



THE HAGUE SPACERESOURCES GOVERNANCE WORKING GROUP

FINAL REPORT

THE HAGUE SPACE RESOURCES
GOVERNANCE WORKING GROUP

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EXECUTIVE SUMMARY

This is the final report of The Hague Space Resources Governance Working Group for its operation during the period January 2016 to December 2017. The Hague Space Resources Governance Working Group was established in January 2016 on the basis of a Project Plan, which sets out the main provisions for its operation. It included, amongst other things, an overview of the activities and schedule, as well as the preliminary estimate of the budget. According to its terms of reference, the objective of the Working Group was to assess the need for a regulatory framework for space resource activities and to prepare the basis for such a regulatory framework. Towards this end, alongside the Project Plan, the first draft of the Building Blocks was distributed to the initial participants. The Building Blocks form the basis for a future governance framework agreement and are the focus of the work of the Working Group. This text also laid the ground for further discussion within the Working Group during and in the aftermath of the four face-to-face meetings that were held between April 2016 and September 2017. In realisation of the aforementioned objectives, in September 2017, the Working Group agreed to circulate the “Draft Building Blocks for the Development of an International Framework on Space Resource Activities”, as the preliminary result of its work, and to invite comments to inform its further consideration of the Building Blocks.



INTRODUCTION

The Hague Space Resources Governance Working Group (the Working Group) was created in January 2016 on the basis of a Project Plan, and comprises of 22 members and 42 observers. Its platform is a Consortium serviced by a Secretariat. The Consortium consists of six partners representing organizations from all continents and is functioning under a Memorandum of Understanding. The Secretariat consists of the Working Group's Executive Secretary and an Assistant Secretary. The Working Group has a Chair and two Vice-Chairs. Most of the activities are carried out by email or teleconference calls, while face-to-face meetings are planned twice every year. The Working Group operates in a transparent and open manner, and important information is posted on the website (<https://www.universiteitleiden.nl/en/law/institute-of-public-law/institute-for-air-space-law/the-hague-space-resources-governance-working-group>), as well as on social media (@SpaceResourceWG, <https://www.facebook.com/TheHagueSpaceResourcesGovernanceWG/>).

I. OPERATION OF THE WORKING GROUP

A. Platform: The Memorandum of Understanding on The Consortium of The Hague Space Resources Governance Working Group

The Memorandum of Understanding between the Consortium partners of the Working Group (MoU) was signed and copies have been provided to each of the partners. The founding Consortium partner is the International Institute of Air and Space Law of Leiden University, The Netherlands. The Secretariat of the Working Group is hosted here. The other Consortium Partners are the Catholic University of Santos, Brazil; the Centre for Resources, Energy and Environmental Law of the University of Melbourne, Australia; the Indonesian Centre for Air and Space Law of Padjajaran University, Indonesia; the Secure World Foundation, United States; and the SpaceLab of the University of Cape Town, South Africa.

According to the provisions of the Memorandum of Understanding, an evaluation call is held once a year, in order to assess the implementation of the MoU by the Consortium partners. An evaluation call took place on 1 September 2017 and was attended by the majority of the partners. During the call, the activities carried out by the partners since the start of the Working Group and the execution of the MoU provisions in the past as well as in the future were discussed.



B. Secretariat Activities

The Secretariat consists of the Executive Secretary and the Assistant Executive Secretary, who are in charge of managing the operation of the Working Group. Weekly status meetings have been held between the Executive Secretary and the Assistant Secretary, in order to organize the activities of the Group and to set out its working plan. Coordination calls have also been arranged with the Chairs and the Vice-Chairs of the Working Group to discuss critical issues and prepare for the face-to-face meetings.

The Secretariat has also created a webpage for the Working Group (<https://www.universiteitleiden.nl/en/law/institute-of-public-law/institute-for-air-space-law/the-hague-space-resources-governance-working-group>), which is continuously updated with the most recent developments and related documents, and maintains its social media accounts on twitter ([@SpaceResourceWG](https://twitter.com/SpaceResourceWG)) with more than 450 followers and on facebook with 200 followers and 50 new visitors each month (<https://www.facebook.com/TheHagueSpaceResourcesGovernanceWG/>).

C. Participation in the Working Group

- *Members*

Members are major stakeholders from government, industry, universities and research centres. A list of the current members of the Working Group (Annex I) can be found online on the website of the Working Group. Members are responsible for making the decisions and are invited to attend all teleconferences and meetings of the Working Group. The number of members is limited to 25 and is currently fixed at 22. They are consulted before and after every meeting, in order to provide their input for the discussions of the Group. They are also the primary participants of the face-to-face meetings.

- *Observers*

Observers are professionals directly involved in space resources issues and are invited to attend face-to-face meetings, but not teleconferences. They are not permitted to actively participate in the meetings, but are heard after the members have presented their opinions. There is no restriction on the overall number of observers to the Working Group, but the number of observers per organisation is limited to two. Currently there are 42 observers to the Working Group, although this number is increasing continuously. Since the beginning, the circle of observers has been extended to include representatives of international organisations, space



agencies and start-up companies. A formal application to and admission by the Secretariat is required in order to become an observer.

The Working Group also maintains a mailing list of people who wish to receive updates on its developments, without being involved as members or observers. A list of members and observers can be found in the Annex (I).

D. Meetings of the Working Group

➤ First face-to-face meeting, 18-19 April 2016 and Space Resources Symposium, Leiden

The first face-to-face meeting of the Working Group was held from 18-19 April 2016, at the Old Observatory of Leiden University, the Netherlands. It was attended by a majority of members and observers (13 members and 14 observers). The meeting facilitated an extensive discussion on the proposed Building Blocks. The draft notes of this meeting were distributed to the members and to the observers who were in attendance, and the final version was sent out. The Building Blocks of the project were revised and distributed to the members and to the observers who attended the meeting.



➤ Second face-to-face meeting, 7-8 November 2016, Leiden

The second face-to-face meeting was held from 7 to 8 November 2016 in the Academy Building of Leiden University. It was dedicated to discussing the remarks made on the first version of the Building Blocks, submitted by members and observers, and disseminated in advance of the meeting. The outcome was a further elaboration on the revised text of the Building Blocks, aiming at providing a more concrete set of guidelines. According to the discussions that took place during the meeting (attended by 14 members and 20 observers), the Building Blocks were revised again and distributed to the participants, requesting their input on the



comments to inform its further consideration on their content. The Group also decided to extend its duration for another period of two years in 2018-2019, as well as to create a technical panel to support its activities.



