KNACKSAT satellite for educational space technology in Thailand

Phongsakorn Meemak
Double Degree Program Student
King Mongkut's University of Technology North Bangkok
Kyushu Institute of Technology

King Mongkut's University of Technology North Bangkok (KMUTNB)
KMUTNB Space System Laboratory (KSSL)

- KMUTNB Space System Laboratory was established in 2012 at Department of Mechanical and Aerospace Engineering, KMUTNB.

- KSSL has been the first academic space system laboratory to provide a knowledge of satellite system designs in Thailand.

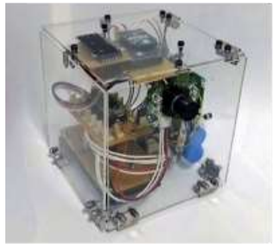
Department of Mechanical and Aerospace Engineering

KMUTNB Space System Laboratory

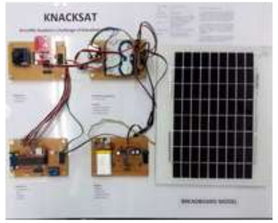
KNACKSAT Project

Background

- 1U CubeSat: KNACKSAT
  (KmutNb Academic Challenge of Knowledge SATellite)
- KMUTNB CubeSat Project started in 2012
- 270k USD granted from NBTC Thailand in OCT 2015
  (National Broadcasting and Telecommunications Commission)



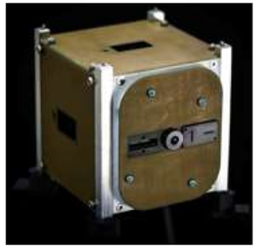
First Prototype
2012



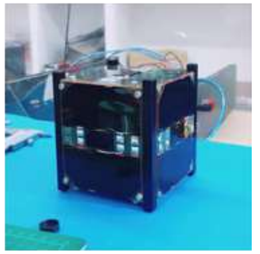
BBM
2013

EM ver 1.1
2014

EM ver 1.2
2015



EM ver 2.3
2015-2017



FM ver 3.1
2017

Missions

- To acquire basic space technologies by demonstrating
  - Remote sensing (Camera)
  - Active Attitude Control using magnetic torquer
  - Communication via HAM radio developed by ourselve

KNACKSAT Laboratories

- The two main laboratories supporting the KNACKSAT project are
  - KMUTNB Space System Laboratory,
    Department of Mechanical and Aerospace Engineering, Faculty of Engineering, KMUTNB
  - RF and Microwave Laboratory,
    Department of Communication Engineering, The Sirindhorn International Thai-German Graduate School of Engineering (TGGS), KMUTNB

KMUTNB Space System Laboratory

RF and Microwave Laboratory

Objectives

- To enhance the knowledge and experiences in satellite design and construction
- To be the first step as fundamentals for development of larger satellite in Thailand in the near future
- To provoke the interests in space science and technology of young Thais

KNACKSAT Team

Director
Prof. Suwat Kuntanapreeeda

Project Manager
Dr. Phongsatorn Saisutjarit

Researcher: 4
Student: 12 (D:1, M: 8, B: 3)

