

Chapter 2

Overview of the Existing Mechanisms of Global Space Governance

Key Facts/Issues Addressed

- The evolution of the global space governance regime, what differentiates it from other governance regimes, and whether the existing global space governance regime has succeeded or failed in serving the global public interest in outer space;
- A survey of the five existing United Nations space law treaties, their current impact, breadth, and status of ratification. What are their main features that relate to global space governance, and what deficiencies exist?
- Is the United Nations and its specialized agencies the best organization to regulate, coordinate, or standardize space activities and practices?
- What other forums exist, and how can they contribute to effectively address issues of global space governance?
- How and to what extent do existing and emerging non-binding “soft law” (e.g., resolutions, guidelines, transparency and confidence-building measures, etc.) instruments influence global space governance?
- Are there alternative or complementary mechanisms – such as standards and codes of conduct – available, and to what extent are they effective for achieving an internationally acceptable form of global governance in outer space, taking into account current and future uses of space?

2.1 Introduction and Background

This chapter poses the question of whether the existing global space governance regime is adequate in serving global public interest in outer space by supporting both current and proposed future space activities. The “global public interest in outer space” is understood to mean that the exploration and use of outer space,

including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all States, irrespective of their degree of economic or scientific development, and in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding [GA Res 1962 (XVIII); Outer Space Treaty; Jakhu, 2006].

In order to understand the context of global space governance, the phenomenon of global governance in general will first be discussed. This chapter will then outline the five U. N. core space treaties, the U. N. bodies that were tasked with space governance in the 20th century, the alternative bodies that have taken up space governance given the limitations of the U. N. system, and the non-binding “soft law” instruments (regimes) that have been created and are in the process of being created, as a result of this fragmented structure. The adequacy or inadequacy of each of the existing governance structures will be discussed. However, given that most of the following chapters in this study will ask the same question with respect to specific issues in outer space activities, this chapter will not carry out thorough analysis and make detailed suggestions. Rather, the focus will be on whether the global public interest is indeed being served by these systems and institutions, or whether we should be looking to create new ones.

2.1.1 The Evolution of a General Global Governance System

Global governance is made up of legal mechanisms (e.g., norms, rules, and institutions), put in place through political processes and entities, that affect peace and security, and social and economic development. Global governance, as the institutionalization of international cooperation, largely emerged with the establishment of international law and international organizations in the 20th century. Where international law provided the “rules of the game” for sovereign nations, international organizations were established by private and public bodies in order to promote industrial growth and development and create larger markets through the unification of transportation and communication rules and standards across national boundaries in Western Europe [Murphy, 1994]. Indeed, among the first international organizations was the Central Commission for Navigation on the Rhine (CCNR), created in 1815 by the Congress of Vienna, followed by the International Telecommunication Union (ITU), established in 1865 under the name International Telegraph Union, which is now one of the key institutions for space governance. The result was better cross-border infrastructure and a much larger market for European industries, leading to the Second Industrial Revolution.

The most important generation of international organizations, led by the United States, came with the establishment of the Bretton Woods system in the aftermath of World War II, and included several financial organizations, including the World Bank, the International Monetary Fund (IMF), and the General Agreement on Tariffs and Trade (GATT), which evolved into the World Trade Organization (WTO)

in 1994. In addition, the United Nations was established in 1945, replacing the failed League of Nations. The United Nations had much greater success, since today it encompasses nearly all States.

The next generation of international organizations came in the mid-1960s and started with the establishment of the International Telecommunications Satellite Organization (INTELSAT), an intergovernmental organization to share satellite telecommunications and television broadcasting. This generation was led by the United Nations and opened a new era of industrial growth, arising out of the emergence of transportation, communications, and information technologies. International organizations responded to the needs of the time, to enhance peace but also to facilitate economic development. Probably, it is time for a yet another generation of international organizations, as both our activities in space and our dependence upon space technologies increase.

Global governance is, however, more than just the sum of all international organizations. It comprises an array of actors: the major international organizations (United Nations, WTO, IMF, World Bank, etc.); quasi-formal intergovernmental gatherings (G7/8, the World Economic Forum, etc.); international nongovernmental organizations (NGOs) (e.g., International Committee of the Red Cross); and private associations (e.g., the International Chamber of Commerce).

These global, regional, national, and local actors work in complex and partial cooperation to govern, and often micro-manage, specific areas of human activity. There is a growing complexity in the scope of all actors and the way in which they interact and interrelate [Wilkinson, 2002]. Indeed, global governance has grown and evolved into a myriad of sub-systems with various types of connections, from which a polycentric mode of governance emerges [Scholte, 2008; Tepper, 2014].

As international law was initially the law made by and between independent States, global governance also had States at its core for the creation of the norms, rules, and institutions, as members of the institutions, and as the subjects of those rules and norms. Since the early days of global governance, it evolved, as did international law, to include non-State actors in all the above roles, mainly civil society and business actors. These non-State actors include sub-State entities, such as national NGOs, corporations, and even some individuals, as well as international entities, notably international NGOs, transnational corporations, and intergovernmental organizations.

The rise of global governance, with its supranational norms, rules, and institutions, does not necessarily mean that States today are weaker and that there are limitations on their activities. Instead, the fundamental rule of sovereignty in international law still holds strong. In fact, there are also factors that have enlarged the power of States, from the increase in domestic legislation and regulation to the new opportunities that global governance has opened to them, such as in international trade and international cooperation on many issues. States that can successfully navigate global governance are stronger than ever. In the context of space, INTELSAT, the International Maritime Satellite Organization (INMARSAT), EUTELSA, the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), INTERSPUTNIK, and the Arab Satellite Communications Organization (Arabsat) have enabled States, many of which could not have produced

such services at the national level, to enjoy the benefit of satellite communication and meteorological services.

In other words, international cooperation has allowed States to use and supply their nationals with services that they would otherwise be deprived of. International cooperation has also enabled States to better handle natural disasters by sharing satellite data, which is the purpose for establishing the U. N. Platform for Space-based Information for Disaster Management and Emergency Response (U. N.-SPIDER). Global governance, therefore, does not replace States. Furthermore, the goal of global governance is not to force States to behave in a certain way. Indeed, States continue to act mostly to promote their own national interests. However, these interests have led and continue to lead them to cooperate on many issues, to advance, and to take part in global governance.

As global governance is not enshrined in a single global constitution, it is flexible and ever-changing. New forums and organizations are established, existing ones see the scope of their mandates increase, and new rules and norms are adopted.

Throughout the 20th century, there was a trend toward negotiating universal and legally binding treaties that prescribed, in a top-down fashion, general policies, norms, and rules, and established international organizations with clear mandates. However, in the 21st century, the will and desire for this type of international governance seems to be decreasing [Falkner et al. 2010]. Already weak international laws are becoming even more so, and global governance architectures, both legal and institutional, are fragmenting. As the 2006 report of the International Law Commission (ILC) noted, fragmentation of international law is a widespread phenomenon [ILC Report 2006], as is fragmentation of international institutions and organizations [Ruggie, 2014].

Although the scope of global governance is expanding, the challenges are also growing. Today's world is multipolar. Major States such as Russia and China advocate for a changed world order [Russia—China Declaration]. With the seeming decline of the dominant influence of the West, there is a demand for an international system that more closely correlates to the new multipolar world with a more poly-centric system.

2.1.2 Is Global Space Governance Unique?

When discussing global space governance, one must keep in mind two facts. First, not all activities that fall under space governance are physically located in outer space. Second, this governance is still, and will remain so in the foreseeable future, terrestrially contextualized, thus dependent on national governments, international organizations and forums, and other actors on Earth. For these reasons, one might presume that global space governance is and cannot be significantly different from general global governance.

Nevertheless, the unique features of the environment of outer space and the activities carried out in space do make global space governance significantly different, albeit not entirely. The spirit that inspired the space pioneers, including those in

leadership positions, is the spirit of conducting things better and more peacefully in space, and is enshrined in the first goal in the first U. N. General Assembly resolution on space exploration: “to avoid the extension of present national rivalries into this new field” [GA Res 1348 (XIII)]. This new spirit accompanied the negotiations for the 1967 Outer Space Treaty, held primarily between the United States and the Soviet Union. While their rivalry continued on other fronts during the Cold War, these two superpowers collaborated by creating a visionary legal framework for space and later even cooperating in space missions. Negotiations were short and conducted “in a businesslike fashion, with a minimum of polemics, and were successfully concluded in a remarkably short time, considering the treaty’s comprehensive nature,” according to the then U. S. secretary of state [Statement of Rusk, p. 111]. Space brought new dreams, visions, and increased cooperation. U. S. President Lyndon B. Johnson declared:

The “very fact of cooperation” in the evolution of this treaty is to be taken as a “substantial contribution toward perfecting peace.”...

The climate in which such accord has been reached is clearly an encouraging omen for continuing in other realms our constant quest for understandings that will strengthen the chances for peace.

In the diplomacy of space, as in the technology of space, it is essential always that interim achievements not be mistaken for final success. This treaty I transmit to the Senate today is such an interim achievement—a significant, but not a final step forward.

It carries forward the thrust of the past decade to enlarge the perimeters of peace by shrinking the arenas of potential conflict. [Message from President Johnson, p. 58]

The inspiration that space provided did not eliminate all national rivalries or other human shortcomings. A notable example is the absence of China from the International Space Station (ISS). Still, in contemporary interest-based international politics, a model of global space governance based on improved and revisited cooperation can present an improvement to global governance in other issue areas.

As we have seen, global governance is relatively new in terms of human history. Space exploration is an even more recent phenomenon. If global governance has had some achievements and faces difficulties, global space governance has had more success, though it is not without its challenges. The next chapters will review global space governance, its evolution, accomplishments, and challenges, and will further offer a way forward to improve the current mechanisms of governance on various issues, to allow humankind to better exploit the opportunities offered by outer space.

2.2 Is the Existing Global Space Governance Regime Adequate to Meet Present and Future Global Public Interest in Outer Space?

Space governance is today a combination of international agreements adopted during the space race of the 20th century, together with non-binding principles and guidelines that were created to deal with specific issues as they arose, through several international organizations. For the texts of these agreements and principles, see Appendix C.

However, since the world is no longer bipolar but rather multipolar, and since there are many more States and now non-State actors actively participating in space activities, the competing interests have become more diverse. Although the G-77, a group of 134 developing States, consistently advocates binding instruments, some States have become less willing to subject themselves to new binding norms. As a result, the United Nations and its specialized agencies have not been successful in negotiating new treaties. Instead, there has been an increase in the number of non-binding “soft law” norms, and an increased number of entities involved in their creation, sometimes parallel and sometimes at odds with each other.

This may be an oversimplification, but the real struggle is often between the pragmatic efforts of various States advocating on behalf of their self-interests versus international cooperation, and the need for dialectic is clearly seen in the realm of global space governance. On the one hand, some areas, where there has been no conflict in space to date, have seen successful international cooperation and effective regulation. Institutions such as the ITU operate with near universal participation. On the other hand, it is clear that the nature of our activities in space is changing in two main ways. First, space activities are becoming more commercialized. Second, the number of actors and stakeholders, whether governmental or private, in many sectors of the space industry is rapidly increasing. It is clear that the existing institutions were not created to regulate or govern this new emerging paradigm. Therefore, the successes of the past are unlikely to translate into successes in the future, especially when some States may want to pursue an approach that is motivated by self-interests rather than pursue a cooperative governance outlook.

