area in space or a natural resource, orbits are therefore always considered non-appropriable.[59] Underlying this line of thought is a silent assumption that the natural resources of celestial bodies and of outer space *sensu strictu* should be subjected to a fundamentally different regime of appropriation, according to which only the former should be exempt from application of article II of the Outer Space Treaty. In turn, it is the alleged applicability of the non-appropriation principle to orbits that is thought to restrict the legitimate types of orbital use. It is not at all clear, however, that this should necessarily follow from the Outer Space Treaty.

A bifurcated approach to space resources as suggested above presupposes that it is both possible and necessary to define and distinguish between celestial bodies and other physical components of outer space, since the categorization of natural resources pursuant to this theory rests solely on the physical entities in which they originate. However, no satisfactory definition has ever been offered in either space law treaties or doctrine of either a celestial body or of outer space *sensu strictu*, on the basis of any criterion whatsoever, be it legal, physical or scientific.[60] The only legal provision that offers guidance as to the interpretation of the celestial body notion merely compounds the issue, as it states that the reference to celestial bodies should also comprise the orbits around or other trajectories to or around them, thus further conflating the outer space and celestial body concepts.[61] Far from offering a workable solution, the

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[59] A distinctly discriminatory approach to the appropriation of natural resources of celestial bodies and outer space *sensu strictu* underlies the analysis in, e.g., K.U. PRITZSCHE, NATÜRLICHE RESSOURCEN IM WELTRAUM - DAS RECHT IHRER WIRTSCHAFTLICHEN NUTZUNG [NATURAL RESOURCES IN SPACE – LAW PERTAINING TO THEIR ECONOMIC USE] 87-96 (Lang, Frankfurt am Main, 1989) [hereinafter NATURAL RESOURCES IN SPACE]; Oosterlinck, *supra* note 47, at 277.

[60] See, for example, the definitions and criteria suggested in G.P. Zhukov, *The Problem of the Definition of Outer Space*, *in* 10 PROC. COLL. L. OUTER SPACE 273 (1967); Gyula GÁL, SPACE LAW 186-187 (Leiden, Sijthoff, 1969); Michel S. Smirnoff, *Fourth Report of the Working Group III of the International Institute of Space Law*, *in* 7 PROC. COLL. L. OUTER SPACE 352 (1964); R. FROHN, INTERNATIONALISIERUNG VON HIMMELSKÖRPERN [INTERNATIONALIZATION OF CELESTIAL BODIES] 69 (Berlin, Verlag, 1969); MARCOFF, *supra* note 13, at 242. *See further*, *in general*, De Man, *supra* note 54, 44-51, with references (for an analysis of the celestial body notion).

[61] Moon Agreement, *supra* note 56, at art. 1, para. 2.

provision thus only confirms that there is no satisfactory criterion for an *a priori* definition of 'celestial bodies' that would allow distinguishing them from the empty space in between, and, by extension, between the natural resources of either category.

This does not imply, however, that the issue must remain unresolved. A number of indications in the outer space treaties exist that appear to render the search for an *a priori* definition of the physical components of outer space wholly unnecessary, as the ambit of their provisions can be delineated on the basis of the activity regulated. The scope of the treaties and their main provisions can thus be defined from a functional point of view. An example may illustrate this point. Article XII of the Outer Space Treaty provides that

> All stations, installations, equipment and space vehicles on the Moon and other celestial bodies shall be open to representatives of other States Parties to the Treaty on a basis of reciprocity.

Without having at our disposal a prior definition of 'celestial bodies,' it is clear from the activity regulated by this provision that it can only apply to land masses in space that by their nature allow for the settlement of such bases as are contemplated by the provision. Therefore, if a natural object in space is sufficiently large and solid to sustain a base, it should be considered a celestial body for the purpose of this provision. If it does not meet these requirements, the question of whether or not the object at issue constitutes a celestial body becomes irrelevant, as the provision cannot be deemed applicable.[62] A functional approach to determining the scope of the space treaties avoids the need for a prior classification of material phenomena in space and has therefore been suggested by a number of authors in order to escape the definitional dilemma of the celestial body concept.[63] The approach is also in line with the principal

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[62] *Id.* at art. 8 (2) (allows states parties to the Agreement to land their space objects on celestial bodies).

[63] Imre Csabafi & Savita Rani, *The Law of Celestial Bodies*, 6 INDIAN J. INT'L L. 195, 196 (1966); A.S. PIRADOV, INTERNATIONAL SPACE LAW 114 (Honolulu, University Press of the Pacific, 2000); MARCOFF, *supra* note 13, at 240; GÁL, *supra* note 60, at 186-187; Elmar Vitt, *Begriffsdefinitionen [Definition of Terms], in* K.-H. BÖCKSTIEGEL (ED.),

aim of the UN space treaties, which is to regulate the *activities* of states in outer space and on celestial bodies, rather than to determine the *legal status* of these areas as such. This clearly follows from the full titles of the Outer Space Treaty and the Moon Agreement.[64]