II. OUTCOME OF THE FIRST PHASE: THE DRAFT BUILDING BLOCKS FOR THE DEVELOPMENT OF AN INTERNATIONAL FRAMEWORK ON SPACE RESOURCES

The Draft Building Blocks for the Development of an International Framework on Space Resources represent the preliminary result of the work of the Group and implement the input provided by members and observers before, during and after the four face-to-face meetings. The initial set of building blocks was presented to the members of the Working Group during the first teleconference meeting in January 2016. The members were asked to provide their comments on the building blocks, in order to initiate discussion on their content. The building blocks were revised accordingly by the Board of the Working Group and formed the basis of discussion for the first face-to-face meeting in April 2016. Following the first meeting, taking into account the remarks made by members and observers, the Board revised the text of the building blocks, and distributed it to the members and participating observers, soliciting further comments in advance of the second face-to-face meeting in November 2016. Similarly, the received comments along with the remarks presented by the members and observers attending the second meeting were considered for further revision of the building blocks. The revised version was again disseminated among the members and participating observers, alongside the invitation to provide comments in advance of the third face-to-face meeting of April 2017. The input submitted was discussed during the third meeting, following which another revision of the building blocks was delivered. The latter, combined with the contributions submitted before the meeting, constituted the material discussed during the fourth face-to-face meeting in September 2017. This last meeting of the first phase produced the text of the Draft Building Blocks, which the Working Group agreed to circulate, acknowledging them as initial outcome of its work. They were also printed in 2000 copies in the form of a booklet and several were sent to members and observers, with



the purpose of further expanding the outreach of the Working Group through their network and activities. The Draft Building Blocks have been made public and will be open for comments until 1 July 2018. The text of the 19 Draft Building Blocks follows.

1. Objective

- 1.1 The international framework should create an enabling environment for space resource activities that takes into account all interests and benefits all countries and humankind.
- 1.2 To achieve this objective, the international framework should:
 - a) Identify and define the relationship of space resource activities with existing international space law, including the provisions of the United Nations treaties on outer space;
 - b) Propose recommendations for the consideration of States for the application or development of domestic frameworks;
 - c) Propose recommendations for the consideration of intergovernmental organizations for the application or development of internal frameworks;
 - d) Promote the identification of best practices by States, intergovernmental organizations and non-governmental entities.

2. Definition of key terms

- 2.1 Space resource: an extractable abiotic resource *in situ* in outer space.¹
- 2.2 Utilization of space resources: the recovery of space resources and the extraction of raw mineral or volatile materials therefrom.²
- 2.3 Space resource activity: an activity conducted in outer space for the purpose of searching for space resources, the recovery of those resources and the extraction of raw mineral or volatile materials therefrom, including the construction and operation of associated extraction, processing and transportation systems.
- 2.4 Space object: object launched into outer space from Earth, including component parts thereof as well as its launch vehicle and parts thereof.³
- 2.5 Space product: product made in outer space wholly or partially from space resources.⁴
- 2.6 Operator: a governmental, intergovernmental or non-governmental entity conducting space resource activities.

¹ According to the understanding of the Working Group, this includes mineral and volatile materials, including water, but excludes (a) satellite orbits; (b) radio spectrum; and (c) energy from the sun.

² According to the understanding of the Working Group, this excludes secondary utilization of space resources, i.e. (a) utilization of raw materials derived from space resources; and (b) marketing and distribution of space resources.

³ According to the understanding of the Working Group, this includes objects made wholly or partially from space resources).

⁴ According to the understanding of the Working Group, this excludes raw mineral and volatile materials, including water, irrespective of form.



3. Scope

- 3.1 The international framework should address States and intergovernmental organizations.
- 3.2 The international framework should address space resource activities within the solar system.

4. Principles

- 4.1 The international framework should be consistent with international law.
- 4.2 The international framework should be designed so as to:
 - a) Incrementally regulate space resource activities at the appropriate time (principle of adaptive governance);
 - b) Promote consistency and predictability among domestic frameworks of States and internal frameworks of intergovernmental organizations;
 - c) Contribute to sustainable development;
 - d) Prevent disputes arising out of space resource activities;
 - e) Promote and secure the orderly and safe utilization of space resources;
 - f) Promote the rational, efficient and economic use of space resources;
 - g) Promote the use of sustainable technology;
 - h) Provide legal certainty and predictability for operators;
 - i) Take into particular account the needs of developing countries;
 - j) Take into particular account the needs of science;
 - k) Take into particular account the contributions of pioneer operators.
- 4.3 The international framework should provide that:
 - a) Space resources shall be used exclusively for peaceful purposes;
 - b) Space resource activities shall be carried out for the benefit and in the interests of all countries and humankind irrespective of their degree of economic and scientific development;
 - c) Space resource activities shall not harmfully interfere with other on-going space activities, including other space resource activities;
 - d) International cooperation in space resource activities shall be conducted in accordance with international law.

5. International responsibility for space resource activities and jurisdiction over space products

- 5.1 The international framework should provide that States and intergovernmental organizations shall be responsible for space resource activities authorized by them in accordance with their international obligations.
- 5.2 The international framework should provide that space resource activities require prior authorization and continuing supervision by the appropriate State or intergovernmental organization.



5.3 The international framework should provide that States and intergovernmental organizations shall exercise jurisdiction and control over space products used in space resource activities authorized by them.

6. Access to space resources

6.1 The international framework should enable the unrestricted search for space resources.

6.2 The international framework should enable the attribution of priority rights to an operator to search and/or recover space resources *in situ* for a maximum period of time and a maximum area upon registration in an international registry, and provide for the international recognition of such priority rights. The attribution, duration and the area of the priority right should be determined on the basis of the specific circumstances of a proposed space resource activity.

7. Utilization of space resources

7.1 The international framework should ensure that resource rights over raw mineral and volatile materials extracted from space resources, as well as products derived therefrom, can lawfully be acquired, and provide for the mutual recognition between States of such resource rights.

7.2 The international framework should ensure that the utilization of space resources does not contravene the principle of non-appropriation under Article II OST⁵.

8. Due regard for interests of all countries and humankind

The international framework should provide that States and intergovernmental organizations authorizing space resource activities shall give due regard to the interests of all countries and humankind.

9. Avoidance of harmful impacts resulting from space resource activities

Taking into account the current state of technology, the international framework should provide that States and intergovernmental organizations authorizing space resource activities shall adopt a precautionary approach with the aim of avoiding harmful impacts, including:

- a) Risks to the safety of persons, the environment or property;
- b) Damage to persons, the environment or property;
- c) Adverse changes in the environment of the Earth, taking into account internationally agreed planetary protection policies;

⁵1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.



- d) Harmful contamination of celestial bodies, taking into account internationally agreed planetary protection policies;
- e) Harmful contamination of outer space, including the creation of harmful persistent space debris;
- f) Harmful interference with other on-going space activities, including other space resource activities;
- g) Changes to designated and internationally endorsed outer space natural or cultural heritage sites;
- h) Adverse changes to designated and internationally endorsed sites of scientific interest.

10. Technical standards for, prior review of, and safety zones around space resource activities

10.1 The international framework should provide that States and intergovernmental organizations shall require the conduct of a review prior to the authorization of a space resource activity to ascertain that such an activity is carried out in a safe manner to avoid harmful impacts.

