

Opening Remark

Higher Education in the space field



Mengu Cho

Laboratory of Lean Satellite Enterprises and In-Orbit Experiments

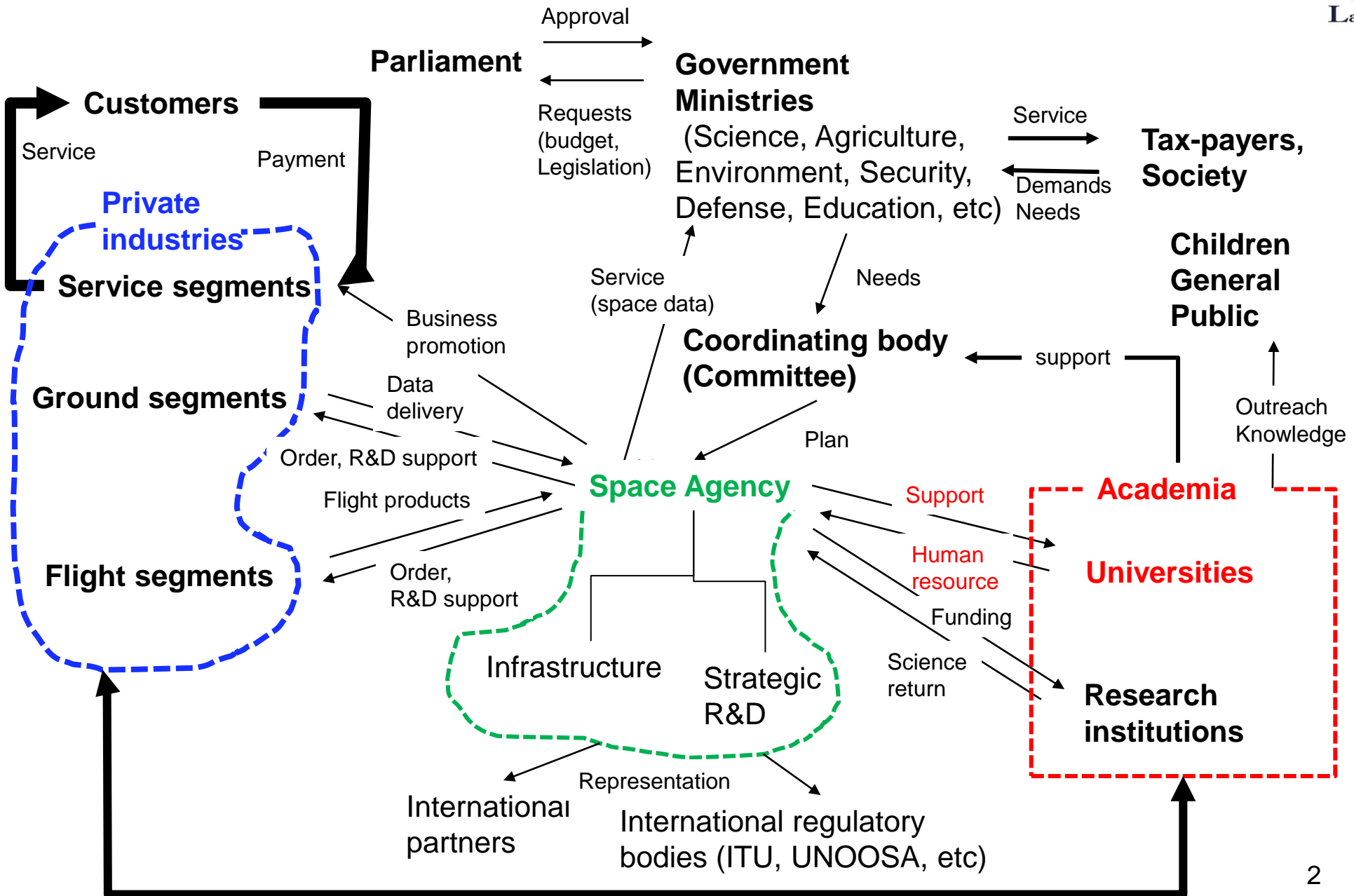
Kyushu Institute of Technology

Kitakyushu, Japan

December 1, 2021

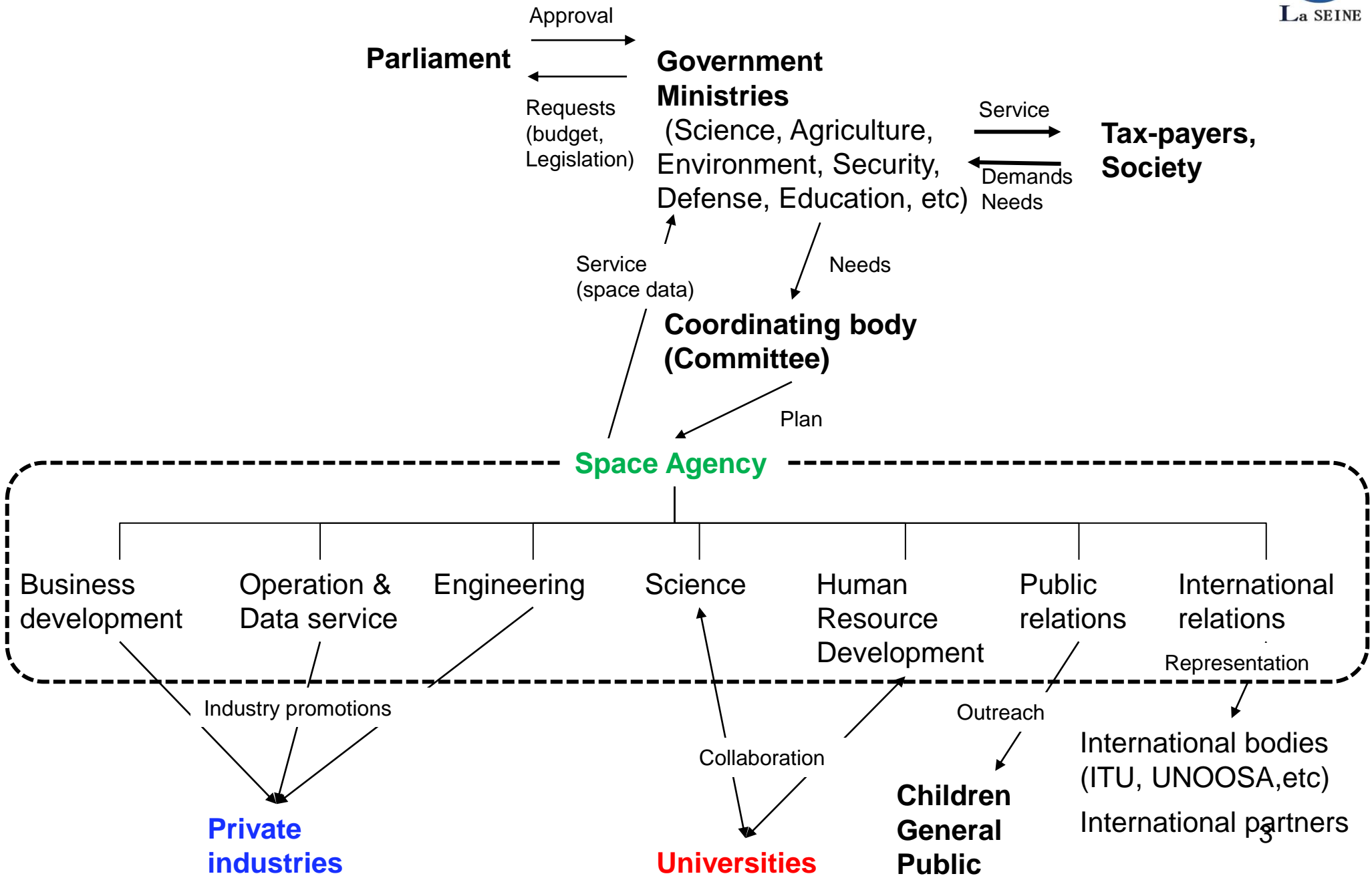
APRSAF (Virtual)

Very matured space ecosystem



Industry-academic collaboration(R&D, human resource exchange)

Infant space ecosystem



University's role in space ecosystem

- Regardless the status of space ecosystem, university plays a key role in terms of
 - **Human Resource Development**
 - Research on space science and technology
- This session discusses how to promote space-related higher education

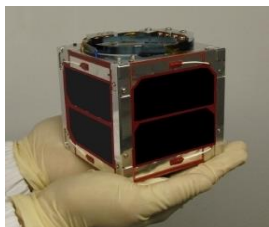
Kyushu Institute of Technology (Kyutech)



