

# ENVIRONMENTAL IMPACT ASSESSMENT AND SPACE ACTIVITIES

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## ABSTRACT

Environmental Impact Assessment (EIA), the prior assessment of the possible effects of a proposed activity on the environment, is a common tool for environmental protection and management on Earth today. It was the first major step in the development of impact assessment procedures, which are probably the most obvious examples of an approach that integrates economic, social and environmental considerations. Environmental impact assessment is not a well-established tool in the international law of outer space, however. Despite the peculiarities in assessing the potential impacts of space activities, the premise of this paper is that also this field of human endeavor would benefit greatly from the adoption of EIA procedures and, moreover, such an approach is even becoming vital for the safe and rational conduct of these activities. This is particularly true inasmuch as any adverse environmental impacts of space activities are highly difficult to mitigate once they have materialized.

## BRIEF INTRODUCTION TO ENVIRONMENTAL IMPACT ASSESSMENT

### History of EIA

The earliest mandatory EIA procedures were introduced back in 1969 through the US National Environmental Policy Act (NEPA; 42 U.S.C. § 4321-47). Since then, the terrain has broadened dramatically. The idea of EIA as part of national policy has been adopted in the international arena, too, and there have been significant increases in both the type of activities to which assessments are applied and the scope of the activities, which nowadays extends far beyond the purely environmental (Cordonier Segger et.al., 2002, pp. 58-59). For instance, assessing social and health impacts is now a standard component of EIAs (Cordonier Segger et.al., 2002, p.61). Consequently, environmental impact assessment has often allowed the selection of an alternative which is environmentally, economically and socially superior to the original choice (Harrop and Nixon, 1999, p. 9).

The increasing recognition of environmental impact assessment, and its potential value as an instrument to promote sustainable development in particular, was also reflected in the 1992 Rio Declaration, Principle 17 of which provides: "Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority" (Rio Declaration on Environment and Development, Report of the United Nations Conference on Environment and Development, UN Doc. A/CONF.151/6/Rev.1, 31 I.L.M. 874 (1992)). Principle 15, promoting the more general precautionary approach (of which the impact assessment procedures are a vital part) states: "In order to protect the environment, the precautionary approach should be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".

Obligations under international environmental law that required EIAs were first introduced in the context of the potential transboundary impacts of particular projects (in the historic US-Canada Trail Smelter Arbitration 1938/1941, for instance, the tribunal held that a state may be held internationally liable for causing transboundary harm. See, e.g., Cordonier Segger et.al., 2002, p. 60). With growing recognition of international interdependence, international obligations to conduct EIAs have arisen also in relation to activities that are proposed to take place in areas beyond the limits of national jurisdiction: such obligations can be found, for instance, in the 1991 Protocol to

the Antarctic Treaty on Environmental Protection (Art. 8) (30 I.L.M. 1455 (1991)), and in the 1982 United Nations Convention on the Law of the Sea (Art. 206) (21 I.L.M. 1245 (1982)). It may well be argued that there even exists an obligation under customary international law to conduct an EIA in such circumstances (for instance, in the 1997 *Gabcikovo-Nagymaros* case, the International Court of Justice found a duty to conduct EIAs before proceeding with serious transboundary projects under customary international law as well as treaty and customary obligations to consult and cooperate in implementation of projects which might affect other states' interests. See, e.g., Cordonier Segger et al., 2002, p.60).

Currently, there are regulations for project-level EIA in over 100 countries, but with considerable variations in the types of projects assessed, details of the procedures, and the numbers of assessments carried out (Cordonier Segger et al., 2002, p. 59). In addition to countries and states, international organizations may have their own environmental assessment procedures - amounting to over 200 EIA systems altogether (Koivurova, 2002, p.131). There are also international agreements on EIA which establish their own EIA systems (e.g., the 1991 Espoo Convention on Environmental Impact Assessment in a Transboundary Context; 30 I.L.M. 800 (1991)).

### **Procedure and Aims of the EIA**

EIA is primarily meant to provide the decision-makers with information that is as comprehensive as possible about the different environmental effects the proposed activity would entail, including alternative courses of action and the zero-alternative (i.e., the no-action alternative). Additionally, plans for mitigation in respect of each alternative are to be outlined.

Typically, an EIA includes a preliminary information-gathering phase and a report, followed by a possible decision to proceed with the project in question. There may also be additional measures, such as full investigations and studies, public meetings and consultations. The assessments take account of, among other things, environmental impacts on ecosystems, diminution of aesthetic and scientific values, long-term or cumulative effects, as well as transboundary implications. They also consider issues such as pollution control, environmental protection measures, reporting, post-project analysis, and rehabilitation. Uncertainties in the assessment process must also be expressly presented. Another common requirement is that the results of the impact assessment should be presented in a way that makes them comprehensible to the general public. (On the EIA procedure, see, e.g., Koivurova, 2002, pp. 131-134.)

