

Minutes of SMR #2 Study Group 3.26
IAC 2017 Tuesday 26 September 2017
City Room #3, Adelaide, SA

Meeting was originally scheduled in City Room #4, but, a legal session extended well past its scheduled completion time, so the meeting was moved to City Room #3.

11 people attended:

Roger X. Lenard	rxlenard@gmail.com	USA	LPS
Peter Swan	dr-swan@cox.net	USA	ISEC
Melissa Mirino	melissa.mirino@community.isunet.edu	Italy	
Michael Simpson	mkscms@gmail.com	USA/IE	Secure World Found
Susan McKenna Lawlor	STIL@mu.ie	IE	STIL
Austin Dula	austin@dula.com	USA	Heinlein Prize Trust
Art Dula	art@dula.com	USA	Heinlein Prize Trust
Kyle Acierno	K-acierno@ispace.inc	Canada	iSpace
Chris Johnson	johnson.c@gmail.com	USA	SWF, IISL, ISU
Bruckner Hightower	buckhightower@gmail.com	USA	Heinlein Prize Trust
Konstantin Rayknol		RUS	Tsnimash

Status of progress discussed, briefing attached. Plans for future activities discussed. All participants have clear idea of path forward.

Roger X. Lenard, SG Chair

Space Mineral Resources #2: IAA Study



Peter A. Swan, Ph.D. Member, International Academy of Astronautics
President, Member BofD's, International Space Elevator Consortium
Industry Professor, Technical University of Delft and Stevens Institute of Technology

Roger Lenard,
Member, International
Academy of Astronautics,
President, Little
Prairie Services

Arthur Dula,
Member, International
Academy of Astronautics,
Trustee, Robert Heinlein
Foundation

Note: many images from
Heinlein Prize Trust and
Excalibur Exploration

9/26/2017

Image from IAA Study



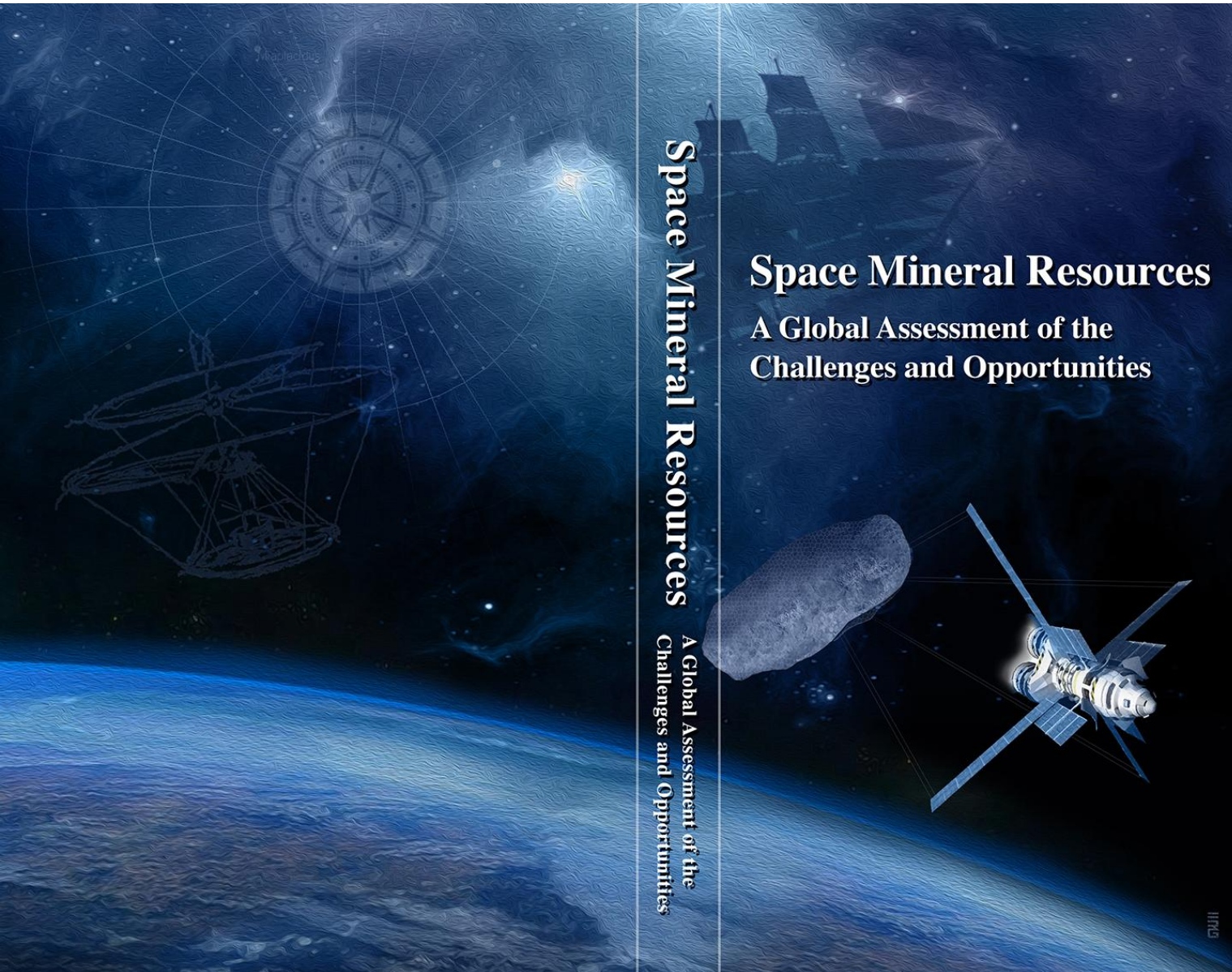
Space Mineral Resources #2:

