International Regulation of Access to the Geostationary Orbit: Mission Impossible?

Sara-Louise Khabazian considers the ITUs regulation of the Geostationary Orbit

The description of the geostationary orbit as a 'reservoir of wealth'[1] conveys the immense value to countries in securing access. However, scarcity problems are further compounded by the competing interests of developed and developing countries. Transnational cooperation in the regulation of access to the geostationary orbit under the auspices of the International Telecommunications Union (ITU)[2] therefore represents a significant development. This article however, questions the effectiveness of the ITU framework for reconciling equity and efficiency considerations, concluding with hope that transformations in the nature of modern communication will eventually compensate for the deficiencies of international regulation.

Geostationary Satellite Orbit

The 'geostationary orbit' has been defined as "[a]n orbit, any point on which has a period equal to the average rotational period of the Earth…circular and equatorial".[3] Such characteristics render the geostationary orbit highly desirable for the placement of communication satellites. In addition to reducing the complexity and cost inherent in using additional satellites for tracking purposes,[4] satellites placed in the geostationary orbit provide significant coverage in terms of line-of-sight communication with the earth.[5] As a result, a single satellite may communicate with 'approximately one third of the planet, an entire country, or if in conjunction with a satellite network, the entire globe'.[6] Such extensive coverage is particularly significant in light of globalisation and the importance of connecting national communication networks.[7] The initial proposal for the placement of artificial satellites in the geostationary orbit for the purpose of communication is widely attributed to A.C. Clarke in 1945.[8] Following the fiftieth anniversary of the launch of Sputnik I, satellites are now well renowned for their widespread uses including, television, telephony, meteorology, space research and global positioning systems.

However, the number of beneficiaries of access to the geostationary orbit is inherently restricted by the limited number of useful orbital slots.[9] The geostationary orbit is ultimately a finite geographical resource with the capacity to contain a restricted number of satellites in order to avoid collision.[10] Spectrum is similarly regarded as a scarce resource, permitting the allocation of a limited number of frequencies so as to avoid harmful interference.[11] With the unprecedented rate at which developed countries are employing satellites to exploit the latest technology there has been increasing awareness of the limitations of the geostationary orbit.[12] Despite the relatively rapid development of certain developing countries in recent years, there generally remains significant disparity between the ability of developed and developing countries to utilise satellite technology. Such disparity has fuelled divergent perspectives on the appropriate regulation of access to the geostationary orbit.

Pronounced under customary international law as forming part of outer space,[13] the geostationary orbit is subject to the principles enumerated in the Outer Space Treaty:

> *[t]he exploration and use of outer space…shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.*[14]

Whilst beyond national appropriation,[15] the proposal that there ought to be wholly equitable access to the geostationary orbit is arguably undermined by the absence in the Outer Space Treaty of a positive right for all countries to use the geostationary orbit. Uncertainty therefore remains as to the proper reconciliation of potentially competing efficiency and equity considerations, developed countries generally prioritising the former and developing countries the latter.

ITU Framework

Transnational cooperation under the auspices of the ITU represents an attempt to reconcile competing national interests. Whilst the ITU does not formally allocate spectrum or orbital slots,[16] it provides international recognition of assignments that fulfil the advance publication, coordination and notification procedures,[17] and a forum for dispute resolution.[18] Member states must observe the ITU Constitution acknowledging that the geostationary orbit is a 'limited natural resource'[19] to be used

> *rationally, efficiently and economically…taking into account the special needs of the developing countries* and the geographical situation of particular countries'.[20] In an attempt to reconcile equity and efficiency considerations so as to reflect its diverse membership, the ITU has developed its approach to regulation of access to the geostationary orbit in a somewhat incremental fashion.

Whilst ITU member states continue to retain sovereignty in relation to the use of spectrum in the absence of a global regulator,[21] orbital slots have traditionally been allocated via an *a posteriori*[22] registration system.[23] However, with a continual increase in the number of countries seeking to establish satellite systems a strict *a posteriori* approach has been perceived as increasingly inappropriate,[24] arguably conferring 'squatter's rights'[25] antithetical to both the concept of efficient and equitable access.