Although the central aspect of an EIA is to provide decision-makers with scientific information, the process has other important implications, too. One of the most relevant of these is the involvement of those potentially affected by the proposed activity: most EIA systems require in some way the participation of the public alongside the relevant governmental authorities and other stakeholders. Such public involvement has various aims and goals: it may serve as testimony to good governance in general, or, in more practical terms, be considered improved planning due to the concrete contribution of the public to the decision-making process. Clearly, it is also a tool for reducing conflict and developing wider support for the eventual decisions. In any case, it enables the public to gain information about planned activities and influence these developments in some way. (On the aims of EIA, see, e.g., Morgan 1998, pp. 12-21.)

## **ENVIRONMENTAL IMPACT ASSESSMENT AND SPACE LAW**

### **Space Treaties**

Despite its success in many other fields, environmental impact assessment is not a well-established tool in the international law of outer space. The UN space treaties were drafted at a time when such considerations were definitely not among the highest-ranking items on national agendas in any field of endeavor. Therefore, these instruments lack provisions regarding impact assessment, and the rest of the environmental content found in them is rather modest, too. The nearest equivalent to any impact assessment is contained in Article IX of the Outer Space Treaty, which requires prior consultations in the case of a planned space activity or experiment that might cause "potentially harmful interference" with the space activities of other States Parties.

### **Domestic Space Laws**

The national legislation of some spacefaring countries provides at least for the supply of some kind of information assessing the possible environmental consequences of proposed space activities. In the USA, for instance, regarding the 1969 NEPA, the court decided in *Environmental Defense Fund v. Massey* (986 F. 2d 528 (1993)) that this Act also applies to Antarctica. By analogy, it should be applicable to space activities as well. In addition to these general obligations, there is a requirement of "formal assessment" on NASA programs of "[orbital] debris generation potential and debris mitigation options" (NASA Policy for Limiting Orbital Debris

Generation, Art. 1.b).

Also, the Russian Statute on Licencing Space Operations requires that in order to obtain a license for space operation in the Russian Federation, the applicant has to supply, among other things, "documents confirming the safety of space operations (including ecological, fire and explosion safety) and the reliability of space equipment"(Art.5.h). However, such provisions are obviously not enough for ensuring effective regulation of the issue, whereby the possibility of international environmental impact assessment for space activities deserves further examination.

## PROSPECTS FOR ENVIRONMENTAL IMPACT ASSESSMENT OF SPACE ACTIVITIES

### Problematic Aspects

The space environment is a unique arena in many ways. An obvious problem for any impact assessment is the deficiency in knowledge about processes taking place in outer space. Space activities involve not only natural processes but also complex technological phenomena. These factors together contribute to the fact that the inclusiveness of information most often leaves a great deal to be desired and the outcome of proposed space activities cannot be assessed in detail.

The quality of the impact information is, however, of paramount importance to the effectiveness of the entire EIA system. Scientists are usually expected to produce information that is as unambiguous as possible for the use of decision-makers, but the above limitations considerably increase uncertainty about the conclusions in this case. This means that a substantial gray area exists between scientific resolution and political choice, which enables non-scientific factors to become significant components of debates regarding space missions. Additionally, since much of the subject matter is poorly understood and the tools available are often inappropriate for the task of assessment, the assessment of impacts on space is rather expensive to implement and likely to be comparatively time-consuming. Indeed, lack of time and resources is in practice likely to pose a serious constraint on the development of responsible conduct in space.

However, outer space is a global common, and any adverse environmental effects of space utilization are likely to be severe, irreversible and wide in scope. At the same time, the tragedy of the commons problem (i.e. free-riders) renders many nationally adopted strategies for combating adverse environmental consequences ineffective. Additionally, some of the environmental principles applied on Earth have not been too warmly welcomed among the spacefaring nations and other entities involved. For instance, it is still an issue under debate whether space has any intrinsic value or is merely a resource for human utilization. Understandably, as there is presently no permanent human settlement in space, the environs thereby remain a somewhat remote issue in the everyday life of the vast majority of humankind.

Furthermore, the space industry is a highly commercialized and militarized area of international activity, and spacefaring nations and other entities are seldom very keen on distributing detailed information about their planned activities. The relevance of the precautionary principle and sustainable development, for instance, might seem to rest on a bit shakier ground when applied in outer space. Also, the fact that any activity taking place in outer space may be regarded as ultra-hazardous, although during normal operation the environmental harms usually are minor, renders for instance the due diligence principle, and the transboundary impact assessment duty it entails, somewhat less applicable as well.

### Benefits of Space EIAs

Nevertheless, sustainable development and the precautionary principle are important issues for all space activities, and such goals would obviously necessitate better environmental protection, and, thereby, the application of impact assessment procedures. The large scale of potential impacts of space activities would require an equally wide scope of assessment. Also, health and social impacts should be studied in space EIAs as far as possible, since space activities are likely to involve at least indirect social effects, too (the 1991 Espoo Convention, for instance, refers to "any effect. . . on the environment including human health and safety. . . landscape and historical monuments " and includes even "effects on cultural heritage or socio-economic conditions", in addition to effects on more "natural" parts (such as flora and fauna) of the environment; Art. 1.vii). The uncertainty created by the lack of time and resources for impact assessment can partly be amended by ongoing monitoring programs, and, in any case, the potential damage resulting from space activities is of such magnitude that we can hardly afford to omit a thorough assessment of the environmental and other impacts, regardless of the costs.

