

**United Nations/United Arab Emirates High Level Forum  
“Space as a driver for  
socio-economic sustainable development”**

**6-9 November 2017  
Dubai, United Arab Emirates**

**Improved Global Space Governance and  
New Opportunities for the Future**

**Kuan-Wei Chen ©**

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# Orbiting topics and issues

- **Why the need for Global Space Governance?**
- **What is the *Global Space Governance Study*?**
  - History and process
  - Short and Long Term recommendations
- **Select Topics of Satellite Usages from the *Global Governance Study***
  - Extending the benefits of space to all humankind
  - Capacity-building in Global Space Governance
  - Space Mining and Use of Space Natural Resources
  - Satellite telecommunications and Broadcasting
  - Remote sensing and Earth Observation
  - Global Navigation Satellites Systems



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# Why the need for Global Space Governance?

“... the increased strategic value of space has resulted in a growing focus on the governance of outer space activities, their safety and sustainability.”

*UNISPACE+50 and Global Space Governance (2016)*

“The key is a governance system that allows new opportunities and innovations, based on a system underpinned by the principles of **sustainable use, sharing, fairness, and equity for all**”.

Simonetta di Pippo, Director UNOOSA,  
Foreword in *Global Space Governance: An International Study (2017)*



# Dubai Declaration 2016

[the four pillars of Space Economy, Space Society, Space Accessibility and Space Diplomacy] as constituting an inclusive global Space2030 agenda for exploration, innovation and inspiration that calls for **strengthened cooperation and governance of outer space activities...**"

"stronger interconnectedness between actions to enhance the **safety, security and sustainability of outer space activities**"



"...UNISPACE+50 is a milestone opportunity to further demonstrate the broad societal benefits of space as an area of **innovation, inspiration, interconnectedness, integration and investment**, and to **strengthen unified efforts at all levels and among all relevant stakeholders of the space sector in addressing the overarching long-term development concerns of society** ..."

*Dubai Declaration*

# Evolution and adoption of the concept of *Global Space Governance*

“Space lies at the nexus of security, strategic stability, and scientific, as well as technological, advancement. ... The emergence of a burgeoning private (i.e. non-governmental) space sector and the massive environmental repercussions of space debris are just some of the many issues that have challenged the very foundations of the existing model of *global space governance*”.

*Prof. Ram Jakhu, October 2013*

2014:



2<sup>ND</sup> MANFRED LACHS INTERNATIONAL CONFERENCE  
ON GLOBAL SPACE GOVERNANCE  
May 29-31, 2014, Omni Mont-Royal Hotel, Montreal, Canada

2015: Push for **UNISPACE+50 Conference** in 2018 (UN Doc A/AC.105/L.297)

2016: “UNISPACE+50: Thematic priorities and the way ahead towards 2018” (UN Doc A/71/20)  
*UNISPACE+50 and Global Space Governance* (UN Doc A/AC.105/2016/CPR.4)

2017:



5<sup>TH</sup> MANFRED LACHS INTERNATIONAL CONFERENCE  
ON GLOBAL SPACE GOVERNANCE AND THE UN 2030 AGENDA  
5-6 May 2017, Montreal, Canada

*In collaboration  
with UNOOSA*

2018: **UNISPACE+50**, special segment of the 61st Sess of UNCOPUOS

# Why the need for a new and comprehensive look at global space governance?

**“The great void in [...] global governance of outer space was an interchange of knowledge, ideas, and evolving problems in space development which must come from effective communications between *academia, governments, international organisations, NGOs, industry, private space sector, start-ups* as well as individual *scientists, engineers, space agencies, commercial space interests and entrepreneurs, and space lawyers*”.**

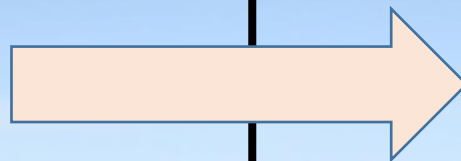
*Manfred Lachs Conference 2014*

# What is *global space governance* ?

“...the **international action or manner (process) of governing and regulating space-related activities** [...], encompasses a wide range of instruments, institutions and mechanisms, ranging from international and regional treaties, agreements and regulations, model national laws and regulations to a wide-range of international cooperative mechanisms utilized in space cooperation, guidelines and transparency and confidence building measures, **aimed at ensuring a certain level of predictability and orderly conduct of space activities**”.