IAA Study-Agenda



- Welcome
- Sign-up sheet
- Review of status
- Supplemental information

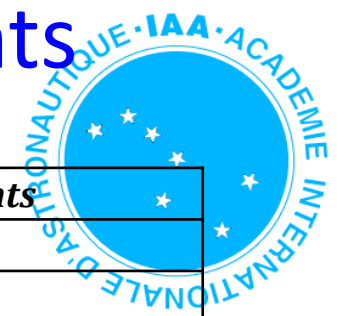
Building upon



International Academy of Astronautics



Chapter Outline and Writing Assignments



Chapter	Topic	Lead Author	Co-Author	Comments
ExSum	ExSum, Preface,	Dula	Swan	
1	Introduction, Past & Present	Swan	Lenard	
2	Vision, the Why, Benefits	Simpson	Swan	UN sustainable Goals
3	Arch Approach, the How	Swan		
4	Case Studies	Lenard	Mirino	
4a	Commercial viability lunar regolith	Blair	Lenard/Mirino	
4b	Commercial viability Propellants and habitats on Mars	Lenard	Swan	
4c	Commercial viability of propellant in LEO	Lenard	TBD	
4d	Commercial power distribution for Mars	Lenard		Draft finished [April 28 th]
5	Legal – non-traditional commercial	Dula	Zheng-China*	
6	Conclusions Recommendations	Swan	Lenard	
	Appendix			

Membership



- SG Chair: Art Dula – USA
- SG Vice Chair: Zhenjun Zhang – China
- Secretaries: Pete Swan/Roger Lenard
- Michael Simpson – USA
- Susan McKenna Lawlor: Ireland
- Melissa Mirino: Italy
- G.S. Sachdeva: India
- R Herzfeld: USA
- Salem Al-Marri: UAE
- Brad Blair: USA
- Catherine Conley: USA
- Christophe Bonnal: France
- Bernd Hoffer: UAE

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Schedule



- Create Study Group – gain approval – IAC Israel Meeting [Oct 2015]
- First Meeting by Paris 2016
- Form Team – by Paris 2016
- Create path to follow – by Paris March 2016
- Work on study – March 2016 to October 2018
- Develop study report – Mar 18 – Dec 18
- Joint IAA-ISDC workshop in May 2018
- Final study report approved by commission III Mar 2019
- Academy Level peer review and then publishing by Sept 2019
- Plenary at IAC and discuss findings in technical sessions

