

KiboCUBE Academy

Live Session # 3-2

Satellite Facility Tour of Kyushu Institute of Technology

Kyushu Institute of Technology

Laboratory of Lean Satellite Enterprises and In-Orbit Experiments

Professor Ph.D. Mengu Cho

This lecture is NOT specifically about KiboCUBE and covers GENERAL engineering topics of space development and utilization for CubeSats.

The specific information and requirements for applying to KiboCUBE can be found at:
<https://www.unoosa.org/oosa/en/ourwork/psa/hsti/kibocube.html>



0. Lecturer introduction



Mengu Cho, Ph.D.



Position:

2004 - Professor, Department of Space Systems Engineering*
Director, Laboratory of Lean Satellite Enterprises and In-Orbit Experiments **
Kyushu Institute of Technology, Japan

2021 – Visiting Researcher, Chiba Institute of Technology, Japan

2014 - Visiting Professor, Nanyang Technological University, Singapore

2013 - Coordinator, Nations/Japan Long-term Fellowship Programme, Post-graduate study on Nano-Satellite Technologies (PNST)

(*since 2018)
(up to 2022)

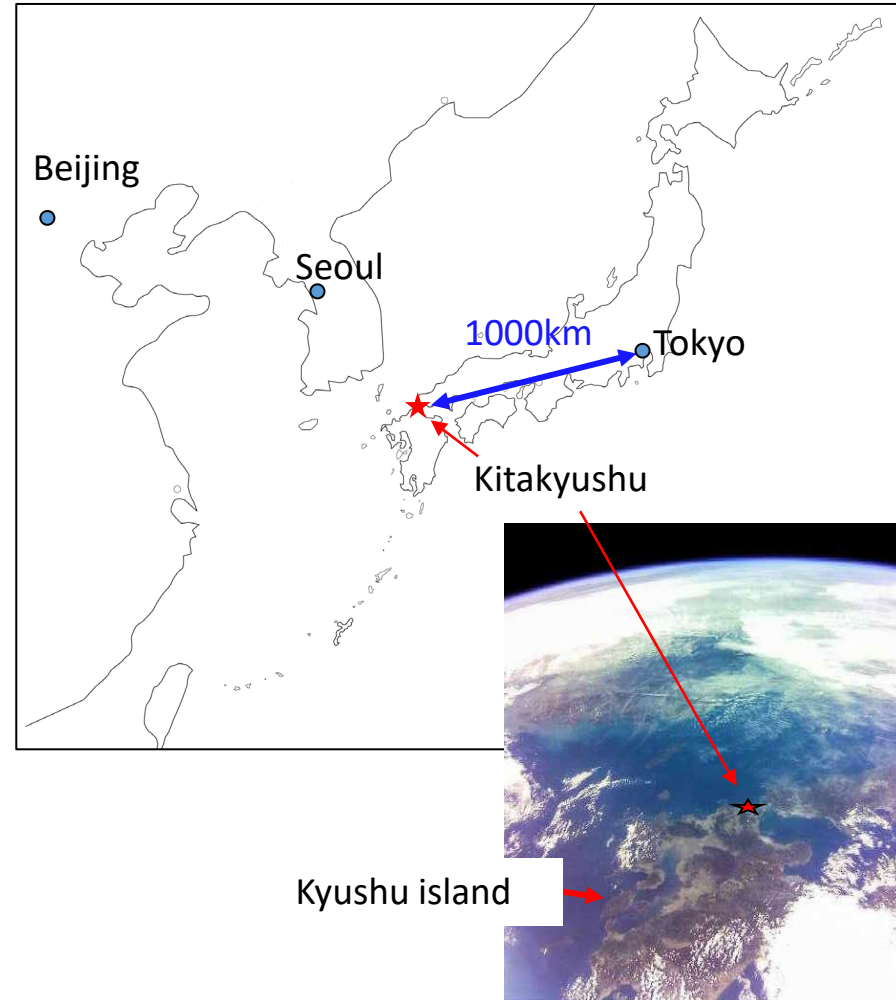
Research Topics:

