

International Astronautical Congress  
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26<sup>th</sup> IAA/IISL Scientific-Legal Roundtable  
“Space Debris Remediation”

Chairpersons: Kai-Uwe Schrogl (France), Wendell Mendell (US)  
Rapporteur: Nicola Rohner-Willsch (Germany)

Space debris mitigation has received a global recognition and regulatory framework through the 2007 Space Debris Mitigation Guidelines of UNCOUOS. The next step in securing a space environment, where the threat through space debris is limited to the greatest extent, is putting in place space debris remediation measures. Building on the results of an IAA study on this topic technical, policy and regulatory aspects will be investigated in this interdisciplinary roundtable composed of selected experts in the respective fields.

As in the previous years the IAA/IISL Scientific Legal Liaison Committee could win the president of IISL, Tanya Masson-Zwaan, and the Secretary General of IAA, Jean-Michel Contant, to give a welcome speech. Kai-Uwe Schrogl introduced the topic and the speakers. Nicola Rohner-Willsch announced and distributed the 25 years IAA/IISL Scientific Legal Roundtables booklet. The 2011 topic “Space Debris Remediation” of the 26th IAA/IISL Scientific legal Roundtable did meet the interest of more than 60 conference participants. Four speakers were present; one could not travel to CPT.

Heiner Klinkrad started the lectures with a very interesting overview of the results of the IAA study on space debris environment remediation. These facts on the character of the debris environment, on technologies and methods for the remediation and the following recommendations of the 25 contributors of the study were an excellent entry to the following presentations about economic and legal aspects. Carsten Wiedemann reported in his contribution about space debris mitigation measures and cost issues. He identified 20 target objects with the highest probability of a catastrophic collision, especially in the orbital region of 800km altitude (collision cascading). He concluded that it is necessary to remove such space objects actively by using De-Orbiting (controlled at EOL) or active removal, in spite of high estimated costs. The legal part of the roundtable topic was represented by Catherine Doldirina, the policy part by Jana Robinson. Doldirina presented critical legal issues in "cleaning up" outer space. She discussed questions as if it is possible to implement an obligation for immediate de-orbiting at end of life for new satellite launches; if risk objects (i.e. old satellites) can be removed by a third party; or if someone can be held responsible for a collision? Robinson, who reported about space debris remediation and space security concerns, presented different efforts to advance safety and security in space, talked about the urgent enhancement of space situational awareness (SSA) and possibilities for more transparency and confidence-building measures.

The lively discussion among the panellists and in the end with the audience concluded with the following points:

- Five or more missions per year are needed to bring back satellites, probably in cooperation with Russia
- The costs are immense and can only be managed in international cooperation
- Implementing an international fund could help
- In this case it must be discussed who could be such an authority to collect money for the removal of objects and to decide about the missions
- For approval which satellite did cause the damage a monitoring system is necessary
- Technical options are available and can immediately put in practice
- Space debris related insurance for satellites should be a legal obligation

- Legal obligation for remediation is not existent yet in the treaties but there are principles where it can arise from
- It should be avoided to launch cubesats into densely populated orbits
- Politics must be comprised to push new governances (i.e. guidelines for space debris)
- Public should be engaged (education)

Table of speakers:

	Name	Presentation	Country/Institution/Contact
1	Heiner Klinkrad	The IAA Study on Space Debris Environment Remediation	ESA-ESOC, Germany
2	Carsten Wiedemann	Space Debris Mitigation Measures and Cost Issues	TU Braunschweig, Germany
3	Catherine Doldirina	Critical Legal Issues in "cleaning up" Outer Space	McGill University Montreal, Canada
4	Jana Robinson	Space Security Dimensions of Debris Remediation	ESPI, Austria