

## SHOULD THERE BE AN ENVIRONMENTAL “CODE OF CONDUCT” FOR ACTIVITIES IN OUTER SPACE?

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### Abstract

The *corpus juris spatialis* provides that states shall avoid harmful contamination of natural celestial environments in the exploration and use of outer space. COSPAR has developed a planetary protection policy directed to issues of potential biological contamination, and the IADC has adopted guidelines to limit the creation of orbital debris. These forms of regulation are very limited, and as concluded by the IAA Cosmic Study “Protecting the Environment of Celestial Bodies,” significant gaps exist in the regime for the preservation of the natural environments of space. However, the ability to preserve environmental integrity can be directly related to technological competence, as well as political resolve. The exercise of such political will can be seen in relation to the protection of Antarctica, which has been the subject of extensive environmental regulation. This paper compares the current status of measures to protect the outer space and Antarctic environments, and examines whether an

environmental ‘code of conduct’ should be established for outer space activities to supplement treaty obligations consistent with scientific purposes and technological capabilities.

### Introduction

The exploration and use of celestial bodies by robotic and human missions will interact with the natural environment in two reciprocal ways. On the one hand, personnel, equipment, hardware and facilities will need protection from potentially harmful environmental elements, including radiation, temperature, and even dust. On the other hand, the celestial environment will need protection to minimize the impact of activities of man and machine.<sup>1</sup>

The International Academy of Astronautics recently concluded a Cosmic Study on Protecting the Environment of Celestial Bodies, which reviewed the current status of planetary protection, including legal, scientific, and technological considerations. Among the conclusions of the Study is that celestial environments may be at risk from contamination by human activity unless

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1. IAA Cosmic Study, *Protecting the Environment of Celestial Bodies* 45 (M. Hoffman, P. Rettburg & M. Williamson eds. 2010).

significant improvements are made to the planetary protection regime.<sup>2</sup> The analysis in the IAA Cosmic Study is complemented by a report by the COSPAR Panel on Exploration (PEX),<sup>3</sup> which examined the manner in which space exploration programs could be developed without jeopardizing the scientific value of solar system objects.

The PEX Report investigated various legal frameworks to protect the scientific study of celestial environments, particularly of the Moon and Mars, including:

The designation of certain protected areas or zones for special management regimes to avoid or mitigate the impacts of human activity;

The development of appropriate analytical tools and criteria for the review of proposed activities, including considerations of costs, benefits, the level of impact, and the potential reversibility of such impact;

The development of a comprehensive protocol for environmental protection with defined procedural approaches to review and evaluate proposed scientific and other activities with a potential for significant direct or indirect environmental impact; and

The establishment of code(s) of conduct applicable to different categories of solar system bodies and

environments and for different categories of activities conducted by different sectors.<sup>4</sup>

This article considers the manner in which a code of conduct could enhance the environmental protection provisions of the *corpus juris spatialis*. The experience of Antarctica is examined as an example where a code of conduct and other non-treaty instruments have been utilized for the regulation of activities which may impact the environment.

### **The Planetary Protection Policies**

The examination of planetary protection policies often is focused on the preservation of a celestial environment or area for scientific exploration. This is not the only purpose to be served by an effective planetary protection policy. Additional purposes include:

The preservation of areas for use, including scientific use such as a base for missions to other celestial bodies, as a radio astronomy observatory on the lunar far side,<sup>5</sup> or for commercial endeavors;

The preservation of areas for their unique historical value, such as the Lunakhod, Apollo 11, Viking, and other landing or impact sites on the Moon, Mars, and other bodies;

The preservation of areas of unique scientific interest, or of natural beauty,

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2. *Id.* at p. 97-8.

3. COSPAR Panel of Exploration, *Toward a Global Space Exploration Program: A Stepping Stone Approach* (2010)

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4. *Id.* at 49-52.

