A/CONF.184/BP/2 (May 25, 1998).

derived, disaster aid.[46] However, they also concluded that, at that time, there was still an absence of international mechanisms for cooperation and dialogue between the space and disaster management communities.[47] As a result, an *International Charter on Space and Major Disasters* was established to support disaster response efforts by the European, French, and Canadian space agencies (ESA, CNES, and CSA), and was declared operational on November 1, 2000.[48] Soon thereafter, other agencies and space system operators proceeded to follow suit. Today, parties to the Charter include space agencies from the United States, Canada, Russia, China, India, Korea, Argentina, Brazil, Japan, Germany, France, and the United Kingdom, along with a number of other governmental, non-governmental, and commercial contributors acting as cooperating bodies.[49]

The overall goal of the Charter is straightforward: upon request, members should gather and provide relevant satellite-based information for any state or community immediately affected by disasters.[50] Technical resources can include satellite communications, meteorology, and positioning and timing data; however, until now, the Charter has primarily been tasked for remote sensing data and information. Contributions are voluntary and there is no exchange of funds among the members. Technical, administrative, and operational resources and activities are divided among the signatory agencies which make up the Charter Board, with a Lead Agency function rotating on a six-month basis.[51] The gathering and distribution of these resources is dependent on the location and needs of a specific disaster event and the availability of satellites and agencies' personnel. In this regard, the contributions by members are fairly uneven. For example, Project Managers (PM) are tasked from member agencies or contributing bodies on an ad hoc basis. Thus, a high number of floods in Asia one year may translate into more human resource commitments from Asian partner agencies. Additionally, data from more advanced satellites is often the most useful. Thus, in recent years, very-high resolution (VHR)[52] radar and optical data from U.S. and German commercial satellites far exceeds

46. *Id.* at 19–21.

47. *Id.* at 22.

48. *About the Charter*, INT'L CHARTER SPACE & MAJOR DISASTERS (2015) [hereinafter About the Charter], https://www.disasterscharter.org/web/guest/about-the-charter [https://perma.cc/P3JX-VAN8] (archived Sept. 21, 2015).

49. Charter Text, *supra* note 2, art. II, IV.

50. *Id.* art. III, V (setting out clear definitions for what constitutes a crisis and who may activate the Charter).

51. Eur. Space Agency [ESA], *International Charter Space & Major Disasters*, at 7 (2013), https://www.disasterscharter.org/documents/10180/66908/13thAnnual Report [https://perma.cc/L9UZ-ZG7A] (archived Sept. 21, 2015) [hereinafter ESA].

52. VHR data typically has a spatial resolution around 1 meter.

the contributions from other parties.[53] These contributions are not insignificant: in 2013 alone, the United States provided 4,094 commercial VHR images to the Charter.[54] But in spite of distributional asymmetries, all members make annual contributions that must be worked into their agency's or organization's budgets.[55]

Operationally, the Charter is widely regarded as a success within the space and disaster management sectors.[56] Its achievements include steady numbers of yearly activations, a continued increase in membership, automatic five-year renewals, and a clear commitment to improving services over time.[57] In addition to its own activities, the Charter has also helped strengthen and bring attention to other regional and international mechanisms using satellite-derived information for disaster management, such as Sentinel Asia, the EU Copernicus Programme, the Group on Earth Observation (GEO), and the Committee on Earth Observation Satellites (CEOS).

More impressive still is the Charter's political reach, both internally and in the field. For instance, within hours of the 2008 Sichuan earthquake, the National Disaster Risk Reduction Centre of China (NDRCC) activated the Charter.[58] Among the many Charter members who contributed data was the Japanese space agency (JAXA), which provided high-resolution images (some of which are still available on the Charter website), detailing damages to buildings and infrastructure in many of the affected regions.[59] From a geopolitical perspective and more recent experiences, one does not expect a lot of room for cooperation between these two Asian powers.[60] But at that particular time, ongoing political tensions

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53. ESA, *supra* note 51, at 30-32.

54. *Id.* at 30.