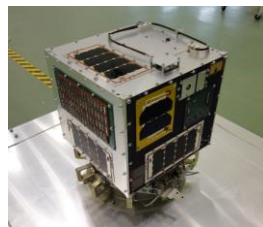
- A national university founded in 1909
 - 4,200 Undergraduate students
 - 1,300 Graduate students
 - 360 Faculty members
 - Engineering, Computer science, Life-science
- Located in the Kitakyushu region
 - Population of more than 1million



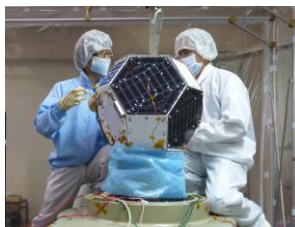
Kyutech Satellite Heritage



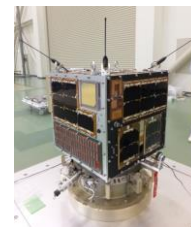
HORYU-1 (1U)
2006-2010
Not launched



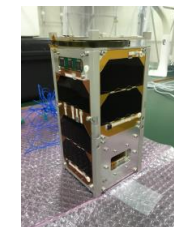
HORYU-II
2010-2012
Launch 2012/5/18



Shinen-2
2013-2014
Launch 2014/12/03



HORYU-IV
2013-2016
Launch 2016/02/17



AOBA VELOX-III
2014-2016
ISS Release 2017/01/19



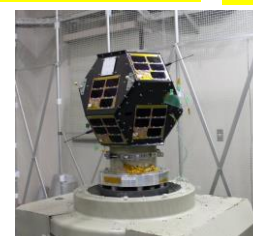
BIRDS-I constellation
2015-2017
ISS release 2017/07/07



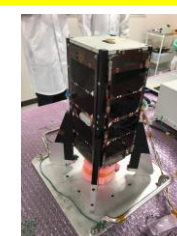
BIRDS-II constellation
2016-2018
ISS release 2018/08/10



SPATIUM-I
2016-2018
ISS release 2018/10/06



Ten-Koh
2016-2018
Launched 2018/10/29



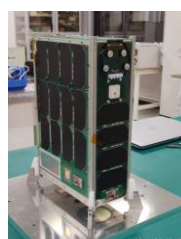
AOBA VELOX-IV
2016-2018
Launched 2019/01/18



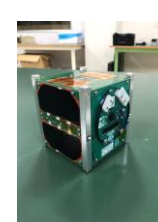
BIRDS-III constellation
2017-2019
Launched 2019/04/18



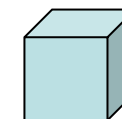
BIRDS-IV constellation
2018-2020
Launched 2021/03/14



