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SVOM: A FRENCH/CHINESE COOPERATION FOR A GRB MISSION

Abstract

The Space-based multi-band astronomical Variable Objects Monitor (SVOM) is an approved mission for Gamma-Ray Burst (GRB) studies, developed in cooperation between the Chinese National Space Agency (CNSA), the Chinese Academy of Sciences (CAS), the French Space Agency (CNES) and several French laboratories.

In the continuity of Swift, SVOM will be a highly versatile Astronomy satellite, with built-in multi-wavelength capabilities and rapid slew capability, flexible operations and ground follow-up opening a large discovery space. In addition to permit GRB studies and the use of GRBs for Cosmology and Multi-Messenger Astrophysics, SVOM, will have a broad science return thanks to its unique instrumental combinations.

For example, the SVOM mission has been conceived to promptly scrutinize the celestial fields where sources have been detected by wide field- of-view astronomical devices such as the upgraded generation of gravitational wave detectors (advanced Virgo/LIGO) and high-energy neutrino detectors (KM3NeT, IceCube) The SVOM satellite will be launched by a Chinese LM-2C from Xichang and will be inserted into a Low Earth Orbit with an inclination of 30and an altitude of approximately 625 km.

The payload is composed of:

a. two wide field of view high-energy instruments : a coded-mask gamma-ray imager (ECLAIRs) and a gamma-ray spectrometer (GRM)

b. two narrow field telescopes : a Micropore X-ray Telescope (MXT)and a Visible-band Telescope (VT)

The SVOM ground segment includes additional instruments: o a wide angle optical camera (GWAC) monitoring a part of the ECLAIRs FoV in real-time, o and two 1-m-class robotic follow-up telescopes (the GFTs).

When a GRB is detected, its position is sent to the ground using the SVOM VHF alert system. The VHF signal is received by one of the 45 ground stations distributed all around the world under the satellite track. The system then forwards this information via internet (using the GCN and VOEvent networks) to the SVOM ground instruments (GWAC and GFTs) and to the scientific community.

The paper presents the organization of the program between France and China, the mission and its objectives, the satellite and the payload, the ground segment architecture and finally the operational concept.