5th Space Traffic Management Conference, Unv. of Texas at Austin, Feb. 2019.

SPACE TRAFFIC MANAGEMENT (STM) IN THE NATURE OF INTERNATIONAL SPACE LAW

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* The views expressed herein are entirely those of the author and do not reflect any official views of the organizations that the author belongs to.

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1. PARADOX IN INTERNATIONAL SPACE LAW

Outer Space Treaty (OST), Art. 1
Outer space, including the Moon and other celestial bodies, shall be **free for exploration and use by all States** without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.

OST, Art. 9
If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the Moon and other celestial bodies, **would cause potentially harmful interference with activities of other States Parties** in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, **it shall undertake appropriate international consultations before proceeding** with any such activity or experiment. A State Party to the Treaty which has reason to believe that **an activity or experiment planned by another State** Party in outer space, including the Moon and other celestial bodies, **would cause potentially harmful interference** with activities in the peaceful exploration and use of outer space, including the Moon and other celestial bodies, **may request consultation** concerning the activity or experiment.

⇒No common understanding yet.

<INTERNATIONAL INITIATIVES>

International | Disarmament | Peaceful Use | National debris mitigation | STM | Events

2007 COPUOS Debris Guidelines

IAA Cosmic Study

Chinese ASAT

ISU Studies

2008 Russian new PPWT*

2009 Authorize research in NASA Authorization Act

Cosmos-Iridium collision

EU

Fr. Space Activities Act *compulsory Decree

2010 **Draft International Code of Conduct**

ISO Debris Standards

2011 **GGE on Space TCBM* Report(2013 UNGA)**

2015 incompleted

US Security Space Strategy

2012 EU Ru

Fr

2013 Russia&China new new PPWT

COPUOS Long-Term Sustainability of Space Activities draft guidelines

SSA Sharing Agreement (Japan-US)

2014 #1 STMConference (ERAU)

2015 US Space Act of 2015

2018 incompleted

2016 #1 GSTMW(UK)

Small sats at COPUOS-LSC

STM at COPUOS-LSC

2017 US CSTM policy

2018 **GGE regarding PAROS**

Ch Ru

IADC Megaconstelation Statement

US SPD 3

ISO debris standard revision

FCC Notice of Proposed Rulemaking

CONFERS*

WEF*

2019 **US STM international conference ?**

*PAROS:Prevention of Arms Race in Outer Space
*PPWT:Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects
*TCBM:Transparency and Confidence Building Measures
*GGE:Group of Governmental Experts
*CONFERS:Consortium for Execution of Rendezvous and Servicing Operations
*WEF:World Economic Forum (Global Future Counci, The Future of Space Technologies)

<CONSTRUCTIVE PARADOX>

	Ground	Maritime	Aviation	Space
Jurisdiction to vehicle	Territorial State	Flag State	State of registry	State of registry
Jurisdiction to area	Territorial jurisdiction	Territorial sea jurisdiction	Territorial air jurisdiction	None
Vehicle registration	Vehicle registration	Vessel registration	Aircraft registration	Space object registration
Sanction to registration failure	Denial of travel	Subject to capture by authority /Denial of entry to ports	Denial of traffic navigation/landing/passage	None
Traffic management rules	Road traffic rules	Sea way/prev		
Tr m au	police	Maritime safety authority/military	Civil aviation authority	None

Non-sense to wait State actions!

2.BOTTOM-UP APPROACH AS THE KEYSTONE

Disorder circumstance of the outer space is;

① False economy for the entire market

- ✓ Under/over estimation of risk analysis in operation
- ✓ Unable to conduct adequate cost allocation

② Operators will possibly being liable for on-orbit damage in near future.

- ✓ Currently, presenting the evidence of "fault" is the hardest point
  - ◆ No common standards for identifying fault

    ← practical standards are fragmented
  - ◆ No litigation case to establish those standards

    ← even 1 case may serve as an indicator
- ✓ In near future, if;
  - ◆ Common standard [illegible] avoidance [illegible] level of operation have to be recognized as the [illegible] space operation

Operators have reasons to take actions!

→Practices not using that standard database/tool/measures will be qualified as "fault" in operation, and that operator may become liable to the damage.

