

Form 442 Question 6: Description of Research Project

a. A description of the nature of the research project being conducted.

This is an Air Force/Space Force SMC sponsored CubeSat demonstration mission called Rapid Revisit Optical Cloud Imager (RROCI) for the purpose of collecting cloud imagery and theater weather imagery in support of the Air Force's Electro-Optical/Infrared (EO/IR) Weather System (EWS) OT-1a prototype program. This demonstration mission assists in addressing the continuity of satellite data and the Space-Based Environmental Monitoring (SBEM) gaps.

The RROCI mission is a 12U CubeSat mission with team members from Atmospheric and Space Technology Research Associates, Pumpkin Space, Science and Technology Corporation, and Lockheed Martin. The RROCI spacecraft is designed to approach the complex challenges of large scale, global observations of weather imagery. RROCI is a demonstration mission that will provide the initial capability characterization of a suite of cameras, lenses, and filters to support a future constellation mission. The measurements taken from the RROCI spacecraft will be compared against currently orbiting weather instrument satellites, such as VIIRS and MODIS.

The RROCI mission is slated for launch in March 2022, with frequency licensing required no later than January 1, 2022. The baseline operational plan will be a year of on-orbit operational lifetime after deployment from a rideshare rocket, nominally inserted into a 500-600km circular orbit in a morning/afternoon Sun Synchronous Orbit (SSO). After conclusion of the nominal operations, the RROCI satellite will be de-orbited passing down to 300km altitude through its lifetime.

The RROCI CubeSat utilizes a combination of an S-Band uplink / X-Band downlink radio (Xlink) provided by IQ Spacecom and an S-Band downlink radio (AstroSDR) provided by Rincon. The RROCI spacecraft will communicate with the KSAT-Lite global ground station network, with uplink licenses filed at each site used by KSAT.

b. A showing that the communications facilities requested are necessary for the research project.

The high-speed telemetry requirement of RROCI requires the use of facilities such as the KSAT-Lite global ground station network in order to operate at the 100 Mbps downlink rate. This FCC license covers the transmission of high-resolution research telemetry from the RROCI CubeSat to the KSAT-Lite stations.

c. A showing that existing communications facilities are inadequate

The satellite has not been launched. The downlink communication links (S-Band, X-Band) from satellite to ground must be licensed independently of the uplink link from ground to satellite provided by KSAT.