Guidance for the course of “Space Development and Public Policy” 2022

Koichi Kikuchi

30th September 2022

Status of Course

- This course is relevant to the Science, Technology, and Innovation Governance (STIG) Education Program.
- STIG is University-wide Graduate Education Program

https://stig.pp.u-tokyo.ac.jp/en/

Theme & Objective

- Space Governance / Space Policy / Space Law
- Traditional Actors / New Actors
- Societal Needs / Daily Life / Space Exploration
- Space Sustainability / Space Security

- Solutions for Sustainable Space Activities

Why Space Governance Now?

Emerging Space Activities

<Large Constellation>

- SpaceX: Starlink program
  - 12,000 small satellites
  - 30,000 more satellites applied for radio frequency
- OneWeb
  - 6,000 small satellites
- Amazon
  - 3,236 small satellites

<Cislunar and Lunar Exploration>

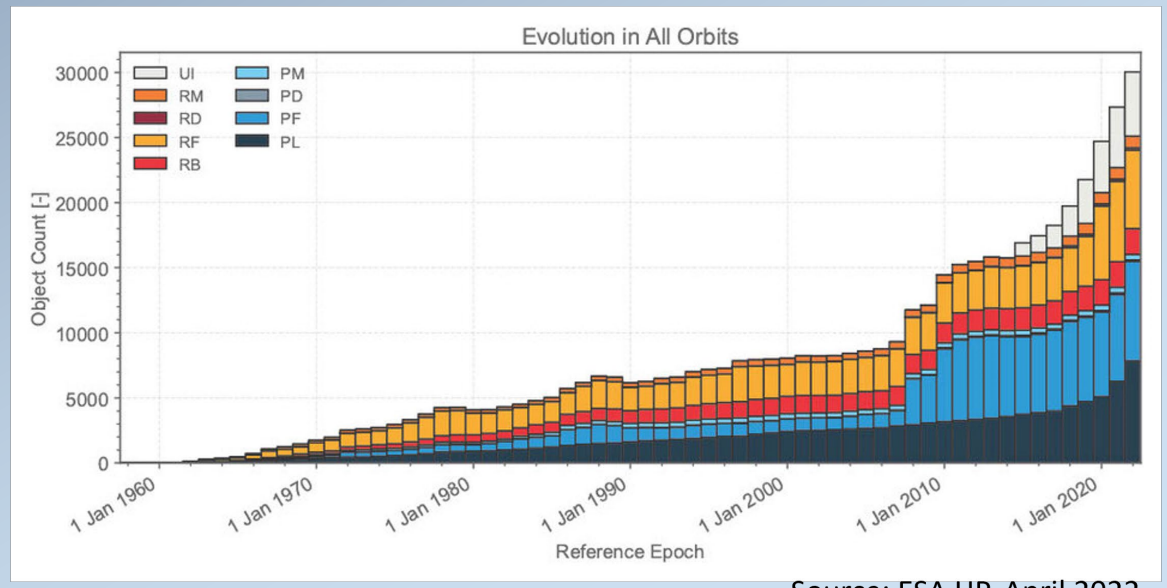
- NASA
  - Gateway program
  - Artemis Program
- National legislation that allows ownership of space resource (USA, LUX, UAE, JPN)

<Space Travel>

- Suborbital
  - Virgin Galactic
  - Blue Origin
- Orbital
  - SpaceX
  - Commercial use of ISS

Why Space Governance Now?

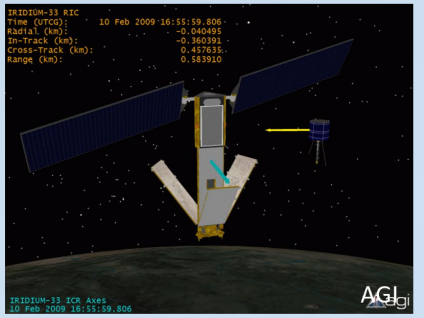
Concerns on Sustainability

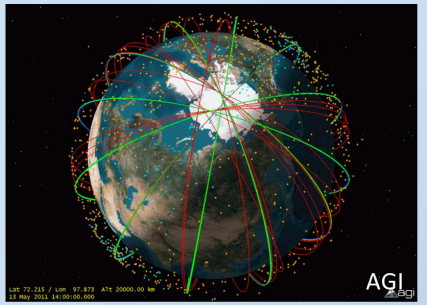


Source: ESA HP, April 2022

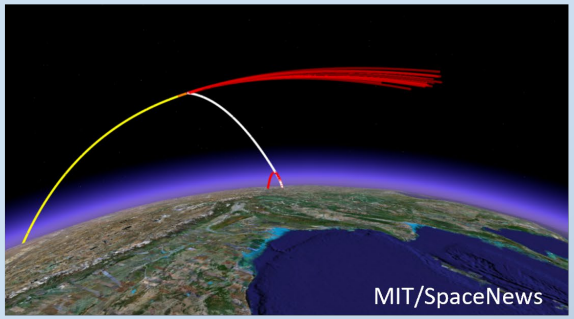
- Rocket launched: appx 6,250
- Satellites launched: appx 13,630
- Satellites on orbit: appx 8,850
- Satellites functioning: appx 6,500
- Traceable debris: appx 32,000
- Collisions and destructions: more than 630
- Gross weight: more than 10,100
- Debris by Model:
  - 36,500 (>10cm)
  - 1,000,000 (1cm to 10cm)
  - 135,000,000 (1mm to 1cm)