## “Instruments, institutions and mechanisms”

- International and regional treaties
- Agreements and regulations
- National laws and regulations
- Guidelines
- Transparency and confidence building measures etc, etc



Predictable and orderly  
conduct of space  
activities

# 2018 “UNISPACE+50” THEME OF STSC, LSC and COPUOS

UN Doc A/AC.105/C.1/2015/CRP.30 (Feb 2015)

- “The space agenda is **evolving and becoming more complex**”
- “The development of international mechanisms such as **guidelines, codes and other confidence-building measures** are reflective of this new environment”.
- “Addressing **challenges to humanity and sustainable development, protecting the space environment, and securing the long-term sustainability of outer space activities** all require further attention”.
- There is a need “for stronger **space governance and supporting structures** in the future at all levels ....”



# “space agenda is evolving and becoming more complex”

## TRENDS, REALITIES and CHALLENGES:

- Ever-growing reliance on outer space (“*dependence*”)
- Ever-increasing number of actors (“*democratisation*”)
- Shift away from governmental to **private/commercial ventures** in outer space (“*commercialisation*”)
- Shift of balance of power to rising powers /economies (BRICS) (“*multi-polarisation*”)
- **Militarisation and security concerns** in outer space (“*militarisation*”)
- **Need to address *needs and interests of developing countries***
- **Need to address *environmental degradation of outer space***
- **Need to ensure *sustainability of human activity* and long-term presence in outer space**

## COMMON interests and concerns

Spacefaring States

Space Middle Powers

Emerging Spacefaring States

Non-/ Aspiring spacefaring States

Non-state actors and stakeholders

# Foundations of Global Space Governance

“Reaffirm that the Outer Space Treaty, together with other relevant treaties and instruments, lays down the **foundations of international regulation of space activities**, and note that the 50th Anniversary of the [OST as an opportunity to] **manifest the fundamental role of legal regime of outer space for strengthening global governance of outer space activities of outer space activities**”. *Dubai Declaration 2016*

## Legal framework governing space activities

### (binding) international legal instruments:

- treaties
- resolution

### national instruments:

- national space legislation
- National space policies

### Voluntary commitments:

- Codes of conduct,
- transparency and confidence building measures,
- - non-mandatory guidelines,
- technical, safety etc standards

Spacefaring States

- Interests
- Concerns

Space Middle Powers

- Interests
- Concerns

Emerging Spacefaring States

- Interests
- Concerns

Non-/ Aspiring spacefaring States

Non-state actors and stakeholders

# Foundations of Global Space Governance

“...need to modernize and reinforce the overall mandate and structure of the **Office for Outer Space Affairs** to better position the Office to assist States in using space for sustainable development”  
*Dubai Declaration 2016*

## Institutional Framework governing space activities

### International and multilateral institutions

- UNOOSA / UNCOPUOS
- UN General Assembly
- Conference on disarmament

### National institutions :

- national space agency
- Relevant national agency/ministry

### Regional institutions:

- ESA, APSCO, APRSAF ...

### Technical and standards-institutions:

- ITU, ISO, IADC, IAASS, COSPAR, ICG, INMARSAT, GEO etc etc

Spacefaring States	Space Middle Powers	Emerging Spacefaring States	Non-/ Aspiring spacefaring States
<ul style="list-style-type: none"> <li>- Interests</li> <li>- Concerns</li> </ul>	<ul style="list-style-type: none"> <li>- Interests</li> <li>- Concerns</li> </ul>	<ul style="list-style-type: none"> <li>- Interests</li> <li>- Concerns</li> </ul>	<ul style="list-style-type: none"> <li>- Non-state actors and stakeholders</li> </ul>

# Goals of the *Global Space Governance Study*

“In light of the minimal global progress made by conventional international negotiations, it seems that now is the time to explore new mechanisms to cooperate in space”.