With respect to efficiency, whilst an *a posteriori* approach enables developed countries access to the geostationary orbit for the purpose of exploiting the latest satellite technology,[26] such an approach has been criticised for potentially giving rise to market failure.[27] 'Common pool inefficiencies'[28] may arise where an *a posteriori* approach "creates an incentive for both incumbent and prospective satellite operators to overestimate their orbital slot requirements",[29] preventing "productive use by others with near term needs".[30] To the extent that this may encourage free-riding, both developed and developing countries may be reluctant to invest in technology to enhance exploitation of the geostationary orbit.[31] Efficiency may be further undermined where the effect of warehousing is to

> *impose higher costs on developed countries which may as a consequence have to innovate orbit economizing technologies that are, strictly speaking, uneconomic.*[32]

With respect to equitable access, an *a posteriori* approach is arguably unfair to countries currently lacking the capital and technology necessary to utilise the geostationary orbit.[33] Developing countries express concern that given scarcity problems, once they are in a position to utilise the geostationary orbit there will be insufficient orbital slots remaining.[34] It is further claimed that in the interim, developed countries may extraterritorially impose values inconsistent with the culture of developing countries.[35]

In response to such concerns, at the WRC-97 the ITU implemented a number of mechanisms including, the coordination procedure,[36] due diligence obligation,[37] and stricter

time limits within which to utilise orbital slot allocations.[38] Consistent with criticism of the effectiveness of such mechanisms,[39] is the continued pursuit by developing countries for an *a priori* approach "in which frequencies and orbits are pre-coordinated"[40] in the interests of equitable access. Notably, the ITU fails to define 'equitable access'.[41] However, 'equitable' is more broadly defined as "[j]ust, fair, and right, in consideration of the facts and circumstances *of the individual case*".[42] Clearly such a definition is inappropriate for the international context characterised by conflicting national interests. This is exemplified by the fact that the purportedly more equitable *a priori* approach may ultimately lead to "long periods of unused and unoccupied parking slots and orbital spectrum",[43] where countries allocated orbital slots lack the necessary capital and technology to utilise them. The possible 'chilling effect'[44] on technological development of an *a priori* approach is explicitly antithetical to not only the economic but also social interests of all nations. Hence, despite failed attempts to assert sovereignty over the geostationary orbit,[45] following the WRC-2000 equity considerations have led the ITU to establish a hybrid approach[46] where all countries are granted 'priority access' [47] to at least one orbital slot.[48]

Equitable Access: Developing Countries' Perspective

In theory, the hybrid approach may relatively speaking enhance equitable access to the geostationary orbit. However, in addition to the fact that priority access constitutes neither registration nor a legal right,[49] priority access arguably fails to enhance the ability of developing countries to benefit from priority access allocations where they continue to lack necessary capital or technology. In such circumstances, it is arguable that the hybrid approach represents an inadequate compromise, continuing to

> *deprive [developing countries] of any near-term share of associated economic rents, and hence of vital resources to develop their own telecommunications infrastructure.*[50]

Even where developing countries possess the necessary capital and technology, the priority access approach arguably fails to address the 'latecomer cost handicap'[51] of countries seeking to utilise the geostationary orbit for the first time. This includes the "higher R&D and engineering costs incurred to open up new bands at higher frequencies"[52] necessary to avoid harmful interference with existing satellites.[53] To this extent, the hybrid approach is arguably inconsistent with the explicit recognition by the ITU of the need "to promote and to offer technical assistance to developing countries in the field of telecommunications…"[54]

It is argued that by demanding the use of outer space for the benefit of all countries 'irrespective of their degree of economic or social development', Article I(1) of the Outer Space Treaty imposes technology transfer obligations on developed countries to assist developing countries in their pursuit to utilise the geostationary orbit at 'affordable prices'.[55] Therefore, proposals to assist developing countries include, providing a "temporary waiver [for developing countries] of the requirement to use costly spectrum conservation technologies",[56] and establishing a collective fund to enhance the rate at which orbital slots may be sought.[57]