3.STM DISCUSSION IN JAPAN

1955 1st rocket launch success (Tokyo unv.)
1970 1st satellite "Ohsumi" launch success (Tokyo unv.)
1969 National Space Development Agency (reorganized as JAXA from 2003) founded
1988 Joined ISS Program
2008 Basic Space Law enacted; Basic Space Plan established
2012 Governmental reformation for directing national space program complete

Strategic Headquarters for National Space Policy (chair: Prime Minister)
Committee on National Space Policy (advisor to PM)
National Space Policy Secretariat (Cabinet Office)

2013 SSA Sharing Agreement at Japan-US governmental level

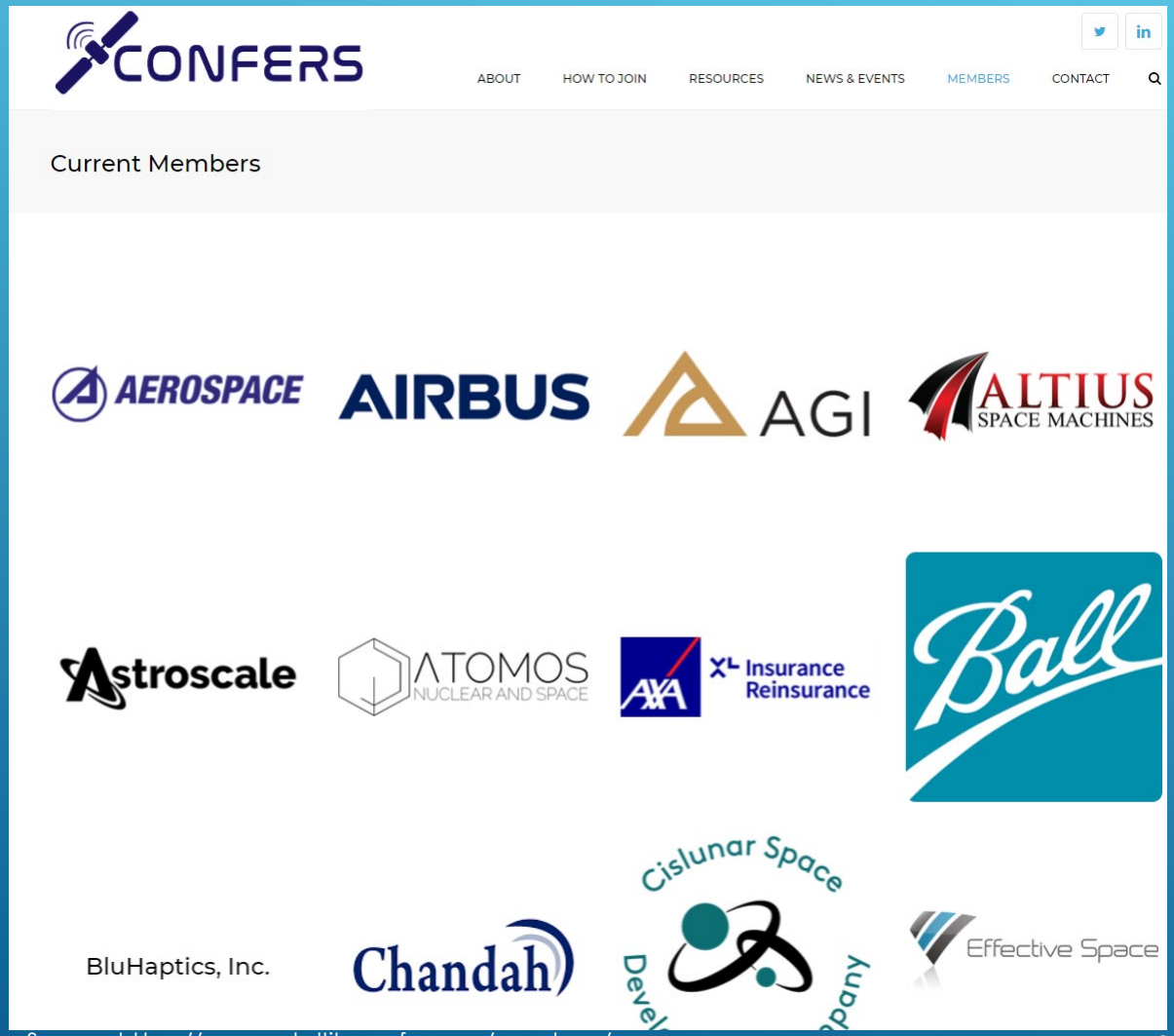
2018 Consideration on future STM starts in Basic Space Plan

Space Activities Act enacted (license system for space activities)

"Consideration of Possibility of Government Compensation Measures to Third Party Damage Caused by Satellite On-Orbit" published by Sub-committee of Space Legislation, Committee on National Space Policy.

