

POLICY, LEGAL AND ECONOMIC ISSUES IN ORBITAL DEBRIS REMOVAL

Draft Outline

I. INTRODUCTION

- A. The Issue facing the world community
- B. How Active Debris Removal Might Help
- C. Technical Approaches To Debris Removal (very short summary including lethal/nontrackable, trackable fragments, large derelicts already deposited, future large derelicts (not yet abandoned))

II. POLITICAL/POLICY ISSUES

- A. States treat outer space as an international commons
 - 1) Restrictions on behavior in outer space was limited to allow original spacefaring States as much flexibility as possible
 - 2) States reluctant to assume responsibility for debris removal
- B. Who will go first in removing large debris?
- C. Much ~~T~~ technology for ADR can be used for satellite servicing or as anti-satellite weapon
- D. States often do not divulge the presence or function of classified military payloads
- E. There is strong need for transparency and confidence-building measures (TCBMs)
- F. How can the equities and concerns of the emerging space States be addressed?
- G. International cooperation
 - 1) Tech transfer issues
 - 2) How can the smaller space States be involved in ADR? What level of technological capacity is required?

III. LEGAL ISSUES

- A. What is the definition of orbital debris?
- B. Who owns debris, especially the smaller pieces, for which the origin is highly uncertain?
- C. No internationally agreed definition of debris, including non-functional spacecraft
 - 1) Treaties only refer to "space objects"
 - 2) Does sovereign ownership extend to debris?
- D. IADC and UN Debris Mitigation Guidelines define space debris, but they are not treaty based definitions

- E. What looks like space debris might be a working spacecraft with hibernating capability
- F. How resolve intellectual property and ownership issues?

IV. **ECONOMIC ISSUES**

- A. ADR is expensive
- B. How will we pay for it?
- C. Little economic incentive to remove debris
- D. Most debris is in LEO, where few commercial entities operate
- E. Governments largely created the problem; governments will likely need to pay for cleanup
 - 1) Slow governmental progress on mitigation guidelines until recently
 - 2) Scale of costs limits private sector solutions

V. **CONCLUSIONS AND RECOMMENDATIONS**

- A. Debris removal is much more than a technical matter
 - 1) What is technically feasible may not be politically desirable or legally permitted today
 - 2) Solutions will likely require an interdisciplinary approach
- B. Although individual States have created the problem, solutions will most likely require international cooperation
- C. Challenges include:
 - 1) Creating an internationally agreed definition of space debris
 - 2) Developing an international cooperative approach to debris removal
 - 3) Clarifying inconsistencies among international agreements .
- D. Need to develop a set of candidate best practices for active debris removal
 - 1) Includes notification protocols
- E. Need to do much more legal research on the problem of ADR
- F. Need to develop practical solutions to the host of legal issues
- F-G. Institutional arrangements