5. See generally C. Maccone, *Lunar Farside Radio Lab* 56 ACTA ASTRONAUTICA 629 (2005).

which are protected for their intrinsic worth; and

The preservation of regions for future generations, in an analogue to wilderness areas on Earth, which recognizes and respects the rights of others to make decisions in the future as to environmental stewardship.<sup>6</sup>

In addition to the foregoing can be added that consideration needs to be given to the cumulative impact of exploratory and other missions on celestial environments. Moreover, consideration also needs to be given to the issues that would arise by the discovery of extraterrestrial life, remnants, or precursors thereof.<sup>7</sup>

The emergence of issues concerning tourism, and the utilization of resources for scientific or commercial purposes, will place additional pressure for appropriate and effective environmental protection measures. The establishment of a balance for access and use of a celestial area or environment by different users necessarily will involve a determination

of fairness, equity, and rights between potentially competing entities.<sup>8</sup> The express designation of certain areas for special protection may imply the encouragement of the utilization of other areas, especially for non-scientific purposes.<sup>9</sup> It has been asserted that significant value could be achieved from the establishment of a new international consultive body to consider these issues.<sup>10</sup>

### The Antarctic Experience

The protection of celestial environments shares some interesting parallels with the legal regime for the protection of the Antarctic environment. The legal regulation of outer space and Antarctica reflect similar policies: on the prohibitions on assertion of claims of national sovereignty;<sup>11</sup> that use and exploration be conducted for peaceful purposes;<sup>12</sup> for freedom of scientific investigation;<sup>13</sup> and for the banning of nuclear weapons.<sup>14</sup> The legal regimes diverge, however, in the protection of natural environments.

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6. See Cosmic Study, *supra* note 1, at 45-9; Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, art. I, *entered into force* Oct. 10, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

7. Margaret Race, *Policies for Scientific Exploration and Environmental Protection: Comparison of the Antarctic and Outer Space Treaties*, in SCIENCE DIPLOMACY ANTARCTICA, SCIENCE, AND THE GOVERNANCE OF INTERNATIONAL SPACES \_\_\_\_\_ (Paul Arthur Berkman, Michael A. Lang, David W. H. Walton, and Oran R. Young, eds. 2011)(in press).

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8. Race, *supra* note 7.

9. Cosmic Study, *supra* note 1, at 49.

10. Race, *supra* note 7; PEX Report, *supra* note 3.

11. Outer Space Treaty, *supra* note 6, art. II; Antarctic Treaty, art. IV, *opened for signature* December 1, 1959, 12 U.S.T. 794, 420 U.N.T.S. 71.

12. Outer Space Treaty, *supra* note 6, art. IV; Antarctic Treaty, *supra* note 11, art. I.

13. Outer Space Treaty, *supra* note 6, art. I; Antarctic Treaty, *supra* note 11, art. II.

14. Outer Space Treaty, *supra* note 6, art. IV; Antarctic Treaty, *supra* note 11, art. V.

The Outer Space Treaty expressly requires states to avoid the harmful contamination of the Moon and other celestial bodies.<sup>15</sup> This obligation has been expanded by the Moon Agreement, which requires states to take measures to prevent the disruption of the existing balance of the environment.<sup>16</sup> The Antarctic Treaty does not expressly prohibit harmful contamination or disruption of the existing balance of the Antarctic environment. The preservation and conservation of the indigenous flora and fauna of the frozen continent are to be considered at periodic meetings of the parties to the Treaty,<sup>17</sup> but there is no provision within the four corners of the instrument which expressly extends to the natural physical environment.

The apparent lacuna in the protection of the Antarctic environment is filled by other international agreements which are components of Antarctic Treaty System (ATS). The ATS is a series of treaties, agreements, and other international undertakings which together regulate activities south of 60 degrees south latitude, which is designated as the Antarctic Treaty Area. These instruments have been drafted and developed outside of the United Nations, through meetings of the major parties participating in the exploration of Antarctica, and in consultation with scientific organizations, including the Scientific Committee on Antarctic Research (SCAR) of the International Council of Sciences. Among the

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15. Outer Space Treaty, *supra* note 6, art. IX.

16. Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, art. 7.1, *entered into force* July 11, 1984, 1363 U.N.T.S. 3 [hereinafter Moon Agreement].

17. Antarctic Treaty, *supra* note 11, art IX(1)(f).

agreements which have been adopted to regulate the natural environment are the:

Protocol on Environmental Protection to the Antarctic Treaty;<sup>18</sup>

Code of Conduct for Antarctic Expeditions and Station Activities;<sup>19</sup>

Agreed Measures for the Conservation of Antarctic Fauna and Flora and associated Recommendations;<sup>20</sup>

Convention for the Conservation of Antarctic Seals;<sup>21</sup>

Convention on the Conservation of Antarctic Marine Living Resources;<sup>22</sup>

Convention on the Regulation of Antarctic Mineral Resource Activities;<sup>23</sup>

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18. *Entered into force* 14 January 1998, [http://www.antarctica.ac.uk/about\\_antarctica/geopolitical/treaty/update\\_1991.php](http://www.antarctica.ac.uk/about_antarctica/geopolitical/treaty/update_1991.php) [hereinafter Protocol].

