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Author: Dr. Necmi Cihan Örger

Kyushu Institute of Technology, Japan, orger.necmi-cihan397@mail.kyutech.jp

Prof. MENGU CHO

Kyushu Institute of Technology, Japan, cho@ele.kyutech.ac.jp

Dr. Omer Burak Iskender

Nanyang Technological University, Singapore, Republic of, iske0001@e.ntu.edu.sg

Mr. Wee Seng Lim

Nanyang Technological University, Singapore, Republic of, LimWS@ntu.edu.sg

Prof. Amal Chandran

Nanyang Technological University, Singapore, Republic of, achandran@ntu.edu.sg

Prof. Keck Voon Ling

Nanyang Technological University, Singapore, Republic of, ekvling@ntu.edu.sg

Prof. King Ho Li Holden

Nanyang Technological University, Singapore, Republic of, holdenli@ntu.edu.sg

Dr. Chee Lap Chow

Nanyang Technological University, Singapore, Republic of, clchow@ntu.edu.sg

Dr. John Bellardo

Cal Poly, SLO, United States, bellardo@calpoly.edu

Dr. Pauline Faure

California Polytechnic State University, United States, pfaure@calpoly.edu

Prof. Fabio Santoni

Sapienza University of Rome, Italy, fabio.santoni@uniroma1.it

Dr. Christian Circi

Italy, christian.circi@uniroma1.it

Mr. Paolo Marzioli

Sapienza University of Rome, Italy, paolo.marzioli@uniroma1.it

Mr. Lorenzo Frezza

Sapienza University of Rome, Italy, lorenzo.frezza@uniroma1.it

Prof. Kazuhiro Toyoda

Kyushu Institute of Technology, Japan, toyoda@ele.kyutech.ac.jp

Dr. Hirokazu Masui

Kyushu Institute of Technology, Japan, masui@ele.kyutech.ac.jp

Dr. Teramoto Mariko

Kyushu Institute of Technology, Japan, teramoto.mariko418@mail.kyutech.jp

Dr. Jose Rodrigo Cordova Alarcon

Kyushu Institute of Technology, Japan, cordova.rodrido207@mail.kyutech.jp

Dr. Takashi Yamauchi

Kyushu Institute of Technology, Japan, yamauchi.takashi098@mail.kyutech.jp

Dr. Sangkyun Kim

Kyushu Institute of Technology, Japan, kim.sangkyun571@mail.kyutech.jp

Dr. Jian Wei Mark Lim

Aliena Pte Ltd, Singapore, Republic of, marklimjw@ntu.edu.sg
Mr. George-Cristian Potrivitu
Aliena Pte Ltd, Singapore, Republic of, georgepotrivitu@aliena.sg
Dr. Matteo Laterza
Aliena Pte Ltd, Singapore, Republic of, matteolaterza@aliena.sg
Mr. Federico De Grossi
Sapienza University of Rome, Italy, federico.degrossi@uniroma1.it

HORYU-VI: INTERNATIONAL CUBESAT MISSION TO INVESTIGATE LUNAR HORIZON GLOW

Abstract

If the lunar regolith that covers the lunar surface rises due to charging and attaches to a landing spacecraft, rover, astronaut, etc. on the lunar surface, it may have a great effect on their activities. The Lunar Horizon Glow (LHG), which causes the lunar regolith to float and the sunlight to scatter forward due to the electrostatic field generated at the boundary between the day and night of the moon, has been described as a symbol of the charging of lunar fine particles. Discontinued, still wrapped in mystery. LHG observations using conventional lunar probes have limited observation opportunities and do not cover the various conditions of space weather that cause lunar charging. The nanosatellite “HORYU-6” specialized in LHG observation will be put into lunar orbit. We take high-resolution photographs of the lunar surface just before sunrise or just after sunset with multiple optical cameras, and perform much higher-resolution and high-resolution LHG observations than before. Confirm the presence of LHG, and investigate the correlation between LHG generation and space weather. We will end the mystery surrounding LHG and aim to improve our understanding of the charging environment of lunar fine particles. We show that we can obtain scientific results of lunar and planetary exploration using CubeSat at low cost and in a short period of time, and contribute to the development of lunar and planetary exploration in the future. The spacecraft will be developed jointly with universities in Singapore, the United States and Italy under the supervision of Kyushu Institute of Technology, with the aim of launching the SLS-2 rocket in the second half of 2022. Together with its own scientific objectives, the HORYU-6 mission will demonstrate the low thrust trajectory optimization by utilizing electric propulsion system together with other novel embedded technology demonstrations such as atomic clock, deep space navigation and communication with CubeSats.