10.2 The international framework should:

- a) Encourage the development of a domestic approval process to ensure that equipment, operational procedures and processes applied in space resource activities avoid harmful impacts;
- b) Encourage the development of a methodology to assess that equipment, operational procedures and processes applied in space resource activities meet common technical standards (conformity assessment);
- c) Encourage operators to develop technical standards for equipment, operational procedures and processes applied in space resource activities (standardization).

10.3 Taking into account the principle of non-appropriation under Article II OST, the international framework should permit States and intergovernmental organizations authorizing space resource activities to establish a safety zone, or other area-based safety measure, around an area identified for a space resource activity as necessary to assure safety and to avoid any harmful interference with that space resource activity. A safety zone shall not impede the free access, in accordance with international law, to any area of outer space of personnel, vehicles and equipment of other governmental, intergovernmental and non-governmental entities conducting space activities. A State or intergovernmental organization may authorize the restriction of access to a safety zone for a limited period of time, provided that timely public notice has been given setting out the reasons for such restriction.



11. Monitoring and redressing harmful impacts resulting from space resource activities

- 11.1 The international framework should provide that States and intergovernmental organizations shall monitor whether any harmful impacts result from space resource activities authorized by them.
- 11.2 If a harmful impact resulting from a space resource activity occurs, the international framework should provide that the State or intergovernmental organization that authorized the space resource activity shall implement measures to respond to such harmful impact (response measures) and consider whether the space resource activity should be adjusted or terminated (adaptive management).

12. Sharing of benefits arising out of the utilization of space resources

- 12.1 Bearing in mind that the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and humankind, the international framework should provide that States and intergovernmental organizations authorizing space resource activities shall provide for benefit-sharing through the promotion of the participation in space resource activities by all countries, in particular developing countries. Benefits may include, but not be limited to enabling, facilitating, promoting and fostering:
 - a) Development of space science and technology and of its applications;
 - b) Development of relevant and appropriate capabilities in interested States;
 - c) Cooperation and contribution in education and training;
 - d) Access to and exchange of information;
 - e) Incentivization of joint ventures;
 - f) Exchange of expertise and technology among States on a mutually acceptable basis;
 - g) Establishment of an international fund.
- 12.2 The international framework should not require compulsory monetary benefit-sharing.
- 12.3 Operators should be encouraged to provide for benefit-sharing.

13. Registration and sharing of information

The international framework should provide that States and intergovernmental organizations shall:

- a) Register priority rights of an operator to search and recover space resources *in situ* in accordance with the international framework;



- b) Give advance notification of space resource activities authorized by them through an international repository;
- c) Register space objects in accordance with the REG⁶, United Nations General Assembly Resolution 1721 B (XVI)⁷, or Article XI OST, taking into account United Nations General Assembly Resolution 62/101⁸;
- d) Notify frequency assignments for recording in the Master International Frequency Register in accordance with the Radio Regulations of the International Telecommunication Union⁹;
- e) Provide, taking into account Article XI OST and the legitimate interests of operators, information and best practices on the authorization and supervision of space resource activities authorized by them through an international repository, including:
 - i. The purposes, locations, orbital parameters and duration of space resource activities;
 - ii. The nature, conduct, and locations of space resource activities and associated logistic activities, for example deployment of stations, installations, equipment and vehicles;
 - iii. The results of space resource activities;
 - iv. Any phenomena discovered in outer space which could endanger human life or health, as well as of any indication of life;
 - v. Any harmful impacts resulting from space resource activities authorized by them and the measures planned or implemented to redress such impacts;
- f) Notify the termination of space resource activities authorized by them through an international repository together with a statement on the condition of the area where the space resource activity was carried out, including the presence of any space objects or space products, or parts thereof.

14. Provision of assistance in case of distress

The international framework should provide for the applicability of Article V OST and the ARRA¹⁰ to persons involved in space resource activities.

⁶ 1975 Convention on the Registration of Objects Launched into Outer Space.

⁷ 1961 Resolution 1721 B (XVI) adopted by the United Nations General Assembly, International Cooperation on the Peaceful Uses of Outer Space.

⁸ 2008 Resolution 62/101 adopted by the United Nations General Assembly, Recommendations on enhancing the practice of States and international intergovernmental organizations in registering space objects.

⁹ The Radio Regulations, edition of 2016.

¹⁰ 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Space.



15. Liability in case of damage resulting from space resource activities

- 15.1 The international framework should provide for the applicability of Articles VI and VII OST and the LIAB¹¹ to damage resulting from space resource activities.
- 15.2 The international framework should encourage initiatives of operators to provide, individually or collectively, compensation for damage resulting from their space resource activities.

16. Visits relating to space resource activities

The international framework should provide for the applicability of Article XII OST, taking into account the legitimate interests of operators.

17. Institutional arrangements

The international framework should provide for:

- a) The establishment and maintenance of a publicly available international registry for registering priority rights of an operator to search and recover space resources *in situ*;
- b) The establishment and maintenance of an international repository, in addition to the international registry, for making publicly available:
 - i. Information and best practices;
 - ii. The list of designated and internationally endorsed outer space natural and cultural heritage sites; and
 - iii. The list of designated and internationally endorsed sites of scientific interest;
- c) The designation or establishment of an international body or bodies responsible for:
 - i. The identification of best practices;
 - ii. The listing of designated and internationally endorsed outer space natural and cultural heritage sites, and sites of scientific interest;
 - iii. The monitoring and review of the implementation of the international framework as well as its modification or amendment; and
 - iv. The governance of the international registry, the international repository and any other mechanism that may be established for the implementation of the international framework.

18. Settlement of disputes

The international framework should encourage recourse by States, intergovernmental organizations and operators to the amicable resolution of

¹¹ 1972 Convention on International Liability for Damage Caused by Space Objects.



disputes, for example by developing procedures for consultation or promoting the use of the 2011 Permanent Court of Arbitration Optional Rules for Arbitration of Disputes Relating to Outer Space Activities.

19. Monitoring and review

Mechanisms should be developed for monitoring implementation of the international framework, for example on the basis of reports of States and intergovernmental organizations, as well as for its review and further development (principle of adaptive governance).



The printed booklet of the Draft Building Blocks

III. OUTREACH ACTIVITIES

The Working Group has been present, through its members and observers, at various international events in an effort to increase the transparency and outreach of its activities. Furthermore, the Consortium Partners have organized several activities, in an effort to promote the work of the Group and raise awareness on the issue of space resource governance.

A. *Activities of the Working Group*

➤ *ECSL Practitioners' Forum 2016, Paris, France, 18 March 2016*

A presentation on “The Activities of The Hague Space Resources Governance Working Group” was given by the Executive Secretary during the Practitioners’ Forum of the European Centre for Space Law. The Forum took place on 18 March in Paris and focused on “The Exploitation of Natural Resources in Outer Space”.

