

Attachment A to API for VZLUGEM mission

Description of the VZLUGEM mission regarding the used frequencies

The mission focuses on technological research in the field of RPO (Rendezvous and Proximity Operations) for small-scale satellites. It consists of two identical 6U CubeSats equipped with a hot gas propulsion system. The launch is planned for mid-2027 (SpaceX Rideshare, Transporter 21). All onboard equipment is designed to support the mission's primary goal, particularly the camera payload for observing and imaging the paired satellite, or at least the orbital background for further technological development.

Communication between the space segment and the ground segment is primarily via **S-band** for TT&C (Telemetry, Tracking and Command) and data downlink from the camera payload (images of the paired satellite). The main ground station is located in the Czech Republic (CZE). During the initial months of the mission (approximately 4 to 6 months), an additional worldwide network of ground stations will be utilised in cooperation with Leaf Space. The coverage areas and locations of these ground stations are listed in the attached document API/A.

Both spacecraft are equipped with an additional S-band radio (with reduced transmitting power). It will be used as an experimental short-distance **inter-satellite link** for the exchange of position data between the satellites and for ranging, using the round-trip time-of-flight (RTTOF) measurement method.

The **UHF** band will be used only as a backup link and is limited to emergency beacon transmissions within the XAA service area. The beacon is activated only when the spacecraft enters safe mode and transmits basic telemetry and position data at an interval of several tens of seconds. UHF uplink is intended as an emergency TT&C link. Its transmission is limited to the Czech Republic service area.

Summary of the frequencies used:

Band	Frequency [MHz]	Notes
S-band Uplink	2025 – 2110	nominal TT&C
S-band Downlink	2200 – 2290	nominal TT&C and payload data
S-band Crosslink (RTTOF)	2225 – 2240	inter-satellite link and ranging
UHF Uplink	401 – 402	emergency TT&C (CZE only)
UHF Downlink	401 – 402	emergency TT&C (CZE only) emergency beacon (XAA; only in safe mode)