In the long run, the use of EIA may even reduce direct long-term project costs as well as the time taken to reach a decision by identifying and quantifying not only the beneficial effects but also the possible environmental consequences that might require expensive pollution abatement technology, compensation payments or other costs,

and so on (Harrop and Nixon, 1999, p.9). Additionally, democracy would seem to require the possibility of enhanced public participation, or at least more open distribution of information about human enterprises in space. A more communicative approach is becoming increasingly vital for mission planners and policy-makers as well, because the present development of a myriad of groups with specialized interests in space, combined with laws facilitating access to the courts, considerably heightens the probability that a mission or program will attract opposition, even legal challenge (Sterns and Tennen, 1995, pp. 268-269). Effective use of EIA can thereby help to avoid significant administrative delays and increased costs (Sterns and Tennen, 1995, p. 280). Effective EIA is of course also likely to benefit the environment itself - not least in the outer space environment, where many of the environmental amenities can be considered to have more or less unique value.

## STRATEGIC ENVIRONMENTAL ASSESSMENT

Environmental Impact Assessment, modified to address the particular features of space activities, would indeed seem to be a tool worth considering for the spatial sphere, too. The (formal) aims of EIA are, however, often already contained in some broader policy statements (Morgan, 1998, p. 12). Space activities are a good example of a field regulated for the most part on the policy level. Therefore, Strategic Environmental Assessment (SEA), as the next "level" of impact assessment procedures, would seem to be a good option for supplementing individual EIAs of space missions. As distinct from project EIA, SEA means carrying out EIAs of plans themselves, thereby directly addressing the environmental implications of proposed strategies and policies. Strategic-level assessments extend the scope of assessment to cover earlier stages in planning cycles (policies, plans and programs), offering a way of dealing with cumulative impacts and making possible the examination of alternatives which project level assessments cannot deal with efficiently (Harrop and Nixon, 1999, p.7). This also often results in reducing the time and costs involved in the lower, project-level assessments (Cordonier Segger et al., 2002, p.62).

The multiple causes of the deterioration of the space environment also seem to necessitate more proactive, integrated approaches than those found in conventional EIAs, which only represent a limited response to problems. Additionally, there are major non-project-level factors behind individual space missions that determine the course of space activities - starting from the basic principle of international space law, namely, the freedom-of-use rule established by Article I of the Outer Space Treaty of 1968. On the political scene, government macro-economic and security policies often address space issues (either directly or indirectly) with only modest consideration of the full scale of their impacts. Similarly, the international tendency to privatize space activities is only likely to diminish recognition of environmental and social impacts. On balance, the cumulative assessment enabled by SEAs would seem very appropriate. But, at the same time, the fundamental freedom-of-use principle and the right of every state to retain jurisdiction and control over its space missions (Outer Space Treaty, Art. VIII) also need to be respected. The more significant the potential international impacts of space projects, the more easily the balance should, however, be tipped away from state discretion.

Formerly, the governmental authorities tended to regard SEA with suspicion because of the involvement of public interest groups in policy-making that the SEA entails (Morgan 1998, 36). However, the SEA is currently a highly topical issue in the international arena, particularly because of the ongoing discussions within the United Nations Economic Commission for Europe about adopting a Protocol on Strategic Environmental Assessment to amend the Espoo Convention, and of the recent EU Directive (2001/42/EC) on the assessment of the effects of certain plans and programmes on the environment. These instruments could also serve as feasible models for SEA in the outer space environment.

## SUSTAINABILITY IMPACT ASSESSMENT

Finally, the most recent "innovation" in the integrated impact assessment field is the introduction of so-called Sustainability Impact Assessments (SIAs). They take into consideration environmental, social and economic factors and apply to policies, plans and programs as well as projects, seeking strategies which will result in long term sustainability. SIAs are increasingly concerned with processes, i.e., with the soundness of institutional planning and management, including mechanisms for the meaningful involvement of the appropriate stakeholders. Access to information and public participation are considered essential, and efforts are made to involve public interest groups in all aspects of the SIA system. Currently, there are still few existing concrete international legal obligations referring to SIAs. (Cordonier Segger et al., 2002, pp.64-65).

As regards space activities, conducting SIAs would be a substantial improvement and could, for instance, better integrate both the increasingly important private sector proponents as well as the numerous public interest groups into the assessment procedures. However, for the moment, adopting even somewhat effective environmental

impact assessment and strategic environmental assessment procedures seems like a demanding enough task. Yet, one might hope that sustainability impact assessment systems will become a reality in the future of space activities, too.

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