Efficiency: Impact Upon National Communications Regulation

Regardless of the relative merits of proposals to assist developing countries, it is arguable that the substantive effectiveness of the ITU framework would nevertheless continue to be undermined by institutional defects of the ITU, giving rise to procedural inefficiencies in the regulation of access to the geostationary orbit.[58] A non-exhaustive list of such defects includes, firstly, in terms of utilising the geostationary orbit, arguably generous time frames within which to utilise registered slots encourage delay, thereby enhancing inefficiency.[59] Also, the ITU does not mandate the use of efficiency enhancing technology despite its availability in some member states.[60] Secondly, in terms of enforcement, since ITU recommendations lack binding force of law the ITU "can only legitimize, rather than guarantee, a spectrum use and orbital slot registration".[61] Similarly, the ITU provides no redress where countries employ the tactic of paper satellites to foreclose access by others,[62] or rotate satellites between orbital slots.[63] Indeed, the relatively low cost of filing for orbital slots arguably encourages unnecessary registrations.[64] This is particularly problematic given the opportunity for member states to unilaterally exploit the geostationary orbit for economic gain, as exemplified by the Tonga saga.[65] Thirdly, as a forum for dispute resolution, the ITU framework is very slow.[66] This is particularly problematic given that "one nation's orbital slot use often can occur only at the expense of another nation's current or future use".[67] Fourthly, "[t]he fundamental legal instruments of the ITU…continue to be under the exclusive jurisdiction of the Member States."[68] This is of particular concern given that "there are no institutional procedures to enable Sector Members to appeal against a decision made by Members States or to arbitrate in a dispute with a Member State",[69] failing to reflect the increasing importance of the private sector.[70]

Future

The current hybrid approach to orbital slot allocation arguably fails all ITU member states, regardless of their state of economic development. Through continuing to prioritise efficiency over equitable access, the current approach to orbital slot allocation arguably fails to assist developing countries in their pursuit to develop national communication networks. However, the substantive effectiveness of the ITU framework in securing such efficiency is arguably undermined by institutional defects giving rise to procedural inefficiencies in the allocation of orbital slots. Such inefficiency is explicitly undesirable from the perspectives of both developed and developing countries.

Nevertheless, it is proposed that future technological developments may remedy such deficiencies of the ITU framework by alleviating relevant scarcity problems and reducing reliance upon the geostationary orbit altogether. In terms of alleviating current scarcity problems, a non-exhaustive list of potentially significant developments includes, increasing commercial use of spectrum formerly used by the military,[71] increasing popularity of unregulated spectrum bands,[72] and availability of

> *"[n]ew satellites [with] onboard signal processing [enabling] operators to transmit on one frequency and receive signals on another frequency...[and enabling] users to change the beam size or location of the signal footprint".*[73]

In support of declining reliance upon the geostationary orbit, reference is made to the increasing demand for satellites operating at non-geostationary orbits,[74] exemplified by the recent proliferation of mobile telephony.

Ultimately, it remains to be seen to what extent transformations in the nature of modern communication may alleviate debate regarding the reconciliation of efficiency and equity considerations in regulating access to the geostationary orbit. However, this Article concludes with hope that the difficulty inherent in strengthening a metaphorical international dam for preservation of this 'reservoir of wealth' is bypassed with the aid of technological development.

