



**Space Dynamics**  
LABORATORY  
Utah State University Research Foundation

# FCC FORM 442: Exhibit A

## CIRiS Research Project Description

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**Submitted By:**

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## **1. INTRODUCTION**

The Space Dynamics Laboratory (SDL) submits this document as Exhibit A of FCC Form 442 in response to question 6: Description of Research Project.

## **2. OVERVIEW**

The Compact Infrared Radiometer in Space (CIRiS) is a thermal infrared radiometric imaging instrument under development by Ball Aerospace for a Low Earth Orbit mission on a CubeSat spacecraft. Funded by the NASA Earth Science Technology Office's In-Space Validation of Earth Science Technology (InVEST) program, the mission objective is technology demonstration for improved on-orbit radiometric calibration. The CIRiS calibration approach uses a scene select mirror to direct three calibration views to the focal plane array and to transfer the resulting calibrated response to earth images. The views to deep space and two blackbody sources, including one at a selectable temperature, provide multiple options for calibration optimization. Two new technologies, carbon nanotube blackbody sources and microbolometer focal plane arrays with reduced pixel sizes, enable improved radiometric performance within the constrained 6U CubeSat volume. The CIRiS instrument's modular design facilitates subsystem modifications as required by future mission requirements. CubeSat constellations of CIRiS and derivative instruments offer an affordable approach to achieving revisit times as short as one day for diverse applications including water resource and drought management, cloud, aerosol, and dust studies, and land use and vegetation monitoring. Launch is planned for 2018.

## **3. CONCEPT OF OPERATIONS**

CONOPS: After deployment from the host vehicle, the spacecraft will deploy solar arrays and enable communications. The UHF Radio will be activated and able to transmit but still only upon command from the ground. For the first few passes the ground station operators will attempt communications to perform checkouts of the spacecraft. Several days after launch, payload tests will begin and continue for 3-9 months.