The functional approach as suggested here implies, first, that if two provisions are applicable to 'celestial bodies,' their scope may differ in practice, should this be warranted by the relevant activities. For example, it was noted above that article XII of the Outer Space Treaty is only applicable to celestial bodies capable of supporting a space station or other installation of human fabrication. Other activities regulated by the space treaties, however, may warrant application to a larger category of natural space objects, such as the proscription of installing weapons of mass destruction on celestial bodies contained in article IV of the Outer Space Treaty. Secondly, it follows from the functional approach advocated here that a bifurcated approach to the application of a certain provision is unwarranted if the nature of the regulated activity does not provide any guidance as to the limits of such bifurcation. This is most pertinent for the application of provisions with inclusive scope, such as article II of the Outer Space Treaty, as they do not distinguish between outer space *sensu strictu* and celestial bodies and there is no accepted *a priori* definition of either concept. It follows that the non-appropriation provision should be applied indiscriminately to both categories. This in turn implies that, whatever the outcome of the discussion on the applicability of article II of the Outer Space Treaty on natural resources in general, the legal regime should be the same for resources of celestial bodies and of outer space *sensu stricto*, for they can only be defined by reference to the physical environment in which they are located.

HANDBUCH DES WELTRAUMRECHTS [HANDBOOK OF SPACE LAW] 51-54 (Heymann, Cologne, 1991).

[64] *See* Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, *opened for* signature Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty], and the Moon Agreement, *supra* note 56.

Now that we have clarified the conceptual implications of the outer space and celestial body notions in the non-appropriation principle, we can turn to the applicability of this provision to the natural resources of these categories, as opposed to their areal manifestation. Most authors limit the applicability of the proscription contained in article II of the Outer Space Treaty to the establishment of titles over territorial areas in outer space, without applying it to their qualification as natural resources.[65] The main purpose of this provision is to avoid territorial conflicts in outer space so as to guarantee the free exploration and use thereof in accordance with article I of the Outer Space Treaty. Article II of the Outer Space Treaty neither mentions nor excludes natural resources originating in the space environment and should thus be considered inapplicable thereto, as it is an exception to the general rule of freedom of activity in outer space. This is confirmed by the Moon Agreement, pursuant to which only natural resources 'in place' on the Moon and other celestial bodies cannot be appropriated. *A contrario*, the appropriation of natural resources should be lawful once removed from their place. The discussion on whether or not the Moon Agreement installed a moratorium on the exploitation of natural resources can only confirm this view.[66] Article 11, paragraph 5, of the Moon Agreement provides that

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[65] *See* Bin Cheng, *The 1967 Space Treaty*, 95 J. DR. INT'L 564-568 (1968); MARCOFF, *supra* note 13, at 328; C. W. JENKS, SPACE LAW 202 (Stevens, London, 1965); C. Wilfred Jenks, *Property in Moon Samples and Things Left Upon the Moon"*, *in* 12 PROC. COLL. L. OUTER SPACE 148 (1969); GÁL, *supra* note 60, at 200-201; Stephen Gorove, *Sovereignty and the Law of Outer Space Re-Examined*, 2 ANN. AIR & SPACE L 311, 321 (1977); H.A. Wassenbergh, *Speculation on the Law Governing Space Resources*, 5 ANN. AIR & SPACE L. 616 (1980); Sylvia Maureen Williams, *The Law of Outer Space and Natural Resources*, 36 INT'L & COMP. L.Q. 146 (1987); D. Goedhuis, *Some Recent Trends in the Interpretation and the Implementation of the Rules of International Space Law*, 20 COLUM. J. TRANSNAT'L L. 213, 219 (1981); Wayne N. White, Jr., *Interpreting Article II of the Outer Space Treaty*, *in* 46 PROC. COLL. L. OUTER SPACE 175 (2003); Stephen Hobe, *Adequacy of the Current Framework Relating to the Extraction of Natural Resources in Outer Space*, 32 ANN. AIR & SPACE L. 115, 119 & 126 (2007) [hereinafter *Adequacy of the Current Framework*].

[66] Stephen GOROVE, STUDIES IN SPACE LAW: ITS CHALLENGE AND PROSPECTS 217 (Sijthoff, Leiden, 1977); *Sovereignty and the Law of Outer Space Re-Examined*, *supra* note 65, at 320-321; *Adequacy of the Current Framework*, *supra* note 65, at 124-125.

> States Parties to this Agreement hereby undertake to establish an international regime . . . to govern the exploitation of the natural resources of the Moon as such exploitation is about to become feasible.

Regardless of the interpretation of this provision, the mere fact that it resulted in heated discussions on whether or not it installed a moratorium on the exploitation of Moon resources confirms the legality of this activity under the Outer Space Treaty, as a moratorium by definition implies the temporary prohibition of an activity that was previously allowed.[67]

Given the express wish of the drafters of the Moon Agreement to respect the fundamental principles of the Outer Space Treaty,[68] and taking into account that article II of the Outer Space Treaty does not allow distinguishing between the natural resources of celestial bodies and other space resources (*supra*), it follows that no resources in outer space are *in se* non-appropriable, including orbits. The inapplicability of the non-appropriation principle to orbital positions also follows from the nature of the exploitation of these resources when compared to the excavation of mineral reserves on celestial bodies. While the latter activity takes the form of a permanent and irreversible destruction through consumption of a depletable natural resource, the exploitation of orbits merely amounts to the temporary use of a non-depletable resource that does not significantly deteriorate after intensive use. If it is accepted that article II of the Outer Space Treaty does not apply to the resources of celestial bodies, it should, *a fortiori*, be inapplicable to the use of orbital positions for the everyday usage of orbital positions that have so strenuously come under attack in recent years. Arguing that article II of the Outer Space Treaty is inapplicable to natu-

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[67] *See* THE MODERN INTERNATIONAL LAW OF OUTER SPACE, *supra* note 16, at 298-303 (for the submissions of the US to the UN Committee on the Peaceful Uses of Outer Space (UN COPUOS) and the understanding adopted by the Committee itself in its 1979 report); Milton L. Smith, *The Commercial Exploitation of Mineral Resources in Outer Space*, *in* Tanja L. ZWAAN (ed.), SPACE LAW: VIEWS OF THE FUTURE 47 & 52 (Kluwer Law and Taxation, Deventer, 1988).

