

University effort on democratizing space technology using CubeSat



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Laboratory of Lean Satellite Enterprises and In-Orbit Experiments

Kyushu Institute of Technology

Kitakyushu, Japan

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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 around 1million





Expanding and democratizing the “Base of Space Development” through Microsatellites

The purpose of Laboratory of Lean Satellite Enterprises and In-Orbit Experiments is to contribute to the development of human space activities by expanding the “base of space” and democratizing space technology through microsatellites.

Importance of Nano/Small Satellite

- Low price ▪ Short delivery time
 - Can take risks
 - Can do new things
 - Entry of new players
- Non-space companies, startups, emerging nations, universities, elementary and secondary education, etc.

→ 「Increasing diversity in the space sector」



Space Engineering International Course

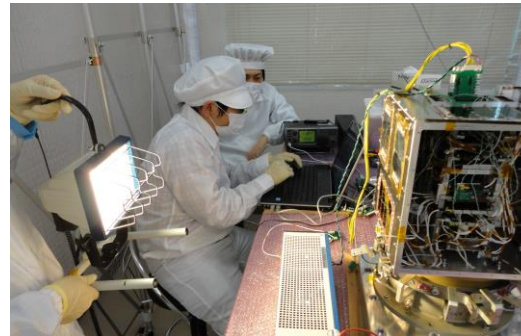
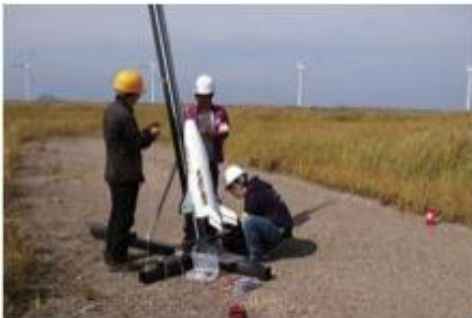


@Laboratory of Lean Satellite Enterprises
and In-Orbit Experiments (La SEINE)

Space Engineering International Course (SEIC)

