

February 24, 2020

FCC Office of Engineering and Technology  
445 12th Street SW Washington, DC 20554

SUBJECT: CUTE cubesat mission (FCC application # 0085-EX-CN-2020)

Please find details on the CUTE cubesat mission included below.

Date license is required: July 1<sup>st</sup>, 2020

LV integration date: October 1<sup>st</sup>, 2020

Launch date: ELaNa 24 with LandSat January 14<sup>th</sup>, 2021

Date for initiation of on-orbit operations: January 14<sup>th</sup>, 2021

Expected mission duration: 12 months base

Principle Investigator for the mission.

Point of Contact Name: Kevin France  
Organization Name: University of Colorado  
Address: 1234 Innovation Dr., Boulder, CO  
E-Mail: Kevin.France@Colorado.edu  
Telephone Number: 303-492-1429

Technical point of contact for the mission.

Point of Contact Name: Rick Kohnert  
Organization Name: University of Colorado  
Address: 1234 Innovation Dr., Boulder, CO  
E-Mail: kohnert@colorado.edu  
Telephone Number: 303-492-6804

\*please also include Kevin France on any relevant communications.

Point of contact who can terminate ALL satellite transmissions if interference is detected.

Point of Contact Name: Rick Kohnert  
Organization Name: University of Colorado  
Address: 1234 Innovation Dr., Boulder, CO  
E-Mail: kohnert@colorado.edu  
Telephone Number: 303-492-6804

\*please also include Kevin France on any relevant communications.

Point of contact who can terminate ALL Boulder CO ground station transmissions if interference is detected.

Point of Contact Name: Rick Kohnert  
Organization Name: University of Colorado  
Address: 1234 Innovation Dr., Boulder, CO  
E-Mail: kohnert@colorado.edu  
Telephone Number: 303-492-6804

\*please also include Kevin France on any relevant communications.

Point of contact who can terminate ALL Fairbanks AK ground station transmissions if interference is detected.

Point of Contact Name: Rick Kohnert  
Organization Name: University of Colorado  
Address: 1234 Innovation Dr., Boulder, CO  
E-Mail: kohnert@colorado.edu  
Telephone Number: 303-492-6804

\*please also include Kevin France on any relevant communications.

Point of contact for conjunction alerts.

Point of Contact Name: Rick Kohnert  
Organization Name: University of Colorado  
Address: 1234 Innovation Dr., Boulder, CO  
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\*please also include Kevin France on any relevant communications.

### Project Description

The Colorado Ultraviolet Transit Experiment (CUTE) will have a 1-year mission life time and plans to launch in early 2021. The mission goal is to train and educate students while conducting scientific research. The onboard science instrument uses near-ultraviolet (NUV) transmission spectroscopy from 255 to 330 nanometers (nm) to characterize the composition and mass-loss rates of exoplanet atmospheres. CUTE measures how the NUV light from the host star is changed as the exoplanet transits in front of the star and passes through the planet's atmospheres. CUTE's spectrally resolved lightcurve will provide constraints on the composition and escape rates of these atmospheres, and may provide the first concrete evidence for magnetic fields on extrasolar planets.

## License Details

The CUTE mission will utilize a SpaceQuest TRXU UHF radio operating a half-duplex uplink and downlink at 437.250MHz. CUTE will also include a Blue Canyon Technologies SDR-S S-band radio operating at 2402MHz that will be used as a data transmitter nominally operating at 1Mbps. Both frequencies have been coordinated with the IARU (see attached coordination letter).

Additional data required for applications requesting use of federal or shared government frequencies.

## Spacecraft: CUTE

Non-geostationary satellite

Inclination: 97.598° Apogee: 550 km Perigee: 550 km

Orbital period: 95.65min

Number of satellites in the system: 1

Number of transmitting satellites: 1

Number of transmitting satellites: 1

### Transmitter #1 (UHF)

Center Frequency: 437.250MHz

Bandwidth: 30kHz

3dB beamwidth: 300° (Maximum Antenna Gain: 2dBi)

Polarization: Linear

Maximum transmit power: 2W

Modulation: GMSK

ITU emission designator: 30K0G2DAX

### Transmitter #2 (S-band)

Center Frequency: 2402 MHz

Bandwidth: 1MHz

3dB beamwidth: 80°

Maximum Antenna Gain: 6.8dBi

Polarization: RCP

Maximum transmit power: 2W

Modulation: BPSK

ITU emission designator: 1M00G2DAX

### Receiver #1 (UHF)

Center Frequency: 437.250MHz

Bandwidth: 30kHz

3dB beamwidth: 300° (Maximum Antenna Gain: 2dBi)

Polarization: Linear  
Receiver Sensitivity: -110dBm  
Modulation: GMSK  
ITU emission designator: 30K0G2DAX

Ground Station #1:

Boulder, CO 80309  
40°00'31.6"N, 105°14'51.0"W  
Altitude above MSL [m]: 1588  
Antenna height above ground [m] : 3 above roof top.  
Elevation: 5-90° (min V00 for UHF and V10 for S-Band) Azimuth: 0-360°

Transmitter #1 (UHF)

Center Frequency: 437.250MHz  
Bandwidth: 30kHz  
3dB beamwidth: 21°  
Maximum Antenna Gain: 21dBi  
Polarization: RCP  
Maximum transmit power: 500W Modulation: GMSK  
ITU emission designator: 30K0G2DAX

Receiver #1 (UHF)

Center Frequency: 437.250MHz  
Bandwidth: 30kHz  
3dB beamwidth: 21°  
Maximum Antenna Gain: 21dBi  
Polarization: RCP  
Receiver Sensitivity: -110 dBm  
Modulation: GMSK  
ITU emission designator: 30K0G2DAX

Receiver #2 (S-band)

Center Frequency: 2402MHz  
Bandwidth: 1MHz  
3dB beamwidth: 2.1°  
Maximum Antenna Gain: 38dBi  
Polarization: RCP  
Receiver Sensitivity: -110dBm  
Modulation: BPSK

ITU emission designator: 1M00G2DAX

Ground Station #2:

Fairbanks, AK 99709

64°47'39.14"N 147°43'10.91"W

Altitude above MSL [m]: 142

Antenna height above ground [m] : 5.5m

Elevation: 5-90° (min V05) Azimuth: 0-360°

Transmitter #1 (UHF)

Center Frequency: 437.250MHz

Bandwidth: 30kHz

3dB beamwidth: 21°

Maximum Antenna Gain: 18dBi

Polarization: RCP

Maximum transmit power: 500W Modulation: GMSK

ITU emission designator: 30K0G2DAX

Receiver #1 (UHF)

Center Frequency: 437.250MHz

Bandwidth: 30kHz

3dB beamwidth: 21°

Maximum Antenna Gain: 18dBi

Polarization: RCP

Receiver Sensitivity: -110 dBm

Modulation: GMSK

ITU emission designator: 30K0G2DAX