



**STATUS 20 SEPTEMBER 2019**

**IAA STUDY 5.10—POLICY,  
POLITICAL, LEGAL AND ECONOMIC ISSUES IN  
ACTIVE SPACE DEBRIS REMOVAL**

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Co-chairs

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# Overall Status

1. The draft report has been through three review rounds:
  - a) Outside reviewers
  - b) Report team review
  - c) Additional team member review
2. It has been transmitted in final form to the chairs of Commission 5.
3. We have no funds to print the report.

# Chapters Outline

## Executive Summary

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### Chapter 1: Introduction to the Issue

- a) The orbital debris problem and why active debris removal (ADR) will help
- b) Short summary of technical proposals and issues: summary of Debris Remediation Study – Study Group 5.5
- c) Limits of ADR for remediation; role of collision avoidance

# Chapter 2: On-orbit servicing (OOS) and its relationship to ADR

- 2.1. Techniques for OOS
- 2.2. Preliminary considerations on financing OOS
- 2.3. Orders of magnitude
- 2.4. Initial solutions identified
- 2.5. Potential of OOS

# Chapter 3: Political/Policy Issues

- 3.1 Role of national and international politics
- 3.2 Relationship of current space sustainability efforts to ADR/OOS
- 3.3 Collision avoidance
- 3.4 Creating transparency & confidence building measures
- 3.5 Roles of less developed countries in ADR



# Chapter 4: Legal Issues

- 4.1 Treaty Rules on Liability and Third Party Risk
- 4.2 Definitional Issues
- 4.3 Legal Rules Applicable to Orbital Debris
- 4.4 Dividing Technical Rules into Two Groups
- 4.5 Development of Technical Rules Related to Orbital Debris
- 4.6 Codes of Conduct At the European Level
- 4.7 Summary of Guidelines
- 4.8 Legal Basis for ADR, OOS, and JCA
- 4.9 Beyond the Space Treaties: Other Regimes

## Chap. 4: Cont.

- 4.10 Prototypes in International Law: Law of Salvage
- 4.11 Salvage and the Principal of Cooperation
- 4.12 Interference in Property Rights
- 4.13 Impact of Insurance on Orbital Debris Remediation
- 4.14 Future Approach: What New Laws/Treaties Might be Needed?
- 4.15 Conclusions




# Chap. 5. Economic Issues

- 5.1 General Considerations
- 5.2 Economic Dimensions of ADR
- 5.3 Domains (ADR Market Segmentation)
- 5.4 Stakeholders
- 5.5 Values and Benefits
- 5.6 Costs
- 5.7 Economic and Financial Models
- 5.8 Financing
- 5.9 Economic Analysis of Risk and Insurance
- 5.10 Implementation
- 5.11 Cross-Synergy Potential with OOS

# Chapter 6—ADR Metrics for Analysis

- 6.1 Derelict Collision Prevention
- 6.2 Graveyard Orbits
- 6.3 Summary



# Chapter 7—Conclusions and Recommendations

- 7.1 Political/policy Matters
- 7.2 Legal Issues
- 7.3 Economic Issues
- 7.4 Recommendations

## Recommendation to IAA

- We recommend that this report be made available in electronic form on line so it can receive wide distribution
  - We believe that the findings of this report could lead to action within the space community to proceed with an effort to develop one or more pilot ADR missions
  - Without an on-line version, this report will likely be seen by only a few individuals and organizations
  - Increasingly, on-line access is becoming the norm for many, many timely reports

# Major Conclusions

- Unless spacefaring countries act soon to remove the largest debris from orbit, the potential for destructive collisions will increase substantially.
- Active debris removal (ADR) will make a significant contribution to space sustainability, but is not sufficient.
- In addition to ADR, improved space situational awareness will also be needed to achieve long term space sustainability.
- At present, the costs of ADR are highly uncertain; much additional research on technological solutions and costs will be needed.

# Legal Issues

- There appear to be no insurmountable legal barriers to ADR
  - *Acceptable procedures for notification of ADR operations,*
  - *Spectrum allocations and usage for ADR and OOS,*
  - *Agreed-upon risk management procedures,*
  - *Procedures to avoid harmful interference to others,*
  - *Agreements for avoiding allegations of aggressive activities in space,*
  - *Readily accessible dispute resolution techniques.*