

This document summarizes the research by Rochester Institute of Technology (RIT) to conduct operations using a synthetic aperture radar (SAR) in accordance with FCC regulations.

The Digital Imaging and Remote Sensing (DIRS) Laboratory is a research group inside Rochester Institute of Technology and serves as a focal point for remote sensing research and education.

The DIRS Laboratory focuses on the development of tools to extract information about the Earth from aerial and satellite imaging systems with an emphasis on the application of science and engineering to solving end-to-end remote sensing problems using a systems engineering approach. This includes design and development of imaging instruments, developing algorithms to extract information from remotely sensed systems and measurement, and modeling of the physical phenomena associated with the formation of remotely sensed images.

The DIRS Laboratory, formed more than 30 years ago, is housed within the Chester F. Carlson Center for Imaging Science, an academic unit within RIT's College of Science, and has about 40 graduate students conducting research who are supported by nine faculty and 12 full-time research and administrative staff. DIRS also has on-going research partnerships with multiple federal agencies, large and small companies, and other academic institutions.

The Unmanned Aerial Systems (UAS) Research Laboratory is focused on the design, engineering, and implementation of multimodal imaging systems, calibration techniques, and processing algorithms to provide the highest quality data with which to solve problems in the fields of precision agriculture, infrastructure inspection, and wildlife management.

The desired license is for operation of a Ku-band SAR from a small DJI Matrice 600 drone (UAS). The SAR instrument radiation pattern will be oriented for imaging the ground near the location of the drone vehicle. All operations will be below the FAA's maximum allowable altitude of 400' above ground level (AGL).

Imaging research using this instrument will be in support of RIT's educational program and US government sponsored grants from the USDA, DoD and others.

a) University

The Rochester Institute of Technology (RIT) in Rochester, NY is a well-known ABET accredited university with a graduate research program in engineering.

b) Institutional Processes

RIT has the institutional processes to monitor and effectively manage a wide variety of research projects. In FY 2018, RIT had secured \$78M in sponsored research funding with 94 current researchers having achieved over \$1m or more in sponsored funding since 2000.

Specifically within RIT's Remote Sensing Lab within the Center for Imaging Science (operator of the UAS), we conduct approximately \$3M per year in remote sensing research focused on imaging the earth's environment in the visible, near

infrared, and thermal infrared (and now RF) spectral regions. We use modeling tools, field measurements, and synthetic image generation to understand how remotely sensed data can be used to study environmental processes and provide security.