➤ *United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), Legal Subcommittee 55th Session, Vienna, Austria, 4-15 April 2016*

A statement on the Working Group was delivered by the Dutch representative at the 55th session of the UNCOPUOS Legal Subcommittee, held in Vienna from 4-15 April 2016. The statement served as a factsheet, providing an overview of the origins of the Working Group, the objectives of the project, the structure and operation of the



Working Group, as well as the contact details of the Secretariat. It was made available to all delegates as a Conference Room Paper (A/AC.105/C.2/2016/CRP.17).

- *67th International Astronautical Congress, Guadalajara, Mexico, 26-30 September 2016*

A paper reporting on the progress of the Working Group was submitted for the IISL Colloquium on the Law of Outer Space of the International Astronautical Congress in Guadalajara, Mexico. The presentation titled “The Hague Space Resources Governance Working Group: A Progress Report” was delivered on 27 September 2017 during the session on the Legal Perspectives on Space Resources and Off-Earth Mining. The paper was co-authored by the Chair, Prof. R. Lefeber, the Executive Secretary, Dr. G. Reibaldi, the Assistant Executive Secretary, M. Stewart, and Consortium Partner Asst. Prof. T. Masson-Zwaan, and was published in the proceedings of the Colloquium (Tanja Masson-Zwaan, René Lefeber, Giuseppe Reibaldi & Merinda Stewart, *The Hague Space Resources Governance Working Group - A Progress Report* in P. J. Blount, Tanja Masson-Zwaan and Kai Uwe Schrogl (eds.), *Proceedings of the International Institute of Space Law 2016*, 163-168, 2016).

- *United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS), Legal Subcommittee 56th Session, Vienna, Austria, 27 March – 7 April 2017*

During the 56th session of the Legal Subcommittee of UNCOPUOS a statement was made by the Dutch delegation, following up on the previous year’s one on the objectives and operation of the Working Group. A presentation was also given by Consortium Partner, Asst. Prof. Tanja Masson-Zwaan, at the opening of the session in the framework of the IISL-ECSL Symposium, which took place on 27 March.

- *Invitation to support the work of the United Nations Action Team on Exploration and Innovation*

In April 2017, the Working Group was invited to support the work of the United Nations Action Team on Exploration and Innovation by providing input on the issues addressed within the Action Team, namely raising awareness of space exploration and innovation, triggering new partnerships, developing capabilities that create new opportunities for addressing global challenges; fostering dialogue with the space industry and the private sector, and allowing space exploration activities to become open and inclusive on a global scale. The Secretariat solicited comments from members and provided its contribution to the UN Action Team in May 2017.



- *10th IAA Symposium on the Future of Space Exploration: Towards Moon Village and Beyond, Turin, Italy, 27-29 June 2017*

In the framework of the 10th Symposium on the Future of Space Exploration of the International Academy of Astronautics, on the topic “Towards Space Village and Beyond” a status report of the Working Group was presented by the Executive Secretary, Dr. Giuseppe Reibaldi. The presentation was held on 27 June 2017 during the panel on International Exploration, Cooperation & Governance.

- *68th International Astronautical Congress, Adelaide, Australia, 25-29 September 2017*

A second progress report paper was submitted at the International Astronautical Congress that took place in Adelaide, Australia in September 2017. A presentation was given on 26 September 2017 during the “NewSpace”, New Laws/How Governments can Foster New Space Activities session of the IISL Colloquium on the Law of Outer Space. The paper “The Hague Space Resources Governance Working Group: Second Progress Report and the Way Forward” co-authored by the Chair, Prof. R. Lefeber, the Executive Secretary, Dr. G. Reibaldi, the Assistant Executive Secretary, D. Stefoudi, and Consortium Partner Asst. Prof. T. Masson-Zwaan was submitted for publication in the forthcoming proceedings in 2018.

- *Press Conference, NewSpace Europe, Luxembourg, Luxembourg, 16 November 2017*

Vice-Chair, Dr. Michael Simpson and Executive Secretary, Dr. Giuseppe Reibaldi, held a press conference in the form of a presentation during the NewSpace Europe conference organized in Luxembourg from 16 to 17 November 2017. The presentation on “International Cooperation for the Development of Space Resource Activities” took place on 16 November 2017 and discussed the outcome of the first phase of activities of the Working Group, as well as the content of the Draft Building Blocks for the Development of an International Regime on Space Resource Activities.

The Working Group has also been quoted on many occasions, such as news items, academic articles and newsletters of organizations, thus managing to increase its visibility and prove its status as authoritative point of reference on the issue of space resources governance.

B. Activities of the Consortium Partners

- *International Institute of Air and Space Law, Leiden University, The Netherlands*

A symposium on the “Legal Aspects of Space Resource Utilization” was organized on 17 April 2017 at Leiden University by the International Institute of Air and Space



Law, on the side of the first face-to-face meeting of the Working Group. During the symposium, several presentations were given on topical issues related to the governance of space resources. The presentations can be found online (<https://www.universiteitleiden.nl/en/events/2016/04/symposium-on-legal-aspects-of-space-resource-utilisation>), while a report of the symposium was also published in the Kluwer Air & Space Law Journal (H. Hameed, D. Stefoudi, *Report on the Symposium on Legal Aspects of Space Resource Utilization: IIASL, Leiden University, 17 April 2016*, 41 Air & Space Law issue 4/5, 387-393, 2016).

The Institute also addresses the issue of space resource governance in the academic curriculum of the Adv. LL.M. in Air and Space Law of Leiden University, where the Working Group developments are discussed.

➤ *Catholic University of Santos, Brazil*

On 27 October 2016, the Law School of the Catholic University of Santos organized a Conference on International Environmental Law, which attracted the attention of the local media. During this event, the work of the Working Group was acknowledged, evaluated and appraised by distinguished speakers, followed by questions that engaged the audience on the subject. In particular, the impact of the law of the sea on the development of space law was discussed, while one of the speakers focused on the issues of use, extraction and commercialization of space resources. Vice-Chair, Prof. Olavo Bittencourt, conveyed a letter written by Consortium Partner Asst. Prof. Tanja Masson-Zwaan, mentioning the absence of a clear framework for the governance of space resources activities and the work of the Working Group on this matter.

The Catholic University of Santos is also managing a TV channel, broadcast to a wide audience, in which Prof. Bittencourt has participated by speaking about space law and the developments within the Working Group. Finally, the University is planning to extend the outreach of the Working Group through its partnering with foreign academic institutions, especially in Latin America. A detailed presentation of the activities of the Catholic University of Santos, Brazil, can be found in the Annex (II).