Lean Satellite, Spacecraft Environment Interaction

0. Lecturer introduction

0.2 Kyushu Institute of Technology (Kyutech)

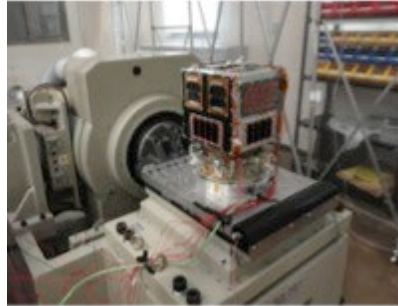
- A national university founded in 1909
 - 4,200 Undergraduate students
 - 1,300 Graduate students
 - 360 Faculty members
 - Engineering, Computer science, Life-science
- Located in the Kitakyushu region
 - Population of more than 1million



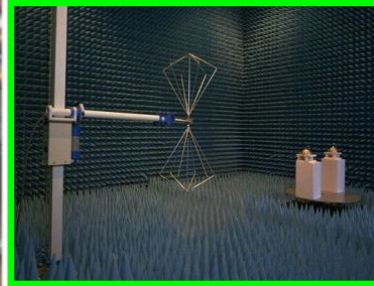
0. Introduction to Kyutech

0.3 Center for Nanosatellite Testing

To be capable of doing all the tests for a satellite up to 50cm, 50kg



Vibration



EMC & Antenna pattern



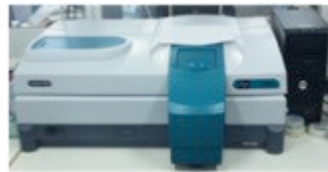
Pressure & Leak



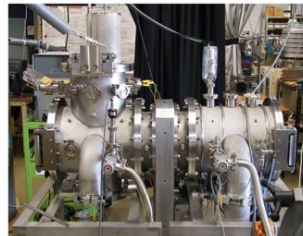
Thermal vacuum



Assembly & Integration



α & ϵ measurement



Thermal vacuum



Thermal cycle



Shock



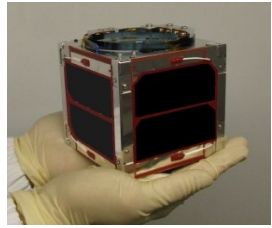
Outgas
(ASTM E595)

Tested more than 70 satellites since 2010 including satellites from overseas (e.g. Egypt, Costa Rica, Singapore, Malaysia, Vietnam, Thailand, etc.)

Space Development and Utilization Award (JAXA president award), 2022

0. Introduction to Kyutech

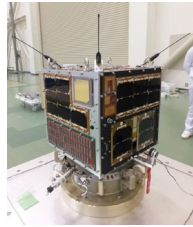
0.4 Kyutech Satellite Heritage



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



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



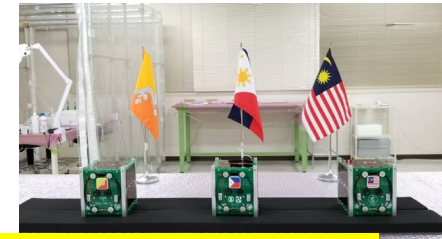
HORYU-IV
2013-2016
Launch 2016/02/17



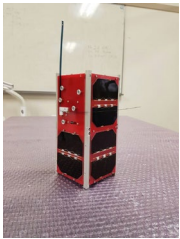
AOBA VELOX-III
2014-2016
ISS Release 2017/01/19



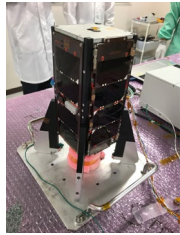
BIRDS-I constellation
2015-2017
ISS release 2017/07/07



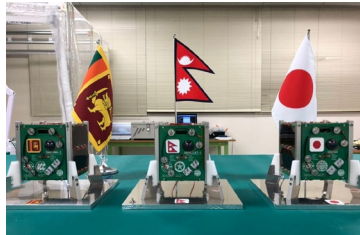
BIRDS-II constellation
2016-2018
ISS release 2018/08/10



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



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



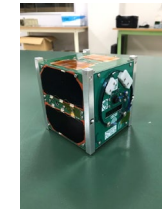
BIRDS-III constellation
2017-2019
ISS release 2019/04/18



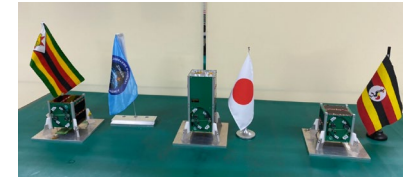
BIRDS-IV constellation
2018-2020
ISS release 2021/03/14