Although there are some entities committed to the global public interest, such as the ITU, there is no guarantee that this global interest is the top priority of the different institutions and regimes. As will be discussed later, the enforcement mechanisms are generally weak, meaning that, as we move forward into a more competitive environment in space in all the ways outlined in other chapters of this book, new forms of global governance will be necessary to ensure that short-term and selfish interests do not dominate the global public interest.

2.3 Recap of the Existing Five U. N. Space Law Treaties

The five core international treaties governing space activities are certainly not the outer limit of international law and governance on outer space. However, these treaties are the main internationally binding instruments and form the basis of other “soft law” principles and guidelines. They are a product of their time, the 1960s and 1970s, and as such they are very “State-centric” [von der Dunk, “International Space”, 2015b, p. 45]. Nevertheless, they still form an important basis for global space governance.

The five treaties were all negotiated through the U. N. Committee on the Peaceful Uses of Outer Space (UNCOPUOS), a U. N. body created in 1958 [GA Res 1348 (XIII)]. UNCOPUOS generally operates on consensus. However, an agreement

without a vote against does not necessarily mean there is unanimity among all States; it can often mean that compromises are made [Lyll & Larsen, 2009, pp. 19, 42]. As a result, the language of the five treaties is not always clear and leaves room for varied interpretation. In order to understand the implications of these treaties, a brief outline of the law of treaties is necessary.

2.3.1 *The Law of Treaties*

Although some of the U. N. treaties are called “Agreement” or “Convention,” there is no legal difference in international law between any of these terms, and they are all legally binding treaties [VCLT, art. 2(1)(a)].

Treaties act as international contracts between States. They are binding because States explicitly consent to their terms, and demonstrate their intent by signing these contracts [VCLT, art. 11]. However, the signature itself is usually not enough, since States must also ratify the treaty, and usually also enact it into its national law. Thus, although a treaty might be signed by States at a conference or at the closing of negotiations, it may not come into legal force until a designated number of States have also ratified it, depending on the terms of the specific treaty [VCLT, arts 2(1)(b), 14]. Nevertheless, as soon as a State has signed a treaty, even if it has not ratified it, the State is still obliged to refrain from acts that would defeat the object and purpose of the treaty [VCLT, art. 18].

If a State acts in breach of a treaty provision, any other State that is injured by this may demand cessation of the activities, or in some situations bring a case before the International Court of Justice (ICJ) against the injurious State [Articles on State Responsibility, art. 42(a)]. Some obligations included in the five space treaties could also be considered obligations *erga omnes*, i.e., obligations toward the international community as a whole. In the case of a breach of such an obligation, any other State, which is a party to the treaty, may bring a claim without having to prove injury [Articles on State Responsibility, art. 42(b)]. However, one of the weaknesses of this regime is that there are very few enforcement mechanisms. Should a State choose to ignore a ruling of the ICJ, even though it is in breach of its international obligation, there is little that can be done other than perhaps economic and trade sanctions or political pressure mainly through the United Nations.

2.3.2 *The 1967 Outer Space Treaty*

The UNCOPUOS had been mandated to draft a treaty to safeguard the peaceful uses of outer space. Based upon much of the wording of the non-binding U. N. General Assembly Resolution 1962 (XVIII), the UNCOPUOS adopted the Outer Space Treaty, which contains the core legal principles governing space activities.

Currently, the Outer Space Treaty has 104 State Parties, which represents extremely broad international participation. Of these 89 were negotiating States, and the rest have since joined, or in some cases succeeded, the treaty. For instance, the Soviet Union ratified the treaty in 1967, and the Russian Federation succeeded to it in 1992 following the breakup of the Soviet Union.

The main “freedoms” guaranteed in Article I include freedom of exploration, freedom of access to space and all areas of celestial bodies, and freedom of scientific investigation. All of these freedoms are couched in terms that are also intended to guarantee that the exploration and use of space “shall be carried out for the benefit and interests of all countries,” “without discrimination of any kind, on a basis of equality and in accordance with international law,” and “shall be the province of all mankind.” Thus, while only the United States and the Soviet Union had the capacity at the time to explore and use space in any meaningful sense, there was a will among States to ensure that space would not be the province of only those two powerful nations. This was particularly desired and achieved through the active participation of the non-spacefaring nations, mainly developing States [Jakhu, 1982].

The question is to what extent it can truly be guaranteed that exploration and use of space is “for the benefit and interests of all countries” when orbital slots for telecommunications, television broadcasting, and other commercial services are used by some, but not all, States. The same can be said for future mining expeditions, which will be for the economic benefit of certain States or commercial entities, but not necessarily for the benefit of all States and in the global public interest. Although Article IX requires States to conduct all their activities in space “with due regard to the corresponding interests of all other States Parties” and “according to the principle of cooperation and mutual assistance,” these are essentially only obligations of conduct, and not of result, as is the obligation under Article I. An obligation of conduct does not guarantee any particular outcome [Crawford, 2012, p. 221], and is weak by definition. Thus, it would be difficult to assert that a State had breached this obligation, especially since enforcement mechanisms for the Outer Space Treaty are limited.

The intention to protect against national monopolization or even colonization of space or celestial bodies is also echoed in Article II, where national appropriation “by claim of sovereignty, by means of use or occupation, or by any other means” is prohibited. Although it is clear that no State can claim territory in space, recent actions have begun to call the meaning of these provisions into question. The U. S. Federal Aviation Administration made statements to the effect that it would license U. S. companies wishing to land on the Moon and begin mining, although this statement was later retracted after consultations with the National Aeronautics and Space Administration (NASA) and the U. S. State Department [Klotz, 2015]. Even more recently, the United States and Luxembourg adopted laws that purport to provide mining rights to private companies “in accord with international treaty obligations.” Chapter 16 elaborately deals with the issue of space mining. Some

argue that it might be possible to circumnavigate this prohibition by asserting the protection of the activities of domestic commercial entities in space under domestic law. Whether doing so would be in accordance with international law is currently hotly debated, particularly as the VCLT provides that States cannot invoke domestic law as justification for failing to fulfill its treaty obligations [VCLT, art. 27]. Nonetheless, the weak enforcement mechanisms for provisions contained in the Outer Space Treaty may mean that States feel few limits on their legislative capacities, even in the case where it would be judged to be not fully compliant with the treaty.

Although at the time of negotiating the Outer Space Treaty it was not conceivable that commercial entities would become such prevalent space actors, Article VI ensures that States are responsible under international law for all national activities in outer space, regardless of what entities are involved, and requires that States authorize and exercise continued supervision over activities of nongovernmental activities. These tie in with the general law on State responsibility, which was fully clarified and codified after the Outer Space Treaty was adopted, but is nonetheless considered to be binding as customary law [Crawford, 2012, p. 43]. Although the provision on the responsibility of States for space activities still depends on the willingness of other States to invoke responsibility with the risk of upsetting diplomatic or economic relations, it puts at least some restraint on States, thereby ensuring that they monitor all activities taking place under their jurisdiction. It would seem that, to date, States have acted in accordance with this requirement, and continue to take it seriously even as they legislate in favor of commercial entities pushing the boundaries of the prohibition on appropriation.

One of the core principles in the Outer Space Treaty is the use of the Moon and other celestial bodies for peaceful purposes. There has been continued debate as to whether this should be interpreted to mean “exclusively non-military purposes,” or only “non-aggressive purposes.” The latter could include military activities, such as intelligence gathering or verification of compliance with disarmament or non-proliferation treaties. Given that Sputnik, the first artificial satellite in space, was a military undertaking, that the early space race included much military technology, and that many imaging and communications satellites today are “dual-use,” thus serving both military and civilian purposes, it would be near impossible to assert that Article IV prohibits all military activities in outer space. The *negotiating history* of the treaty also suggests that the negotiating States intended this narrower meaning. As Chapter 12 will discuss in full, military uses of space are only expanding, and this core principle may also be under great strain.

In general, it can be said that the intention of the Outer Space Treaty was to protect the global public interest in space and, for its first few decades in existence, it very successfully achieved this goal. However, with more and more governmental and private stakeholders, the nature of the space economy is changing, and as a result the Outer Space Treaty has come under great pressure to remain a strong governance instrument.

2.3.3 *The 1968 Rescue Agreement*

The Rescue Agreement, which has been ratified by 94 States, is symbolic of the will to cooperate that has existed between spacefaring and non-spacefaring nations even during and since the Cold War. As such, it is one of the more successful instruments in protecting the global public interest.

In the event of astronauts or any space object or components thereof landing unintentionally, or due to distress or emergency, on the territory of a State other than the launching State, Articles 1 through 6 of the Agreement establish obligations to assist astronauts, to share information, and to help recover objects collaboratively. It also creates these obligations in the event that astronauts or space objects land on the high seas or anywhere else on territory not belonging to any State. The Agreement also takes into account launches conducted by international organizations in addition to launches conducted by a single State or two or more States.

The clear intention is for the safety of astronauts to be paramount over the competition between States, and to promote collaboration and mutual support in recovering space objects. These principles are also present in Article V of the Outer Space Treaty, as is the designation of astronauts as “envoys of [hu]mankind,” which ensures neutrality and cooperation with respect to the status of astronauts. This can be said to be a note of success in fulfilling the global public interest. However, the question arises whether “space tourists” will fall under the same special designation, as there is no definition of “astronaut” in any of the core space treaties. It could be said that there is a general agreement that those who pay to be passengers in a suborbital or spaceflight are not entitled to the same special status as those trained for complex missions [Lyll & Larsen, 2009, p. 131], regardless of whether they are called “spaceflight participants” or astronauts. On the other hand, it is unclear whether these commercial space flight participants should be excluded from the “rescue and return” obligations upon States under the Outer Space Treaty and the Rescue Agreement purely because they have paid for their passage. The notion of aiding those in danger or distress has long roots in international law [SOLAS, UNCLOS], and could also be considered to be a moral obligation. The extent of any obligation to aid commercial spaceflight passengers will have to be given more attention as the technology advances, and should not be left up to a moment of disaster to debate. This will be discussed in Chapter 11 dealing with human spaceflight.

2.3.4 *The 1972 Liability Convention*

Liability for damage caused by space objects receives some attention in the Outer Space Treaty. However, at the time the general rules of State responsibility and liability were not yet fully developed by the ILC, and there was a need for further clarity with respect to space activities in particular. Thus, in 1972, the Liability Convention was adopted by UNCOPUOS.

Articles I and III of the Outer Space Treaty reiterates that States must conduct their activities “in accordance with international law”, and these clauses render the general rules on State responsibility and liability also applicable [Lyll & Larsen, 2009, p. 104]. As mentioned above, Article VI of the Outer Space Treaty also makes explicit that States are responsible for all national activities in space, including for nongovernmental entities. Further, Article VII of the Outer Space Treaty spells out that the State from whose territory or facility an object was launched, or which procures a launch, is liable for damage caused on Earth, in the air, or in outer space.

The Liability Convention was negotiated in order to go into more detail than the Outer Space Treaty on these matters. Article I of the Liability Convention essentially imports the definition of launching State from the Outer Space Treaty, i.e., the term “launching State” means (i) a State that launches or procures the launching of a space object; (ii) a State from whose territory or facility a space object is launched. The Liability Convention differs slightly from the Outer Space Treaty in that the word “space object” is used rather than just “an object” that is launched. The term “space object” is defined in the Liability Convention to include all component parts of the space object, including its launch vehicle and parts thereof. However, Articles II and III of the Convention depart from the general terms of the Outer Space Treaty. Article II determines that liability for damage caused on the surface of the Earth or in airspace is “absolute,” i.e., there is no need to prove any fault. Article III determines that, for damage caused in space (“elsewhere than on the surface of the Earth”), liability is fault-based, i.e., there must be proof that the injurious or accused State acted negligently or had the possibility to avert damage and failed to do so. This means that a State cannot be held liable for accidents in orbit where there was no fault, such as the 2009 Iridium-Cosmos collision. However, this is true only in the ambit of international space law, since a victim State may pin liability based out of the principles of general international law [Rio Declaration, Principle 2; *Legality of the Nuclear Weapons*].