[68] *See* US/UN Press Release 107/79 (Nov. 1, 1979), at 5 ("The discussion in the Outer Space Committee confirmed the understanding that the Moon Treaty [sic] in no way derogates from or limits the provisions of the 1967 Outer Space Treaty").

ral resources of any type is not to say that orbits in space in their capacity of natural resource should necessarily be amenable to appropriation. It merely implies that there is no legal ground for *a priori* barring the appropriation of orbital points and other natural resources of outer space *sensu stricto* on the basis of article II of the Outer Space Treaty, if it is accepted that this provision does not proscribe the appropriation of mineral reserves on celestial bodies. The legal regime of orbits does not depend on the formulation of a physical criterion for distinguishing these resources from other types of space resources solely on the basis of their origin. Rather, it requires a criterion for differentiating celestial bodies and outer space *sensu strictu* as territorial areas, from such phenomena in their capacity as natural resources. This requires a closer look at the meaning of the natural resource concept in the context of space activities.

Like 'outer space' and 'celestial body', the notion 'natural resource' does not have a clearly defined meaning in international law. The Outer Space Treaty does not expressly address the issue and the only international space law instruments that contain explicit provisions on natural resources fail to define the concept in any way. Article 11 of the Moon Agreement is limited to declaring natural resources of celestial bodies 'the common heritage of mankind,' relinquishing the interpretation of this concept to the subjective evaluation of the States parties. The only other reference to natural resources in international space law is article 44, paragraph 2, ITU CS, which, as we have seen, merely obliges States to "bear in mind that radio frequencies and any associated orbits, including the geostationary-satellite orbit, are limited natural resources." While these provisions are hardly revelatory in their vagueness, the unqualified references to the general notion 'natural resources' in two instruments that regulate two physically disparate environments does confirm that the notion's meaning transcends categorisation and that there is no legal ground for distinguishing between the resources of celestial bodies and other space resources.[69] The pro-

[69] *Compare* Armand D. ROTH, LA PROHIBITION DE L'APPROPRIATION ET LES RÉGIMES D'ACCÈS AUX ESPACES EXTRA-TERRESTRES [THE BAN ON APPROPRIATION AND THE

visions also reveal that any legal definition of natural resources should not be limited to tangible resources alone. Definitions proffered in literature that focus on any particular material characteristics of space resources should thus be dismissed, for they would incorrectly result in the exclusion of orbital positions and radio frequencies, in manifest contradiction to the unequivocal language of article 44, paragraph 2, ITU CS.[70] Most authors therefore advance a broad definition of space resources, which comprises both tangible and intangible resources. For example, Pritzsche, in his intensive study of the legal regime of space resources, interpreted the notion as comprising

> alle materiellen oder immateriellen Teile, Bestandteile und körperlich oder räumlich abgrenzbaren Erscheinungen des Weltraums einschließlich der Himmelskörper . . ., die Gegenstände wirtschaftlicher Nutzung sind oder sein können.[71]

Ultimately, it seems that any component particle of outer space can theoretically be considered a natural resource and, indeed, some authors have argued just this.[72] Obviously, such an encompassing interpretation of the notion would deprive it of all

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REGIMES ON ACCESS TO AREAS IN SPACE] 79 (Paris, Presses Universitaires de France, 1992).

[70] R.V. Dekanozov, *Weltraum, Himmelskörper, ihre Ressourcen und der Begriff 'Gemeinsame Erbe der Menschheit' [Space, Celestial Bodies, their Resources and the Term 'Common Heritage of Mankind']*, *in* WELTRAUM UND RECHT 19 (Institut für Staat und Recht der Akademie der Wissenschaften der UdSSR (ed.), Moscow, 1985) (for an example of the definition of "natural resources").

[71] NATURAL RESOURCES IN SPACE, *supra* note 59, at 17; K. U. Pritzsche, *Die Nutzung Natürlicher Ressourcen [Use of Natural Resources]*, *in* K.-H. BÖCKSTIEGEL (ED.), HANDBUCH DES WELTRAUMRECHTS [HANDBOOK OF SPACE LAW] 560-561 (Cologne, Heymann, 1991). *See also, e.g.*, Martin WILL, SOLAR POWER SATELLITES UND VÖLKERRECHT: VÖLKERRECHTLICHE ASPEKTE VON GROßPROJEKTEN ZUR ENERGIEGEWINNUNG AUS WELTRAUMRESSOURCEN [SOLAR POWER SATELLITES AND INTERNATIONAL LAW: INTERNATIONAL LAW ASPECTS OF LARGE-SCALE PROJECTS ON THE EXTRACTION OF ENERGY FROM SPACE RESOURCES] (SOLAR POWER SATELLITES, LUNAR POWER SYSTEMS, HELIUM-3-PROJEKT) 59-60 (Stuttgart, Boorberg, 2000) (for the definition advanced by Will, who extends the notion to cover every material and immaterial object and phenomenon in outer space, including orbits, points, solar rays and radio frequencies).