19. Hereinafter referred to as the "Code of Conduct," *text reproduced in* Handbook of the Antarctic Treaty System 485-86 (2002), <http://www.state.gov/g/oes/rls/rpts/ant/>.

20. *Entered into force* 1 November 1982, <http://sedac.ciesin.org/entri/texts/acrc/aff64.txt.html>.

21. *Entered into force* 11 March 1978, <http://sedac.ciesin.org/entri/texts/antarctic.seals.1972.html>.

22. *Entered into force* 7 April 1982, <http://sedac.ciesin.org/entri/texts/antarctic.marine.resources.1980.html>.

23. *Concluded* 2 June 1988, not yet entered into force, <http://sedac.ciesin.org/entri/>

Recommendations relating to the Antarctic Protected Area system concerning Specially Protected Areas, Sites of Special Scientific Interest and Historic Sites and monuments;<sup>24</sup>

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal;<sup>25</sup>

Convention for the Prevention of Marine Pollution by the Dumping of Wastes and other Matter;<sup>26</sup> and the

Arctic Shipping Guidelines.<sup>27</sup>

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[texts/acrc/cramra.txt.html](#).

24. See, e.g., Comprehensive Measures for the Protection of the Antarctic Environment and Dependent and Associated Ecosystems, [http://www.ats.aq/devAS/info\\_measures\\_listitem.aspx?lang=e&id=170](http://www.ats.aq/devAS/info_measures_listitem.aspx?lang=e&id=170); ATCM XXIV: Measure 1(2001): Antarctic Protected Areas System: Historic Sites And Monuments: "A Hut", Scott Base, Ross Sea Region, Antarctica, <http://www.state.gov/documents/organization/30602.pdf>.

25. Done 22 March 1989, <http://www.basel.int/text/con-e-rev.pdf>.

26. Entered into force 30 August 1985, [http://www.imo.org/Conventions/mainframe.asp?topic\\_id=258&doc\\_id=681](http://www.imo.org/Conventions/mainframe.asp?topic_id=258&doc_id=681).

27. The International Maritime Organization approved Guidelines for ships operating in Arctic ice-covered waters, MSC/Circ.1056/MEPC/Circ.399, December 2002, [http://www.imo.org/includes/blastDataOnly.asp/data\\_id%3D6629/1056-MEPC-Circ399.pdf](http://www.imo.org/includes/blastDataOnly.asp/data_id%3D6629/1056-MEPC-Circ399.pdf).

The Code of Conduct and the Protocol on Environmental Protection establish a comprehensive set of regulations to govern activities which may impact the Antarctic environment. The Code of Conduct is divided into four sections: waste disposal; introduction of alien species; disturbance of breeding colonies and concentration of birds and mammals; and guidelines for Antarctic operating organizations planning major Antarctic projects. The Protocol on Environmental Protection currently includes five Annexes: environmental impact assessment; conservation of fauna and flora; waste disposal and management; prevention of marine pollution; and area protection and management.

### *Waste disposal*

There is no legal prohibition on the abandonment of space objects, and the practice of states in the exploration of celestial bodies historically has been to leave unwanted hardware, equipment and spent payloads on site on alien worlds.<sup>28</sup> In contrast, the Code of Conduct and the Protocol contain specific guidelines for the management and disposal of waste from expeditions and stations in Antarctica. Different waste disposal guidelines have been implemented depending on the kind of waste or the area in which it is located.