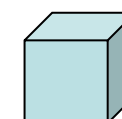
KITSUNE
2019-2021
Launch, 2021



FUTABA
2018~2021
Launch, 2021



BIRDS-5J, -5Z, -5U
2022年

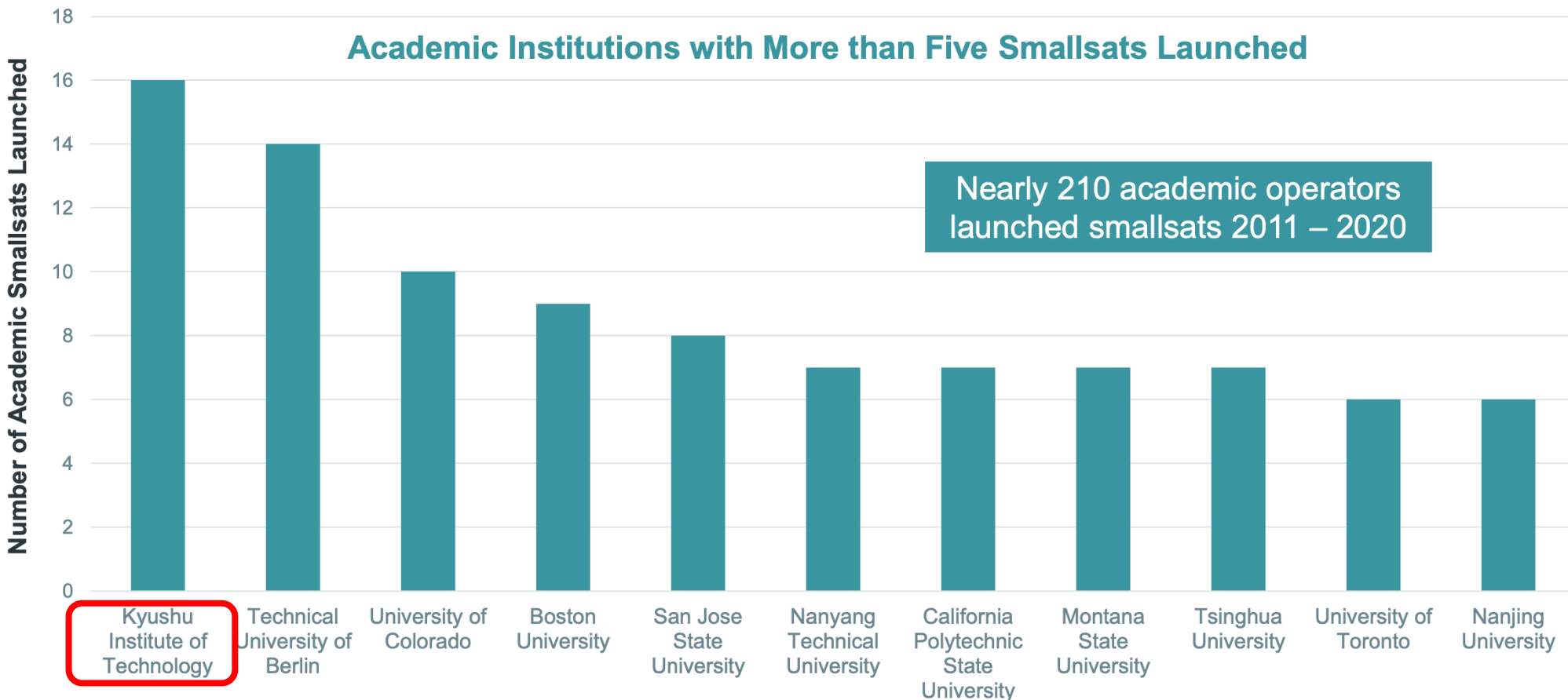


MITSUBA
2022年

Satellite name
Satellite development period
Launch/ISS release date

Number of Academic Smallsats 2011 – 2020, by Institution

Smallsats in Context and Operator/Mission Type Trends



Kyutech space engineering education



- Sine 2013
 - Space Engineering International Course
 - Post-graduate (Master and Doctor) program offered in English
- Since 2018  To be connected from 2022
 - Department of Space Systems Engineering
 - Under-graduate program offered in Japanese
 - 55 students/year
 - 11 full-time faculty members
 - 4 adjunct faculty members

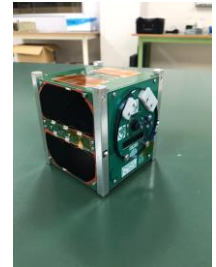
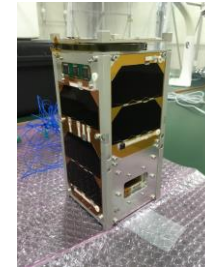
Kyushu Institute of Technology

Department of Space Systems Engineering

- Dedicated to **space** engineering only. No aircraft.
 - Aircraft and spacecraft are different
 - Aircraft: **Transportation** of people and goods
 - Spacecraft: **Utilization** of Space
- What make space engineering different from other traditional disciplines are
 - Importance of Systems Engineering
 - *Must work flawlessly in severe space environment*
 - Based on various traditional disciplines (mechanical, electrical, material, etc.)

Department of Space Systems Engineering

- Goal
 - Train engineers who can handle the creation, research and development, manufacturing, and operation of complex engineering systems such as space systems.
- Curriculum
 - **Lean systems through practice**
 - Project based learning
 - Subjects special to space engineering
 - orbit mechanics, space environment, rocket and satellite systems, etc.
 - Subjects related to Mechanical or Electrical engineering
- Career path
 - Space industry
 - Target: 20 out of 55 students going to the space sector
 - **Other industries that requires engineers who understands systems**
 - Automobile, Aircraft, Plant, Electronics, etc.
 - Important if you want to start a similar curriculum



Satellites built by undergraduate students