[72] Lubos Perek, *Outer Space as Natural Resource*, *in* René-Jean DUPUY (ed.), LE RÈGLEMENT DES DIFFÉRENDS SUR LES NOUVELLES RESSOURCES NATURELLES [THE SETTLEMENT OF DISPUTES ON NEW NATURAL RESOURCES], 222 (Martinus Nijhoff, The Hague, 1982).

practical and legal significance. Given the equally inclusive nature of the notion 'outer space' as a territorial concept, it would follow that every single particle in space could arbitrarily be categorised both as an area and as a natural resource. This would be untenable in light of the established inapplicability of article II of the Outer Space Treaty to natural resources *only*. The natural resource notion should thus be further circumscribed in order to be practically relevant. Most authors have chosen to concretize the notion by requiring that a particular phenomenon in space can *produce an economic value upon transformation through human use* in order to be considered a natural resource. As such, Roth specifies that "[p]ar ressource spatiale, on vise ici ce que la nature (l'espace) fournit à l'homme . . . en vue d'une utilisation directe ou après transformation."[73] The natural resource concept is traditionally circumscribed by similar criteria in general international law, which remains a useful tool for guiding the interpretation of space law pursuant to article III of the Outer Space Treaty.[74] Moreover, the qualification also corresponds to the definition of natural resources in most legal dictionaries.[75] It follows that space resources should be defined, not on the basis of any physical or material characteristics of the resource in question, but by virtue of their susceptibility to exploitation by human activity. After all, it is precisely because an orbital slot can only produce economic value when assigned in conjunction with radio frequencies that it is considered intrinsically linked with the frequency spectrum. A functional interpretation of the natural resource notion further supports the limitation of the scope of the non-appropriation principle to territorial areas, in light of the prohibition in article

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[73] ROTH, *supra* note 69, at 79. *See also, e.g.*, Marta Miklódy, *Einige Bemerkungen zur Frage der Eigentumsrechte an Mineralschätzen der Himmelskörper [Some Remarks on the Question of Ownership of Mineral Resources of Celestial Bodies], in* 22 PROC. COLL. L. OUTER SPACE 177 (1979) (referring to a similar criterion proposed by Vassilievskaïa).

[74] S. PAQUEROT, LE STATUT DES RESSOURCES VITALES EN DROIT INTERNATIONAL: ESSAI SUR LE CONCEPT DE PATRIMOINE COMMUN DE L'HUMANITÉ (THE STATUS OF VITAL RESOURCES IN INTERNATIONAL LAW: AN ESSAY ON THE CONCEPT OF COMMON HERITAGE OF HUMANITY) 15 (Bruylant, Brussels, 2002).

[75] Black's Law Dictionary, for example, defines natural resources as "any material from nature having potential economic value". BLACK'S LAW DICTIONARY (9th ed. 2009).

II of the Outer Space Treaty to appropriate outer space 'by means of use.' Rendering this provision applicable to phenomena that exist only by virtue of their amenability to a certain type of use would be pointless and would unnecessarily curtail human activity in outer space.

Now that we have exhausted our analysis of the language of article II of the Outer Space Treaty, it becomes interesting to take a closer look at the exact wording of the non-appropriation principle in the Moon Agreement. The Moon Agreement elaborates on article II of the Outer Space Treaty, as repeated nearly *verbatim* in article 11, paragraph 2, Moon Agreement, by holding that

> Neither the surface nor the subsurface of the Moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental organization, national organization or non-governmental entity or of any natural person.[76]

The legal implications of this provision hinge on the interpretation of the phrase 'natural resources in place,' as it implies that natural resources no longer in place escape the proscription of appropriation. It is tempting to equate the moment in time when space resources are no longer in place with their removal from a location on the surface or subsurface of a celestial body. This might be too narrow an interpretation of this fundamental provision, however. In his landmark study of space law, Christol argued that the 'in place' criterion of article 11, paragraph 3, Moon Agreement should not be interpreted without taking into account the language of article 1 of the Moon Agreement.[77] Pursuant to this article, it is recalled, the celestial body notion also encompasses orbits around and trajectories to or around them. Hence, the qualification in article 11, paragraph 3, of the Moon Agreement, which *a contrario* allows the appropriation of natural resources when no longer 'in place', should be interpreted in such a way as to render it relevant for resources of orbits around these bodies as well. It is clear that orbits or segments of

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[76] Moon Agreement, *supra* note 56, at art. 11, para. 3.