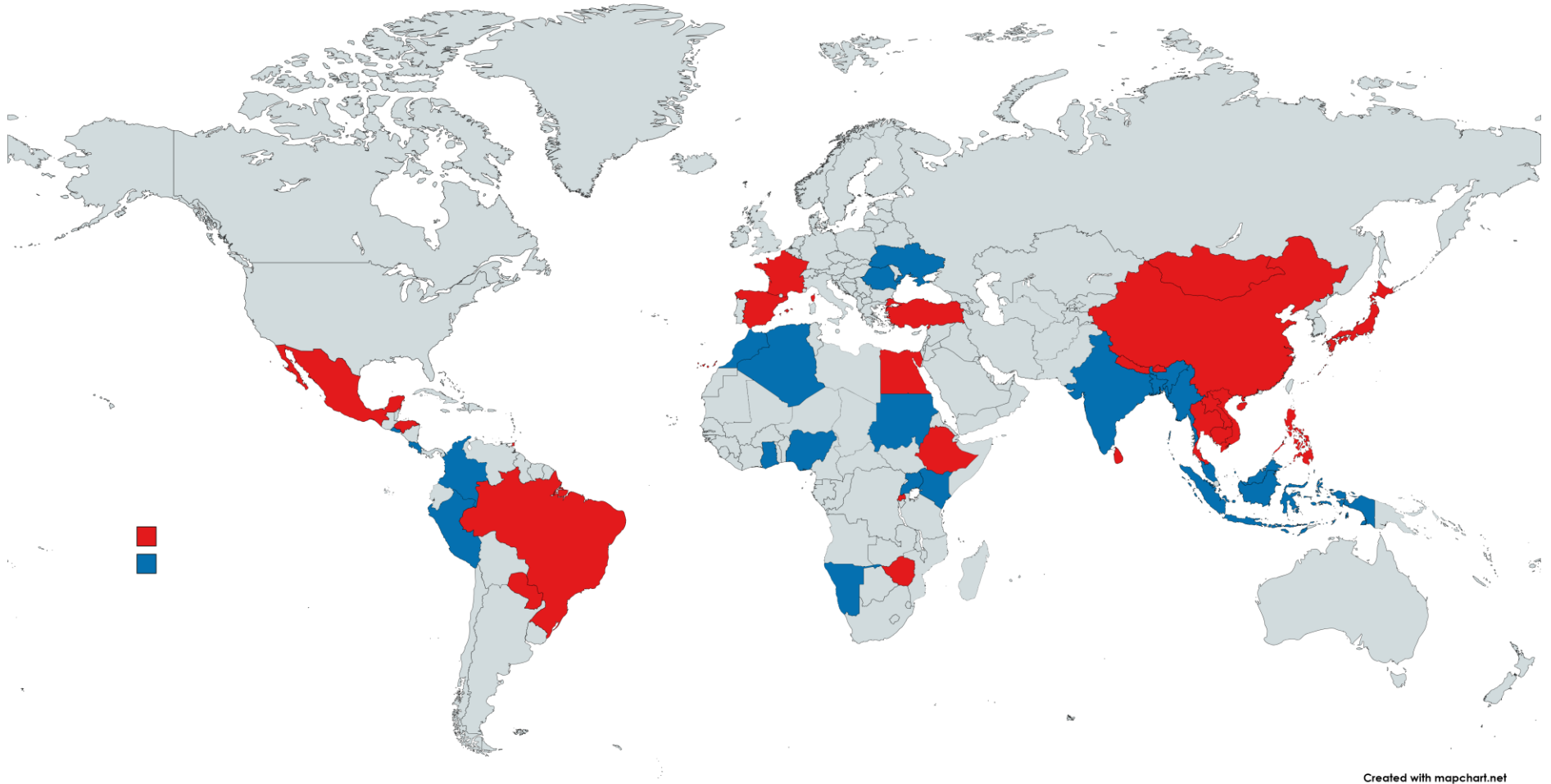


- Started in April 2013 at Graduate School of Engineering, Kyutech to support PNST
 1. Research toward a Master or Doctoral degree
 2. On-the-job training such as space environment testing workshop
 3. Project Based Learning (PBL) through space projects
 4. Space-related lectures in English
 - Not only engineering, but also space policy and others



There is a scholarship opportunity. “PNST”

SEIC Student Composition

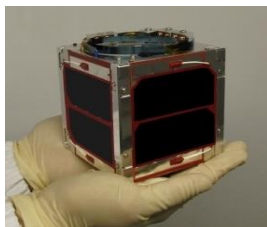


Graduated

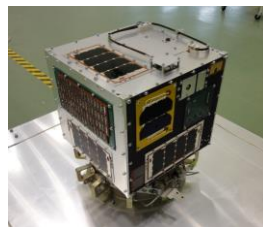
Current (as of April 2023)

More than 159 foreign students from 46 countries enrolled in 11 years

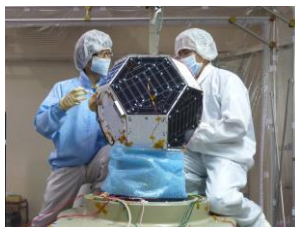
Kyutech Satellite Heritage



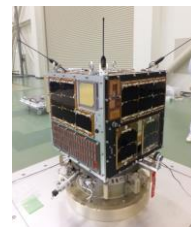
HORYU-1 (1U)
2006-2010
Not launched



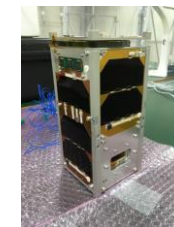
HORYU-II
2010-2012
Launch 2012/5/18



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



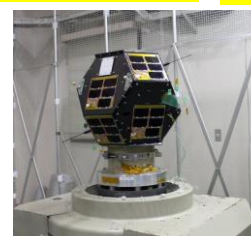
BIRDS-I constellation
2015-2017
ISS release 2017/07/07



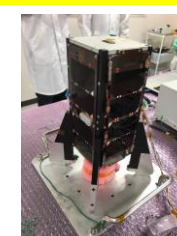
BIRDS-II constellation
2016-2018
ISS release 2018/08/10



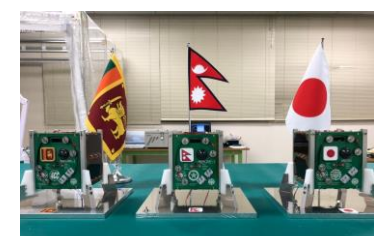
SPATIUM-I
2016-2018
ISS release 2018/10/06



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



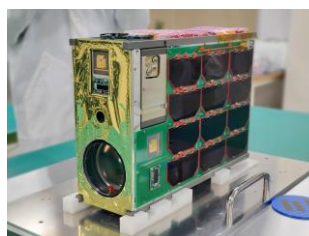
AOBA VELOX-IV
2016-2018
Launched 2019/01/18



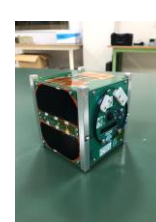
BIRDS-III constellation
2017-2019
Launched 2019/04/18



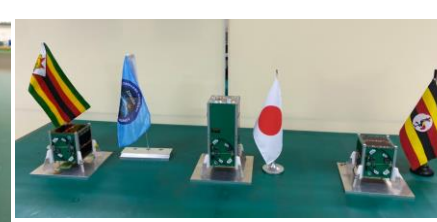
BIRDS-IV constellation
2018-2020
Launched 2021/03/14