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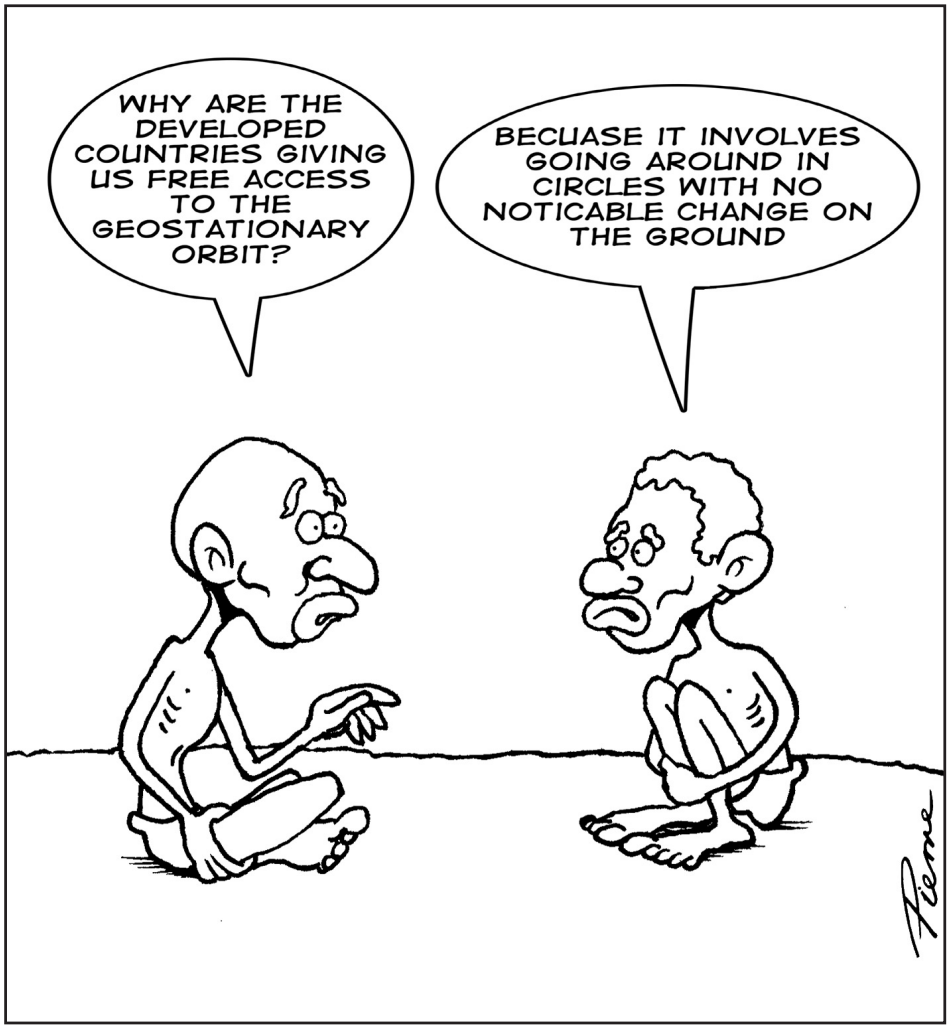
(Endnotes)

1 M.A. Rothblatt, 'International Legal Norms Governing Development of the Orbit/Spectrum Resource' (1981) 5 (2) *Telecommunications Policy 63* ; R.F.G. Hart, 'Orbit Spectrum Policy: Evaluating Proposals and Regimes for Outer Space' (1991) *Telecommunications Policy 64*.
2 International Telegraph Convention 1865.
3 Newton's Telecom Dictionary 352 (15th Ed., 1999); D. Shih, 'Open Access or Forced Access: Should the FCC Impose Open Access on Cable-Based Internet Service Providers' (2000) 52 *Admin. L. Rev.* 802, footnote 48.
4 M.L. Smith, *International Regulation of Satellite Communication* (1990).
5 Ibid.
6 J.C. Thompson, 'Space for Rent: The International Telecommunications Union, Space Law, and Orbit/Spectrum Leasing' (1996-1997) 62 *J. Air L. & Com.* 279, 283.
7 Smith, above n 4.
8 A.C. Clarke, 'Extra-Terrestrial Relays' (1945) Wireless World 305-308; N. Brady, 'The Geostationary Orbit and Satellite