55. *See* Joanne Gabrynowicz, Charter on Cooperation to Achieve the Coordinate Use of Space Facilities in the Event of Natural or Technological Disasters (Disasters Charter): Introduction, Initial Issues, and Experiences (Apr. 3, 2006), at 8, [hereinafter Gabrynowicz, Charter], http://www.spacelaw.olemiss.edu/events/pdfs/2006/disasters-charter.pdf [http://perma.cc/RT26-KV2Z] (archived Sept. 21, 2015); *see also* Joanne Gabrynowicz, *Brown Bag: International Disasters Charter: Introduction, Initial Issues and Expereinces*, WILSON CENTER (2012) https://www.wilsoncenter.org/event/brown-bag-international-disasters-charter-introduction-initial-issues-and-experiences.

56. *See, e.g.*, Brian R. Israel, *Help from Above: The Role of International Law in Facilitating the Use of Outer Space for Disaster Management*, *in* THE INTERNATIONAL LAW OF DISASTER RELIEF 217, 217 (Michael Kelly et al. eds., 2014); Ito, *supra* note 45, at 145; Gabrynowicz, Charter, *supra* note 55, at 3.

57. *See generally* ESA, *supra* note 51.

58. *Latest Activation: Earthquake in China*, INT'L CHARTER SPACE & MAJOR DISASTERS (May 11, 2008), https://www.disasterscharter.org/web/guest/-/earthquake-in-ch-13 [https://perma.cc/Y8Y6-SFES] (archived Sept. 21, 2015).

59. *Id.*

60. Owen Guo, *China Says 'No' to Japan's Earthquake Aid Offer*, GLOBAL VOICES (April 24, 2013), https://globalvoices.org/2013/04/24/china-says-no-to-japans-earthquake-aid-offer/ [https://perma.cc/9VLM-CGZX] (archived Sept. 21, 2015).

seemed absent. A similar situation was observed following an earthquake in Pakistan.[61] Initially, the UN entity that activated the Charter instructed Charter members not to use acquired VHR data for fear of stirring up diplomatic tensions.[62] The Pakistani authorities, however, were seemingly unbothered by the political implications and welcomed the Charter's assistance.[63] Indeed, a quick browse through the Charter website reveals that high-resolution Indian satellites have been tasked at least twice more in recent years to respond to floods in Pakistan.[64] Of course, under international law, no state has the legal authority to prevent another state from sensing their territory. But the processing and sharing of potentially sensitive data between political foes is a rather new phenomenon.

How, then, are we to view the Charter? The activities of its members over the past decade appear to bypass conventional domestic interests and geopolitical tensions, and, within an institutional context, it continues to move forward as a successful collaborative endeavor. To better understand these developments, the final Part of this Article offers some reflections on the rational and normative dynamics that may be guiding Charter member states.

V. DISCUSSION

As previously covered in this Article, the rational interests of remote sensing states are many. Commercial and security concerns continue to dominate among the policy objectives of satellite operating nations. But it is less clear how these interests play out for the Charter. Under international law and the mandate of the Charter, the overall contributions of any member are state-sanctioned activities. From a rationalist standpoint, these states should stand to benefit economically and/or politically to some degree. Certainly, there is value in investing in a global mechanism like the Charter, if for no other reason than to share costs and resources for responding to international disaster events.[65] And member states may potentially benefit from further notions of reciprocity and legitimacy

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61. *See* Frans G. Von der Dunk, *Legal Aspects of Using Space-Derived Geospatial Information for Emergency Response, With Particular Reference to the Charter on Space and Major Disasters*, *in* GEOSPATIAL INFORMATION TECHNOLOGY FOR EMERGENCY RESONSE 21, 27 (Sisi Zlatanova & Jonathan Li eds., 2008). Note the author does specify which earthquake.

62. *Id.*

63. *Id.*

64. *Latest Activation: Flood in Pakistan*, INT'L CHARTER SPACE & MAJOR DISASTERS (Aug. 22, 2013), https://www.disasterscharter.org/web/guest/-/flood-in-pakist-8 [https://perma.cc/Q9QL-G29N] (archived Sept. 21, 2015).

65. *See* Israel, *supra* note 56, at 237.

within the global aid community. However, the current domestic policy trends make it difficult to identify such calculated and forward-looking intentions.