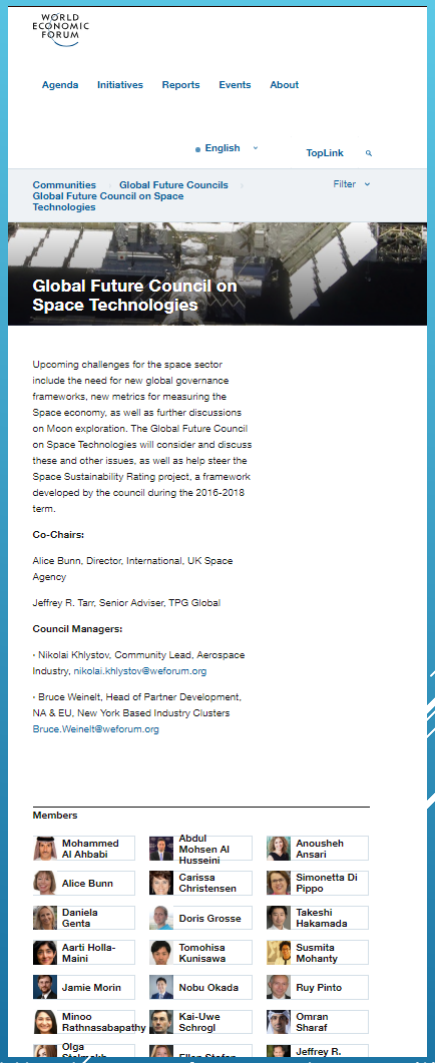
<JAPANESE INDUSTRIES IN INTERNATIONAL DISCUSSIONS>

Consortium for Execution of Rendezvous and Servicing Operations



Source: https://www.satelliteconfers.org/members/

World Economic Forum



Source: https://www.weforum.org/communities/the-future-of-space-technologies

<STM STUDY GROUP>

Keio – JAXA joint open-minded group started from October, 2018.

【Principles】

- Chatham House Rule based
- No individual goals, accept diversity, allow repeat discussions

【Purposes】

- Fostering understanding on the issues of STM through diverse discussion.
- Understanding why and what is difficult to realize STM.
- Rely on participants to take actions back in their own entities.