States may also share liability if they are jointly responsible for damage caused to an object belonging to a third State [Liability Convention, art. IV]. The Liability Convention may also apply to international organizations if they accept its terms [Liability Convention, art. XXII]. The European Space Agency (ESA), EUTELSAT, and EUMETSAT are the only three international organizations to have made such declarations [U. N. Doc A/AC.105/C.2/2016/CRP.3].

Although the Liability Convention has never been the cause of a contentious court case or arbitration, it was triggered when the Russian nuclear-powered satellite Kosmos 954 crashed in the Northwest Territories in Canada in 1978, spreading radioactive debris over about 48,000 square miles (124,000 sq. km). A joint Canadian-U. S. team were able to recover some of the satellite debris. By diplomatic note, Canada billed the Soviet Union over CA\$ 6 million for actual expenses and additional compensation for future unpredicted expenses, citing both the Liability Convention and State responsibility under customary international law [Lyll & Larsen, 2009, p. 117]. The Soviet Union eventually paid a sum of CA\$ 3 million to Canada, and both countries settled this matter through negotiations. This could be seen as a relative success of the convention, since it was referred to in the exchange of diplomatic notes and the two States settled without further dispute.

The only other time the Liability Convention has been activated was following the crash landing of parts of the U. S. Skylab in 1979 near Australia's westernmost city, Perth [Lyll & Larsen, 2009, p. 117]. Since these parts landed in the desert, no economic damage was caused, and although NASA advertised for claims, no actionable claim was made. The local shire government seemingly fined NASA a remarkably small sum of AU\$ 400 for littering (finally paid in 2009 when a radio DJ collected funds from his listeners!). Nevertheless, this is hardly an instance of international liability [Cooper, 2013; Wall, 2013]. Although liability rests with the launching State, now that many more private and commercial entities are involved in space activities, it is common for States to require as a condition of licensing that non-State entities are insured against possible compensation liability.

The Liability Convention currently has 92 State parties; a further 21 States have signed but not yet ratified the Convention, and three international organizations have made declarations accepting its terms. This is a very broad participation, and the fact that it has never been invoked in a contentious case is noteworthy. Furthermore, due to its purely economic substantive content, it is this treaty that is most likely to be invoked in light of the commercialization of space and its growing economic importance.

2.3.5 *The 1974 Registration Convention*

Already in the early U. N. General Assembly resolutions on space activities, there had been a call for States to furnish UNCOPUOS with information for the registration of launchings and space objects [GA Res 1721 (XVI); GA Res 1963 (XVIII)]. Article VII of the Outer Space Treaty refers to national registries for objects launched into space, as a means of identifying which State has jurisdiction over such an object. However, the idea of a central international registry did not emerge until the 1974 Registration Convention. This convention creates a dual, mandatory system of both national registries [Registration Convention, art. II] and an international registry maintained by the U. N. Secretary-General – now maintained by UNOOSA [Registration Convention, art. III].

Currently, the Registration Convention has 63 State Parties, with an additional 4 signatories. Just as with the Liability Convention, international organizations may also make declarations that they accept the terms of the Registration Convention. Only the ESA, EUTELSAT, and EUMETSAT have done so [U. N. Doc A/AC.105/C.2/2016/CRP.3].

The goal of the convention is to help identify launching States and jurisdiction over space objects for the purpose of tracing liability, control, as well as returning astronauts and salvaged space objects or parts thereof. Already in 1974, it was clear that such information was needed in order to safely plan launches and entry into orbital slots, since there was a growing awareness of the increased traffic and the existence of some space debris [Lyll & Larsen, 2009, p. 89].

The actual data and conditions of a national registry can be determined by each State [Registration Convention, art. II], whereas the international registry allows full and open access to the required data [Registration Convention, art. IV]. States are also required to notify the U. N. Secretary-General, via UNOOSA, of registered space objects that are no longer in Earth orbit [Registration Convention, art. VI].

The Registration Convention has been a relative success in that, as far as we can tell, States duly register launches that are under their jurisdiction [Jakhu, 2006]. Nevertheless, whether the global public interest is protected under this regime has come into question recently with launches conducted by North Korea that have been registered as part of a space program, but which many contend is in fact the beginning of a missile program prohibited under a series of U. N. Security Council resolutions [Statement by Di Pippo].

The convention has also been criticized because it allows a very fragmented system of national registries, as well as limited information on orbital data, which today is of very high importance given the congestion of orbital slots [Lyall & Larsen, 2009, p. 91]. Compiling information can also be problematic, since units of measurement in time and distance differ between national registries, and there is only a general requirement of registering the purpose of a space object.

Another problem that has arisen is the transfer of ownership. With increased commercial activities and private enterprises, ownership of a satellite or other space object may be transferred after launch, meaning that the launching State no longer has control or jurisdiction over it [Schrogl & Davies, 2002]. One example is the transfer of INTELSAT satellites to the Dutch company New Skies Satellites NV. In fact, the Netherlands claimed that it was not subject to the Rescue Agreement, the Liability Convention or Registration Convention, even though it accepted responsibility under Article VI of the Outer Space Treaty [U. N. Doc A/AC.105/806]. This could be a sign that the Cold War period of space governance is breaking down in the face of 21st century economics and politics. As space objects have become more complex, and the space debris issue has become more problematic, it would be beneficial to have more detailed registration requirements, such as the identification of more component parts of space objects, or clearer identifiers on the larger parts [Lyall & Larsen, 2009, p. 93].

Finally, the definition of “launching State” may itself require refinement, as launches have become more complex and more international, in contrast with the time when the Registration Convention was negotiated. Article I refers to either the entrepreneurial State, which launches or procures a launch, or the territorial State, from which a launch takes place or whose facility has been used to launch. However, transnational relationships may be more complex now that there are many private and commercial entities involved in the procurement and actual launches, and as the practice of subcontracting becomes more prevalent.

Although the Registration Convention allowed for revision 10 years after it entered into force, it was decided by the U. N. General Assembly not to do so in 1986 [GA Res 41/66]. Article X does allow for later revision, but this would require a request of one-third of the States Parties and the concurrence of a majority, a

process that necessitates much more proactive will of States than there appears to be on the international stage today. As with the other core space treaties, we may, therefore, say that the Registration Convention has been relatively successful in the 20th century at achieving the global public interest in space, but that it may be insufficient moving forward in the 21st century, especially when thousands of CubeSats and nano-sats will be launched (an issue dealt with more detail in Chapter 15).

As for the recent developments in terms of soft law, it is pertinent to recall U. N. General Assembly Resolution 62/101, which recommended enhancing the practice of States and international intergovernmental organizations in registering space objects [GA Res 62/101]. In particular, it was recommended that all new developments in the field and also changes in ownership be reported to UNOOSA, while increased transparency and the availability of public information and membership of the Registration Convention was encouraged [GA Res 62/101]. Interestingly, the 2014 Russian working paper on concepts concerning the establishment of a Center for Information on Near-Earth Space Monitoring under the auspices of the United Nations is a promising initiative [U. N. Doc A/AC.105/L.290], as is the proposal of Canada, Egypt, France, Germany, Italy, Japan, Romania, Sweden, the United Kingdom, and the United States to set up an expert group for monitoring space objects and exchanging information with the international community [U. N. Doc A/AC.105/2016/CRP.16].

2.3.6 *The 1979 Moon Agreement*

The Moon Agreement (also known as Moon Treaty) is the last of the five U. N. space treaties and has had the least impact, because it has attracted the smallest number of participants. Currently, the Moon Agreement has only 17 State parties, with a further 4 signatories. Since France and India, as signatories, and the Netherlands, as a State party, are the only States among them to be truly active spacefaring nations, the Moon Agreement has little chance of being put into action. Nevertheless, it has recently received increased attention due to advances in national laws regarding the rights of private commercial companies to mine the Moon or asteroids and reap profits from such activities.

The initiative for the Moon Agreement was taken by Argentina in 1970 [A/AC.105/C.2/L.71 and Corr:1] followed by the Soviet Union in 1971 [A/8391]. However, in the ten years following the first landing on the Moon, the UNCOPUOS was occupied with what were considered to be more urgent issues, namely the four other main space treaties. The urgency for a Moon Agreement waned as it appeared that further exploration or exploitation of the Moon was no longer the priority of national space programs. Furthermore, much of the international attention was placed on the long and complex negotiations surrounding the Law of the Sea Convention (UNCLOS), which was opened for signature in 1982.

The text of the Moon Agreement was agreed upon by consensus and adopted by the U. N. General Assembly in 1979, although it took five years (i.e., 1984) to enter

into force with the required number of ratifications. Its main goal was to expand upon and clarify the terms of the Outer Space Treaty with respect to the exploitation of the Moon and its resources. Article II of the Outer Space Treaty prohibits national appropriation of the Moon and other celestial bodies by way of sovereignty “or any other means.” Thus, no public or private entity may claim property rights: “A valid right of property to immovable estate can exist only within a legal system established by a State and in relation to property over which that State has sovereignty” [Lyall & Larsen, 2009, p. 185]. The Moon Agreement reiterates this and, to exclude any doubt, provides that the Moon cannot become property of “any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person” [Moon Agreement, art. 11(3)]. These are exactly the issues that have come into contention with recent national legislation in the United States and Luxembourg that are encouraging private commercial mining of the Moon and asteroids.

In this sense, the inclusion of the term “common heritage of mankind” in Article 11 of the Moon Agreement had roots not only in discussions on how to regulate the Antarctic, but also in the discussions taking place in the UNCLOS negotiations. The latter resulted in the protection of deep seabed resources while also allowing extraction activities to take place [UNCLOS, Part IX; Lyall & Larsen, 2009, pp. 194-95]. Similarly, Article 11(5) of the Moon Agreement calls for the establishment of an international regime to govern the exploitation of natural resources on the Moon as soon as that exploitation is about to become feasible. Article 11(7) provides that the purpose of such a regime would be the orderly and safe development of the natural resources of the Moon, their rational management, the expansion of opportunities in the use of these resources, and the equitable sharing in the benefits derived from those resources.

This concept of common heritage is laudable, and Article 11 appears to try and strike a compromise between States desiring to encourage exploitation and developing States that are unlikely to be able to partake but which want to benefit from such activities. However, this may be one of the key reasons why the Moon Agreement has such low participation and almost no participation among the most active space-faring nations.

It appears that national legislation is currently the driving force behind any regime encouraging economic activity in space mining. Nevertheless, there is a great risk that important environmental principles, such as the precautionary principle, might not be at the forefront of such forces. Moreover, the notion that the benefits of space exploration should be shared for the benefit of all nations and that exploration and use of outer space, including the Moon and other celestial bodies and is the province of all humankind [Outer Space Treaty, art. I] is threatened when one or a few spacefaring nations legislate to enhance their exclusive national interests and promote their own commercial entities.

For now, there is a clear failure in the global space governance regime to protect the global public interest with respect to the possible appropriation of in-situ natural resources in outer space. This will be discussed in more detail in Chapter 16 on space mining.

