Paper ID: 63844
oral

28th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Small Space Science Missions (2)

Author: Prof. Emrah Kalemci
Sabanci University, Türkiye

Dr. Antonios Manousakis
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates
Prof. Ilias Fernini
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates
Dr. Ayhan Bozkurt
Türkiye
Prof. Alim Rüstem Aslan
Istanbul Technical University, Türkiye
Mr. Ali Murteza Altingun
Türkiye
Mr. Kaan Veziroglu
Türkiye
Mr. Refik Yalcin
Sabanci University, Türkiye
Mr. Kaya Gokalp
Sabanci University, Türkiye
Mr. Milad Diba
Sabanci University, Türkiye
Mr. ali Yasar
Sabanci University, Türkiye
Mr. Efe Oztaban
Sabanci University, Türkiye
Mr. Bogac Karabulut
Istanbul Technical University, Türkiye
Mr. Onur Öztekin
Istanbul Technical University, Türkiye
Prof. Hamid M.K. Al-Naimiy
University of Sharjah, United Arab Emirates
Mr. Yousuf Faroukh
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates
Mr. Ibrahim Alsabt
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates
Ms. Tarifa AlKaabi
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates
Mr. Sahith Reddy Madara
ISAE-Supaero University of Toulouse, France
Dr. Muhammad Mubasshir Shaikh
Sharjah Academy for Astronomy, Space Sciences and Technology (SAASST), United Arab Emirates

Abstract

Sharjah-Sat-1 is currently being developed as a collaborative research project among the Sharjah Academy for Astronomy, Space Sciences, and Technology (SAASST), University of Sharjah (UoS), Istanbul Technical University (ITU), and Sabanci University (SU). A 3U CubeSat design has been adopted with a dual payload onboard: (i) an improved X-ray Detector (iXRD) and (ii) a system of two optical cameras. The mission's primary scientific targets are the bright, hard X-ray sources in our Galaxy and the solar coronal holes. A complimentary payload, consisting of the two optical cameras, will serve as a low-resolution remote sensing application. This project's main technological aim is to develop a CubeSat, from A to Z, operational in the electromagnetic spectrum's hard X-ray regime. The Sharjah-Sat-1 would be the first CubeSat mission to be developed by the SAASST team and UoS students to not only design, fabricate, test, and launch the CubeSat itself but also building the capacities and expertise necessary for future CubeSat missions as well. The anticipated launch is planned for late Q4-2021.

The primary science payload onboard is the iXRD (developed by Sabanci University) with a pixelated CdZnTe-based crystal as the active material and a Tungsten collimator with a field of view of 4.26 degrees. The energy range is from 20 keV to 200 keV with a target spectral resolution of 6 keV at 60 keV. Its primary science goal is to observe the very bright galactic hard X-ray sources, transient and persistent. Blackhole candidates and pulsars can emit radiation up to a few 100 keVs, making them potential targets. Besides, solar observations will be conducted to study hard X-ray spectra of flares and coronal holes. Other opportunity targets are transient bright events, such as gamma-ray bursts (GRB) and magnetar bursts. A complete in-orbit background analysis has been conducted. While the detector's effective area is only 6.5 cm^2, it is expected to reach a sensitivity of 60 mCrab in a single day in 20 keV-100 keV band assuming 600s exposure each orbit.