Announcement for all of SEIC Staff and Students

SAPIENZA
UNIVERSITÀ DI ROMA

On 29 Nov. 2018, Kyutech will host a special presentation about LEDSAT nano satellite mission by Prof. Fabio Santoni of Sapienza – Univ. of Rome in Italy. Please mark your calendar.

See the next 6 pages for details.

Basic Facts

Motto	Il futuro è passato qui
Motto in English	The future has passed here
Type	Public
Established	1303
Administrative staff	8,000
Students	112,564
Location	Rome, Italy

https://en.wikipedia.org/wiki/Sapienza_University_of_Rome

B I O

of our guest

Prof. Fabio Santoni

Fabio Santoni received the Dr. Eng. degree in Aeronautical Engineering (cum laude) and the PhD in Aerospace Engineering at Sapienza University of Rome.

He was visiting scholar at Stanford University, were he participated in the small satellite programs Sapphire and Opal. He had technical management responsibility in the education program UNISAT at Sapienza University of Rome.

He is presently Associate Professor in Aerospace Systems at the Dipartimento di Ingegneria Astronautica, Elettrica ed Energetica (DIAEE) of University of Rome “La Sapienza”, where he established the Aerospace Systems Laboratory.

He is delegate for the Italian Space Agency in the IADC (Inter Agency Space debris Committee) and in the UNCOPUOS (United Nations Committee On Peaceful Use of Outer Space).

He is point of Contact in Italy for UNISEC (University Space Engineering Consortium). His research activity is mainly devoted to nano-spacecraft design, attitude determination and control, space debris observation, mitigation and remediation techniques, including end-of-life disposal and active debris removal.

This university was established in the Year 1303

Church of Sant'Ivo alla Sapienza, originally the chapel and seat of the university library (until 1935)

Department of Mechanical Engineering

New campus built in 1935

TITLE of the lecture

LEDSAT nanosatellite mission and space debris optical monitoring

ABSTRACT

The importance of the space debris mitigation is crucial for preserving the safety of current and future manned missions, as well as for ensuring a sustainable usage of the outer space for the future generations of scientists and engineers. Space debris are usually tracked by means of active systems (such as radar and lidar). Although optical observations present important constraints, depending on the weather conditions and on lighting conditions (the target shall be enlightened by the Sun, while the observatory site shall be in darkness), they offer a significant improvement of the orbital parameters estimation of the tracked debris, with the possibility to combine and integrate optical and radar data.

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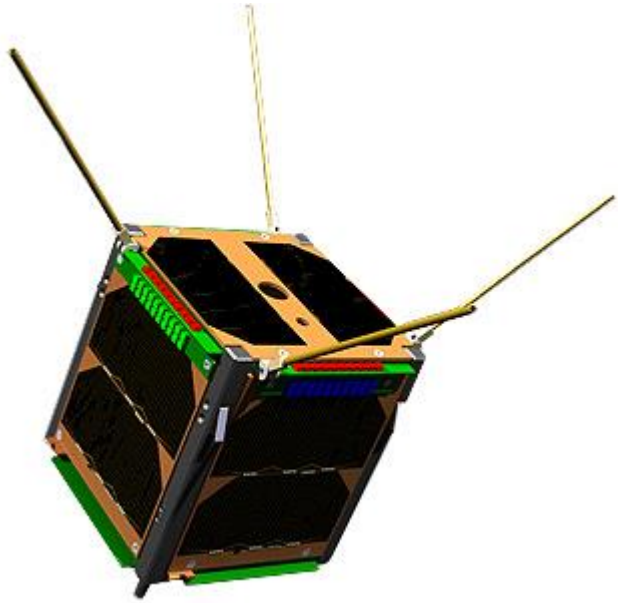
The advantage offered by optical systems is relevant when considering multiple observatories cooperating from different sites. In addition to an obvious improvement in the debris traceability and in the coverage of the celestial vault, the integration of data from different sites can lead to a tremendous improvement in the orbital parameters estimation of the debris. As an example, the S5Lab team has taken advantage of data from several observatories in the area nearby Rome (Italy), and from two observatories at low latitude (located in Malindi, Kenya), for the space debris monitoring activities, as well as for the recent Tiangong-1 re-entry observational campaign.

On the other hand, the space debris mitigation and the improvement of the optical stand-alone orbit determination can be carried out by means of light emitting sources, such as LEDs, to be mounted on the outer surfaces of CubeSats and other spacecraft. The capability of self-illuminating the satellite allows to perform optical observations during the whole eclipse time, instead of constraining the observational intervals to short time windows at dawn and dusk. On this purpose, the S5Lab team is developing LEDSAT (LED-based small SATellite), a 1-Unit CubeSat that will test the capabilities of LED-based systems for the improvement of the optical orbit determination and attitude reconstruction algorithms.

The seminar will present the current and future optical observation techniques for space debris, the recent achievements in terms of data integration and attitude reconstruction, and the future developments in the field of debris monitoring. The LEDSAT mission will be presented, with focus on the expected results and the possible improvements for the currently applied orbit determination algorithms. **End of Abstract**

LEDSAT (**LED-based small Satellite**) is an 1U CubeSat developed by the S5Lab research group at Sapienza - University of Rome and is equipped with LEDs (Light Emitting Diodes) and retro-reflectors for optical tracking with ground-based telescopes and laser ranging observatories.



From Gunter's Space Page
https://space.skyrocket.de/doc_sdat/ledsat.htm

This lecture:

Date: Thurs., 29 Nov 2018

Time: 3限 (13:00-14:30).

Place: See the next page.

All SEIC students are expected to attend this presentation.

Map of Tobata Campus of Kyutech

Location of this talk

Lecture Hall S-2A（2nd floor) in the General Research Building 1 総合研究1号棟, which is the same building as Cho Lab 趙研。

BE ON TIME – DO NOT DISRUPT THE LECTURE.

This 7-page document prepared by G. Maeda on 9 Nov. 2018.