[77] THE MODERN INTERNATIONAL LAW OF OUTER SPACE, *supra* note 16, at 305-307.

orbits cannot as such be 'moved' from their location. Therefore, it can be assumed that the meaning of the in place criterion should extend beyond its mere locational connotation. To be sure, the ordinary meaning of the term 'in place' should repudiate this interpretation. It is a general rule of interpretation of treaty provisions, however, that the ordinary meaning of terms should be abandoned if it renders the significance of a provision manifestly absurd or unreasonable.[78] It is submitted that a locational interpretation of the in place criterion in article 11, paragraph 3, of the Moon Agreement could hardly contribute to a sensible reading of the provision. Natural resources are only of interest to States to the extent that they can harvest their economic potential. This is done through their exploitation, which in turn requires that they be removed from their location. The very act of exploiting natural resources, however, unleashes their economic potential and renders them susceptible to appropriation. It appears pointless to proscribe the appropriation of natural resources, defined as elements that can produce economic value upon their exploitation, if the proscription can be lifted by the very act of exploitation itself. Moreover, the notion of natural resources 'in place' has little significance if it is accepted that natural resources can only be defined by their exploitation. As long as they are 'in place,' 'natural resources' should be considered intrinsic parts of a territorial area. The in place criterion should thus be interpreted as referring to the act of exploitation, which determines the qualification of natural resources, hence rendering spatial phenomena appropriable. This approach would also allow extending the scope of article 11, paragraph 3, of the Moon Agreement to all natural resources covered by the Moon Agreement, *i.e.* including orbital positions around celestial bodies.

Article 11, paragraph 3, of the Moon Agreement, confirms that natural resources should be used in order to identify them as appropriable elements originating in a non-appropriable area. *Actual use* is a necessary precondition for identifying and, subsequently, establishing the lawfulness of exploiting natural

[78] Vienna Convention on the Law of Treaties, arts. 31-32, May 23, 1969, 1155 U.N.T.S. 331, 8 I.L.M. 679.

resources in space, as through this activity, they acquire economic value and are 'transformed' from an area into a natural resource. This is easily understood with respect to mineral reserves of celestial bodies, as these can be excavated and, in a way, 'separated' from their area. When it comes to orbital slots, however, things are a bit more complicated. Simply declaring orbital points as natural resources intrinsic portions of outer space *sensu strictu* and hence indistinguishable from their environment is unwarranted from a legal perspective. Rather, it follows from the above interpretation of all relevant provisions of the Outer Space Treaty, that, despite their immaterial manifestation, the actual use criterion is equally applicable to natural resources of outer space *sensu stricto*. This conclusion is corroborated by a detailed analysis of the ITU regime.

III. THE ITU REGIME ON THE USE OF ORBITAL SLOTS

A. *'First-come, First-served' vs. 'A Priori' Approaches*

The history of the ITU regime on the use of orbital slots is often recounted as a politically charged battle between the developed, space-resource nations, who favoured an inflexible 'first-come, first-served' system granting quasi-permanent rights to the first to register the use of a certain orbital segment, and developing countries, who, lacking the capacity to actually use the freedoms granted by the Outer Space Treaty, advocated a rigid *a priori* planning regime that would equitably divide orbital slots among all nations.[79] Only a handful of ITU members ever adopted such extreme viewpoints, however, and most were willing to compromise in the interest of establishing a functional regime. Moreover, some countries radically changed their position over time, the most prominent example being the United States. This outspoken proponent of the current *a posteriori* regime originally strongly argued in favour of establishing an entirely engineered radio spectrum at the 1947 Atlantic City

[79] *See in general,* Fleming, *supra* note 19, at 332-345.

International Radio Conference.[80] It quickly became clear, however, that such an approach was unfeasible, as the recorded demands of all nations greatly exceeded the available spectrum.[81] The goal of establishing an engineered spectrum was therefore sidelined at the first ever conference to formally address space services in 1959. The ITU system henceforth moved firmly towards an *a posteriori* regime, which was formalized in the final acts of the 1963 and 1971 space WARCs.[82] However, the engineering goal was never completely abandoned, and it quickly remerged as a tool for equitable access to orbital positions for countries feeling 'left out' under the general ITU regime. In 1971, the International Frequency Registration Board (IFRB, currently the Radio Regulations Board) did not cease to point out the advantages of adopting worldwide *a priori* plans, and it stressed the principles of equity and justice as a counterbalance to ruthless efficiency.[83] During the 1970s, the steep increase in the ITU membership of developing nations without immediate access to outer space only strengthened the calls for alternative approaches that would 'guarantee in practice' equitable access

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[80] See the Proposal for a Convention of the US delegation on 11 March 1947 at the Atlantic City International Radio Conference, Doc. No. 17 TR, http://www.itu.int/en/history/plenipotentiaryconferences/Pages/1947AtlanticCity.aspx.

[81] INTERNATIONAL TELECOMMUNICATIONS AND INTERNATIONAL LAW, *supra* note 13, at 68, 71; *The Evolution of the ITU's Regulatory Regime*, *supra* note 19, at 396. The then Soviet Union also considered engineering a violation of their sovereignty, although this argument of course does not hold for orbital slots. *See* Fleming, *supra* note 19, at 339 (*referring to* George Arthur CODDING & A. M. RUTKOWSKI, THE INTERNATIONAL TELECOMMUNICATION UNION IN A CHANGING WORLD 119 (Artech House, Dedham, 1982).