Source: ESA HP, August 2022





Collision of Cosmos-Iridium (2009)



China's ASAT (2007)

India's ASAT (2019)

Major Events

2020

- Artemis Accords (October)
- Gateway MOU (NASA-ESA: October, NASA-GOJ: December)

2021

- 1st Commercial Crew Transportation to ISS by SpaceX (May)
- Space Resources WG in LSC/UNCOPUOS (June)
- Space Resources Act in Japan (June)
- 1st Private/Commercial Sub-Orbital Human Spaceflight by Virgin Galactic (July)
- Private/Commercial Sub-Orbital Human Spaceflight by Blue Origin (July)
- 1st Commercial Orbital Human Spaceflight without Professional Astronaut by SpaceX (September)
- Guidelines on a License to Operate a Spacecraft Performing On-Orbit Servicing in Japan (November)

Challenges

- Earth Orbit: Commercialization vs. Sustainability
- Beyond Earth Orbit: Commercial Value vs. Scientific Value
- Stakeholder: Government, National Space Agency, Industry, Academia
- Analogy: High Sea, Air Space, Antarctica, Cyberspace

Professor and Lecturer

Professor	 Dr. Hideaki Shiroyama, Graduate School of Law and Policy / Graduate School of Public Policy, The University of Tokyo	 Dr. Shinichi Nakasuka Department of Aeronautics and Astronautics School of Engineering, The University of Tokyo
Lecturer	 Mr. Koichi Kikuchi, JAXA / The University of Tokyo	 Dr. Ikuko Kuriyama, JAXA /The University of Tokyo
Guest Lecturer	Prof. Kazuto Suzuki, The University of Tokyo Dr. Quentin Verspieren, The University of Tokyo Dr. Yuichiro Nagai, Nihon University Dr. Yuri Takaya, The University of Tokyo Other Distinguished Lecturers from Academies, Governments, Space Agencies, and Industries	

Teaching Methods

- This course consists of three parts:

(1)Lectures by academia, practitioners and specialists in each field;

(2)Group study and presentation; and

(3)Individual report for space policy strategy/proposals.

Method of Evaluation

- Results of group study, individual report, and attendance

A+	90-100
A	80-89
B	70-79
C	60-69

Task	**Group Study / Presentation**	**Individual Report**	**Attendance / Contribution**
Rates	40%	50%	10%
Evaluation Points	Leadership Followership Convincing Originality	Reasonability Evidence Convincing Originality	Rates Contribution to Discussion

Schedule *themes and titles can be changed

Week 1 (9/30): Guidance of the course (Kikuchi / Kuriyama)
Governance of Outer Space Activities and JAXA (Kikuchi)
Week 2 (10/7): Introduction to Space Policy (Suzuki)
Introduction to Space Law (Takaya)
Week 3 (10/14): Space Policy and Governance from Comparative Perspectives (Shiroyama)
Long Term Sustainability and Space Security (Verspieren)
Week 4 (10/21): UNCOPUOS (Iwaki / Horikawa)
Governance of Earth Observation (Kuriyama)
Week 5 (10/28): Norms and Principles for Sustainable Space Activities (Takeuchi)
Japan's Space Policy (TBD/CAO)
Week 6 (11/4): Governance of Satellite Telecommunication and ITU (Takaya)
Roles of Space Agency in Space Governance (Nagai)
Week 7 (11/11): Space Activities by Universities and International Collaborations (Nakasuka)
Space Debris Removal by Private Entities (Blackerby)

Schedule *themes and titles can be changed

Week 8 (11/18): Gateway/Artemis Program and its Legal Framework (Saisho)
Space Resources Exploration by Private Entities (Sato)
Week 9 (11/25): Space Resources and International Law (Takaya)
US Space Policy (Umeda)
Week 10 (12/2): NASA (MacIntosh)
Week 11 (12/9): DLR (German Space Agency) (Reinke)
CNES (French Space Agency) (Mariez)
Week 12 (12/16): Space x SDGs (Harada/Kuriyama)
Space business for societal needs (Kurosu)
Week 13 (1/6): Group Study Presentation

After group presentation, students need to submit individual report with policy proposals (due by the end of Jan. 2023)

Reference

<Book>

- 青木節子『日本の宇宙戦略』，慶應義塾大学出版会, 2006.
- 稲田伊彦・斎藤幹雄・富田忠治・吉川一雄『日本宇宙開発夜話』，東京図書出版2021.
- 呉羽 真・伊勢田哲治編『宇宙開発をみんなで議論しよう』，名古屋大学出版会，2022
- 小塚荘一郎・佐藤雅彦編『宇宙ビジネスのための宇宙法入門第2版』，有斐閣, 2018.
- 佐藤靖『NASA－宇宙開発の60年』，中公新書, 2014.
- 城山英明『科学技術ガバナンス』，東信堂, 2007.
- 鈴木一人『宇宙開発と国際政治』，岩波書店, 2011.
- Ram Jakhu, et al., ”Global Space Governance: an international study”, Springer, 2018
- Kazuto Suzuki, “Policy Logics and Institutions of European Space Collaboration”, Routledge, 2019

<Website>

- 内閣府 http://www.kantei.go.jp/jp/singi/utyuu/
- JAXA http://www.jaxa.jp/
- 日本航空宇空学会（JSASS） https://www.jsass.or.jp

Questions?

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