Certain waste must be removed from the Antarctic Treaty Area, but much waste is permitted to be disposed of on site or at sea. Waste containing radio-isotopes, batteries, plastics and rubber are to be removed from the Antarctic Treaty Area. In general,

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28. See generally M. WILLIAMSON, SPACE: THE FRAGILE FRONTIER (2006).

combustible materials are to be incinerated, with sea disposal of the ash. Non-combustible, solid waste and chemicals, not including batteries, also are to be disposed of at sea. Deep water disposal is preferable, but disposal sites in shallow water may be specified. Much liquid waste is to be flushed into the sea.<sup>29</sup> The Code of Conduct specifies that waste from inland stations should be concentrated and disposed of in deep pits.<sup>30</sup>

### *Introduction of alien species*

Annex II of the Protocol, on the Conservation of Antarctic Fauna and Flora, contains procedures to safeguard against the introduction of non-indigenous species, parasites and diseases to the Antarctic environment. Parties are to take precautions to prevent the introduction of micro-organisms including viruses, bacteria, parasites, yeasts, and fungi, not present in the native fauna and flora. No species of non-indigenous plant or animal shall be introduced onto land or ice shelves or the waters of the Antarctic Treaty Area unless a permit has been issued therefor.

Permits shall be drawn in as specific terms as possible, and potentially harmful plants or animals shall be kept under controlled conditions to prevent escape or contact with native flora or fauna. Any plant or animal for which a permit has been issued shall either be removed from the Antarctic Treaty Area or destroyed. This permit procedure shall not apply to the importation of food, provided that no live animals are imported for such purpose,

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29. Protocol, *supra* note 18, Annex III, arts. 2, 3, 4 and 5.

30. Code of Conduct, *supra* note 19, par. 1(c).

and all plant and animal products are kept under carefully controlled conditions.<sup>31</sup>

### *Disturbance of breeding colonies and concentration of birds and mammals*

Annex II to the Protocol not only regulates the introduction of non-native species into the Antarctic Treaty Area, but also contains criteria to minimize disturbances with breeding colonies and concentrations of birds and mammals.<sup>32</sup> In general, aircraft, vessels, explosives and firearms are to be used in a manner which does not disturb concentrations of birds and seals, and concentrations of native terrestrial plants are not to be “significantly damaged” by vehicles or otherwise. The annex defines “harmful interference” as “any activity that results in the significant adverse modification of habitats of any species or population of native mammal, bird, plant or invertebrate.”<sup>33</sup> Permits may be issued, however, for activities which otherwise may be considered as harmful interference, including authorization for the taking of specimens.<sup>34</sup>

### *Environmental Assessments*

The Code of Conduct calls for organizations conducting operations in the Antarctic Treaty Area to evaluate the environmental impact of a proposed activity in the planning of major operations. Pursuant to the Protocol, planned

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31. Protocol, *supra* note 18, Annex II, art. 4.

32. *See also* Code of Conduct, *supra* note 19, par. 3.

33. Protocol, *supra* note 18, Annex II, art. 1(h)(vi).

34. *Id.* Annex II, art. 3.

activities are subject to an Initial Environmental Evaluation. Activities which may have more than a minor or transitory impact require that a Comprehensive Environmental Evaluation be prepared, including an assessment of the potential benefits of the activity, the possible impact on the relevant ecosystems, and a consideration of alternative actions.<sup>35</sup> States are required to cooperate in the assessment of environmental impacts.<sup>36</sup>

A Comprehensive Environmental Assessment of a proposed activity is to consider the consequences of alternatives, including the alternative of not proceeding. In addition, the evaluation is to include a description of the initial environmental reference state; the methods and data used to forecast the impacts of the proposed activity; the nature, extent, duration, and intensity of the likely direct impacts; and consideration of possible indirect impacts. The evaluation also must identify unavoidable impacts of the proposed activity, measures which could be used to minimize the impact and to detect unforeseen impacts, and gaps in knowledge. Consideration also must be given to the effects of the proposed activity on the conduct of scientific research and on other existing uses and values.<sup>37</sup> Evaluations of environmental impacts should take into account whether technology and procedures are available to provide for environmentally safe operations, and whether the capacity exists to respond promptly and effectively to

accidents with potential environmental effects.<sup>38</sup>

### ***Area Protection and Management***

The Protocol designates Antarctica as “a natural reserve, devoted to peace and science.”<sup>39</sup> At various times, certain areas of the frozen continent have been set aside as areas of special interest, subject to different management regimes. In 2002, Annex V of the Protocol entered into force, which modernized the past practice and reduced and consolidated the categories of areas of special interest to just two defined protected areas: Antarctic Specially Protected Areas (ASPAs) and Antarctic Specially Managed Areas (ASMAs). ASPAs are intended to protect environmental, scientific, historic, aesthetic or wilderness values, while ASMAs are directed toward protecting activities.<sup>40</sup>

### ***Additional Protocol provisions***

The Protocol provides for the establishment of a Committee for Environmental Protection to advise parties and make recommendations on the implementation of the Protocol and annexes.<sup>41</sup> States are required to submit annual reports of their activities to implement the Protocol.<sup>42</sup> Perhaps one of the most significant attributes of the Protocol is that it specifies a procedure for the resolution of disputes. Parties may engage in dispute

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35. *Id.* art. 8; Annex I.