2.4 Are the United Nations and Its Specialized Agencies the Best Organizations to Regulate, Coordinate, or Standardize Space Activities and Practices?

The creation of the UNCOPUOS, one year after the launch of Sputnik, signified the recognition by both the United States and the Soviet Union that regulation of space activities would be necessary, and that it should be in the hands of an international body. The United Nations was the obvious – if not the only feasible – such international body, and it has continued to play an important role in the regulation of space activities and registration of space objects. There are multiple U. N. bodies involved in space activities in various ways. Viewed as a whole, however, even if the U. N. bodies are successful at maintaining a certain overview of space activities, they have become less effective in recent decades with respect to the progressive development of space governance in the eyes of many, mainly due to political gridlocking. Although some of the bodies described below are still the best institutions to regulate or coordinate activities (e.g., the registration of launches and the allocation of orbital slots), many of the other institutions are failing to protect the global public interest. On the other hand, mechanisms for the progressive development of space governance refer not only to the laws developed under the auspices of the U. N. bodies but also to legal instruments entered into between States and international organizations [Brisibe, 2016].

2.4.1 The U. N. General Assembly

U. N. General Assembly resolutions are non-binding. Nonetheless, they do represent a clear global political view, and the vote count can often indicate where specific States stand on any given issue. In its early years, General Assembly resolutions were a successful instrument of global governance in general and space governance in particular. However, as issues have become more complex, General Assembly resolutions have become less effective.

The General Assembly established UNCOPUOS and adopted a series of resolutions on general space principles prior to the drafting of the five core treaties. UNCOPUOS proactively began its work, drafting a set of resolutions that were adopted by the U. N. General Assembly and formed the basis of the five core space treaties. For example, the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space [GA Res 1962 (XVIII)] became the basis of the Outer Space Treaty. However, following this spate of codification, the UNCOPUOS' ability to negotiate new treaties was weakened. Instead, a second series of resolutions were drafted by the UNCOPUOS and adopted by the General Assembly in response to the increase in the specific nature of activities in space [Brisibe, 2016].

In 1982, the resolution on direct television broadcasting satellites was adopted by a vote [GA Res 37/92]. However, it was contentious and did not reach consensus, since many States, which did not yet have such technology, disagreed as to the freedom to broadcast into other States without the prior consent of the receiving State [Koppensteiner, 2012, p. 170].

In 1986, the resolution on remote sensing was adopted by consensus [GA Res 41/65], and has since been considered to be representative of customary law [Gabrynowicz, 2012, p. 185; von der Dunk, "International Space," 2015b, p. 42]. The same can be said of the Principles Relevant to the Use of Nuclear Power Sources in Outer Space [GA Res 47/68], which was very technical in nature and dealt with issues that were clearly less contentious.

In 1996, a resolution was adopted that reflected the shift toward a multipolar political world and the concern of developing States that their potential access to the benefit of space needed to be protected. General Assembly Resolution 51/122 laid out general principles in furtherance of Articles I and II of the Outer Space Treaty, and attempted to draw a compromise between enabling spacefaring nations to progress in their activities while also expressing the concerns of developing nations.

Every year, the U. N. General Assembly passes a resolution with nearly identical wording, known as the Prevention of an Arms Race in Outer Space (PAROS) resolution, which urge "all States, in particular those with major space capabilities, to contribute actively to the objective of the peaceful use of outer space and of the prevention of an arms race in outer space and to refrain from actions contrary to that objective and to the relevant existing treaties in the interest of maintaining international peace and security and promoting international cooperation" [GA Res 70/26, 2015]. While admirable in language, it is merely aspirational, and the fact that it is repeated every year without any additional force behind it, and without the support of the United States, may undermine any effect it could have.

In 2014, the U. N. General Assembly also adopted by a majority vote a resolution prohibiting the first placement of weapons in outer space. This resolution was adopted in support of the Chinese-Russian proposal to negotiate a treaty on the prevention of placement of weapons in outer space (PPWT), and appeals to all States to adopt a political commitment that they will not be the first to place arms in outer space [GA Res 69/32]. In 2015, the General Assembly again adopted (with a majority vote of 122 in favor, 4 against, 47 abstentions) a similar resolution on the no first placement of weapons in outer space [GA Res 70/27]. At the time of writing, 12 States have made declarations that "they would not be the first to place weapons in outer space," and these include Argentina, Armenia, Belarus, Brazil, Cuba, Indonesia, Kazakhstan, Kyrgyzstan, the Russian Federation, Sri Lanka, Tajikistan, and Venezuela [GA Res 70/27]. Among these States, Russia is the only truly active spacefaring nation, and thus the effectiveness of these General Assembly resolutions can be questioned.

The General Assembly has also adopted resolutions in support of other non-binding soft law initiatives, such as the endorsement of the Space Debris Mitigation Guidelines that had been drafted by the Inter-Agency Space Debris Coordination

Committee (IADC) and adopted by the UNCOPUOS [GA Res 62/217]. The General Assembly also encourages transparency and confidence-building measures (TCBMs) that States or international organizations may come up with in many of its resolutions. More recently, the adoption of a report by the Group of Governmental Experts (GGE) has triggered some gains in momentum, and is seen as an instrument providing impetus for the coordination of activities concerning space security and governance. As such, U. N. General Assembly resolutions can be seen as a supporting mechanism, rather than a leading one.

2.4.2 The U. N. Committee on the Peaceful Uses of Outer Space

With the launch of the first satellites, the UNCOPUOS was initially set up as an *ad hoc* body in 1958, made up of 18 members that were to study the technical, legal, and other issues regarding new space activities [GA Res 1348 (XIII)]. Currently, the UNCOPUOS has 83 Member States, as well as a number of intergovernmental and non-governmental organizations with observer status. It operates through two subcommittees: the Scientific and Technical subcommittee and the Legal subcommittee [U.N. Doc A/4141].

The UNCOPUOS operates a decision-making process that is based on consensus. The fact that the core space treaties were all negotiated based on consensus, instead of by vote, gave them a strong base of international acceptance and strengthened the sense of democratization of space governance in its early years. However, the downside of this system is that it significantly slows down negotiations, and many blame the requirement of consensus for the failure to develop any binding norms since those five treaties [Lyll & Larsen, 2009, pp. 19-20]. In recent years, as more States have become spacefaring nations, and as commercial entities have gained prominence, negotiations and decision-making can sometimes become paralyzed. This is made worse by the fact that not all States send representatives to the meetings, and representatives who take part often lack the necessary expertise [Lyll & Larsen, 2009, p. 22]. Instead, some States have preferred bilateral agreements with partner States in specific space activities [Jankowitsch, 2015, p. 13], or they have preferred non-binding norms agreed to outside the UNCOPUOS (discussed in Section 2.6 below). Thus, the UNCOPUOS was an early success in ensuring that the global public interest remained paramount but is today considered to be a failure in moving forward [Brisibe, 2016].

One of the central themes that occupies the UNCOPUOS today is the long-term sustainability of outer space activities. This encompasses space debris, access to and use of orbital slots, and prevention of an arms race in space, among other issues. At the time of writing, the UNCOPUOS adopted a set of guidelines, to be submitted to the General Assembly for adoption, calling on States to cooperate in all matters regarding the sustainable use of outer space [U. N. Doc A/AC.105/C.1/L.354]. Although these guidelines are to be applauded, it remains to be seen how effectively they will impact State legislation and cooperation.

2.4.3 *The U. N. Office for Outer Space Affairs*

The UNOOSA was initially created as a small expert unit within the Secretariat of the United Nations to service the *ad hoc* UNCOPUOS in 1958. It became a unit within the Department of Political and Security Council Affairs in 1962 and was transformed into the Office for Outer Space Affairs within the Department for Political Affairs in 1992.

The UNOOSA implements the decisions of the General Assembly and of the UNCOPUOS. It is also the secretariat of the latter. It maintains the Register of Space Objects, various other compilations of data and documents that can aid U.N. bodies dealing with space activities, as well as provides publicly available information. It can be said to be fairly successful in that it coordinates all of these activities and the centralized sharing of information. However, it is also entirely dependent upon the cooperation of States. It is, therefore, a limited proactive instrument of global space governance.

The UNOOSA describes itself as having the dual objective of supporting the intergovernmental discussions in the UNCOPUOS and its two subcommittees, and of assisting developing States in using space technology for development. In this respect, it often holds conferences to disseminate information about space activities and governance, as well as training programs.

In particular, the UNOOSA has hosted three major U. N. Conferences on the Exploration and Peaceful Uses of Outer Space (UNISPACE). The first was in 1968, following which the UNOOSA undertook to provide training in the practical applications of space technology, in particular for developing States. The second conference was in 1982 during which the UNOOSA expanded the mandate of the Program on Space Applications to include promoting the development of indigenous capabilities in the developing States. UNISPACE III was held in 1999, following which the focus was on globally disseminating knowledge of the benefits of space and its regulation. Many look to these UNISPACE events as major moments of global dialogue regarding space governance, and the fact that the UNOOSA is planning UNISPACE+50 in 2018 may be a significant opportunity for reflecting upon the needs of global space governance in the coming decades.

Following UNISPACE III, the U. N. General Assembly tasked the UNCOPUOS with establishing an international entity to provide for coordination and optimization of space-based services for use in disaster management. This led to the establishment in 2006 of U. N.-SPIDER (the U. N. Platform for Space-based Information for Disaster Management and Emergency Response) to provide a knowledge portal and the ability to coordinate information “donated” by the operators of satellites around the world. The UNOOSA remains the central information point for this knowledge portal, and the mission of U. N.-SPIDER is to “ensure that all countries and international and regional organizations have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle” [GA Res 61/110]. The success of U. N.-SPIDER is difficult to measure as it tends to move fairly slowly and to be dependent on the participation of national

agencies. It offers technical training and outreach, and aims to coordinate the contribution by national disaster response authorities to States in need. However, it cannot offer a fully coordinated response to disasters. Perhaps, it is the best organization for such a role, since it is a neutral institution to house data-sharing, a matter which can sometimes be sensitive for other reasons.

2.4.4 U. N.-Space

The U. N. Inter-Agency Meeting on Outer Space Activities is a platform allowing national and regional space agencies to convene annually and discuss issues of coordination and shared concern, as well as emergent technologies. In 2013, it was decided that it should be known as U. N.-Space to increase its visibility [GA Res 68/75].

U. N.-Space reports to the UNCOPUOS, and following the mandate of the U. N. General Assembly's Open Working Group on Sustainable Development Goals, it has recently taken up as its focus the articulation of "Sustainable Development Goals" in space. As part of the promotion of international cooperation on peaceful uses of outer space, U. N.-Space has emphasized the "need to enhance dialogue between the scientific community, the providers of data and added-value products, and the user community in order to bridge the existing gaps in knowledge on the access to and use of space-based technology," as well as the need for awareness raising, capacity-building, and training at the national, regional, and international levels [U. N. Doc A/AC.105/2014/CRP.9].

The fact that there is inter-agency agreement on the need for sustainable approaches to uses of space and the need for communication among the various actors, both State and private, is promising. What is lacking, however, is an articulation of concrete measures to achieve this. Thus far, U. N.-Space is, therefore, of limited success in protecting the global public interest in space, though it has potential to be further utilized by States.

2.4.5 The International Telecommunication Union

The ITU was established in 1865 as the International Telegraph Union, and later changed its name to represent the change in technology. It became a specialized agency of the United Nations in 1947. Today, it plays an important role in space governance as a regulator and facilitator, since it allocates radio frequencies and orbital slots, and registers frequencies and slots in the Master International Frequency Register (MIFR), an international database of national frequency assignments. The ITU World Radiocommunication Conferences (WRC) are held regularly, at which the ITU adopts radio frequency allocations, regulatory procedures, plans, technical standards and studies, and work plans for the following years.