[82] LAW AND SPACE TELECOMMUNICATIONS, *supra* note 13, at 350-352; Fleming, *supra* note 19, at 340; *The Evolution of the ITU's Regulatory Regime*, *supra* note 19, at 397-398 & 402; Thompson, *supra* note 4, at 290-292; E. D. DuCharme, et al., *The Genesis of the 1985/87 ITU World Administrative Radio Conference on the Use of Geostationary Satellite Orbit and the Planning of Space Services Utilizing It*", 7 ANN. AIR & SPACE L. 261, 265-266 (1982); Sigfried Wiessner, *The Public Order of the Geostationary Orbit: Blueprints for the Future*, 9 YALE J. WORLD. PUB. ORD. 230 (1983) (*referring to* Abram Chayes & Leonard Chazen, *Policy Problems in Direct Broadcasting from Satellites*, 5 STAN. J. INT'L STUD. 4, 18 (1970).

[83] Final Acts of the 1963 Extraordinary Administrative Radio Conference to Allocate Frequency Bands for Space Radiocommunication Purposes (Space Radiocommunication Conference, Geneva, 1963), at International Frequency Registration Board Recommendation 10-A, *see Legal issues concerning the radio frequency spectrum and geostationary satellite orbit*, 1998 AUSTL. INT'L L.J. 50-51 (1998). *See also* Fleming, *supra* note 19, at 340-341; *The Evolution of the ITU's Regulatory Regime*, *supra* note 19, at 399-401.

to orbital slots for all nations.[84] These efforts eventually reaped the promulgation of a number of resolutions arguing for the adoption of veritable *a priori* plans that would enhance access to the geostationary orbit for broadcasting-satellite and fixed-satellite services.[85] The *a priori* plans established for these services and their guiding principles can be found in Appendices 30 and 30A, and Appendix 30B of the ITU Radio Regulations, respectively.[86] Even though these plans cover only a small percentage of all types of orbital usage, they nevertheless merit analysis for their ostensibly diametrically opposed starting point on the use of orbital slots (see further *infra* section III.B.2.).

A strict *a posteriori* approach as arrogated to the spacefaring countries would grant administrations permanent rights to the use of an orbital position through the mere registration of a frequency assignment. Hence, it would allow the reservation of orbital capacity without subsequent use, thereby depriving other States from exercising their freedom to actually use the same slot. Conversely, the very essence of the *a priori* approach imputed to the developing world is to grant non-spacefaring nations irrevocable rights to the future use of orbital points, thereby removing these slots from the reach of States currently having the capacity to use them. Both the *a priori* plans and the 'first-come, first-served' approach thus appear to institutionalize the creation of paper satellites. Any allegation of the purported unlawfulness of the reservation of orbital capacity without actual use thus requires a close analysis of the present ITU regime. This will reveal that, rather than leaning toward either

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[84] Resolution No. 3 Relating to the Use of the Geostationary-Satellite Orbit and to the Planning of Space Services Utilizing It, *in Final acts of the World Administrative Radio Conference of 24 September through 6 December 1979* [hereinafter Resolution 3]. All other ITU resolutions referred to in this article can be found in ITU RR, *supra* note 17, at Vol. 3: resolutions and recommendations.

[85] Resolution 3, *supra* note 84. *See further* DuCharme, et al., *supra* note 82, at 267-269. A broadcasting-satellite service (BSS) is defined in the ITU Radio Regulations as a radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public. ITU RR, *supra* note 17, at art. 1.39. A fixed-satellite service (FSS) is defined as a radiocommunication service between earth stations at given positions, when one or more satellites are used. *Id.* at art. 1.21.

[86] *See* ITU RR, *supra* note 17, at Vol. 2, Apps.

the *a priori* of *a posteriori* approach, a well-balanced, if slightly complicated, compromise solution was adopted that aims to limit the possibility that the limited orbital capacity remains unused.

B. How Is Protection of Orbital Use Acquired?

1. General Procedure

The procedure for acquiring international protection of the use of orbital slots is guided by general principles that, notwithstanding some differences, apply to all satellite networks placed in any orbital slot and operating in conjunction with radiofrequencies in any band.[87] It can be summarized as a process consisting of the following basic steps (articles 9 and 11 RR).

First, an administration[88] that wishes to obtain international recognition and protection of its use of a particular orbit should send a description of its projected satellite network or system to the Radiocommunication Bureau for advance publication in the International Frequency Information Circular (BR IFIC).[89] The information to be procured comprises the following data with relevance for the present analysis of the use of orbital points: the identity of the satellite network; the actual or projected date of bringing a new or modified frequency assignment into use; the period of validity of the frequency assignments;[90] the nominal geographical longitude on the geostationary-satellite orbit and orbital tolerances and the number of orbital planes for space stations onboard non-geostationary satellites, indicating thereby for each orbital plane, where the Earth is the reference body; the angle of inclination of the orbital plane with respect to the Earth's equatorial plane; the number of satellites

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[87] Copiz, *supra* note 11, at 214.

[88] ITU procedures are initiated by "administrations" rather than member States. The annex to the ITU Constitution defines an administration as "[a]ny governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations." ITU CS, *supra* note 8. *See also* ITU RR, *supra* note 17, at art. 1.2.

[89] *See in general*, ITU RR, *supra* note 17, at art. 9.1, 9.3 & 9.5B.