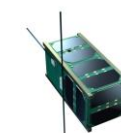
KITSUNE
2019-2021
Launched 2022/03/24



FUTABA
2018~2021
Launch, 2021



BIRDS-5J, -5Z, -5U
2022年

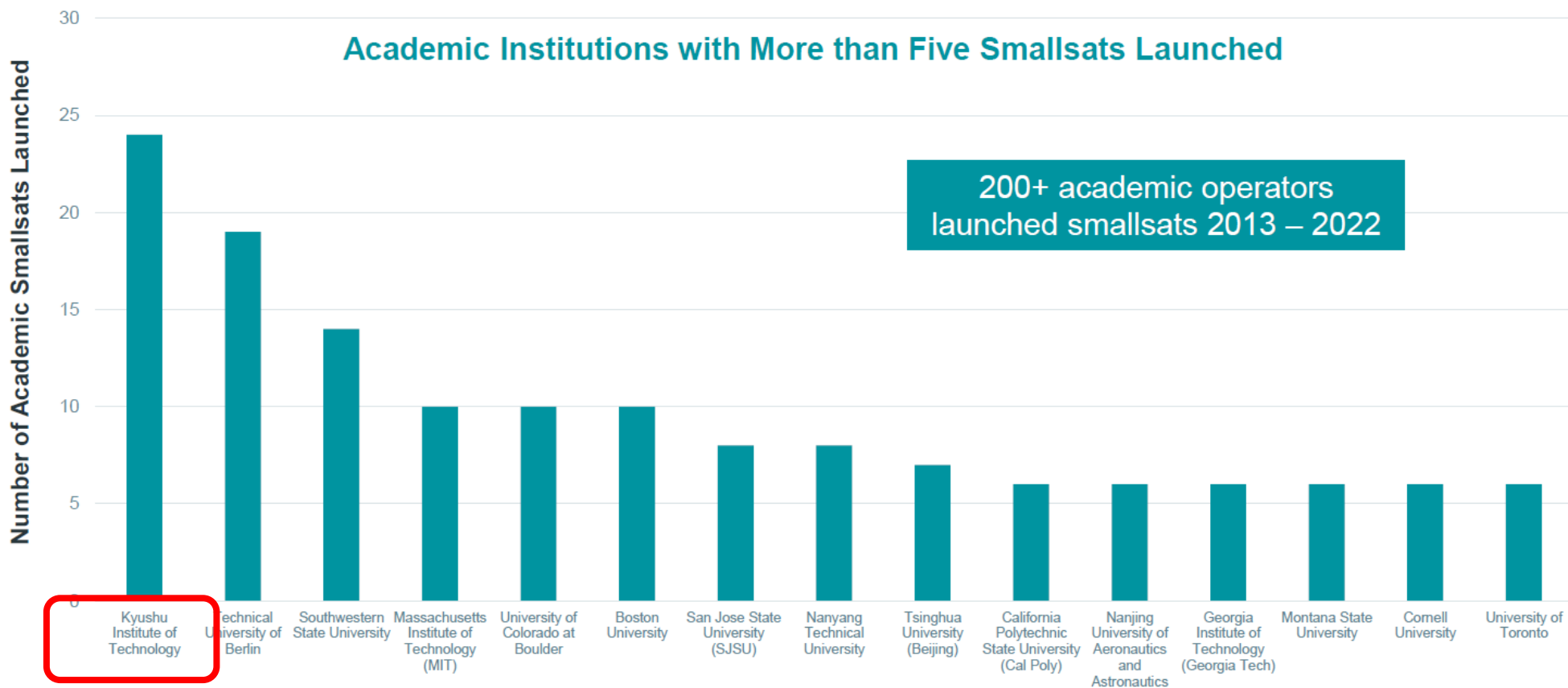


MITSUBA
2022年

Satellite name
Satellite development period
Launch/ISS release date

Operator and Mission Type Trends

Number of Academic Smallsats 2013 – 2022, by Institution



Another advantage of Kyutech

Japan offers 2 CubeSat launching opportunities

JAXA+UNISEC, low-cost opportunities

The program has two categories:

- ① one is construction of international collaborative relationships,
 - ② another is for domestic capacity building.
- Both categories require Japanese partners (UNISEC-Japan's universities, institutes, and technical colleges) for small sat development.

J-CUBE winners secure a low-cost launch opportunity 12U/per year (or 6 satellites/per year). The satellite size is assumed to be 1~3U.

J-CUBE:

<http://unisec.jp/serviceen/j-cube>

JAXA+UNOOSA, zero-cost opportunities



KiboCUBE:

https://www.unoosa.org/oosa/en/ourwork/access2space4all/KiboCUBE/KiboCUBE_Index.html

Kyutech offers full-scholarship program named **PNST which is operated under Space Engineering International Course (SEIC), by Kyutech Collaboration with UNOOSA and Japanese Government.**



Thank you for listening



Kyutech
Kyushu Institute of Technology

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