An elaborated discussion of this body can be found in Chapters 6, 7, and 8. What is important to note is that part of the success of the ITU in establishing and maintaining a global system to regulate an increasingly competitive orbital and radio frequency environment, has been the inclusion of “sector members.” In addition to having 193 Member States, these sector members represent private and commercial interests, including information and communications technology regulators, academic institutions, and some 700 private companies, a feature that is unique for a U. N. agency.

Like most U. N. agencies, the ITU operates based on consensus. Sector members and observers do not have a vote in this sense. Nonetheless, they do have a significant impact on the content of the decisions made. This has led to typical problems that can arise when some issues become politicized. For example, some developing nations disagreed on resolutions regarding the use of the Internet, which some sector members had significant influence on drafting, as many of those States felt the contents of these resolutions disadvantaged them. In the end, since the ITU system is the only global system of regulation and registration, participation is necessary if States want to have any input in negotiations.

Even though it faces some challenges with respect to enforceability, the ITU is considered a very successful institution of global space governance (particularly, in highly technical matters) related to radio frequencies and orbital slots), since States, in general, recognize the benefit of taking part in this regime.

2.4.6 *Other U. N. Agencies*

There are many other specialized agencies of the United Nations that have certain responsibilities with space governance, even if it is not their central mandate. One example is the U. N. Institute for Disarmament Research (UNIDIR) that works together with States, international organizations, civil society, the private sector, and academia “to assist the international community in finding and implementing solutions to disarmament and security challenges” [UNIDIR, “Home”]. It does so through holding international conferences, producing independent research, and providing policy advice. Two of its ongoing research projects concern outer space: the Outer Space Security Conference Series and support to the U. N. Group of Governmental Experts (Space and Cyber), both of which fall under its Emerging Security Issues program [UNIDIR, “Programmes”]. In fact, the UNIDIR itself does not aim to be an instrument of direct governance, but rather aims to support the more traditional forms of governance through States and the United Nations. In this regard, it can be said to be successful in highlighting and bringing the most important issues of space security to the attention of policy makers. However, it cannot be expected to create standards, norms, or even coordination on these issues.

Other examples of U. N. agencies that have some relation to space governance are the World Meteorological Organization (WMO), the U. N. Environment Program (UNEP), the U. N. Educational, Scientific and Cultural Organization (UNESCO),

the Conference on Disarmament (CD), the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO), and the World Intellectual Property Organization (WIPO). The WIPO initiated the conclusion of the 1974 Brussels Convention relating to the Distribution of Program-Carrying Signals Transmitted by Satellite, which obliges States to undertake measures to prevent the unauthorized distribution of any program-carrying satellite signal. In order to maintain an overview of all the space-related activities of these organizations, the UNOOSA operates a central information gathering platform called the U. N. Coordination of Outer Space Activities (UNCOSA).

The activities of all the U. N. bodies that fall under the UNCOSA cannot be ignored in the big picture of space governance, although the impact they have is through coordination rather than separate initiatives. Being part of the United Nations means that decision-making is slow and, although it may be inclusive, it will rarely be truly innovative or able to respond to rapid technological changes and is thus of limited success in terms of promoting the global public interest moving forward into the 21st century.

One possible exception may be the cooperation between the ICAO and the UNOOSA, which met together in March 2015 in Montreal and again in March 2016 in Abu Dhabi to discuss the overlap in aerospace technology and questions arising from the regulation of suborbital flights and human space travel. This may be one arena where the response to technology and commercial activity in space may move forward at a desirable rate, if the experience and relative success of the ICAO in regulating aviation can be utilized. On the other hand, the UNOOSA is constrained by limited budget and funding, which may slow the necessary progress.

2.5 What Alternative Forums Exist and How Can They Contribute to Effectively Address Issues of Global Space Governance?

Although the United Nations was the obvious international body within which to nest space governance in the mid-20th century, it has since become an enormous international organization faced with many challenges, such as the diverging political will of States, a limited budget, and often being impeded by the requirement of consensus decision-making, as discussed earlier. In the absence of the will and capability to continue the “legislation” of international space law by way of multilateral treaties, other regional and international bodies have become more and more active in creating binding regulations and non-binding norms to fill the gap in space governance.

Some of these bodies have a visible international forum and are able to create norms that, though not binding, are effective in incentivizing and changing the behavior of space actors. Many of these are intergovernmental organizations. Others, mostly nongovernmental organizations, have less visible presences, but are still influential in developing norms and disseminating awareness about space governance issues.

2.5.1 *Multilateral and Bilateral Treaties Outside of the U. N. System*

States are not dependent on the United Nations to negotiate treaties and conventions among themselves. Although the five core space treaties were negotiated under the auspices of the UNCOPUOS, there exist many treaties relevant to space activities that were negotiated by States independently. These may be bilateral treaties between two States, or multilateral treaties among many States. Where there is sufficient shared political will, States are very able to come to an agreement on binding international norms, and have a strong history of doing so. For example, the Antarctic Treaty was entered into effect in 1961 between 12 States with active interests in Antarctica, and today has 53 State Parties [*Secretariat of the Antarctic Treaty*]. Another example is the 1998 Rome Statute establishing the International Criminal Court, which today has 124 Member States [“The States Parties to the Rome Statute”].

Some examples of such treaties relevant to space, in addition to those mentioned in 2.5.2 below, are: (i) the 1963 Partial Test Ban Treaty that explicitly outlaws nuclear explosions in outer space, underwater, and in the atmosphere. This is a relatively successful multilateral treaty, currently with 126 Member States [UNODA, “Treaty Banning Nuclear Weapon Tests”]; (ii) the 1972 Anti-Ballistic Missile Treaty, signed by the United States and the former Soviet Union, which prohibited the development, testing, and deployment of anti-ballistic missile weapons including space-based weapons. (However, the United States withdrew from the treaty in 2001 and, hence, it is no longer in force.); (iii) the 1977 Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, which prohibits military or any other hostile use of modification techniques for changing the Earth or outer space; and (iv) the 1998 intergovernmental agreement concerning cooperation on the Civil International Space Station among 15 States.

The UNCOPUOS can sometimes be remarkably slow due to the requirement for consensus in the decision-making process and the variety of interests competing for priority on their agendas. Unfortunately, States have not displayed the kind of willingness and unity to negotiate binding agreements, and even the attempt to negotiate a non-binding instrument, such as the International Code of Conduct, suffered due to the exclusive nature of the process. Thus, while forums outside of the United Nations exist as alternative mechanisms for global governance, these are again entirely dependent on the political will of governments at any given moment. On the other hand, it is also a prevailing view that a treaty for every issue results in complexity and difficulties, especially because of the different membership a treaty receives. It may also lead to inconsistencies and create disharmony in the existing space regime. Therefore, a better governance system should not exclusively aim at increasing the number of treaties; rather, the aim should also be to amend the existing regimes to make them more inclusive and encourage greater membership [Galloway, 1977], as well as to adapt them to meet the changing needs of the space activities.

2.5.2 Intergovernmental Organizations/Institutions

The most well-known intergovernmental organizations with effective space governance capacity are the regional and inter-agency bodies. The ESA, for example, plays a significant role not only in coordinating the space policies and activities of its member European States but also in setting international standards and norms for cooperation with other States or organizations (more on the role of regional space agencies in Chapter 3).

The Conference on Disarmament (CD) was created in 1979 as the single forum for negotiating almost all multilateral arms controls regimes and addressing disarmament problems, including the prevention of an arms race in outer space. Currently it has 65 members States. The Secretary-General of the CD is the Director-General of U. N. office in Geneva, which services many meetings a year related to disarmament matters [CD-UNOG]. Every year, the CD adopts the resolution on the Prevention of an Arms Race in Outer Space (PAROS). In 2008, China and Russia submitted to the CD their draft treaty on the Prevention of the Placement of Weapons in Outer Space (PPWT). In view of criticism the draft treaty received, its authors revised it and resubmitted it in 2014. These are the only two efforts that have been made at the CD in relation to matters of space security. Though a large majority of the Member States are favorable to these governance mechanisms, these efforts did not bring any positive result with respect to controlling the arms race in space and prevention of placement of weapons in space because of the lack of the required consensus.

Similarly, the Asia-Pacific Space Cooperation Organization (APSCO) was finally and formally established in 2005 to promote cooperation on space matters among States in the Asia-Pacific region, though in 2001, it had been given a Secretariat and, in 2003, the APSCO Convention was adopted and opened for signature. Its main focus was to provide training, development, and capacity-building among its Member States. It also hosts an annual symposium focusing on specific themes related to the use of space technologies in the region. A detailed discussion of these regional organizations is provided in Chapter 3, dealing with regional perspectives.

Another important intergovernmental forum is the Inter-Agency Space Debris Coordination Committee (IADC), which was established in 1993 and reports its activities to the UNCOPUOS Scientific and Technical Subcommittee. It has 11 member agencies, including the ESA, and it consists of a Steering Group and four Working Groups, each focusing on a theme, namely Measurements, Environment and Database, Protection, and Mitigation. In 2003, the IADC produced a set of Space Debris Mitigation Guidelines, which it presented to the UNCOPUOS as a basis for each of the national and regional space agencies to then implement as individually developed regulations. Other chapters of this study, particularly Chapter 18, extensively deal with space debris issues. In short, this has been a successful example of intergovernmental cooperation outside of the U. N. system, to generate much-needed regulation even if it is non-binding.

Similar to the IADC, there are the Committee on Earth Observation Satellites (CEOS), and the International Committee on Global Navigation Satellite Systems (ICG). CEOS is an international forum/mechanism of 32 space agencies and 28 associates that operate and/or use civil Earth observation satellites. The mission of CEOS is to ensure “international coordination of civil space-based Earth observation programs and promote exchange of data to optimize societal benefit and inform decision making for securing a prosperous and sustainable future for humankind” [CEOS]. Since 2002, CEOS has had observer status at the UNCOPUOS. The ICG was established in 2005 through the U. N. Office of Outer Space Affairs with non-binding Terms of Reference to “encourage and facilitate compatibility, interoperability and transparency between all the satellite navigation systems” [ICG]. Its membership is confined to the key global navigation satellite system (GNSS) providers and the space-based regional or augmentation system providers. International and regional organizations and associations dealing with GNSS services and applications participate in the ICG as Associate Members. The ICG will make non-binding recommendations and does not set standards. Though the CEOS and ICG play interesting and valuable roles in coordinating, and possibly aligning, national Earth observation programs and navigational services and policies of their respective members, they have no direct and significant influence on global space governance.

A cooperative intergovernmental mechanism exists in the form of the Disaster Charter. This was initiated by the ESA and France’s national space agency, CNES (Centre National D’études Spatiales), following UNISPACE III. It has 21 members, including many national space agencies, and some national and international governmental organizations. Authorized users, typically disaster management authorities, such as civil protection, rescue, defense, and security bodies from the States of Charter member agencies, may request charter support for emergencies in their own State, or in a State with which they cooperate for disaster relief [Disaster Charter].

