THE RF TECHNICAL DETAILS IN THIS LICENSE REINSTATEMENT REQUEST ARE UNCHANGED FROM THE LATEST PRIOR 0255-EX-CR-2020 APPLICATION.

AeroCube-6 FCC Mission Statement

The AeroCube-6 mission consists of two free flying satellites that will feature new variations of micro dosimeter devices (Figure 1) that will enhance discrimination of particle types contributing to the space radiation total dose impinging on spacecraft. Someday, these sensors will become part of a special purpose instrument that will assist with host vehicle anomaly investigations.

The AeroCube-6 is a PICOSAT class satellite, weighs less than 0.7 KG and is 4x4x2 inches in dimension. It will be launched on a DNEPR vehicle, slated for June, 2014. The orbit is 650 km circular with 98 degree inclination. DAS 2.0.2 predicts a lifetime of 17.3 years (area-to-mass ratio of 0.0214 m^2/kg) and a spacecraft probability of collision with space objects larger than 10 cm in diameter during the orbital lifetime of the spacecraft of 0.000001, well below the 0.001 threshold required (see "**AC6 DAS2.02 Output**" Exhibit). DAS 2.0.2 analysis predicts the risk of human casualty for the expected year of uncontrolled reentry and the orbital inclination of less than 1/10000, which also meets the requirement.

Each of the two AeroCube-6 satellites has one radio. The AdvRadio is built by The Aerospace Corporation around a Texas Instruments CC1101 transceiver chip. It also operates at a fixed 914.7 MHz frequency (see "**AdvRadio bandwidth**" Exhibit) and outputs 1.3W. Both radios attach to an omni-directional dipole antenna on the AeroCube-6 with a 0 dBi gain.

When the AeroCube-6 satellites are ejected, they will power on. However the radio will be in receive mode only. As the satellite flies over a ground station, the station will continuously beacon towards the satellite. When the satellite radio hears the beacon, along with the proper serial number code, it will respond and a link will be established. At that point, the ground station will ask the satellite for information, typically payload data or onboard telemetry. The satellite will respond by downlinking the requested information. When the link is lost due to the satellite passing out of view and the satellite was transmitting, the satellite will try up to 3 seconds to complete the last packet transmitted. The satellite will then revert to a passive receive mode and wait for the next beacon from a ground station.

The AeroCube-6 satellites fly as a pair. They use their radio to cue the other satellite when the payload sees an interesting radiation event occurring. The cue is a short, canned message that indicates to the other satellite to start recording data at a faster rate. A reply is given to the sender of the cue to stop the cueing. The most time a cue will occur is 30 seconds. After a cue has been given for 30 seconds, a 60 minute inhibit locks out the cue function to prevent repeated cues.

We would like to use two types of ground stations to communicate with the AeroCube-5 satellite. The first is a 5-meter diameter dish antenna at The Aerospace Corporation in El Segundo, CA. At 914.7 MHz, it has 30 dB gain, 5 deg beamwidth and uses an AdvRadio with a 9W amplifier. The second ground station is a portable 2-meter diameter dish. This has 22 dB gain, a 10 deg beamwidth and uses an AdvRadio with a 9W amplifier. This portable station would be located in an RF quiet area that improves the ground footprint of the ground station network. A typical satellite pass is 8 minutes long, twice per

day - so the system spends a lot of time not in use. The antenna parameters and ground station locations are shown in the exhibit "**FAA sketch and antenna figures v1**."

We are currently requesting a license reinstatement because the AeroCube-6 satellites are still performing well and the science is very good. In addition, their longevity in space is its own useful data point for the miniature satellite community. We request an additional 24 months of licensing.