

1) Please provide a description of the robustness of the propulsion system to contain ionic liquid propellant, especially in the event of a puncture or break of the containing unit. The ionic liquid is protected and shielded from escape to space by three layered enclosures. Firstly, the liquid is contained in a PEEK tank with 1.25 mm wall thickness. Secondly, the PEEK tank is installed into the Accion TILE 2 subsystem aluminum structure with walls 1.5 mm thick all around. Thirdly, the Accion TILE 2 subsystem is installed into the structure of the AeroCube-16 which has walls 1.5 mm thick minimum all around. A puncture of the PEEK tank is therefore prevented by two layers of 1.5 mm aluminum sheet. If ionic liquid were to escape from the PEEK tank, it would be captured by surface tension/wetting the first or second surrounding aluminum boxes. See Correspondence reference number 69464 for graphics of the Accion TILE 2 system and the AeroCube-16 satellite. In those graphics, the aluminum enclosures are accurately depicted.

2) Please provide confirmation of successful qualification testing of the propulsion system, to include vibration and thermal testing, at a minimum. The vendor confirms that qualification testing of the TILE 2 system was successful and that two spaceflights have already occurred. Qualification testing included a 0.4g sine sweep (0.4 g peak, 2 oct/min rate, 5 Hz to 100 Hz frequency range), random vibration in three orthogonal axes (14.1 Grms, NASA GSFC-STD-7000 vibration profile, 2 minutes duration for each axis), and thermal vacuum cycling (4 cycles, -30C cold to 80C hot with 12-hour dwells at each extreme). The testing did not cause any leaks or any anomalous function. The qualification vibration levels exceed the launch environment by more than 6 dB and the thermal testing levels exceed the worst case on orbit hot and cold predictions for AeroCube-16 by 20C minimum.