The Disaster Charter has had some important success as a platform for sharing information based on remote sensing. However, until recently, it was limited in membership. Therefore, many States that could have benefited from the mechanism were denied access to any data sharing and to assistance [Israel, 2014, p. 232]. Recently, the charter members have adopted the principle of universal access, so that any national disaster management authority can submit a request for emergency response. The fact that the authorities of some States are not aware of this space-derived information, or may not be able to request them on time, or may not have the technological ability to take full advantage of it, remains one limiting challenge for truly guaranteeing benefit to all humankind [Israel, 2014, p. 231]. Thus, capacity-building, particularly in developing nations, is of great importance for this mechanism to achieve its potential success.

One important successful collaboration is the Interagency Operations Advisory Group (IOAG), which “provides a forum for identifying common needs across multiple international agencies, for coordinating space communications policy, and for high-level procedures, technical interfaces, and other matters related to interoperability and space communications” [IOAG, “Home”]. IOAG was established by the

Interoperability Plenary in 1999, following a meeting between NASA and ESA, at which it was agreed that interoperability would best be coordinated in a multi-agency forum. Today, the IOAG is made up of seven national space agencies plus the ESA, as well as five observer space agencies [IOAG, “Agencies”]. Its key goal is to achieve full interoperability between national space agencies, and it holds regular meetings, face-to-face or via teleconference, to discuss issues and recommended solutions, which are sent back to the Interoperability Plenary for implementation.

Similarly, the Consultative Committee for Space Data Systems (CCSDS) was established in 1982 by the major space agencies of the world “to provide a forum for the discussion of common problems in the development and operation of space data systems” [CCSDS, “About”]. It is made up of ten national space agencies plus the ESA, as well as thirty observer agencies, and ninety-nine industrial associates. Similar to the ITU, this combination of industry and government agencies is one of its keys to success in ensuring interoperability among space data systems and facilitating multiagency spaceflight collaboration. Much of the CCSDS’ work is to produce recommendations for standards which the national agencies then implement both at a national level and in any collaborative space missions. These standards are produced for all sectors of space operations, including ground station systems engineering, mission operation and information management, space link services, and spacecraft on-board interfaces.

Due to the technical nature of the recommendations made by both IOAG and CCSDS, these are excellent forum for cooperative governance. Neither of these bodies is concerned with political constraints, nor with the promotion of any given member’s agenda, but rather with ensuring uniformity, interoperability, and ease of collaboration, and this is exactly what they have been achieving throughout the course of their lifetime. These and perhaps similar technical collaborative platforms should be encouraged as technologies move forward. The only challenge they currently encounter is that they necessarily exclude developing nations that do not yet have active space programs.

2.5.3 Intergovernmental Operating Organizations

Certain entities engaged in space activities started out as intergovernmental arrangements, and later, either to avoid government interference or due to financial pressures, some of them have become privatized. Examples of this phenomenon are INTELSAT, INMARSAT, EUTELSAT, EUMETSAT, INTERSPUTNIK, and Arabsat. These entities could be said to be a result of global governance because they necessarily entail international collaboration. However, it is difficult to assess the extent these institutions can effectively contribute to global governance or the global public interest since they are not governance organs.

INTELSAT was established in 1964 as the International Telecommunications Satellite Organization (ITSO), an intergovernmental organization that owned and operated a constellation of satellites, which began with 11 members and reached

100 members by the year 2001, when it was privatized [Lyll & Larsen, 2009, p. 4]. The main objective of INTELSAT was to provide, on a commercial basis, international public telecommunications services of high quality and reliability on a non-discriminatory basis to all areas of the world. It was through the INTELSAT network that the first landing on the Moon was televised, and today its services include the provision of broadband, radio, and television broadcasting. What was unique about INTELSAT in its early years was the hybrid between a traditional intergovernmental consortium and a commercial entity providing services to States in an economically sound manner [von der Dunk, "International Organizations", 2015a, p. 285]. This hybrid character was reflected in its internal governance, which allowed members to vote in an Assembly of States Party, the way many intergovernmental organizations do, while at the same time the Board of Governors had a complex voting system related to the investment shares held by certain commercial members [von der Dunk, "International Organizations", 2015a, p. 286].

Many of the States parties to INTELSAT began to commercialize and privatize their telecommunications. At the same time, there were concerns about the U. S. government putting pressure on and intervening in the management and workings of INTELSAT. The decision was made to sell off part of the constellation to a Dutch company in 1998, thus making it difficult to pinpoint responsibility and potential liability, issues that were discussed above. In 2001, the decision to privatize INTELSAT was made, and an agreement between this new private entity and the previous Member States was made to ensure the continual offering of the same quality and range of services. In order to ensure this, a new intergovernmental organization was created, with the original name of ITSO, to act as a watchdog.

Similarly, INMARSAT, first established in 1976 to provide an independent international satellite system dedicated to maritime communications, and in particular for the purposes of safety and rescue, was later privatized [Lyll & Larsen, 2009, p. 344]. There was an overlap in membership between INMARSAT and INTELSAT. However, at the outset, these two entities did not largely compete for market share because of the dedicated nature of INMARSAT to mobile services. IMARSAT had a similar hybrid internal governance structure to INTELSAT, in that States Parties had a vote in general matters, but the day-to-day decision-making powers lay in the hands of the Council, which consists of the largest investors [von der Dunk, "International Organizations", 2015a, p. 292].

Many of the factors that led to the privatization of INTELSAT also affected the privatization of INMARSAT, although the privatization of the latter was also prompted by the additional factor that technologies developed to include mobile satellite communications were simpler than earlier ship-based requirements [von der Dunk, "International Organizations", 2015a, p. 293]. As mobile telecommunications became more economically competitive, largely due to the dramatic increase of individual users around the world from the mid-1990s, it became clear that an intergovernmental organization could no longer compete in economic terms. Just as with INTELSAT, the decision was taken to privatize the operations of INMARSAT and to set up a smaller intergovernmental body to regulate and act as a watchdog, particularly with respect to maintaining the Global Maritime Distress and Safety

System (GMDSS) for search and rescue [von der Dunk, “International Organizations”, 2015a, p. 294]. Thus, global governance ensures that the necessary services for the global public interest do not get consumed by the pure commercial interests of a private entity.

EUTELSAT went through a similar transformation, having been based on some ESA programs and established in 1977 as the European Telecommunications Satellite Organization. In 1982, it began to broadcast television, operating its own channel Sky TV, in cooperation with ESA – the first direct-to-home satellite TV channel launched in Europe – and, in 1983, it began offering telecommunication services. It was privatized in 2001 due to the general privatization of the telecommunications sector and the increased competitiveness of mobile telecommunications. Today, it mainly provides television broadcasting, mobile telecommunications, and in-flight or maritime applications for commercial purposes. Whereas it was established to provide services in Western Europe, it soon expanded to include Eastern Europe, Africa, parts of Asia, and North America.

INTERSPUTNIK was established in 1971, since Russia did not want to join INTELSAT due to the dominance of the United States in that organization [Lyll & Larsen, 2009, p. 364]. INTERSPUTNIK did not have the same two-tiered system of internal governance. When the Soviet Union ceased to exist from approximately 1991 onwards, pressures to privatize space activities were strong, and INTERSPUTNIK went the same way as the other three organizations discussed above. One difference is that the Operating Agreement of the privatized entity is optional for the original Member States. Of the original 25 State members, 19 have signed the Agreement [von der Dunk, “International Organizations”, 2015a, p. 302].

The way in which all four of these organizations changed their relationships with their original members demonstrates that even global governance of the least controversial services can be complex and competitive. It could be said that the transition to private entities has been relatively successful due to the ability to maintain some intergovernmental oversight. Thus, these entities themselves are not a part of global governance but rather are subject to it. Two other intergovernmental regional operating organizations are the EUMETSAT and Arabsat. They have been created under their respective international treaties and provide, respectively, metrological services in Europe and satellite telecommunication services in mainly the Arab countries. These organizations promote regional cooperation but influence or play little role, if any, in global space governance.

2.5.4 Non-Governmental International Organizations

Non-governmental organizations (NGOs) may have less immediate or enforceable impact on global space governance. However, they contribute by identifying issues and helping to create cooperative solutions. In the future, they may have to play a more proactive role in maintaining the global public interest in sustainable space governance, especially in order to detach issues from the shifting and short-term political lines.

One example is the International Organization for Standardization (ISO), an independent, non-governmental organization that has representatives from standardization bodies of 163 States [ISO, "ISO members"]. Its purpose is to generate international standards, which provide "requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose" [ISO, "Standards"]. These standards are developed by groups of experts in a given field working in technical committees of the ISO and serve to ensure that there is international uniformity and operability. The ISO has created standards for mitigating space debris, which led to the IADC Space Debris Mitigation Guidelines, and other standards for space technologies. The ISO may be one of the most suitable forums to further develop standards on space safety.

An alternative and very active forum is the International Association for the Advancement of Space Safety (IAASS), a non-profit organization "dedicated to furthering international cooperation and scientific advancement in the field of space systems safety" [IAASS, "Welcome"]. Its main purpose is "to propagate the idea that the time is ripe for the establishment of an international civil space safety organization" similar to ICAO with respect to aviation safety [IAASS, "Welcome"]. The IAASS has observer status at the UNCOPUOS and is a member of the International Astronautical Federation (IAF), which is described below. The IAASS has individual members, as well as corporations, agencies, universities, institutions, and other professional associations.

The IAASS works closely with the International Space Safety Foundation (ISSF), another non-profit organization dedicated to furthering industrial cooperation and scientific progress in the field of space safety. The ultimate "aim of the Foundation is to pursue the shaping and advancement of an industrial culture of space safety (technical, organizational, and socio-political) to contribute to make space missions, vehicles, stations, extraterrestrial habitats, equipment and payloads safer for the general public, ground personnel, space travelers and crews" [ISSF, "Home"]. The foundation also stresses the importance of the preservation of the orbital environment, in order to ensure sustainability of both intra- and inter-generational access and use of space. The key program of the foundation is the Space Safety Institute, an initiative aimed at developing and supporting the "implementation of a notion of space safety as a collective responsibility of the aerospace industry" [ISSF, "Home"]. It also undertakes training courses for engineers and other space applications professionals, and co-hosts workshops and conferences with the IAASS.

One key organization is the Committee on Space Research (COSPAR), which was established by the International Council for Science in 1958, one year after the launch of Sputnik [COSPAR, "About"]. COSPAR is made up of two types of members, namely national scientific institutions and international scientific unions [COSPAR, "Members"]. COSPAR's purpose is to "promote at an international level scientific research in space, with emphasis on the exchange of results, information and opinions, and to provide a forum, open to all scientists, for the discussion of problems that may affect scientific space research" [COSPAR, "Strategy"]. COSPAR's most impactful work is the 2002 COSPAR Planetary Protection Policy,

as amended in 2011, that serves as a reference for spacefaring nations to avoid organic constituent and biological contamination in space exploration [COSPAR, 2011]. COSPAR's recommendations come from its biannual scientific assemblies and the occasional issue-specific "roadmaps," which are designed to inform the scientific community, space agencies, and decision makers on the importance of collaborative decision-making. It also offers capacity-building workshops for young scientists from around the world. In this sense, it is certainly a successful organization. However, its impact could be even bigger if decision-makers gave it more attention, particularly given the importance of scientific collaboration to deal with all of the issues we will be faced with in the coming decades.

Another important NGO is the International Astronomical Union (IAU), which was founded in 1919 with the mission "to promote and safeguard the science of astronomy in all its aspects through international cooperation" [IAU, "About"]. It differs from COSPAR in that it is made up of individual members who are professional astronomers, active in professional research and education in astronomy. The IAU also collaborates with various scientific organizations around the world. Through the publication of proceedings of its symposia and colloquia, it has a significant impact on the scientific world. Nonetheless, it is difficult to measure its success in terms of a governance mechanism. The challenge is always for scientists to translate the importance of their work to national and international decision makers.