[90] See *infra* on Resolution 4 in section IV.C.2.

in the orbital plane; and the period and the altitude, in kilometers, of the apogee of the space station.[91] If, on the basis of this information, an administration fears that its existing or planned satellite networks may be affected by the proposed system, it should indicate within a specified period of time that it wishes to be consulted by the registering administration. Subsequently, the registering administration and the Radiocommunication Bureau will then identify, on the basis of a number of objectives, technical criteria, and parameters, the administrations with which coordination is to be effected.[92] Following this, the Bureau will publish the information provided in the BR IFIC, on the basis of which any administration believing that it should (not) have been included in the list of administrations shall again inform the relevant administration and the Bureau with the technical reasons for doing so. Administrations receiving a request for coordination will then promptly examine the matter with regard to the possibility of interference caused by their assignments. In case of a continuing dispute regarding harmful interference, the administrations involved shall enter into bilateral negotiations, assisted by the Bureau if needed.[93]

After successful completion of the coordination phase, the registering administration will notify the Bureau in order to have its assignment registered in the Master International Frequency Register (Master Register, MIFR)[94]. Any frequency assignment, including modifications to assignments already recorded in the Register, needs to be notified to the Bureau in the following circumstances: *a)* if the use of that assignment is capable of causing harmful interference to any service of another administration; *b)* if that assignment is to be used for international radiocommunication; *c)* if that assignment is subject to a world or regional frequency allotment or assignment plan which does not have its own notification procedure; *d)* if that assignment is subject to the coordination procedure described above or is involved in such a case; *e)* if it is desired to obtain interna-

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[91] *See* ITU RR, *supra* note 17, at app. 4, annex 2, arts. A.1, A.2 & A.4.
[92] *See in general, id.* at arts. 9.27, 9.28, 9.34 & 9.41, and app. 5.
[93] *See id.* at arts. 9.50-9.65.
[94] *Id.* at art. 11.

tional recognition for that assignment; or *f)* if it is a non-conforming assignment that the administration wishes to have recorded for information.[95] The notice should contain the same data as is to be provided under the advance publication phase. The date of receipt of the complete notice will determine the order in which notices are examined.[96] It should be submitted no more than three years before the assignments are brought into use.[97] In the final phase, the Bureau will examine each submitted notice *a)* with respect to its conformity with the relevant provisions of the Radio Regulations; and *b)* with respect to its conformity with the procedures relating to coordination with other administrations applicable to the radiocommunication service and the frequency band concerned; or *c)* with respect to the probability of harmful interference that may be caused to or by assignments recorded with a favourable finding of the Bureau, for those cases for which the notifying administration States that the procedure for coordination could not be successfully completed; or *d)* where appropriate, with respect to its conformity with a world or regional allotment or assignment plan and the associated provisions.[98] In case of a favourable finding, the Bureau will record the requested assignment in the MIFR, thereby granting it international recognition and protection from other, competing uses. If the finding of the Bureau is unfavourable, the notice will be returned indicating the appropriate course of action.[99]

2. Planned Bands

Even though the *a priori* plans were conceived as an alternative to the traditional *a posteriori* ITU regime, the procedures for acquiring international protection of slots for the use of space services operating in planned bands do not form a complete departure from the general procedure outlined above. As such, article 9 RR on the advance publication and coordination

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[95] *Id.* at arts. 11.2-11.8.
[96] *Id.* at art. 11.28.
[97] *Id.* at arts. 11.15 & 11.25.
[98] *Id.* at arts. 11.30-11.34.
[99] *Id.* at arts. 11.36-11.39.

of satellite networks even expressly refers to Appendix 30B for its application to stations in a space radiocommunication service using frequency bands covered by the fixed-satellite service allotment plan.[100] Likewise, article 11 RR on the notification and recording of frequency assignments in the MIFR provides that Appendices 30, 30A, and 30B are 'also' applicable to assignments in the frequency bands covered by these plans.[101] Finally, the 2003 World Radiocommunication Conference has added a reference to article 9 RR to the title pages of the appendices codifying the broadcasting-satellite service (BSS) plans, thus confirming the general applicability of the basic ITU procedures on orbital slot usage to assignments in these plans. The following subsections will therefore focus on those provisions in the *a priori* plans that deviate from the general procedure and are typical of the use of slots for services operating in planned bands.

a. Orbital Positions for Fixed-Satellite Services

The final acts of the 1979 WARC resolved that the ITU member States would convene a world conference in order to 'guarantee in practice' for all countries equitable access to the geostationary-satellite orbit.[102] Pursuant to this resolution, an allotment plan was negotiated in 1985 and 1988 on the use of the GSO for the fixed-satellite service (FSS) in the frequency bands 4500-4800 MHz, 6725-7025 MHZ, 10.70-10.95 GHz, 11.20-11.45 GHZ, and 12.75-13.25 GHz.[103] The plan is codified in Appendix 30B. It entered into force on 16 March 1990 and remains in force until it is revised by a competent world radio-

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[100] *Id.* at n. A.9.1.

[101] *Id.* at n. A.11.1.

[102] Resolution 3, *supra* note 84.