➤ *Indonesian Centre for Air and Space Law, Jakarta, Indonesia*

The Indonesian Institute of Air and Space Law of Padjajaran University organized on 8 August 2017 a Workshop on Space Resources Governance in Jakarta, Indonesia, in collaboration with the Indonesian Space Agency (LAPAN) and the Indonesian National Institute of Aeronautics and Space. The event aimed at raising awareness on issues related to the exploitation of space resources, to identify potential



opportunities for the ASEAN countries in space resource utilization, and to address the challenges raised in the field of space resources activities. The Terms of Reference and the outcome of the Workshop can be found in the Annex (III).

➤ *Secure World Foundation, USA*

The Secure World Foundation (SWF) has been present at the face-to-face meetings and supported several activities related to the topic of space resources.

In the framework of the International Astronautical Congress 2017 in Adelaide, Australia, Dr. Michael Simpson, Ian Christensen, Krystal Wilson co-authored a paper titled "Broadening Benefit as a Pathway to the Widely Accepted Development of Extra-terrestrial Resources", which was presented during one of the sessions. Moreover, SWF has sponsored the Space Generation Advisory Council Space Generation Workshop on "Space Resources Governance", which took place before IAC Adelaide 2017. Vice-Chair and Consortium partner Dr. Simpson moderated a Plenary Session with Young Professionals on "Innovative Methods for Assured and Secure Access to Space Resources" during the IAC 2017. He also gave a presentation on the recent developments of the Working Group and the content of the building blocks during the Off-Earth Mining Forum in Sydney in September 2017.

In addition, the Secure World Foundation organized a panel event on "Asteroids, Mining, and Policy: Practical Consideration of Space Resource Rights" in Washington DC on 5 May 5, moderated by Mr. Ian Christensen, observer to the Working Group. SWF has also organised a panel on "The International Policy and Market Context for International Space Resources Development." at the 12th Annual International Symposium for Personal and Commercial Spaceflight, held in Las Cruces, New Mexico in October 2016. The panel was moderated by Mr. Ian Christensen and included the Working Group's Vice Chairs, Dr. Simpson and Prof. Bittencourt. Finally, Mr. Christensen has addressed the issue of space resources governance in several events. He has been present, talking about the policy aspects of space resources at the Space Resources Roundtable in 2016 and 2017, a technical conference focused on space resources development, providing also an update of the progress of the Working Group. He has also given a guest lecture to the Colorado School of Mines graduate-level course on Space Resources Fundamentals on 31 October 2017. His presentation, which covered a broad overview of the policy and legal questions surrounding space resources development, Mr. Christensen introduced the activities of the Hague Space Resources Governance Working Group, in the context of other domestic and multilateral policy developments related to space resources. Information related to the activities of the Secure World Foundation can be found in detail in the Annex (IV).



CONCLUSION AND WAY FORWARD

During its two-year period of operation, The Hague Space Resources Governance Working Group has functioned in a transparent manner as a multi-stakeholder platform with diverse representation from governments, industry, academia, and international organizations, among others.

The Working Group has managed to fulfill its objectives to assess the need for a regulatory framework for space resource activities and to prepare the basis for such a regulatory framework. It also achieved meeting its deliverables, namely the identification and formulation of building blocks for the governance of space resource activities with the Draft Building Blocks for the Development of an International Framework on Space Resources.

The Working Group will conclude its first phase of activities, as envisioned, in December 2017. Its participants have agreed to extend the operation of the Working Group for another period of two years, in 2018 and 2019, in order to enable inclusive consultations on the Draft Building Blocks and to continue to explore the need, and form, of any future mechanism for the governance of space resource activities. Towards this end, it has set the deadline for the submission of input on the Draft Building Blocks at 1 July 2018. The second phase of the Working Group will be based on the Project Plan distributed to the members on 1 December 2017.



ANNEX I – Participants of The Hague Space Resources Governance Working Group

LAST NAME	FIRST NAME	AFFILIATION	COUNTRY	STATUS
Lefeber	René	Ministry of Foreign Affairs, The Hague	The Netherlands	Chair
Simpson	Michael	Secure World Foundation (SWF), Broomfield CO	USA	Vice-Chair and Consortium Partner
Bittencourt Neto	Olavo	Catholic University of Santos, São Paulo	Brazil	Vice-Chair
Reibaldi	Giuseppe	Special Space Policy Advisor International Institute of Air and Space Law (IIASL), Leiden	Italy	Executive Secretary
Stefoudi	Dimitra	University, Leiden	The Netherlands	Assistant Secretary
Bargo	Perez Cesar	Catholic University of Santos, São Paulo	Brazil	Consortium Partner
Godden	Lee	Centre for Resources, Energy and Environmental Law (CREEL), The University of Melbourne	Australia	Consortium Partner and (interim) Member
Latifulhayat	Atip	Indonesian Institute of Air and Space Law, Padjajaran University, Bandung	Indonesia	Consortium Partner and Member
Martinez	Peter	University of Cape Town, Cape Town	South Africa	Consortium Partner and Member
Masson-Zwaan	Tanja	International Institute of Air and Space Law (IIASL), Leiden University	The Netherlands	Consortium Partner and Member
Acierno	Kyle	ispace technologies, Inc., Tokyo	Japan	Member
Al Rashedi	Naser	UAE Space Agency, Abu Dhabi	UAE	Member
Baseley-Walker	Ben	Planetary Resources, Luxembourg	Luxembourg	Member
Brisibe	Tare	National Space Research & Development Agency, Abuja	Nigeria	Member
Crawford	Ian	Birkbeck College, London	UK	Member
Keravala	Jim	Off World, Inc., Los Angeles, CA	USA	Member
Kfir	Sagi	Deep Space Industries (DSI), Moffett Field CA	USA	Member
Khan	Imtiaz Ali	Indian Space Research Organisation (ISRO), Paris	India	Member
Link	Mathias	Ministry of the Economy, Luxembourg	Luxembourg	Member
Marchisio	Sergio	University La Sapienza, Rome	Italy	Member
Mariez	Julien	French Space Agency (CNES), Paris	France	Member
Ramirez de Arellano	Rosa Maria	Mexican Space Agency (AEM), Mexico City	Mexico	Member