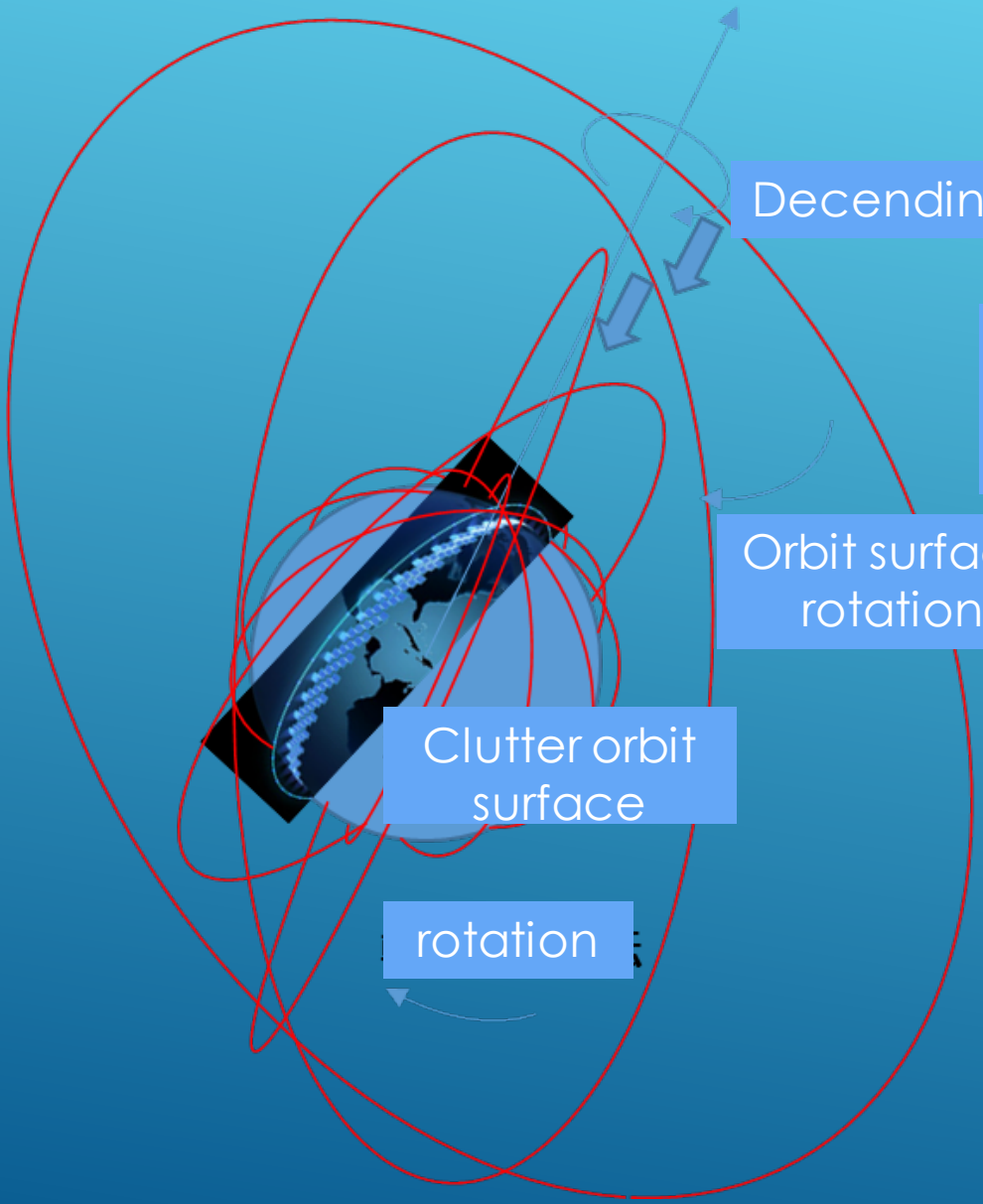
【Achievements so far】

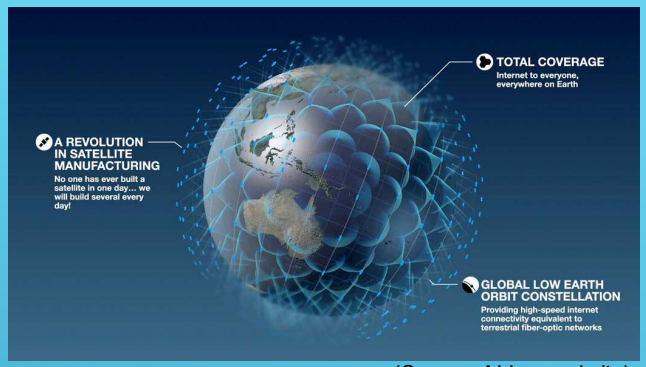
- Why STM Now?
- What will be the prioritized points to be discussed in the topic?
- Detail discussion of the elements consist STM.

【Participants】

Practitioners, academia, officials from industries, agencies, ministries and universities.

<STM NECESSITY>





OneWeb

(Source: Airbus website)

GRUS (Axel Space)

(Source: Cabinet Office website)

<DISCUSSIONS SO FAR>

① Providing civil STM services

⇒How to gather data from operators

⇒How to allocate costs for service provision

② International sharing of SSA data

⇒How to clear national security concerns.

- US and Russia have global capability, China may have and others (France, Germany, Australia, Japan, UK) have partial capability.
- Need to neutralize within a combined data.
- Standardizing data format, meta data analyisis is necessary.
- Meta data contains information of the capability of observation of that system, which is classified information.

⇒Cost allocation for database sharing, maintaining the common data center and the rules' harmonization process.

③ Common rules for operators

⇒Regulations for data sharing (flightplan, maneuver information, POC)

⇒Traffic regulations (standard database, conjunction analysis operation standard, communication standard)

We will continue our "Progress through Collaboration"

"Progress can be made only through Collaboration"