[103] ITU RR, *supra* note 17, at art. 3, app. 30B. *See* Milton L. Smith, *The Space WARC Concludes*, 83 AM. J. INT'L L. 596-599 (1989) (for a concise overview of the main decisions reached at the 1985-88 sessions); *Space Law and the Geostationary Orbit*, *supra* note 17; Nandasiri Jasentuliyana, *The International Regulatory Regime for Satellite Communication: the Meaning for Developing Countries*, 2 ASIAN YB. INT'L L. 49-59 (1992). *See* WHITE & WHITE, *supra* note 15 (for a more expansive coverage of the two sessions).

communication conference.[104] The FSS plan grants national allotments to States, consisting of a nominal orbital position in a predetermined arc, a bandwidth of 800 MHz (up-link and down-link) in the relevant frequency bands and a service area for national coverage.[105] An 'allotment' thus refers to an entry of a designated frequency channel and orbital position in a plan for use by one or more administrations for a space radiocommunication service under specified conditions.[106] If administration wishes to launch a satellite network into a slot of the GSO for a space service covered by the plan, it first has to convert its allotment into an assignment. An 'assignment' in this context refers to the authorisation given by an administration for a particular radio station to use a radio frequency and orbital position under specified conditions.[107] The procedure for converting an allotment into an assignment under the FSS plan is identical to the related procedures for introducing an additional system into the plan and for modifying the characteristics of an assignment already brought into use.[108]

The conversion procedure strongly resembles the general procedure for bringing into use orbital positions in the unplanned bands as described above. First, an administration wishing to convert an allotment into an assignment has to submit a notice to the Bureau, providing therein information similar to the data in the advance publication phase for general slot usage. The Bureau will then examine the submitted notice with respect to its conformity with the relevant provisions of the Radio Regulations and with certain technical standards. If this examination results in a favourable finding, the requesting administration will proceed to obtain the agreement of the administrations whose allotments or assignments are considered

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[104] ITU RR, *supra* note 17, at art. 11.2, app. 30B. 1988 Radio Regulations, *in Final Acts of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing it of 29 August Through 5 October 1988*, at art. 69.

[105] ITU RR, *supra* note 17, at art. 2.3, app. 30B.

[106] *Id.* at art. 1.17.

[107] *Id.* at art. 1.18.

[108] *Id.* at art. 6, app. 30B.

affected by the proposed network.[109] Upon reaching agreement with these administrations, the requesting administration may ask the Bureau to have its assignment included in a so-called List of assignments, thereby indicating that it has successfully completed the conversion of allotment to assignment.[110] The notice submitted for the purpose of completing this phase must contain the final characteristics of the assignment, which will again be examined by the Bureau as to their conformity with the relevant provisions of the ITU regulations. Following this examination, the Bureau will identify the administrations whose allotments and assignments appearing in the List might still be affected. If it is found upon this examination that the final characteristics of the assignment do not produce more interference than under the initially submitted characteristics, or if, in spite of increased interference, the other administrations are nevertheless considered unaffected, the Bureau will enter the proposed assignment in the List. Finally, the assignments on the List will be entered into the Master Register, upon further examination of the complete notice by the Bureau with respect to its conformity with the relevant provisions of the Radio Regulations and with the FSS plan.[111]

b. Orbital Positions for Broadcasting-Satellite Services

Appendix 30 contains the provisions and associated plan for the BSS in the frequency bands 11.7-12.2 GHz (in Region 3), 11.7-12.5 GHz (in Region 1) and 12.2-12.7 GHz (in Region 2).[112] The BSS plan entered into force on 1 January 1979 and, like the FSS plan, remains in force until revision by a competent world radiocommunication conference.[113] The plan was adopted at an earlier date than the FSS plan, as the reduced need for flexibility for BSS services considerably facilitated planning efforts for this type of service, which also helps to explain why the BSS

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[109] *Id.* at arts. 6.5 & 6.8, app. 30B.

[110] *Id.* at art. 2.2*bis*, app. 30B.

[111] *Id.* at art. 8.7-8.9, app. 30B.

[112] Provisions on feeder links for the BSS are codified in Appendix 30A of the ITU RR, which will not be discussed here. *Id.* at app. 30A.

[113] *Id.* at art. 14.3, app. 30.

plan differs from the provisions in Appendix 30B. Most importantly, the broadcasting plan immediately confers assignments to States with predefined nominal orbital positions, rather than distributing national allotments with reference to an abstract orbital arc. It follows that an administration wishing to operationalise its satellite network for broadcasting goals does not have to convert its allotment into an assignment before it can register the relevant orbital slots. This in turn obviates the need to effect any coordination with affected administrations, as the plan is construed in such a way as to preclude harmful interference simply through conformity with the plan. However, coordination is still required when an administration proposes to include new or modified assignments that impact upon the BSS plan as such,[114] or when its proposed assignments to stations in the FSS service may affect broadcasting stations.[115] Finally, the BSS procedure for notifying, examining and recording assignments to space stations in the Master Register is similar to the procedures described above.[116] Due to the rigidity of the plan, however, the examination phase focuses on the conformity of an assignment with the ITU Constitution, Convention, Radio Regulations, and the appropriate regional plan or List, while disregarding the date of receipt of the relevant notice.[117]

C. *When Is International Protection Acquired?*

1. General Procedure

a. Priority through Antecedence?

A basic notion of 'priority' is pivotal for any system wishing to effectively manage the use of a limited natural resource among multiple contenders with demands that are potentially incompatible. Without priority, it is *ipso facto* impossible to determine which use should be protected in case of conflict. The ITU system therefore relies on a number of criteria for deter-

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[114] *Id.* at art. 4, app. 30.
[115] *Id.* at art. 6, app. 30.
[116] *See id.* at art. 5, app. 30.
[117] *Id.* at art. 5.2.1, app. 30. *See further infra* section III.C.2.