Prof. Suwat Kuntanapreeeda
Director of KNACKSAT Project

KNACKSAT Team

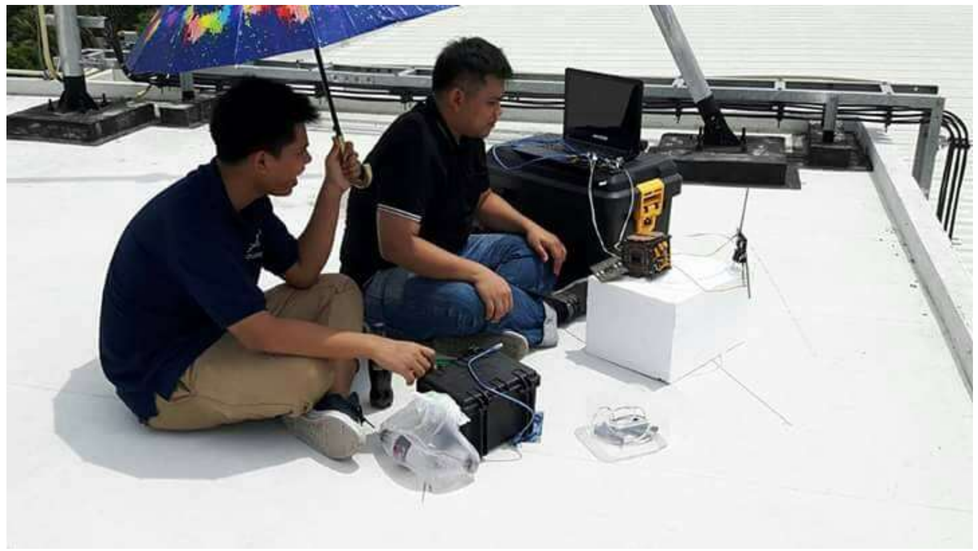
KNACKSAT activities

Preliminary Design Review (PDR) in JAN 2016

Preliminary Design Review by Prof. Shinichi Nakasuka and JAXA in 2016

KNACKSAT activities

Long Distance Testing and Fabrication



Long-Distance Testing

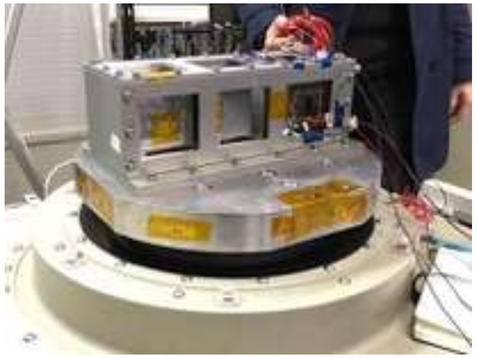
Solar Cell Assembly

KNACKSAT activities

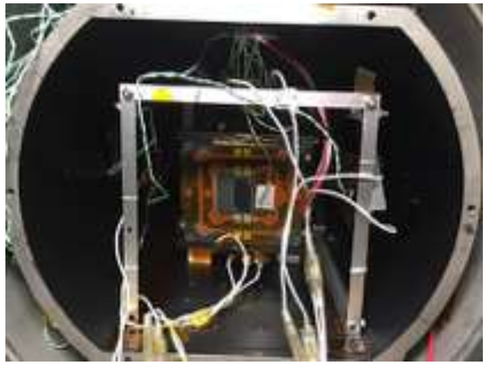
Ground Station at TGGS building

KNACKSAT activities

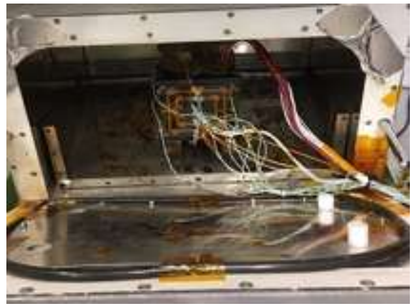
Space Environment Testing at Kyutech in March 2017



