

31st IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Interactive Presentations - 31st IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (IPB)

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QUVIK (QUVIK ULTRA-VIOLET KILONOVAE SURVEYOR) - MISSION DEFINITION AND
FEASIBILITY STUDY

Abstract

This paper introduces a new mission for astronomy science observations and presents outputs of development phases 0/A/B1. QUVIK is a UV space telescope on a 130 kg micro-satellite with a moderately fast repointing capability and a near real-time alert communication system. The mission shall measure the brightness evolution of kilonovae, resulting from mergers of neutron stars, in the UV band and thus it shall distinguish between different explosion scenarios. The observation should be executed within few minutes after kilonova detection, e.g. by gravitational waves observatory. Between observations of kilonovae, it will perform other observations of interest to the scientific community, partly selected in an open competition, such as gamma-ray bursts (GRB), supernovae, outbursts in active galactic nuclei, and tidal-disruption of stars by supermassive black holes, etc. The design of the spacecraft is based on a block-shaped microsatellite implementing modular approach. The primary payload – UV telescope, is placed in the centre of the spacecraft with the platform distributed around it in four modules/blocks and the main base with the launch separation device. The telescope itself is based on modified Cassegrain concept allowing observation in NUV and FUV spectrum. Optical diameter of the primary mirror is 330 mm and total telescope weight is about 17 kg. Data communication is executed via S-band for telemetry and telecommands, X-band for data transfer and L-band for Inter Satellite Link allowing near-real time communication with the satellite. QUVIK project is supervised by ESA and is approved by Czech Ministry of Transportation for realization as an Ambitious Czech national mission, with goal to promote Czech science and space technology. The launch is planned for 2028+.