Another notable international player is International Astronautical Federation (IAF), which was established in 1950 with the intention of bringing scientists working in space technologies together from both sides of the Cold War bipolar divide and encourage scientific dialogue. Its members include organizations and companies working in space-related fields, and it is governed by a general assembly, a "bureau" of presidential and secretarial posts, and administrative and technical committees made up of experts. These committees can make recommendations concerning IAF programs, but also to external bodies as to standards and issues. The IAF's key event is the annual International Astronautical Congress (IAC), which is held in a different State every year and brings together players in space technology, governance, and policy from around the world, including engineers, industry representatives, national and regional space agencies, policymakers, and the media. During the IAC, an annual meeting for members of parliaments takes place, providing an informal forum for dissemination and discussion of key topics of major and global interest. It is difficult to measure the success or impact of this meeting since it does not have any direct decision-making agenda. However, the IAC's existence is important, since it provides a neutral forum for these discussions, and many of the attendees are truly experts in their fields.

Also during the IAC, a UNOOSA workshop is held in pursuance of the UNISPACE III resolution that the UNOOSA should facilitate cooperation between States on space technology and governance issues [U. N. Doc A/CONF.184/6]. This workshop is an important contribution to space governance, since it promotes capacity-building and supports decision-making with the aim of strengthening international and regional cooperation [U. N. Doc A/AC.105/1048]. However, its impact and degree of success are limited, owing to the fact that it is dependent on

States sending delegates, many of whom lack a sufficient background in space governance issues in the first place.

Another important partner with IAF is the International Institute of Space Law (IISL), which also meets at the IAC every year, and publishes its proceedings covering legal questions at the forefront of space activities. Some consider the IISL to be the “legal committee” of IAF [Lyll & Larsen, 2009, p. 10]. The IISL also closely works with the European Society of Space Law, which co-hosts an annual symposium and organizes the Manfred Lachs Space Law Moot Competition. The IISL has individual members, most of whom make active contributions to space law or social science literature, and institutional members, which are actively involved in space law or social or scientific aspects of space activities. The IISL has an observer status at the UNCOPUOS. All members must be nominated by existing members, ensuring a certain level of expertise. However, as a governance body, it has a limited impact, if any. Its greatest strength is bringing the debate on important legal issues to the forefront among those who are already active in the field of space law and supporting graduates and young professionals in the field. It does not provide advice to States or international organizations, and as such it is not a very strong player for global space governance moving forward in the 21st century.

A similar body of legal experts is the Space Law Committee of the International Law Association (ILA). The ILA is a non-governmental organization of individual members from around the world, and its committees produce studies and reports on the issues of international law with which they are concerned. The Space Law Committee considers a range of issues, including those that overlap with other committees, such as the Sea Level Rise Committee [ILA, “Space”]. The ILA has consulting status with a number of U. N. bodies and makes submissions to the UNCOPUOS, among others. It is not a body that governs directly, but the ILA does contribute to knowledge and the dissemination of issues within the United Nations and among the international legal community. Its success as a governance mechanism is perhaps limited by its exclusive membership, since it does not actively communicate much beyond its membership.

2.6 How and to What Extent Do Existing and Emerging “Soft Law” Regimes Influence Global Space Governance?

Many of the regimes and mechanisms that have emerged from the U. N. bodies and from alternative forums fall under the heading of “soft law.” Whereas treaties are binding in the same way that legislation or contracts are binding, “soft law” is non-binding, meaning that it is not “law” in the true sense of the word. Instead, soft law encompasses the influential role of many international documents and resolutions in guiding the behaviors and best practices of space actors, and the multilateral way in which they emerge as a reflection of the general international will and interest.

One example of soft law can be found in U. N. General Assembly resolutions discussed earlier, which has served to influence space governance in two ways. First, soft law influenced the earliest resolutions that guided the negotiation of the five core space treaties, and thus preceded and informed the formation of hard law instruments. Second, later U. N. General Assembly resolutions laid down general principles with respect to specific activities, such as direct broadcasting and the equal access to space and its benefits for all States, including developing States. Although these may be more aspirational, they still demonstrate a tally of the political will at a given time in history.

Similarly, the PAROS resolutions are only aspirational. Nevertheless, the resolutions on the placement of weapons in outer space may be a slow move toward some stronger obligations, since the unilateral declarations made by States in pursuance of this resolution are themselves internationally binding. These resolutions in particular urged States to work toward negotiating the PPWT draft proposed by Russia and China. Although there is no current consensus on the desire for such a treaty, there is a slow push from within the United Nations toward such a binding instrument.

Through the UNCOPUOS and the General Assembly, the United Nations has also been building consensus around the need for transparency and confidence-building measures, which are themselves a form of soft law. In 2006 and 2007, the General Assembly first adopted resolutions emphasizing the need for transparency and confidence-building measures in order to decrease the risk of an arms race, and called on States to make concrete proposals [GA Res 61/75; GA Res 62/43].

In response to this request, the European Union (EU) produced a proposal for a code of conduct in 2008 and presented a revised draft in 2012. This EU proposal received criticisms that the process had not been sufficiently transparent and inclusive. In response, the EU held multilateral open-ended consultations. A total of 95 U.N. Member States participated in the consultation process, and 61 States were present in each round of consultations [EU External Action, “Disarmament”].

In 2014, the EU produced a new draft of the International Code of Conduct (ICoC), which maintains the same central purpose of the previous drafts, asking subscribing States to agree to abide by the principle of freedom in outer space, to recognize the right to self-defense in outer space, while at the same time refraining from the threat or use of force in outer space. Subscribing States should also refrain from damage to or destruction of space objects, unless this is justified by “imperative safety considerations,” and encourages the reduction of space debris, or the “inherent right” to self-defense. It also urges States to implement the Space Debris Mitigation Guidelines, described below. However, in July 2015, when an international conference was held under the auspices of the EU at the United Nations in New York, the intended negotiations failed to reach any agreement, and debates focused on the dissatisfaction with the process, which had not been sufficiently inclusive and which had ignored comments given by various States during the open consultations [Chair’s Summary]. Since this conference, many have declared the

ICoC to be a failure, signaling the importance of truly global collaborative processes [Meyer, 2015]. It may be very difficult to bring this document back to life without the necessary political buy-in.

The Space Debris Mitigation Guidelines referred to in the ICoC are also an example of a soft law regime where binding standards are lacking. In 2001, the UNCOPUOS asked the IADC to develop a set of international space debris mitigation guidelines [U. N. Doc A/AC.105/761; Viikari, 2015, p. 742], which it later used as a basis for the 2007 UNCOPUOS Guidelines adopted by the U. N. General Assembly [GA Res 62/217]. The guidelines are a voluntary measure with which States are encouraged to comply by implementing their own national standards dealing with launch and satellite design (to reduce long-term debris) and space safety (to deal with current debris). Such internationally recognized standards and guidelines, though voluntary, have already had a positive impact on national legislation with respect to licensing requirements, and are an example of successful global governance through standard-setting. This will be discussed in Chapter 14.

In 2011, the U. N. General Assembly adopted a resolution to establish the GGE to conduct a study on outer space transparency and confidence-building measures [GA Res 65/68]. In 2013, the GGE produced a report that strongly encouraged the development of a code of conduct [U. N. Doc A/68/189]. The report also emphasized that non-legally binding measures “for outer space activities should complement the existing international legal framework pertaining to space activities and should not undermine existing legal obligations or hamper the lawful use of outer space, particularly by emerging space actors,” and that transparency and confidence-building measures could contribute to, but not replace, the monitoring of arms limitation agreements [U. N. Doc A/68/189]. The GGE report also recognized the growing role of international cooperation in outer space activities for building confidence and trust among States. Since the need for transparency and confidence-building measures focuses on the concern for an arms race in space, the GGE recommended establishing coordination among the U. N. Office for Disarmament Affairs (UNODA), the UNOOSA, and other U. N. bodies in order to facilitate the implementation of the transparency and confidence-building measures and promote their further development. The lack of this kind of coordinated governance has been one of the key limiting factors in the ability to clearly define and agree on the global public interest in space in recent decades.

2.7 Are There Alternative or Complementary Mechanisms Available and to What Extent Are They Effective?

Global governance can sometimes take the form of civil society creating independent organizations made up of experts seeking to work together outside of any formal bureaucracy and contribute to the setting of standards. Such organizations are

not mandated by any State, nor do they necessarily arise out of intergovernmental cooperation. They are, therefore, not directly taking part in governance. However, the creation of standards or codes of conduct can be important contributions, and some of these organizations have been more successful than States, since they are based on expertise and are unhampered by political considerations. As long as “global governance” does not require any direct mandate, they can be considered to be very effective mechanisms, particularly taking into account current and future uses of space, such as global satellite navigation and human space flight.

2.7.1 Voluntary Bilateral and Multilateral Arrangements

With respect to protecting space for exclusively peaceful uses, the Missile Technology Control Regime (MTCR) is an example of a multilateral, voluntary arrangement that has developed a set of non-binding guidelines to prevent the proliferation of unmanned delivery systems capable of delivering weapons of mass destruction [Missile Agreement; van Fenema, 2015, p. 418]. These guidelines include space launch vehicles and intend to prevent export of such technologies without impeding national space programs or international cooperation on peaceful uses of outer space. The problem with the guidelines, however, is that it is very difficult to verify whether some missile technology could be used for the delivery of weapons of mass destruction and to guarantee that cooperation could not lead to such use. Similarly, the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies is a multilateral, non-binding export control regime that aims to prevent the acquisition of arms and dual-use technologies, including space launch vehicles and spacecraft, if the situation in a certain region or group of States becomes a security concern [Wassenaar Arrangement].

One important forum of non-binding international space governance comes in the form of Memoranda of Understanding (MoUs) between States, State agencies, companies, and even individuals. Although these are not equivalent to legislation or binding contracts, they are important links of cooperation and establish the intentions of parties [Lyll & Larsen, 2009, p. 37]. Often, MoUs contain financial arrangements, agreements on liability, and other rights, duties, and obligations expressed in the form of “expectations” rather than legally enforceable provisions. Sometimes, MoUs are negotiated as a lead up to contractual agreements. However, they can also be stand-alone agreements. MoUs have been extensively used with regard to the ISS and the operation of the Global Mobile Personal Communications by Satellite (GMPCS) [Lyll & Larsen, 2009, p. 122]. These MoUs can form an important link in cooperation between entities as part of a more complex legal arrangement.

2.7.2 The International GNSS Service

The International GNSS Service (IGS) was established in 1991 and currently operates as a federation of more than 200 worldwide agencies and institutions in over 100 States [IGS, “About”]. Each participating organization voluntarily provides its own funding, depending on what it contributes to the IGS network. As a collaborative institution, IGS provides parameters that can aid in the precision of position, navigation, and timing, and collects, archives, and distributes data publicly with respect to scientific monitoring of Earth’s surface and climatic makeup for a wide range of applications and experimentation. It is “a global network of over 400 permanent, continuously operating, geodetic quality stations tracking GPS, GLONASS, Galileo, BeiDou, QZSS, and SBAS” [IGS, “About”].

Similar to the impact of the IAASS and the ISO, which independently provide international standards where States are slow to do so in the traditional forums, the IGS fills a gap in global space governance. By centralizing the data that is generated by many global navigation satellite systems, and providing parameters to improve accuracy, the IGS provides a needed service to hundreds of entities and their end-users. In this sense, it can be said to be a successful mechanism of global space governance, and certainly an alternative to the slow-moving dynamics of formal State-based negotiations or governance.