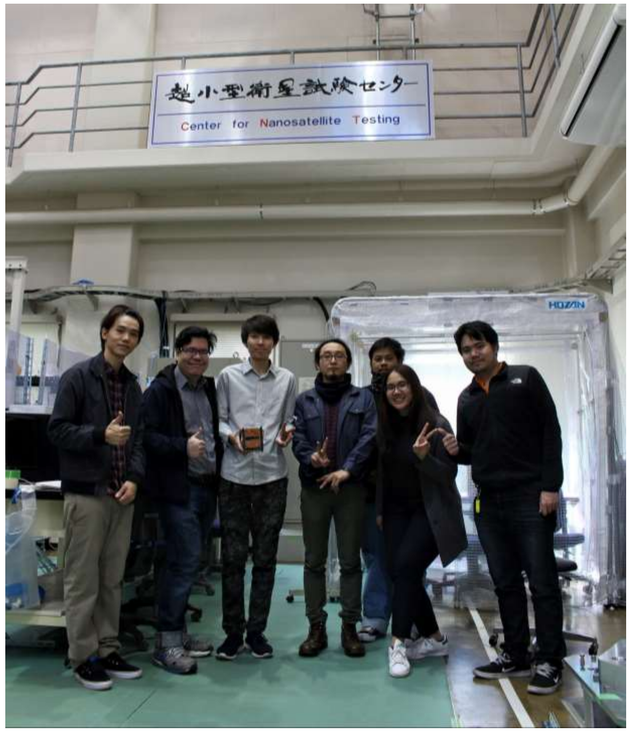
Vibration Testing



Thermal Vacuum Testing



Thermal Cycle Testing



Group Photo after testing

KNACKSAT activities

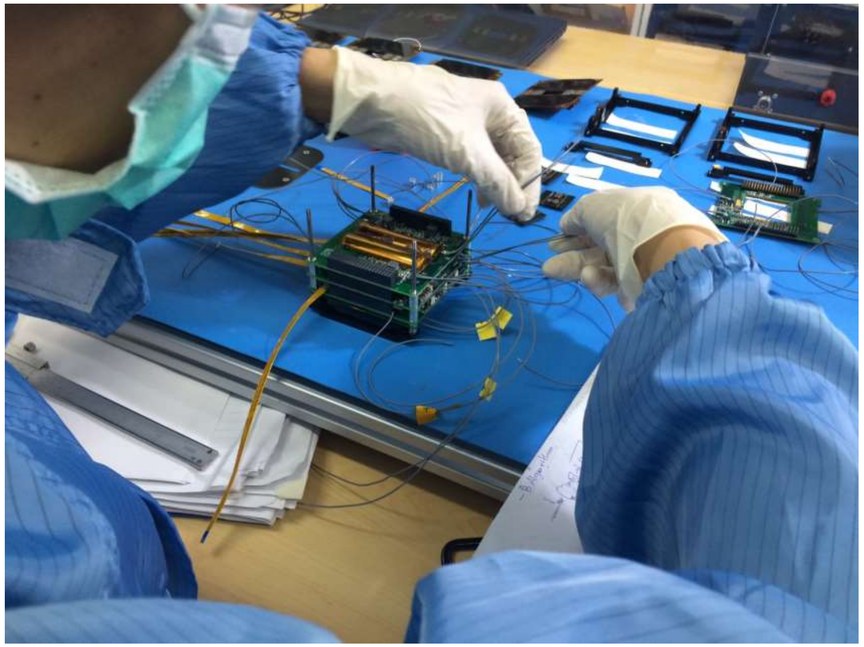
Critical Design Review (CDR) in March 2017

Overview of KNACKSAT by Prof. Suwat Kuntanapreeda

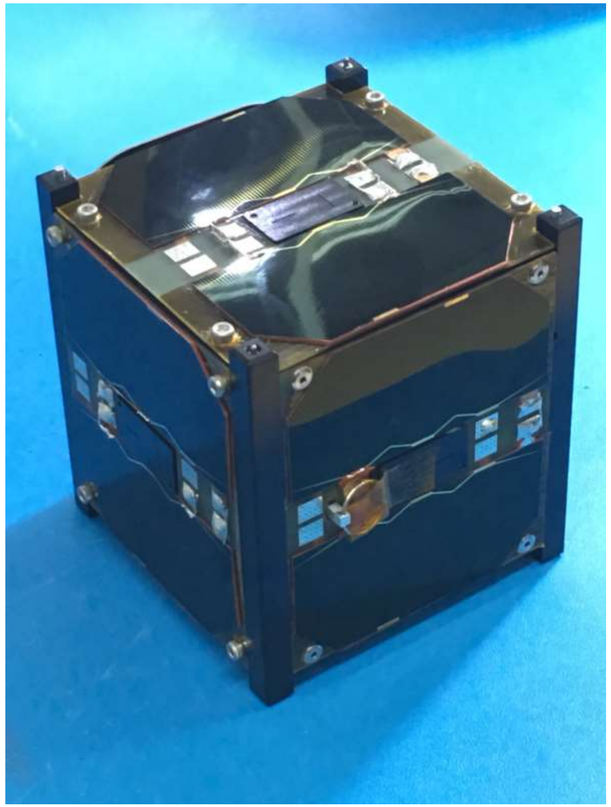
Critical Design Review by Prof. Shinichi Nakasuka and JAXA in 2017

KNACKSAT activities

Flight Model Assembly



Flight Model Assembly



KNACKSAT Flight Model Complete Assembly and waiting for launch in Q3 2018

Launch Vehicle / Orbit

- Launch Vehicle: SpaceX (Falcon-9)
- Launch window: Q3 2018
- Orbit
  - Sun-Synchronous orbit
  - Altitude 575 km

Prof. Suwat Kuntanapreeeda
Director of KNACKSAT Project

"This project does not develop only a satellite, but most importantly, also build a team who know how to develop satellites"

Prof. Suwat Kuntanapreeda

Thank you for your attention

Contact: knacksat@gmail.com

5th UNISEC-Global Meeting
Rome (Italy), 2-4 December 2017