*Ram Jakhu and Joseph Pelton*

1. **Examine the changing global economic, political and social conditions and space infrastructure dependence; Identify and assess all known space threats and risks (*space challenges*);**
2. Examine *space opportunities* and the need for the sustainable and peaceful use of outer space, and the exploration and exploitation of space for the benefit of all humankind;
3. Identify **safety, technical and operational gaps** to be filled; and
4. **Recommend appropriate space governance** agreements, arrangements, regulations, standards and appropriate institutional mechanisms, innovations and **practices relevant to current and emerging space activities.**

## ***Part I: The Legal and Regulatory Framework***

- Definition, context and importance of global space governance

Chapter 1: Introduction to the Global Space Governance: An International Study  
Chapter 2: Overview of the Existing Mechanisms of Global Space Governance  
Chapter 3: Global Space Governance from Regional Perspectives  
Chapter 4: National Space Policies and Laws and Global Space Governance  
Chapter 5: Private Commercial Space Enterprises and Global Governance System

## ***Part II: Specific Space Applications (Uses)***

- Evolution, current status and future trends of various space activities

Chapter 6: Satellite Telecommunications and Broadcasting  
Chapter 7: Remote Sensing, Earth Observation, and Meteorological Satellites  
Chapter 8: Global Navigation Satellite Systems and Services  
Chapter 9: Space-Based Solar Power  
Chapter 10: Space Launch Services

## ***Part III: Global Space Safety and Security Concerns***

- New and emerging challenges since 1970s

Chapter 11: Human Space Flight  
Chapter 12: Global Governance of Space Security  
Chapter 13: Space Traffic Management and Coordinated Controls for Near-Space

## ***Part IV: NewSpace Activities***

- Impact of the rise and proliferation of new, commercial space actors

Chapter 14: On-Orbit Servicing, Active Debris Removal, and Related Activities  
Chapter 15: Small Satellites and Large Commercial Satellite Constellations  
Chapter 16: Space Mining and Use of Space Natural Resources

## ***Part V: Into the longer term future***

- Issues of longer-term consideration and concern

Chapter 17: Cosmic Hazards and Planetary Defence  
Chapter 18: Space Environmental Issues  
Chapter 19: Space Migration and Colonization  
Chapter 20: The Role of Space in Long-Term Economic Development on Earth  
Chapter 21: Extending the Benefits and Uses of Outer Space to All Humankind  
Chapter 22: Capacity-Building in Global Space Governance

## ***Part VI: Way forward***

Chapter 23: Conclusions, Consolidated Findings, and General Recommendations

# Issues of Significant Concern to improve Global Space Governance:



## • Short Term

1. The use of space to achieve the **UN Sustainable Development Goals**, particularly for the benefit of developing countries;
2. **Space traffic management** and control for Earth orbit and near space;
3. **Space security** and cyber security;
4. Controls related to **orbital space debris**, especially **debris mitigation and remediation**;
5. **Cosmic hazards and planetary defense**;
6. Increase **capacity building, outreach, education, training and assistance** in space systems, technology and applications;
7. the mandate of the ITU to address **radio frequency interference and jamming**;
8. **Strengthen the mission, and increase the functioning capability, of the UN Office for Outer Space Affairs (UNOOSA).**

# Conclusions from the Second Global Space Governance Conference:

- **Medium to Long Term**



1. **On-orbit servicing** and repurposing of derelict space objects;
2. Organized and **sustainable space resource exploitation** and the equitable sharing of space benefits;
3. Regulatory requirements enhancing “**NewSpace**” activities and expanding commercial space applications in Earth orbit and deep space;
4. **Sustainability and the environmental protection of outer space** as well as improved capability for international space situational awareness.

Extending the benefits of space to all humankind

Capacity-building in Global Space Governance

Space Mining and Use of Space Natural Resources

# Select Topics of from the *Global Governance Study*

Satellite telecommunications and Broadcasting

Global Navigation Satellite Systems

Remote Sensing, Earth Observation and Meteorological Satellites



# Extending the benefits of space to all humankind

Issue and Challenge	Specific technical, business, societal, political, security etc challenges	Proposed opportunities for mitigation and action <i>Proposed actors to take action</i>
<p>Difference of perspective (from the economic, political, and legal viewpoint) between early adopters of space technology and those that have yet to derive major benefit from outer space (i.e. developing States)</p>	<ul style="list-style-type: none"> <li>- Exploration of space requires great deal of resources and infrastructure</li> <li>- Different development priorities between States</li> </ul>	<ul style="list-style-type: none"> <li>- Focus on shared interests and concerns in the use and exploration of space</li> <li>- Create opportunities / channels to share benefits of space</li> <li>- Strengthen initiatives for cooperation and capacity-building</li> </ul>