2.7.3 The Commercial Spaceflight Federation

On the other end of the governance spectrum is the Commercial Spaceflight Federation (CSF), which, as its name indicates, is a collaboration among private commercial entities working for the industry of human spaceflight. The CSF has over 70 members, and its mission is to lay “the foundation for a sustainable space economy and democratizing access to space for scientists, students, civilians, and businesses” [CSF, “Home”]. However, it should be noted that it has a particular focus on the United States, both in terms of its membership – its executive members are almost exclusively U. S. companies, and the majority of its associate members are U. S.-based. Its self-declared mission is to bolster U. S. leadership in commercial aerospace. Its board of director members are all CEO-level officers of major companies involved in the emerging commercial spaceflight sector, and while their interests are certainly aligned with each other, they are perhaps not aligned with the global public interest.

The CSF has been successful in lobbying for new U. S. legislation, and this is one of its key aims. The organization and its members lobbied the U. S. Congress for the passage of the Commercial Space Launch Competitiveness Act of 2015 (discussed in more detail in Chapters 11 and 16), and have been lobbying for further

legislation on safety regulations, spaceport infrastructure, and the modernization of the international traffic in arms regulations, which presently limit certain trade in space technology. The federation also takes stances on policies relating to NASA and commercial crew being sent to the ISS.

Most of its policy and legal recommendations are aimed directly at U. S. legislators and U. S. laws and infrastructure. Therefore, CSF has a successful influence on national space governance. Nevertheless, its direct role in global space governance is limited. Possibly, it could be seen as a model for other States or regional alliances, whereby private actors join forces to influence the traditional governance mechanisms. However, the United States has a particular culture where commercial and industry actors are known to impact legislators far more than in many other States. Therefore, it remains to be seen whether this model can be replicated in other regions, or indeed, on a global scale.

2.7.4 National Space Regimes as Model Laws

Some States, notably the United States, have been very proactive in legislating on space-related activities at the domestic level. They have done so not only to encourage the space activities of commercial entities within their jurisdiction but also to respond to greater and shared concerns, such as space debris. Many feel that such national laws can be a useful tool to strengthen what to date have only been voluntary measures at the global level.

Similarly, where the international community is slow to come up with clear norms and incentive mechanisms to apply these norms, national legislation may push this frontier. One such example is the recent law passed by the United States that asserts protection against interference by any other entity for U. S. commercial entities wishing to mine asteroids, be they American or foreign companies [Commercial Space Launch Competitiveness Act of 2015]. The law also asserts that such companies will have property rights over what they extract from asteroids under U. S. law [Commercial Space Launch Competitiveness Act of 2015]. This aspect of this law will be discussed in detail in Chapter 16, which deals with space mining.

2.7.5 Insurance as Governance

By comparison to government regulation developed through a complex administrative process, insurers can more rapidly adapt their contractual mechanisms to determine and implement reasonable and beneficial industry standards, which can even be used in the subsequent formulation of regulatory mechanisms [Andrea Harrington, 2016]. The small number of insurers providing coverage globally creates an ideal

environment for “insurance as governance” in the space industry – for example, in terms of debris mitigation rules and space traffic management services. Insurers would form a space insurance industry association to develop standard or insurers could join with launch providers and satellite manufacturers in a space transportation society to develop industry best practices, which would be in line with the call for such best practices issued by the U. S. government.

2.8 Conclusion and Summary Table

From this overview, it is clear that there are many more players in the field of global space governance in addition to States and governmental organizations. What is also clear is that there are no one-size-fits-all solutions. Specific issues will require specific solutions and specific expertise, and, hence, the challenge is to coordinate the many layers of governance to ensure that the global public interest remains at the core.

Even in the bipolar political context of the Cold War that dominated the 20th century space race, there was willingness between the two superpowers to come to internationally binding agreements related to the early governance of space activities. At the same time, there was a parallel concern among other States with regard to the dominance of these two superpowers in space, including a possible space arms race. These factors led to the swift creation of the UNCOPUOS to regulate uses of outer space one year after the launch of Sputnik, as well as to the adoption of a set of fundamental principles by the U. N. General Assembly, and to the drafting and adoption of some core treaties.

However, since there are many more States and now non-State actors actively participating in space activities, the competing interests have become more diverse. The membership of the UNCOPUOS has increased from a small number of nations to over 80 States with very divergent political agendas and space-related objectives. Some States have become less willing to subject themselves to new binding norms, and the United Nations and its specialized agencies have not been successful in negotiating new treaties. Instead, there has been an increase in the number of non-binding “soft law” norms, and an increase in the number of entities involved in their creation, sometimes in parallel and sometimes at odds with each other. These soft law norms may, in the long-term, become more successful in incentivizing actors to maintain global interests. Nevertheless, there is little opportunity to articulate just what the global public interests in space in the 21st century are, let alone to ensure they are being achieved or protected. There is a risk of loss of coherence, and of losing sight of the goal of sustainable use of space for peaceful purposes and for the benefit of all humankind (Table 2.1).

Table 2.1 Summary table of existing major space governance mechanisms

Existing Major Space Governance Mechanisms				
Existing Governance Mechanisms	Member Categories (Formal/ Informal)	Decision-making (Actor/Participant)	Strengths	Limitations
Five core UN space treaties	Formal	States	Created the core principles of access to and use of space, liability for damage due to space activities, registration obligations, and return and rescue obligations. Some of these principles are considered to be customary law, binding on all States and governing all space activities	Product of the Cold War. Geopolitical power is more complex today and there are more space actors, including non-State actors. Therefore, it is difficult to uphold these principles when they are challenged. Limited enforcement mechanisms. Moon Agreement has very low participation and very low impact
UN General Assembly	Formal (Intergovernmental)	UN Member States	Universal participation. Resolutions represent the positions of Member States, as can be seen in vote counts	Resolutions are politically, not legally, binding

UN Office for Outer Space Affairs (UNOOSA)	Formal (intergovernmental)	UN Member States	<p>Centralizes space activities within the UN, through cooperation with many specialized agencies.</p> <p>Discharges the responsibilities of the UN Secretary-General under the UN treaties and principles on outer space, including by maintaining the Register of Space Objects as well as other databases, which are made available to Member States as well as private entities. Conducts capacity-building activities and disseminates knowledge through training programs. Serves as Executive Secretariat for ICG and Permanent Secretariat to SMPAG</p>	Limited funding, need for growing human resource complement
UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS)	Formal (intergovernmental)	UN Member States being members of the Committee (currently 80 members)	<p>Specific focus on peaceful uses of outer space means global public interest is central. Five core space law treaties were produced by UNCOPUOS. Current focus on long-term space sustainability and transparency and confidence-building measures as well as GNSS, space weather, exploration and innovation, planetary defence, and sustainable development</p>	<p>Consensus decision-making means everything is compromised, and UNCOPUOS has had limited ability to reach broad agreement on new space-related subjects nor produced any new binding legal norms, although at the same time it has been successful in “soft law” development of principles, resolutions, and guidelines supplementing the set of space law treaties</p>

(continued)

Table 2.1 (continued)

Existing Major Space Governance Mechanisms				
Existing Governance Mechanisms	Member Categories (Formal/ Informal)	Decision-making (Actor/Participant)	Strengths	Limitations
Conference on Disarmament	Formal (intergovernmental)	UN Member States	Specific focus on disarmament allows global public interest to remain a high priority. Links with other (non-space) disarmament issues	Consensus decision-making means there has been little progress in this politically sensitive area
International Civil Aviation Organization (ICAO)	Formal (intergovernmental)	UN Member States	Has produced much binding law on air law matters. Has recently started cooperation with UNOOSA to consider overlap between air and space safety and traffic management activities	To what extent does it have the jurisdiction and mandate to deal with space governance as far as commercial space transportation and suborbital activities are concerned? Individual State interests dominate law-making
World Health Organization (WHO), World Meteorological Organization (WMO), and UN Environment Programme (UNEP)	Formal (intergovernmental)	Member States	Provide recommendations and standards in terms of radiation and environmental concerns	Only those space-related governance issues are addressed that are limited to the main mandates of these organizations
International Telecommunication Union (ITU)	Formal (intergovernmental with some nongovernmental participation)	States, "sector members" including regional organizations, commercial entities, and academics	Successfully regulated allocation of radio frequencies and orbital slots. Has near-universal participation	Has very few enforcement mechanisms, and no strong ones. Breaches can be noted, but no real penalties

Committee on Earth Observation Satellites (CEOS)	Formal	National space agencies	Coordination of satellite Earth observation policies, standards, and other operational aspects	Membership limited to some space agencies, non-binding decisions
	Formal (intergovernmental)	National space agencies	Provides recommendations to Interoperability Plenary on issues of coordinating space communications policies and technologies. Centralized and neutral. Has broad participation	Recommendations are not binding. Depends upon participation by national space agencies, which excludes developing nations that do not yet have active space programs
Group of Governmental Experts (GGE)	Informal (ad hoc) intergovernmental	Individuals selected for their expertise	Produced reports on transparency and confidence-building measures in accordance with UN General Assembly resolutions. Similar groups have also been formed for cyber security and telecommunications. The 2013 GGE-report on TCBM in outer space activities paved the way for considerations in UNCOPUOS of the broader perspective of space security	Non-binding norms, dependent on States or other bodies to implement them. No enforcement or incentive mechanisms
	Informal (Intergovernmental and nongovernmental events)	UN Member States; international organizations; space-related industry members (on invitation of their governments)	Served as important forums for almost all stakeholders to discuss almost all aspects of space exploration, use, and exploitation of space	Limited and only indirect influence in the formulation of global space governance
UNISPACE I, II, and III				(continued)

Table 2.1 (continued)

Existing Major Space Governance Mechanisms				
Existing Governance Mechanisms	Member Categories (Formal/ Informal)	Decision-making (Actor/Participant)	Strengths	Limitations
International Astronautical Federation (IAF)	NGO	Companies and organizations working in space-related fields	Creates a global network of private entities involved in space activities on a large-scale. Dissemination of knowledge and technological advances contributes to international cooperation, especially through annual meeting with Members of Parliament	Produces no applicable governance documents or guidelines
International Institute of Space Law (IISL)	NGO	Individuals with expertise in space law	Brings together international experts in their personal capacities, rather than as State representatives, to consider issues of space law. Produces “proceedings” and academic publications	No general guidelines or applicable governance documents and no significant and direct input to global space governance
International Association for the Advancement of Space Safety (IAASS)	NGO	Individuals with expertise in space. IAASS is itself a member of IAF and has observer status at UNCOPUOS	Produces reports, academic publications/proceedings, as well as recommendations that it presents to UNCOPUOS, develops international standards	

International Law Association (ILA) Space Law Committee	Formal NGO	Individuals who are members of their national branch of the ILA and have expertise in space law	Brings together international experts in their personal capacities, rather than as State representatives, to consider issues of space law	Produces reports and academic publications, but no general guidelines or applicable governance documents; not very strong on dissemination
Consultative Committee on Space Data Systems (CCSDS)		National space agencies, other governmental agencies, NGOs, private scientific and commercial entities	Develops standards to enhance governmental and commercial interoperability and cross-support, while also reducing risk, development time, and project costs	

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NOTE: There are numerous other regulatory instruments and institutions that play role to a varied degree in global space governance. They are too many to be discussed in this chapter and listed in this table though some of them are referred to in other chapters.

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