KITSUNE
2019-2021
ISS release 2022/03/24



FUTABA
2018~2021
ISS release 2022/08/12



BIRDS-5J, -5Z, -5U
2020-2022
ISS release 2022/12/2



MITSUBA
Launch failure
2022/10/12

Satellite name
Satellite development period
Launch/ISS release date

World's No.1 academic small satellite operator since 2018
(Bryce Space Technology report on SmallSats by the Numbers)



1. Satellite Facility Tour

1. Laboratory tour

1. Kyutech satellites
2. Ground station
3. Antenna
4. Vibration machine
5. Shock machine
6. Thermal vacuum chamber
7. Thermal cycle chamber
8. Ready room
9. Clean room
10. BIRDS room



1. Laboratory tour

Satellites, Ground Station, Antennas

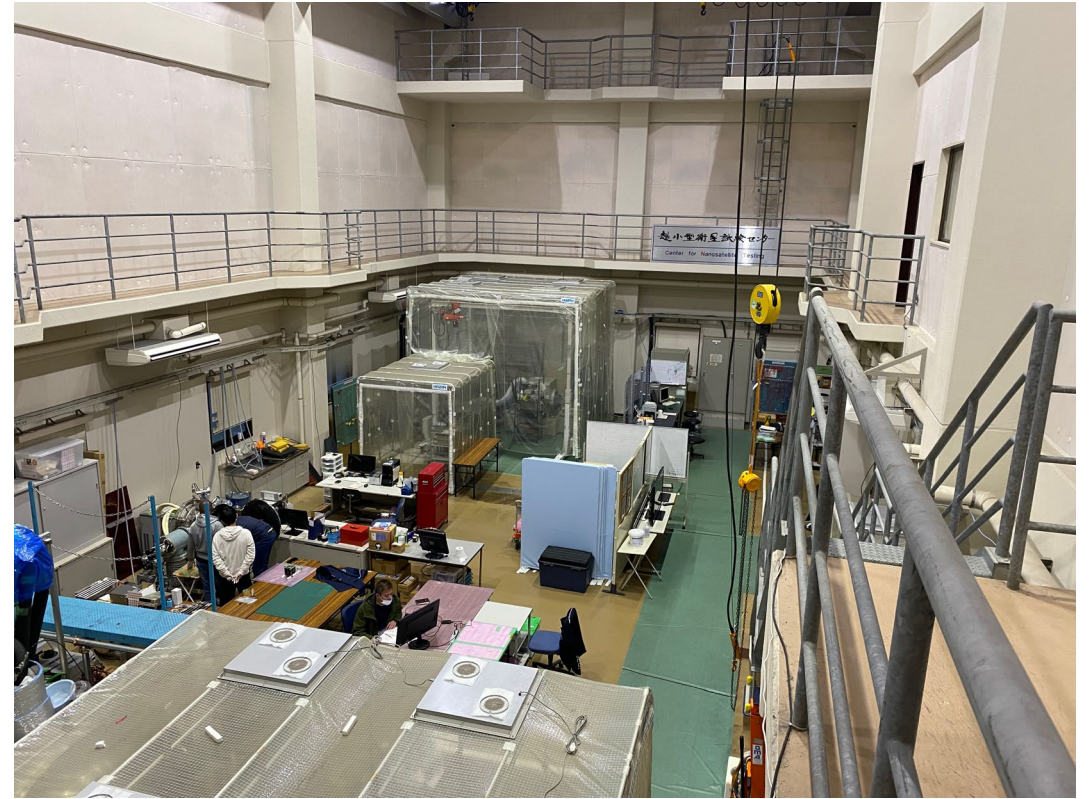


1. Laboratory tour

Satellites, Ground Station, Antennas

1. Laboratory tour

Test facilities, Clean rooms

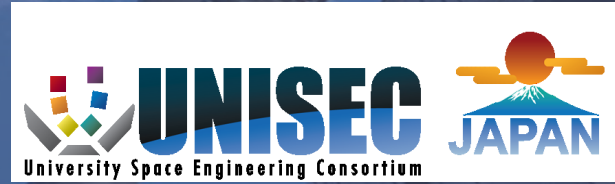


1. Laboratory tour

Test facilities, Clean rooms

1. Laboratory tour

Test facilities, Clean rooms



Thank you very much.

[Disclaimer]

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