Richards	Bob	Moon Express, Cape Canaveral FL	USA	Member
Sakamoto	Mitsuhiro	International Telecommunication Union (ITU), Geneva	Switzerland	Member
Sundahl	Mark	COMSTAC, Washington DC	USA	Member
Wang	Guoyu	Institute of Space Law, Beijing Institute of Technology, Beijing	China	Member
de Wet	Sandea	Office of the Chief State Law Advisor, Pretoria	South Africa	Member
Abhijeet	Kumar	National Law School of India University, Bangalore	India	Observer
Antoni	Ntorina	Swiss Space Systems Holding SA	Switzerland	Observer
Arnould	Jacques	French Space Agency (CNES), Paris	France	Observer
Barton	Matthew	EXPO 2020	UAE	Observer
Carpenter	James	European Space Agency (ESA), ESTEC	The Netherlands	Observer
Castillo Olascoaga	Teresa	Mexican Space Agency (AEM), Mexico City	Mexico	Observer
Chan	Kimberly	Canadian Space Agency	Canada	Observer
Cheney	Thomas	University of Sunderland, Sunderland	UK	Observer
Christensen	Ian	Secure World Foundation (SWF), Broomfield CO	USA	Observer
Frank	Robin Jo	National Aeronautics and Space Administration, Office of the General Counsel, Washington DC	USA	Observer
Fujii	Kojiro	Nishimura & Asahi Professor Emerita / Editor-in- Chief Emerita, Journal of Space Law	Japan	Observer
Gabrynowicz	Joanne Irene		USA	Observer
Galache	J.L.	Aten Engineering Commercial Space Transportation Advisory Committee (COMSTAC), Washington DC	USA	Observer
Gold	Mike		USA	Observer
Goncharova	Victoria	Embassy of Russia to the Netherlands, The Hague	Russia	Observer
Hedman	Niklas	United Nations Office for Outer Space Affairs	Austria	Observer
Hobe	Stephan	Institute of Air and Space Law, Cologne University, Cologne	Germany	Observer
Hofmann	Mahulena	University of Luxembourg, Luxembourg	Luxembourg	Observer
Hunter-Scullion	Mitch	Asteroid Mining Corporation	UK	Observer
Ilves	Erika	Shackleton Energy Company, Del Valle TX	USA	Observer
Jah	Moriba	University of Arizona, Tucson AZ	USA	Observer



Kobata	Yuri	Ministry of Foreign Affairs, Tokyo	Japan	Observer
Kometani	Kazumochi	Ministry of Economy, Trade and Industry, Tokyo	Japan	Observer
Kozuka	Souichirou	Gakushuin University, Toshima-ku	Japan	Observer
Kunstadter	Chris	XL Catlin, New York NY	USA	Observer
de Man	Philip	Katholieke Universiteit (KU) Leuven, Leuven	Belgium	Observer
Marboe	Irmgard	University of Vienna, Vienna	Austria	Observer
Marquez	Peter	Planetary Resources, Washington DC	USA	Observer
Martin	Anne-Sophie	University La Sapienza, Rome	Italy	Observer
Messina	Piero	European Space Agency (ESA), Paris	France	Observer
Mijovic	Milan	SERBSPACE, Serbian Office for Space Sciences Research and Development	Serbia	Observer
Muzyka	Kamil	Polish Space Exploration Group	Poland	Observer
Newman	Christopher	University of Sunderland, Sunderland	UK	Observer
Palkovitz	Neta	Innovative Solutions in Space B.V. (ISIS), Delft	Netherlands	Observer
Di Pippo	Simonetta	United Nations Office for Outer Space Affairs	Austria	Observer
Rummel	John	McGill University, Montreal	Canada	Observer
Smith	Lesley Jane	Leuphana University, Lüneburg	Germany	Observer
Su	Jinyuan	School of Law, Xi'an Jiaotong University	China	Observer
Tronchetti	Fabio	HowlyMo Law Firm, Beijing / Adjunct Professor	China / US	Observer
Tumlinson	Rick	Deep Space Industriess (DSI), Moffett Field CA	USA	Observer
Zeng	Siqi	Ministry of Foreign Affairs, China	China	Observer
Zhang	Zhenjun	China Institute of Space Law, Beijing	China	Observer



ANNEX II – Activities of the Catholic University of Santos, Brazil



UNIVERSIDADE
CATÓLICA
DE SANTOS

Santos, September 25, 2017

To The Hague Space Resources Governance Working Group Report on efforts put forth
by Universidade Católica de Santos

Dear Sirs and Madams:

Universidade Católica de Santos is proud to be a member of such prominent group and as such, it has been struggling to generate awareness on its peers of the relevance expressed by the actions and discussions conducted by the Group.

Congress on International Environmental Law

Our main action regarding effective involvement of students and professors, as well as the community at large was the IV Congress on International Environmental Law, held in the cities of Santos and Sao Paulo in October, 2016.

Current perspectives of developing and space faring nations regarding space resources were the subject of a specific table during the Congress.

In a table held on October 27th, 2016, at the Law School of the Universidade Católica de Santos, the work of the Hague Space Resources Governances Working Group was acknowledged, evaluated and appraised by distinguished speakers, leading to fascinating questions from the floor, in an event which enjoyed full attendance and also significant local media coverage.

After a brief introduction from the chairman of the session, Professor Olavo Bittencourt, indicating the relevance of studies on space law and policy to the Universidade Católica de Santos, as denoted by post-graduation courses and a research group, presentations from distinguished Brazilian scholars were introduced to the audience.

Professor Maria Helena Rolim (UN/IMO International Maritime Law Institute, Malta) offered interesting remarks about the impact of the Law of the Sea on the development of Space Law. Considerations regarding the international legal framework applicable to the exploration and exploitation of the deep seabed, as provided by the Montego Bay Convention of 1982, were advanced in comparison with provisions of the Outer Space Treaty of 1967 and the Moon Agreement of 1979. The evolution towards the concept of shared sovereignty in relation to international territories was acknowledged, justifying the revision of applicable legal instruments in order to address current demands and concerns of the international community.

The next speaker was Professor José Monserrat Filho (Vice-President of the Brazilian



Association of Air and Space Law), who gave an engaging appraisal of the challenges posed to Space Law by the uses, extraction and commercialization of space resources, considering the international treaties currently in effect. Unilateral initiatives of national regulation were questioned, from both political and legal standpoints. Also, the importance of bridging the divide between space faring and non-space faring nations was emphasized, specially concerning sensitive topics as space resources.

After those presentations, Olavo Bittencourt read a letter written by Professor Tanja Masson- Zwaan (Leiden University), invited speaker who unfortunately could not be present at the event, identifying that the absence of a clear framework to govern newly emerging commercial activities such as space mining, thus justifying academic studies and initiatives devoted to ensure that those activities meet existing treaty obligations regarding on-orbit operations and space resource rights. As such, the Hague Space Resources Governance Working Group was introduced , with its mission of assessing the need for a regulatory framework for space resource activities and preparing the basis for such regulatory framework.

To conclude the event, the chairman presented personal remarks concerning his experience as co-vice chair of the Hague Space Resources Governance Working Group , indicating the importance of multilateralism to assure that space activities are conducted for the benefit of all mankind.

Questions from the floor, including from fellow professors and researchers of Universidade Católica de Santos, were then presented to the speakers, denoting the relevance of studies on space resources to the local academic community.

Attached to this document, please find some clipping and the agenda for the Congress as evidence of its realization.

Programa Urbanidades

Universidade Católica de Santos is the controller and manager of a TV Channel in the Baixada Santista Metropolitan Region, a set of 10 cities that encompasses a population of around 2 million inhabitants.

The programming grid of such channel has a special spot for a talk-show (Programa Urbanidades) recorded in the university studios that approaches themes and guests of institutional interest.