36. *Id.* art. 6.

37. *Id.* Annex I, arts. 2, 3.

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38. *Id.* art. 3(2)(c)(iv, vi).

39. *Id.* art. 2.

40. Handbook of the Antarctic Treaty System, *supra* note 19, at 554.

41. Protocol, *supra* note 18, arts. 11, 12.

42. *Id.* art. 17.

resolution processes including consultations, negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement or other peaceful means to which they agree.<sup>43</sup>

Upon signing, ratifying, accepting, approving or acceding to the Protocol, a party can designate that unresolved disputes shall be submitted to the International Court of Justice, otherwise an Arbitral Tribunal shall be utilized.<sup>44</sup> Parties may not exempt themselves from the requirements of this dispute resolution process by means of a signing statement, diplomatic note, or other mechanism, as the Protocol prohibits reservations.<sup>45</sup> However, the Arbitral Tribunal does not have competence to make determinations as to damages pending the entry into force of a formal annex to the Protocol for such purpose.<sup>46</sup>

### **An Environmental Code of Conduct for Outer Space?**

The policies, concerns and considerations that are embodied in the Code of Conduct and Protocol for Antarctica have considerable overlap with the policies, concerns and considerations applicable to protection of the natural environments of celestial bodies. The regulation of environmental protection for Antarctica is both well established and articulated, while the legal regime for protection of environments in space is not well

developed. The creation of an Environmental Code of Conduct for Space that reflects these diverse considerations could be an important adjunct to supplement the provisions of the space treaties and extend the protections of celestial environments.

### ***Removal of Hardware, Equipment and other Waste***

The removal and/or disposal of spent, defunct or otherwise unwanted hardware and equipment from a celestial body may be technologically difficult if not impossible, not to mention costly in terms of fuel and other resources as well as finances. The removal of unwanted objects launched into space has been examined in the limited context of satellites in Earth orbit by the Inter-Agency Space Debris Coordination Committee (IADC). Pursuant to the IADC guidelines, the creation of debris during launch and on orbit is to be minimized, and satellites are to either be de-orbited or boosted to a disposal orbit at the end of their useful lives.<sup>47</sup> While it may be impractical to require the removal of interplanetary spacecraft and components thereof from celestial environments at the end of missions, it nevertheless may be appropriate to consider guidelines for the design of exploratory spacecraft to minimize the creation of debris and to examine the consequences of such debris on an extraterrestrial environment.<sup>48</sup>

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43. See generally *id.* arts. 16, 18, 19 and 20; see also *id.* Schedule on Arbitration.

44. *Id.* art. 19(3).

45. *Id.* art. 24.

46. Handbook on the Antarctic Treaty System, *supra* note 19, at 474.

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47. United Nations Office for Outer Space Affairs, *Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space* (2010), [http://www.unoosa.org/pdf/publications/st\\_space\\_49E.pdf](http://www.unoosa.org/pdf/publications/st_space_49E.pdf).

48. See generally Howard A. Baker, THE APPLICATION OF EMERGING PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW TO HUMAN



### ***Introduction of Earth species to Celestial Environments, and Disturbance or Interference with Alien Life or Habitat***

The COSPAR planetary protection policy<sup>49</sup> is intended to protect celestial environments from the introduction of Earth life forms that could potentially survive and cause contamination. The discovery of evidence of extraterrestrial life on a celestial body will present profound and complex issues, including questions as to the measures to be taken to protect such life forms and their natural development from harmful interference by mankind's activities.<sup>50</sup> The COSPAR planetary protection policy may serve, in part, as a mechanism to prevent harmful interference with any alien life that may be present by reducing the number of Earth organisms that are transported by interplanetary spacecraft. However, a more fundamental consideration may be whether the planetary protection policy should reflect more stringent bioload reduction requirements during the period of scientific uncertainty as to the existence of indigenous life on any celestial body, as a matter of prudence, to prevent significant adverse modification of potential habitats of any species and protect scientific integrity in investigations.

