



Space Law and ISRU

Prof. Henry R. Hertzfeld
Director, Space Policy Institute

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Bocconi School of Management
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Outline

- **Does international space law prohibit the use of resources on celestial bodies?**
- **Does international space law prohibit the exploitation (profit-making) of resources on celestial bodies?**
- **Is an international authority or governing body needed to insure the responsible use of resources on celestial bodies?**



Economic Realities

- **There are useful resources in space**
- **Valuable resources in space have not been proven**
- **There is currently no “space economy;” all economics of space are terrestrial**
 - **Legal issues will also be settled among nations on Earth**
- **There will be no change in the above for at least the next 5-10 years (and likely much longer)**
 - **range for a normal business plan, and**
 - **time needed to perform R&D and prove technologies**



Legal Realities

- **No coordination among governments on rules for the supervision of private space activities**
- **No clear international accountability for ownership of space resources**
- **No effective liability regime for space activities**
- **No enforceable international dispute resolution regime for commercial incidents**
- **But there are nations developing regulatory incentives for on-orbit private ventures**





Managing In-Space Activities

(while preserving future rights)

- **We have time to find solutions, but**
- **Will we?**
 - **Human history—no action until a disaster**
 - **In space—we don't have that “luxury”**
 - **Any serious use of space resources will trigger a set of reactions.**
 - **Will they have any major effect on space law?**
- **Will the legal effect be different if a government does it or if a private enterprise does it.**



United States: Examples of National Responses

- **Apollo moon rocks treated as government property**
 - Criminal offense for a civilian to possess them
- **Other responses to private space activities**
 - Special treatment of space station private initiatives
 - Subsidization of private launch companies
 - Experimental licenses for sub-orbital human flights
- **Very strong push for private resource activities in space**
 - Law of November 2015—permits private ownership of “resources obtained in space”
 - Reassures companies and investors of stable and predictable profit opportunities
 - Establishes a clear path to future approval of resource use through responsible licensing and supervision



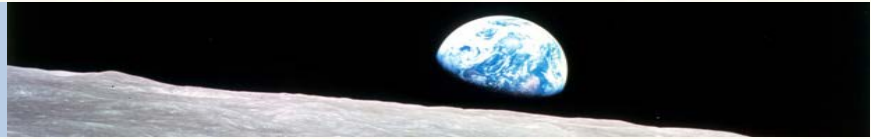
Hidden Dangers to the Core Principles of International Space Law

- **Treaties focus on government activities**
- **Governments can do what they wish in space and assume the risks**
 - Within certain boundaries of long-term sustainability and responsibility
- **Private entities need government permissions to operate in space**
 - And can be face both civil and criminal actions if in violation
- **It is very possible that within a nation two different sets of rules may co-exist for almost identical space activities**
 - One for governments
 - One for private entities



An Example

- **Governments can land on a celestial body, dig, drill, remove resources and even move an asteroid to different orbits.**
 - They must accept the risks, but whose going to complain and to whom?
 - U.S. on the Moon; Japan's Hayabusa missions; China on far side of the Moon, etc.)
- **Companies need permission of their government to do the very same things**
 - Different nations will develop different rules of operation for companies, possibly adjudicated if necessary in local courts
 - Different national courts will base decisions on different criteria, possibly creating regimes across nations that are significantly different.



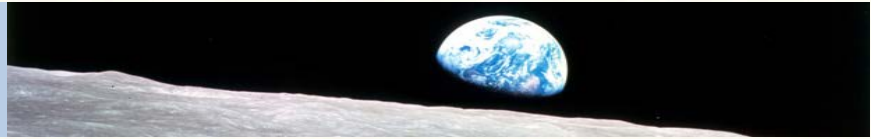
Internationally

- **Internationally, it is only governments that are responsible and liable (OST, Art. VI)**
 - there is no effective and enforceable recovery mechanism
 - Governments will attempt to avoid liability exposure, and transfer as much liability to private entities as they can
- **This can result in an unstable and destabilizing situation, particularly for commercial space**
 - Result: increased legal and political risks of investments in developing space resources
- **Currently there is no effective regime for determining liability or for adjudicating a claim.**



Internationally: A Challenging Future Awaits

- **An international regime like the Sea Bed Commission (or a similar entity as suggested by Art. 11 of the Moon Agreement)**
 - **Could easily result in commercial disincentives for space resource development**
- **Better legal and policy coordination and cooperation among nations would be preferable, but**
- **How can we make that more likely to happen?**
- **Can the near-term solution be effectively negotiated among the nations and companies with the ability and finances to develop those resources?**



Final Thoughts

- **Technology advances very rapidly**
- **Law moves slowly; internationally even more slowly**
- **Space is unique in comparison to terrestrial exploitation**
 - R&D and testing is often prohibitively expensive,
 - There is little margin for mistakes,
 - And “cleanup” is almost impossible
- **Can the law keep up?**
- **Can nations, before broad international agreements become feasible, address legal issues so that they and companies can attract investment and operate**

profitably, responsibly, and ensure space sustainability?