Prof. Dr. Olavo Bittencourt Neto, as the leader of a Research Group on Astropolitics in the university, participated twice of the show, first, talking about Space Law and the implications of his research and materials published; and most recently on a show still not aired, but recorded, presenting the Working Group and more recent issues discussed and of relevance in the process of generating awareness on the subject.

Attached to this document, please find some images of the first show, already aired.

Continuous contact with foreign partner universities

Universidade Católica de Santos has a roll of partner universities that constantly exchange students and professors through our currently en force agreements.

The relationship with such said universities, mainly in the Latin American group has always been around the approach of our research groups and that is a point that has leveraged the visibility of the Group's work, once Dr. Olavo Bittencourt's research group has been exposed to the partner universities whenever we list our groups or evidence some benchmark of process or research.



Main universities working with us in Latin America include: in Mexico - La Salle University, Universidade Popular Autonoma del Estado de Puebla and Universidad Nacional Autonoma do Mexico; in Costa Rica - Universidade Nacional de Costa Rica; in Argentina - Universidad de Buenos Aires and Universidad Catolica de Cordoba; in Chile - Pontificia Universidade Católica de Chile; in Peru - Academia Transdisciplinaria Internacional del Ambiente (ATINA), among other tacit contacts that provide influence of the university in the region.

As 2017 comes to its final stretch, we are planning our scope of action to move forward on the discussions and topics related to the Hague Group issues. The main idea so far is to resume our 60-minute Skype call format with partner universities. In the format, each party has a 20-minute window to express its view on an agreed theme and the remaining 20 minutes would be left for open discussions. The recorded event can later be transcribed and turn into support material for academic papers and projects.

Once again, we at the university look forward to participating intensely of the proposed projects and discussions.

My most sincere regards to all stakeholders ,

Prof. Me. Marcos Medina Leite

Rector

reitor@unisantos.br

Phone: +55 (13) 3225 5555 Ext. 1206



Schedule of Events for the IV Congress on Environmental Law

Hotsite for the Event:

www.unisantos.br/direitoambientalinternacional/

The screenshot displays the website for the IV Congress on Environmental Law, organized by the Universidade Católica de Santos. The header includes the event title, the university logo, and navigation tabs for 'Home', 'Congresso', 'Programação', and 'Palestrantes'. Below the header, there are links for 'Inscrições', 'Trabalhos Aceitos', 'Localização', and 'Fale Conosco'. The main content area is titled 'PROGRAMAÇÃO' and features a 'Congresso' tab. The program is divided into two days: **DIA 28/10 - FACULDADE DE DIREITO DA UNIVERSIDADE CATÓLICA DE SANTOS** and **DIA 27/10 - FACULDADE DE DIREITO DA UNIVERSIDADE CATÓLICA DE SANTOS**. The first day's schedule includes: 16h30 - 18h: Credenciamento do IV CIDA; 19h15: Sessão de Abertura - Composição da Mesa de Autoridades; 20h: Palestra de Abertura by Prof. Dr. Eduardo Felipe P. Matias, followed by the 'Prêmio Jabuti de Literatura' in the category 'Economia, Negócios, Administração e Direito - "O Surgimento do Direito Internacional da Sustentabilidade"'. The second day's schedule includes a 'Mesa: Governança Ambiental Global: recursos especiais' with speakers Prof. Dr. Olavo de Oliveira Bittencourt Neto, Prof. Dra. Maria Helena Rolim, Prof. Dr. José Monnerat Filho, and Prof. Dr. José Monnerat Filho. It also features a 'Debate' and a 'Apresentação de artigos aprovados' by Mesa 1: Prof. Dra. Maria Luiza Grantiera and Prof. Dr. Wallace Paiva Martins Junior. The website also lists sponsors: Pinheiro Neto Advogados, Agência Católica, CAPES, and comgas.

Figure 01: Screen Print of Hotsite



UNIVERSIDADE
CATÓLICA
DE SANTOS

ASSESSORIA DE IMPRENSA
imprensa@unisantos.br
(13) 3228 1239

Jornal: A Tribuna

Data: 22/9/2016

Seção/ Página: Cidades – A3

Santos sedia congresso ambiental

DA REDAÇÃO

Nos dias 26, 27 e 28 de outubro Santos sedia o IV Congresso de Direito Ambiental Internacional. O evento acontece na Universidade Católica de Santos (UniSantos) e discutirá temas como Saúde Pública e mudanças climáticas, Direitos Humanos e deslocados ambientais, Direito do Mar e Estratégia Oceanopolítica, recursos espaciais, desenvolvimento sustentável e soluções alternativas para conflitos internacionais.

“É o único congresso com essa temática no Brasil. É um evento importante para a Cidade, que reunirá palestrantes da Espanha, Holanda, Inglaterra e França. Além de ser uma oportunidade de se discutir abordagens globais para solucionar problemas locais, aprimorando nossas políticas públicas”, afirma o professor Fernando Rei, do Programa de Doutorado em Direito Ambiental Internacional da UniSantos.

Na oportunidade, também serão apresentados 30 trabalhos científicos de autores brasileiros e portugueses. As inscrições para o congresso estão abertas e podem ser feitas no site www.unisantos.br/direitoambientalinternacional.

Figure 02: Screen Print of Media Coverage (Newspaper)



Figure 03 and 04: Photos of the IV Congress on Environmental Law



Figure 05: Screen Print of Talk Show with Prof. Olavo Bittencourt Neto



TERM OF REFERENCES WORKSHOP ON SPACE RESOURCES LAPAN - UNPAD

Background

The discourses regarding the space mining which is more commonly known as the space resource activities, particularly those which are related to legal issues, gradually emerges and has started to draw the attention of the countries especially since the United States published its “Asteroid Act 2014”. The law regulates the commercial space exploration.

Although there are not a lot of countries follow the United States’ approach on this matter, some countries such as Luxembourg has responded by issuing a similar law which also gives the right to private companies to conduct mining activities in space. Meanwhile, some countries, especially the developing countries, has provided some notes and even critical reactions to the steps taken by the ‘space faring nations’, especially the United States.

One of the most crucial issues regarding the exploration of the space resources is the absent of an explicit regulation to regulate the activities. The space law only regulates the countries’ activities on space, not the exploration of the space resources. Another important issue is related to the access and benefit sharing of the activity (benefit sharing).

In response to those problems, the Leiden University in cooperation with some centers of space studies including the Indonesian Center of Air and Space Law – Universitas Padjadjaran has established a working group to create an international legal framework governing this activity (The Hague Space (Mineral) Resources Governance Working Group). The working group consists of various related disciplines and also involves representatives from the industry and academics from both developed and developing countries including Indonesia.