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ACTIVITIES IN OUTER SPACE 272 - 331 (1996)(D.C.L. thesis on file with McGill University); Williamson, *The Fragile Frontier* *supra* note 28; Patricia Sterns, *The Scientific/Legal Implications of Planetary Protection and Exobiology*, PROCEEDINGS OF THE 42<sup>ND</sup> COLLOQUIUM ON THE LAW OF OUTER SPACE 483 (2000).

49. COSPAR Planetary Protection Policy, 2002, a m e n d e d 2 0 0 5 - <http://cosparhq.cnes.fr/Scistr/Pppolicy.htm>.

50. Baker, *supra* note 48, at 266 - 67, 274 - 75.

The discovery of alien life forms that have a form of social structure, or which displays evidence of the attribute of intelligence, will expand the universe of questions into ethical, moral and philosophical realms. For example, should there be any restrictions on the collection of alien life forms as specimens for scientific study, or for the purpose of zoos, or entertainment, or even as a source of direct or indirect nourishment, clothing or shelter for human explorers? What rights should alien life have, and how dependent should those rights be on the capability we refer to as intelligence?<sup>51</sup> Should human or robotic explorations be prohibited from conducting activities within a certain radius of concentrations of life forms, and what number of individuals for such concentrations constitutes the threshold after which protection is afforded? Do the considerations and the analyses change in the event of emergency to human life or safety? Or should these questions be determined on a case by case basis as the need arises?

### ***Assessment of Impact of Activities on Celestial Environments***

The *corpus juris spatialis* does not contain any specific procedures for the assessment of potential environmental impacts of activities proposed to be conducted in alien environments. However, if a state has reason

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51. See generally ERNST FASAN, RELATIONS WITH ALIEN INTELLIGENCES THE SCIENTIFIC BASIS OF METALAW (1970); Patricia M. Sterns, *Metalaw and Relations with Intelligent Beings Revisited*, 20 SPACE POLICY 123 (2004) and SPACE LAW 561 (F. Lyall & P. Larsen, eds. 2007); Patricia M. Sterns, *SETI and Space Law: Jurisprudential and Philosophical Considerations for Humankind in Relation to Extraterrestrial Life*, 46 ACTA ASTRONAUTICA 759 (2000).

to believe an activity planned by it or its nationals on a celestial body would cause potentially harmful interference with the activities of another state, it shall undertake appropriate international consultations pursuant to article IX of the Outer Space Treaty. That same article further provides that consultations may be requested by a state which has reason to believe that the activities of another state may cause potentially harmful interference with its activities. The law of outer space recognizes that states have the right to conduct activities on the Moon and other celestial bodies on a basis of equality and in accordance with international law.<sup>52</sup> Accordingly, prior consent of other states is not required.<sup>53</sup> Nevertheless, states with concerns which are not satisfied have the right to withhold any assistance and support for a mission, such as for deep space communications and tracking, which effectively could prevent the mission from being conducted.

The environmental assessment and evaluation considerations articulated in the Code of Conduct and Protocol mirror concerns which are relevant to the exploration of celestial bodies. The initial environmental reference state, the metrics and data to forecast and

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52. Outer Space Treaty, *supra* note 6, art. I.

53. *But see* L.I. Tennen, *Evolution of the Planetary Protection Policy: Conflict of Science and Jurisprudence?*, PROCEEDINGS OF THE 45<sup>TH</sup> COLLOQUIUM ON THE LAW OF OUTER SPACE 466 (2003), and 34 ADVANCES IN SPACE RESEARCH 2354 (2003), at text & note 19 (proposal by Chairman Khrushchev that experiments in space which may hinder the exploration of space by other countries should be subject to prior consent).

detect impacts, possible indirect and unavoidable impacts, technology and ability to respond to accident and unforeseen circumstances, and gaps in knowledge, all should be considered in the planning and execution of interplanetary missions.<sup>54</sup> Moreover, the design and operation of experiments, hardware and equipment should consider the potential consequences to the natural environment.<sup>55</sup>

### ***Area Protection and Management***

The designation of specially protected and managed areas of Antarctica is similar in concept to the “special regions” in the COSPAR planetary protection policy. The COSPAR special regions are areas of the surface or subsurface of Mars which may support conditions suitable for Earth organisms to reproduce, and are defined on the basis of two parameters: temperature and water activity.<sup>56</sup> The COSPAR special regions are based primarily on the interest of protecting scientific values. Similarly, the Moon Agreement provides that areas of special scientific interest may be designated as “international scientific preserves,” subject to special protective arrangements to be determined.<sup>57</sup> An emerging concept is one of “planetary parks,” which is proposed to protect areas of celestial bodies for purposes

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54. Cosmic Study, *supra* note 1.