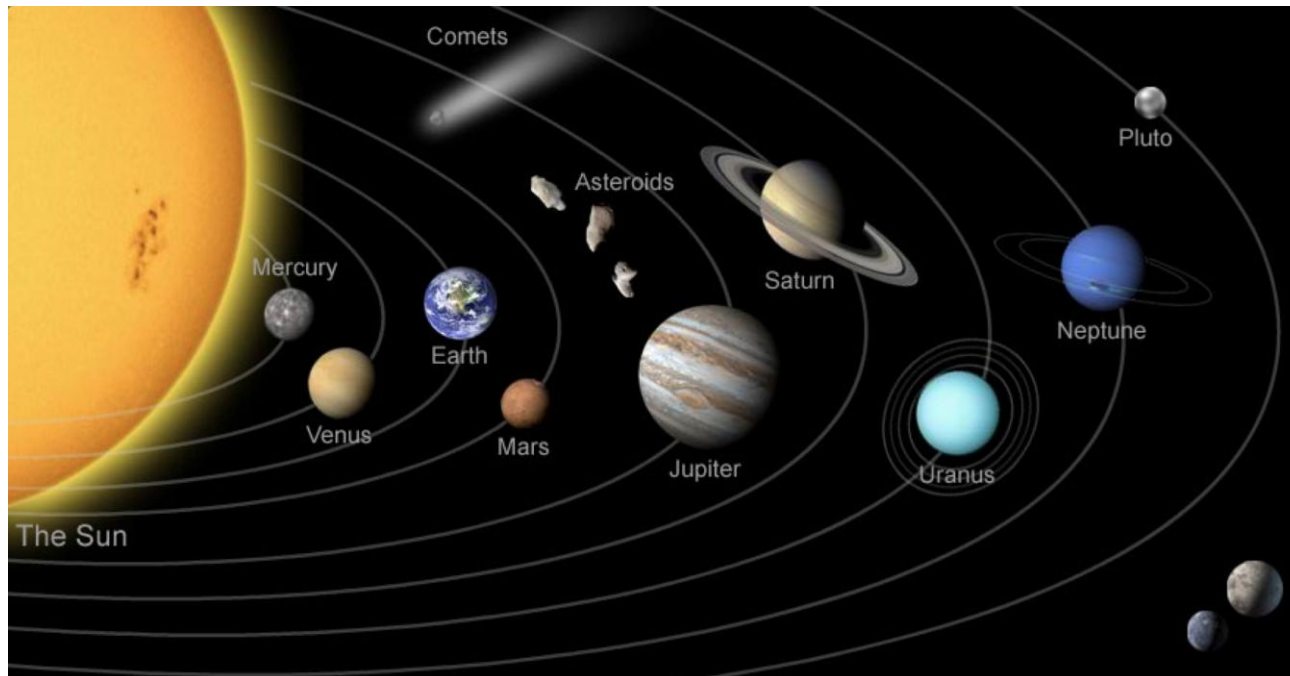


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Chapter Status



- Introduction: Pete
- Benefits: Mike or Pete
- Legal
- Economic Case Studies
 - Power as a resource – complete in draft
 - Mars habitat and propellant – in work
 - Lunar resources – in work
 - Asteroids – TBD
- Legal
- Conclusion

Chapter 2 Report



- Benefits: Mike or Pete



Chapter 3 Legal



- The 2015 study presented the legal situation as of the middle of 2015. After it circulated, and in 2017 became the first IAA study to be published in Chinese, much discussion occurred.
- The purpose of this second study is to summarize the discussion that occurred after the last report with specific attention to national authorization and supervision of nongovernmental activities in outer space, for example:
 - 2015 US Law “Commercial Space Launch Competitiveness Act”
 - 2017 US draft law on commercial space activities.
 - 2017 Luxemburg Law “The Luxemburg Space Law,”
 - Multiple Nations are considering similar legislation

Chapter 4 Lunar Resources



- To make an economic case:
 - Resource must be available
 - Compete cost-wise with Earth delivery or from another source
 - Includes cost of extractive and beneficiating infrastructure

Cost Benefits of Lunar SMR				
Resource	Lunar Concentration	Extraction Method	Beneficiation Cost (\$/kg)	Delivery Cost From Earth (\$/kg)
Aluminum				
Iron				
Oxygen				
Titanium				
Carbon				
Nitrogen				

Chapter 5 Conclusion



- TBD