**“The goal is to preserve flexibility to accommodate growth, new applications, and technology, while ensuring the needs of those from developing economies and new public service needs”.**

*Global Space Governance: An International Study*

*UNCOPUOS, UNOOSA, UN General Assembly, ITU, various special interest institutions*

# Extending the benefits of space to all humankind

Issue and Challenge	Specific technical, business, societal, political, security etc challenges	Proposed opportunities for mitigation and action <i>Proposed actors to take action</i>
<p><b>Need to strengthen support for and implementing mechanisms for national and global governance of outer space</b></p>	<ul style="list-style-type: none"> <li>- Lack of technical, legal and policy knowledge, training, and education related to the governance of outer space</li> <li>- Competing (economic and business) interests that would undermine a strong program in support of the effective governance of outer space</li> </ul>	<ul style="list-style-type: none"> <li>- Support for the universal adoption and reasonable interpretation of the Outer Space Treaty</li> <li>- Initiate a new set of international discussions about sharing the benefits of space among all nations, in the context of sustainability of space that creates a new “balance” of cooperation among current and prospective users of outer space, and possible new mechanisms to allow sharing</li> <li>- Improve capacity building</li> </ul> <p><b><i>UNCOPUOS, UNOOSA, UN General Assembly, ITU, various special interest institutions</i></b></p>
<p>“one of the challenges to space governance may be finding a balanced way to reserve opportunity for economically developing States to benefit from space applications in the future, while, simultaneously, not denying access and opportunity to those who would like to effectively use space today. ...fulfilling future needs is sometimes more important than fulfilling today’s desires.”</p> <p><i>Global Space Governance: An International Study</i></p>		

# Capacity-building in Global Space Governance

Issue and Challenge	Specific technical, business, societal, political, security etc challenges	Proposed opportunities for mitigation and action <i>Proposed actors to take action</i>
<p><b>Current policymakers and lawmakers lack a full understanding of our dependence on space and future issues of concern, including the need for the sharing of international space technology and systems</b></p>	<ul style="list-style-type: none"> <li>- Space applications and technologies are largely oriented to the social, economic, and business needs of developed economies and not those of developing States</li> <li>- Space technology development and related training is not geared to the special needs of developing States</li> </ul>	<ul style="list-style-type: none"> <li>- Strategic public awareness campaign on a global scale with a focus on political leaders in developing States as to the need for capacity-building in space related activities for emerging economies</li> <li>- New investment in scholarships, student innovation, and experiences, including competitions focused on space development for developing States</li> <li>- Global clearinghouse and development centre related to current and future leaders in space governance and new space development</li> </ul>
<p><b>“There is also the need for institutional infrastructure to provide enhanced education and training in specialized knowledge in order to have the leadership needed to govern this new environment. .... To achieve a robust global space governance system, with effective participation by both developing and developed nations, the international community needs to come together and make concrete efforts toward capacity-building.”</b> <i>Global Space Governance: An International Study</i></p>		<p><i>Higher education institutions, UNCOPUOS, UNOOSA through UNISPACE+50 thematic priority, UN Regional Centres for Space Science and Technology Education</i></p>

# Satellite telecommunications and Broadcasting

Issue and Challenge	Specific technical, business, societal, political, security etc challenges	Proposed opportunities for mitigation and action <i>Proposed actors to take action</i>
<p><b>Need for better coordination of orbital slots</b></p>	<ul style="list-style-type: none"> <li>- Overcrowding of orbits in demand</li> <li>- Need to accommodate needs and access of developing States</li> <li>- Need to accommodate expanded service and application needs</li> </ul>	<ul style="list-style-type: none"> <li>- Process for licensing and auctioning of orbits</li> <li>- Development of communications protocols between satellite operators to prevent physical collisions</li> <li>- Proactive debris mitigation /removal measures</li> </ul>
<p>“Until there are more rigorous, precise, and binding space debris mitigation rules with some form of compliance monitoring mechanism in effect (beyond the Space Debris Mitigation Guidelines of the [UNCOPUOS], endorsed by the U. N. General Assembly), and active debris removal processes, <b>the dangers of collisions are quite real</b>”.</p> <p><i>Global Space Governance: An International Study</i></p>		<p><i>ITU, Satellite Industry Association, Space Data Association, UNCOPUOS, UNOOSA</i></p>