The objective of the Working Group is to assess the need for a regulatory framework for space (mineral) resource activities and to prepare the basis for such a regulatory framework. In case such framework is needed, the Working Group would like to encourage states to start negotiating an international agreement or non-legally binding instrument, such as a code of conduct. The groundwork required will include the identification and formulation of building blocks for the governance of space (mineral) resources with possible implementation strategies as well as the identification of a relevant forum for the negotiations.

The working group has conducted three meetings in Leiden and will hold its final meeting in September 2017 to prepare the final report in the form of an international legal framework which covers the regulation on the exploration of space resources. Prior to the September meeting, Indonesia has been asked to hold a “Regional Workshop” to achieve and gain the aspirations from the developing countries in ASEAN, especially Indonesia.



Purposes

The Regional Workshop on Space Resources aims to:

- a. Socialize the important issues concerning the exploration of space resources,
- b. Identify potential opportunities for ASEAN countries, especially Indonesia to obtain and utilize these resources,
- c. Anticipate possible problems arising from the exploration of the space resources and provide the appropriate and accurate solutions.

Participants

The targeted participants of this workshop come from various disciplines and professions from the institutions such as: LAPAN (Indonesian National Institute of Aeronautics and Space), LIPI (Indonesian Institute of Sciences), BPPT (Institute for Assessment and Application of Technology), universities, the industries, and other stakeholders.

Resource person (speakers)

The invited speakers for the workshop are from:

- d. The Hague Working Group of Space Resources
- e. LAPAN
- f. Universitas Padjadjaran
- g. ITB (Bandung Institute of Technology)
- h. LIPI

Organizer

This workshop will be held by the Faculty of Law of Universitas Padjadjaran (the Indonesian Centre of Air and Space Law) in cooperation with LAPAN (Indonesian National Institute of Aeronautics and Space) on the 8th of August 2017 at LAPAN's office on Jalan Pemuda Persil No. 1, Jakarta Timur.

Schedule

08.30-09.00	: Registration
09.00-09.30	: Opening ceremony
09.30-10.00	: Break
10.10-12.00	: Space Resource: Potential, exploitation and its utilization
	1. LAPAN
	2. The Hague Space Resources Governance Working Group.
12.00-13.00	: Lunch
13.00-15.00	: Legal aspects of Space Resource Activities and the



development of its regulation.

1. The Hague Space Resources Governance
Working Group

2. The Indonesian Centre of Air and Space Law

15.00-15.30

: Break

15.30-17.00

: Space Resource Activities: the economic perspective and
industry

1. BPPT

2. LAPAN

17.00-17.30

: Closing remarks

Summary of the outcome of the Workshop

1. Space resource is a new issue in space activities that give raises several legal questions, which is not governed by the existing international space law.
2. Indonesia should take part in discussing the development of space resource activities including efforts in the establishment of an international framework to govern such an issue.
3. The Indonesian Centre of Air and Space Law (ICASL), Padjadjaran University in cooperation with the Indonesian Space Agency will organize regional workshop on space resource in August 2018.



ANNEX IV – Activities of the Secure World Foundation, USA

Space Generation Advisory Council, Space Generation Congress, Adelaide 2017



SWF's Project Manager's Ian Christensen and Krystal Wilson served as technical experts at the Space Generation Advisory Council's (SGAC) 2017 Space Generation Congress (SGC), September 21-23 in Adelaide, Australia. The SGC was well-attended with over 150 students and young professionals participating in three days of high-level lectures, working groups, cultural events, and networking opportunities. The Secure World Foundation is a Gold Level sponsor of SGC. Secure World Foundation is pleased to have been able to sponsor the Working Group on Space Resources Governance, whose aim was to consider and articulate views and opinions a governance framework for space resources. The recent mushrooming of commercial ventures and state-driven projects dedicated to space resource utilization has led to a pressing need to assess the governance framework for space resources. This group considered ongoing work at the UNCOPUOS Legal Subcommittee and the Hague Space Resources Governance Working Group (SRGWG) and looked at what consensus existed around how space resources can be gathered and utilized in a peaceful and sustainable manner and the need for legal certainty for investors, explorers and miners. This working group, led by moderator Caroline Thro (SGAC/ESA) assessed space resources governance and made suggestions to address the challenges. Jose Oracio-Christian of Caelus Partners also addressed the group to provide investor community insights. A full report of the groups findings will be developed in the coming months as part of SGAC's presentation to the UNCOPUOS next year.

International Symposium for Personal and Commercial Spaceflight, Las Cruces, 2016

Secure World Foundation was an active participant in the 12th Annual International Symposium for Personal and Commercial Spaceflight (ISPCS), held in Las Cruces, NM. On Thursday October 13, 2016, SWF Project Manager Ian Christensen moderated a panel session discussing "The International Policy and Market Context for International Space Resources Development." Panelists included Olavo Bittencourt Neto, Vice Chair of The Hague Space Resources Governance Working Group; Olga Stelmakh, McGill Institute of Air and Space



Law, Postdoctoral Fellow in Space Governance; and SWF Executive Director Michael Simpson.

Asteroid, Mining and Policy: Practical Consideration of Space Resource Rights, Washington, 2016

SWF and the Alliance for Space Development (ASD) hosted a panel discussion on "Asteroids, Mining, and Policy: Practical Consideration of Space Resource Rights" on Thursday May 5, 2016 from 12:00pm to 2:00pm in Washington, DC.

As the domestic and international community discusses and implements policy and legislation focused on space resource rights, this panel will focus on identifying legal, policy, and business implications of that activity. The discussion will focus on practical considerations related to the development of space resources-related regulatory frameworks and their relationship to both commercial development and international commitments.

Speakers: Kenneth Hodgkins, Director of Space and Advanced Technology, U.S. Department of State; Peter Marquez, Vice President for Global Engagement, Planetary Resources; Jim Dunstan, Founder, Mobius Legal Group; Christopher W. Ingraham, Senior Legislative Assistant, Office of Congressman Jim Bridenstine (R-OK)

Moderator: Ian Christensen, Project Manager, Secure World Foundation

Space Resources Roundtable, Colorado, 2016

SWF Project Manager Ian Christensen gave a presentation entitled "The Policy Context for Space Resources Development" at the 7th joint meeting of The Space Resources Roundtable (SRR) and the Planetary & Terrestrial Mining Sciences Symposium (PTMSS) held in June 7-9, 2016 at the Colorado School of Mines, in Golden, CO. His presentation highlighted current legal and policy developments related to the development of space resources activities, and suggested issues and potential impact areas that might be addressed in both policy and business plans as the space resources sector advances to implementation.

Space Resources Roundtable, Montreal, 2017

SWF Project Manager Ian Christensen spoke at the 2017 Space Resources Roundtable, held as part of the Canadian Institute of Mining 2017 Convention in Montreal, Quebec. Mr. Christensen's presentation provided an update on international policy and legal discussions related to the emerging space resources industry. The presentation also introduced the ongoing work of the Hague Space Resources Governance Working Group, of which SWF is a member and partner.