In the commercial sense, cost recovery, annual sector growth, and global competitiveness will always trump charitable objectives. Satellites are expensive, and therefore, timely, high-resolution data is not cheap. From the tasking of the satellite, to the acquisition, processing, and translation of binary data sets into a single multispectral image or map, the remote sensing processing chain can easily reach into the tens of thousands of U.S. dollars.[66] Commercial entities—public or private—have a difficult enough time covering their own investments without giving away data for free. And where data policies are concerned, states continue to implement tighter control mechanisms for the distribution and use of these data. Indeed, the notion of access on a "non-discriminatory basis" is increasingly exploited and reworked to match strategic, national policy objectives.[67] Ultimately, as remote sensing technologies advance and the utility of data continues to grow, we can expect to see an increase in these pricing regimes and policies that directly contradict with the efforts of entities like the Charter.

Where does that leave us? On the one hand, the rational concerns of states exist and should not be dismissed. On the other hand, these interests appear to have very little to do with the voluntary contributions of resources, time, and energy to the Charter. As Peter Katzenstein writes, "in the absence of geostrategic or economic stakes, why do some of the most powerful states . . . intervene to protect lives and welfares of citizens other than their own."[68] Indeed, for the Charter, a more complex paradigm has evolved that looks almost altruistic in nature, and where normative actors continuously work to shape expectations at the global level. To frame the interplay among these actors, John Ruggie points to a *global public domain*, where "discourse, contestation, and action [are] organized around the production of global public goods."[69] This domain, he observes, facilitates normative processes among state and non-state actors in pursuit of broader social goals.[70] Over time, these processes prescribe standards, expectations, and appropriate

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66. *Buying Satellite Imagery: Pricing Information for High Resolution Satellite Imagery*, LANDINFO WORLDWIDE MAPPING LLC (2015), http://www.landinfo.com/satellite-imagery-pricing.html [http://perma.cc/S3UL-KV9G] (archived Sept. 21, 2015).

67. Remote Sensing Principles, *supra* note 29, art. XII; *see* GABRYNOWICZ, *supra* note 8, at 11–14; 6, at 521–525.

68. Peter J. Katzenstein, *Introduction: Alternative Perspectives on National Security*, *in* THE CULTURE OF NATIONAL SECURITY 1, 1–2 (Peter J. Katzenstein ed., 1996).

69. Ruggie, *supra* note 5, at 519.

70. *Id.*

behaviors, which help shape and reconfigure the identities and preferences of states.[71]

When considering the origins and continued operations of the Charter, it is nearly impossible to ignore active links to such an arena. The global policy areas that have evolved around disaster aid and cooperative efforts in space have, in many instances, been driven by networks of non-traditional state actors. Alongside decision makers, scientists, engineers, academics, and humanitarians have championed their ideals and beliefs into guiding principles and rules, which have helped to establish the prevailing norms in this field. Martha Finnemore and Kathryn Sikkink captured this process best, writing, "As state bureaucracies and international organizations have become more and more professionalized over the twentieth century, we should expect to see policy increasingly reflecting the normative biases of the professions that staff decision-making agencies."[72]

For the Charter, its members stem from generations of experts from the scientific and technical communities that have understood the potential environmental and societal benefits that can be derived from the open and cooperative use of space resources. In her own research on the Charter, Joanne Gabrynowicz observed that the Charter members "[c]onstitute a few small groups of dedicated, motivated, specific, individual, lower-level government employees and decision makers who believe in and are committed to the Charter and its purposes."[73] Early on, similar groups emerged in organizations like NASA, the WMO, and the IDNDR, and worked alongside rational actors to promote, institutionalize, and codify their values at domestic and international levels. For instance, in spite of diverse national interests represented within the U.S. Delegation during the drafting of the Remote Sensing Principles, the acting parties collectively endorsed the open collection and movement of data and information across borders, as well as the position from developing countries regarding provisions on early warnings and data sharing in cases of natural disasters.[74] Individual motives and pragmatics aside, it was evident that norms rooted in scientific exploration and environmental monitoring had cascaded into an international legal forum, and would, over the next decades, come full circle, making their way back into domestic policies and practices.