# Space Mining and Use of Space Natural Resources

Issue and Challenge	Specific technical, business, societal, political, security etc challenges	Proposed opportunities for mitigation and action <i>Proposed actors to take action</i>
<p><b>Confusion about the interpretation of international space law treaties, and need to respond to requirement to provide “for the benefit and in the interests of all countries” as well as environmental concerns</b></p> <p>“It is to be hoped that mining space resources can ultimately be viewed as a <b>viably shared asset under some sort of globally accepted and observed structure or system, which considers all the costs, complexities, benefits and interests that such an enterprise will entail.</b> ... One can hope that there will be a practical resolution concerning current differences of opinions on these matters in the coming future.”</p> <p><i>Global Space Governance: An International Study</i></p>	<ul style="list-style-type: none"> <li>- Determining the safest, most efficient, and most effective method of outer space transport and resource extraction</li> <li>- Enormous costs associated with building space mining infrastructure that is safe and environmentally sound</li> <li>- lack of public funds as well as lack of confidence by potential private investors</li> </ul>	<ul style="list-style-type: none"> <li>- International discussions involving all interested States, professional space organizations, universities, directly interested companies, and various other institutions, etc to create a new global public dialogue to clarify the conditions for legally engaging in space resource exploitation activities</li> <li>- Explore new confidence-building or non-binding agreement related to space mining that addresses environmental, public health, and property rights concerns, and create a new international regime for carrying out a process for sharing in the benefits of outer space;</li> </ul> <p><i>UNCOPUOS, International Academy of Astronautics (IAA), Hague Space Resource Governance Working Group, major space agencies and representatives of interested States, relevant technical and legal advisers</i></p>

# Remote Sensing, Earth Observation and Meteorological Satellites

Issue and Challenge	Specific technical, business, societal, political, security etc challenges	Proposed opportunities for mitigation and action <i>Proposed actors to take action</i>
<p><b>Need for more effective and instantaneous global warning against violent storms and extreme solar events</b></p>	<ul style="list-style-type: none"> <li>- Severe weather conditions around the world a growing problem</li> <li>- Developing States often more adversely affected and devastated by climate change</li> <li>- States most at risk from global warming are not those that have most impacted climate change</li> <li>- Insufficient advance warning infrastructure to on space weather events</li> </ul>	<p>need for more coordinated action between World Meteorological Organization (WMO), UN Development Programme (UNDP), and International Bank of Reconstruction and Development (IBRD)</p> <ul style="list-style-type: none"> <li>- set up adequate systems to provide effective forecast services to predict and protect Earth and humanity</li> </ul> <p><i>World Meteorological Organization, UN Environment Programme, UNCOPUOS; UNISPACE+50 thematic priority on international framework for space weather services</i></p>

# Global Navigation Satellite Systems

Issue and Challenge	Specific technical, business, societal, political, security etc challenges	Proposed opportunities for mitigation and action <i>Proposed actors to take action</i>
<p><b>Proliferation of national and regional GNSS systems</b></p>	<ul style="list-style-type: none"> <li>- Increased complexity of GNSS systems and multi-use receivers</li> <li>- Interoperability challenges</li> <li>- Possible inconsistencies and extra costs if States oblige use of localized GNSS</li> </ul>	<ul style="list-style-type: none"> <li>- Better coordination and integration of GNSSs around the world;</li> <li>- Amendment of the 1998 <i>Charter on the Rights and Obligations of States Relating to GNSS Services</i> to mandate States to coordinate use and better integration of GNSSs around the world</li> </ul> <p><i>International Committee on Global Navigation Satellite Systems (ICG), International Civil Aviation Organization (ICAO), GNSS-provider States</i></p>

“[GNSSs] are very **expensive and complex national assets that are inherently dual-use in nature**, supporting both military operations and a wide and growing range of civil applications.”  
*Global Space Governance: An International Study*

# Conclusion

- Activities and actors/stakeholders in space domain has increased and changed in recent decades...
- Opportunity to review, to (re)interpret and (re)invent, and to be inclusive and be more encompassing
- Law and policy needs be able to **bridge gaps** with reality, trends, technology and developments and properly respond to challenges and opportunities
- **Common objectives and interests can be a basis for consensus**
- Need for **innovative, interdisciplinary, global approach to global issues, opportunities and challenges**
- The *Global Space Governance Study* is an example of such initiatives



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