55. *See* Handbook on the Antarctic Treaty System, *supra* note 19, at 542; *cf.* IADC Debris Guidelines, *supra* note 47.

56. COSPAR Planetary Protection Policy, *supra* note 49; *see also* Cosmic Study, *supra* note 1, pp 16-25.

57. Moon Agreement, *supra* note 16, art. 7.3.

in addition to scientific exploration and use, including historic and aesthetic values, as well as the interests of future generations.<sup>58</sup>

### ***Dispute Resolution***

There is no corresponding procedure for the resolution of disputes in the law of outer space to the Protocol's mandatory dispute resolution process by Arbitral Tribunal or the International Court of Justice. Similarly, the COSPAR planetary protection policy does not include any enforcement or dispute resolution process. If consultations between states pursuant to the Outer Space Treaty are not successful or are refused, states may resort to diplomatic means or other procedures to seek a peaceful resolution of a dispute. Such diplomatic means or other procedures, unfortunately, do not necessarily guarantee that the dispute will be peaceably resolved.

### **Concluding Remarks**

An environmental Code of Conduct for activities in outer space could provide important measures to protect pristine natural environments. Such a Code of Conduct should apply to both the surface and subsurface of the Moon and other celestial bodies, as well as to orbits, and the creation and management of debris. An environmental Code of Conduct should coordinate and harmonize with standards of behavior such as the COSPAR planetary protection policy, and

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58. See generally Cosmic Study, *supra* note 1, pp. 45-9. The State of California Office of Historic Preservation, Department of Parks and Recreation has designated the Apollo 11 lunar landing site as an historical resource. [http://ohp.parks.ca.gov/pages/1067/files/tranquility%20base\\_draft.pdf](http://ohp.parks.ca.gov/pages/1067/files/tranquility%20base_draft.pdf) (October 26, 2009).

the Inter-Agency Space Debris Coordination Committee (IADC) guidelines.

By its nature, a Code of Conduct would not be a legally binding instrument. However, a Code would serve to supplement the existing regulations set forth in the Outer Space Treaty and the Moon Agreement. Agreement on the text of a Code, as a non-binding commitment by states, may be achieved more readily than more formal treaty obligations. Nevertheless, the standards articulated in a Code could be the precursors to new treaty obligations, or even eventually customary international law.<sup>59</sup>

The European Union formally proposed a Code of Conduct for Outer Space Activities in 2008, which was revised in 2010.<sup>60</sup> The purposes of this Code are to strengthen the safety, security and predictability of space activities. However, this Code developed in the context of disarmament, and is not specifically intended as a mechanism for environmental protection.<sup>61</sup> Nevertheless, this Code provides, in article 5, that states should adopt internal policies and procedures to implement the Space Debris Mitigation

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59. Wolfgang Rathgeber, Nina-Louisa Remuss and Kai-Uwe Schrogl, *Space security and the European Code of Conduct for Outer Space Activities*, 4 DISARMAMENT FORUM A SAFER SPACE ENVIRONMENT? 33 (2009).

60. Council of the European Union, *Revised Draft Code of Conduct for Outer Space Activities*, 14455/10, PESC 1234, CODUN 34, ESPACE 2, COMPET 284, 11 October 2010.

61. See Yukiko Kodachi, *Potential Contribution of Japan to the Code of Conduct for Outer Space Activities*, 2009 PROCEEDINGS OF THE IISL 15 (2010); Jose Monserrat Filho, *Code of Conduct for Space Activities: Evolution or Regression?*, 2009 PROCEEDINGS OF THE IISL 108 (2010).

Guidelines. In addition, article 8.2 provides that states should consider providing timely information on space environmental conditions and forecasts to the international space faring community. The European Code of Conduct has not been implemented, but, together with the experience of Antarctica,

may provide a useful guide for consideration in the development of a future environmental Code of Conduct for outer space.

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