

INTERNATIONAL ASTRONAUTICAL CONGRESS  
AMSTERDAM, THE NETHERLANDS, OCTOBER 4-8, 1999  
**18th IAA/IISL SCIENTIFIC-LEGAL ROUNDTABLE**  
ON  
**PROTECTION OF THE SPACE ENVIRONMENT**

Coordinator: Mark Williamson (UK)

Chairmen: Dietrich Rex (Germany) and Vladimir Kopal (Czech Republic)

Rapporteur: Kai-Uwe Schrogl (Germany)

The purpose of this roundtable, which took place in the morning of 6 October 1999 and which was attended by around seventy persons, was to present the facts regarding the actual and potential degradation of the space environment by human activities. In doing so, its scope was much broader than the already intensive debate on space debris orbiting the Earth. It sought professional opinions on the environmental problems involved in current space exploration and use and their relevance to future solar system exploration. It also considered how awareness of the problems, in both technical and legal contexts, might be enhanced by the space community.

The roundtable was chaired by the two current chairmen of the the Subcommittees of the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS): Dietrich Rex the Chairman of the Scientific-Technical Subcommittee and Vladimir Kopal the Chairman of the Legal Subcommittee. This fact did not only show the importance of the subject discussed but also was regarded as a promising sign that UNCOPUOS could, in the future, include the problem of the protection of the space environment in its workplan.

Six papers were presented, three dealing with scientific-technical, three dealing with political, legal as well as ethical implications. Thus the roundtable covered the subject in a very comprehensive manner. Following question and answer sections after every presentation, only little time remained for the discussion, as specified in the rapporteur's report.

<b>Speakers</b>	<b>Topics</b>
Mark Williamson (UK)	Planetary Spacecraft Debris - The case for Protecting the Space Environment
Iván Almár (Hungary)	Protecting the Planetary Environment - The Point of View of an Astronomer
Nicholas L. Johnson (USA)	Man-Made Debris in and from Lunar Orbit
Francis Lyall (UK)	Protecting the Space Environment and Law
Patricia M. Sterns (USA)	The Scientific-Legal Implications of Planetary Protection and Exobiology
Martyn. J. Fogg (UK)	The Ethical Dimension of Space Settlement

## SUMMARY OF THE DISCUSSION

It was generally appreciated that the roundtable broadened the scope of environmental protection from the problem of orbital debris and applied an approach, taking into account numerous aspects, which had not yet received the necessary attention. While orbital debris is already well established on the technical as well as on the political agenda - which was i.a. demonstrated by being the subject of numerous sessions at the IAF Congress - the roundtable took up problems of environmental protection outside the near-Earth environment and the presentations as well as the discussion made clear that action has to be taken in this respect as well.

It was pointed out, that at UNISPACE III the problem of broader environmental protection was raised in the Technical Forum but was not accepted as an item to be considered in the Report of the Conference as a prime area of future action (while orbital debris most clearly was). Therefore, the understanding that there is a need for further efforts in promoting awareness of this subject was shared by all participants. The roundtable could then be regarded as one first step to turn around the apparent lack of interest, currently displayed by the Member States of the UN. One additional way to carry forward this subject was seen in the young generation of space professionals. The ESA outreach programme, which brought more than 500 students to the Congress, some of them participating in the roundtable, was regarded as a particularly good chance for that purpose.

One focus of the discussion was the recent crash of Lunar Prospector on the surface of the Moon. This crash was deliberately produced in order to investigate in the possibility of detecting water. With the probe, the ashes of the late planetary scientist Shoemaker were spread on the Moon surface. This mission highlighted a whole set of problems, showing that awareness for environmental protection is far too little developed. First, it touched the question of whether or not to alter the surface of celestial bodies, which is an essential problem for astronomers. Secondly, it raised the threat of biological contamination of other celestial bodies. While sterilisation of probes is routinely done (even with different standards in the US and Russia), such "funerals" as the one mentioned certainly counter efforts in planetary protection. In this context, the question arose, why NASA categorizes the Moon as "Not of direct interest for understanding the process of chemical evolution. No protection of such planets is warranted and no requirements imposed".

The discussion did not lead to a complete agreement on how far the Moon should be protected. While the low categorization of the Moon by NASA was criticized (Mars is far better protected), other views were expressed that in the mid-term, the Moon could and would be used for mining natural resources, which would eventually lead to changes in its surface as well as possible biological contamination. This concrete example raised the question, whether it would be wise to enact strict protection, which would lead to a hindrance of exploration and utilization for the benefit of mankind on Earth. While views diverged on that issue, participants in the discussion shared the opinion that a proper basis for any kind of effective protection is and has to remain the principle of non-appropriation in outer space.