Communications: Concepts Older Than Commonly Supposed' (2002) 38(4) *IEEE Transactions on Aerospace and Electronic Systems* 1408.
9 Thompson, above n 6, at 284.
10 Smith, above n 4.
11 ITU Constitution, Article 45.
12 Thompson, above n 6, at 284-285.
13 M.S. Soroos, 'The Commons in the Sky: The Radio Spectrum and Geosynchronous Orbit as Issues in Global Policy' (1982) 36(3) *International Organization*, 665, 669.
14 United Nations Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (1967), Article 1.
15 Id. Article 2.
16 L.D. Roberts, 'A Lost Connection: Geostationary Satellite Networks and the International Telecommunication Union' (2000) 15 *Berk. Tech L.J.* 1095, 111.
17 Thompson, above n 6, at 297.
18 Roberts, above n 16.
19 ITU Constitution No. 196, Article 44.
20 ITU Constitution No. 196, Article 44; ITU Constitution No. 79, Article 12.
21 V. Timofeev, *Radiocommunication Bureau,* available at http://www.itu.int/ASIA2002/press/presskit/qanda1.html.
22 'first come, first served'; D.I. Fisher, *Prior Consent to International Direct Satellite Broadcasting* 92 (1990) citing Georgetown Space Law Group, 'DBS Under FCC and International Regulation' (1984) 37 *Vanderbilt Law Review* 67, 101.
23 With registrations remaining effective 'until the operator-defined system life expectancy has expired, or until the ITU is notified that the [frequency and] orbital position are no longer in use…' Roberts, above n 16, at 1113.
24 Thompson, above n 6, at 285.
25 C.T. White, 'Uprooting the Squatters' (1979) 34 *Foreign Policy* 148-153; Soroos, above n 13, at 671.
26 R. Frieden, 'Balancing Equity and Efficiency Issues in the Management of Shared Global Radiocommunication Resources', (2003) 24 *U. Pa. J. Int'l Econ. L.* 289, 291.
27 H.J. Levin, *'Orbit and Spectrum Resource Strategies: Third World Demands',* (1981) *Telecommunications Policy* 102, 110.
28 Id. at 103.
29 R. Frieden, *Managing Internet-Driven Change in International Telecommunications* (2001) at 181.
30 R. Frieden, 'Balancing Equity and Efficiency Issues in the Management of Shared Global Radiocommunication Resources' (7 December 2002) at 2, 11, available at http://ssrn.com/abstract=360541.
31 Levin, above n 27 at 104.
32 Ibid.
33 F. Lyall, 'Legal Issues of Expanding Global Satellite Communications Services and Global Navigation Satellite Services, with Special Emphasis on the Development of Telecommunications and E-Commerce in Asia' (2001) 5 S*ing. J. Int'l & Comp. L. 227*, 242-243.
34 Frieden, above n 26.
35 Roberts, above n 16, at 1125.
36 ITU Radio Regulations r9.
37 Annex 1 to Resolution 49.
38 ITU Radio Regulations r11.44.
39 T. Gavrilov & J. Lewis, 'Results of WRC-97' ITU



Conference Seminar Paper, available at http://www.itu.int/ITU-R/conferences/seminars/kiev-99/docs/16-wrc97.doc.
40 Thompson, above n 6 at 291-292.
41 Smith, above n 4, at 78.
42 *Black's Law Dictionary* 632 (4th Ed., 1968); Smith, above n 4 at 77 and footnote 2.
43 Levin, above n 27 at 102.
44 Ibid.
45 Eg. *Bogota Declaration of the First Meeting of Equatorial Countries*, WARC-BS (1977) Doc 81-E, reproduced in 6 (1978) 6(2) JOURNAL OF SPACE LAW 2, 193-196; E. Barendt & L. Hitchens, *Media Law: Cases and Materials* (2000) at 327.
46 Frieden, above n 26 at 305.
47 Ibid.
48 ITU Radio Regulations, Appendices 30, 30A and 30B.
49 Frieden, above n 26 at 305.
50 Levin, above n 27 at 103.
51 H. Levin, 'Latecomer Cost Handicap: Importance in a Changing Regulatory Landscape; D. Demac' (1986) Tracing New Orbits – Cooperation And Competition In Global Satellite Development 251-252.
52 Ibid.
53 Frieden, above n 29 at 182.
54 ITU Constitution, Article 1(1)(b).
55 Soroos, above n 13 at 676.
56 Id. at 323.
57 Frieden, above n 26 at 298.
58 Roberts, above n 16 at 1119.
59 Id. at 1122.
60 Ibid.
61 Frieden, supra note 26, at 303.
62 Ibid.
63 T. Foley, 'Filling Parking Spots 22,000 Miles High', *N.Y. Times* (13 November 2000) available at http://query.nytimes.com/gst/fullpage.html?res=9E00EFDB1038F930A25752C1A9669C8B63 .
64 Roberts, above n 16 at 1119.
65 H.J. Levin, 'Trading Orbit Spectrum Assignments in the Space Satellite Industry' (1991) 81(2) *American Economic Review* 42.
66 Frieden, above n 26 at 323.
67 Frieden, above n 29 at 179.
68 I. Walden and J. Angel, *Telecommunications Law* (2nd Ed., 2005) at 476.
69 Id. at 477.
70 ITU Reform Advisory Panel, 'Observations and Recommendations for Reform' (10 March 2000); Walden and Angel, above n 71 at 477 and footnote 49.
71 Timofeev, above n 21.
72 Ibid.
73 Frieden, above n 29 at 100.
74 Ibid.