Of course, social normative processes do not always translate into legal norms, and the very notion of what constitutes a legal norm is often contested among legal scholars.[75] However, the codification of

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71. *Id. See generally* Finnemore & Sikkink, *supra* note 26.
72. Finnemore & Sikkink, *supra* note 26, at 905.
73. Gabrynowicz (2006), *supra* note 55, at 7–8.
74. Hosenball Interview, *supra* note 33, at 6, 26.
75. Brunnée & Troope, *supra* note 23, at 119.

social norms—binding or not—at the international level is often advantageous and a catalyst for a cascading effect among states.[76] Soft law instruments are particularly useful here, as states are often more willing to accept them. What is more, this Article asserts that precisely because they are non-binding, these instruments may be better conduits for advancing normative agendas, and equally as effective as treaties at changing state behaviors.[77] Not because they prescribe obligations, but rather because they condition and constrain decision making over time within a *logic of appropriateness*.[78]

The Charter is an attractive case for exploring these arguments due to the lofty and yet seemingly influential legal environment it operates within. The ideals and expectations within the Remote Sensing Principles have gradually shaped the behaviors of states in this field both in policy and practice. Indeed, the commitments to international cooperation, and continued contributions of remote sensing resources by all Charter members appear to be directly derived from provisions set out within Principles X and XI.[79] This is important; in an era of increasing national interests around space activities, and where treaty making processes have hit a lull, the Principles have helped shape global standards in the absence of binding obligations.[80] Furthermore, the "best endeavors" of the Charter members have come to embody deeper normative values within space law, which promote the use of space technology for the benefits of humankind.[81] How or if this phenomena is applicable to other global issue areas is beyond the scope of this paper, but the implications alone warrant further exploration.

The efforts and global impact of the Charter over the past fifteen years testify to commitments by the members that transcend rational explanations. The territorial range of annual activations and political constitution of the initiative can only be attributed to broader societal influences. That is to say that, normatively, there is both a need and expectation for such a mechanism. This argument does not propose that the Charter does not suffer from the internal political processes inherent to any international mechanism, nor does it assume that

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76. *See* Abbott & Sindal, *supra* note 22, at 42; Brunnée & Troope, *supra* note 23, at 119, 129; Finnemore & 6, at 900.

77. *See generally* Abbott & Sindal, *supra note* 22, at 42; Finnemore & Sikkink, *supra* note 26, at 916; Oscar Schachter, *The Twilight Existence of Nonbinding International Agreements*, 71 AM. J. INT'L L. 296, 296–304 (1977).

78. Finnemore & Sikkink, *supra* note 26, at 897–98.

79. Remote Sensing Principles, *supra* note 29, art. X, XI; *see also* Gabrynowicz, *UN Principles*, *supra* note 44, at 191.

80. Very little lawmaking for space activities has happened within the UN system over the past decades. Instead there is an increase in bilateral and multilateral hard and soft law agreements among state and non-state parties at the transnational level. FABIO TRONCHETTI, FUNDAMENTALS OF SPACE LAW AND POLICY 18–20 (2013).

81. Charter Text, *supra* note 2, art. IV.

commercial interests are absent in the Charter's activities. For instance, members have the option to charge for value-added products, such as maps and other analyzed data. But the continued increase in Charter members and activations indicates that a normative shift has occurred. In the end, rational interests have undoubtedly influenced the development of remote sensing activities for disaster aid, but the experiences and expectations stemming from the growing number of normative actors in this field have also worked to reshape the identity and interests of spacefaring nations.

VI. CONCLUSION

This Article set out to provide a possible explanation as to why states actively and voluntarily cooperate and contribute remote sensing resources for international disaster assistance. Through a review of the actors, legal frameworks, and activities in the field over the last half century, it showed that diverse political, economic, and social interests have played a part in the evolution of the field and the establishment of an International Charter on Space and Major Disasters. Nevertheless, this Article argues that, over time, experts in the scientific and technical communities have helped carve out a *logic of appropriateness* around the use of space assets for scientific and technical advancements, and for protecting the Earth's environment and its human populations. Through social normative processes, these shared beliefs and expectations have been codified in international legal instruments, binding and not, which continue to guide the efforts of the Charter and influence the remote sensing industry as a whole.