# PRCUNAR-2 Satellite Mission Technical Description

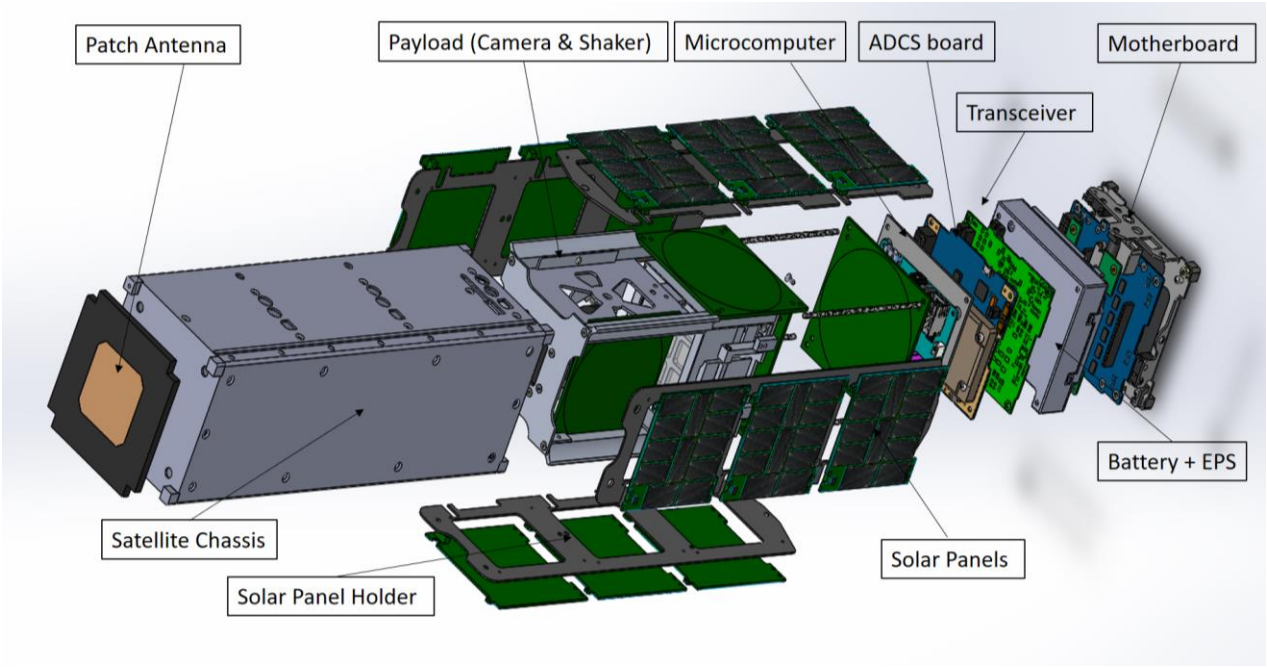
The overall goal of the PRCUNAR-2 mission is to increase understanding of the outcomes of relevant collisions among millimeter-sized particles, or "pebbles", in a protoplanetary disk.

The satellite will be launched on SpaceX-22, currently scheduled for No Earlier Than April, 2021. It will be inserted into orbit from the ISS via the NanoRacks CubeSat Deployer (NRCSD) on an inclination of 51.6° from the equator.

Transmission will begin 30 minutes after deployment from the ISS, and cease no more than 12 months later. Atmospheric friction will slow the satellite and reduce the altitude of the orbit, until de-orbiting occurs no more than 13 months after launch. See the Orbital Debris Assessment Report for details.

PRCUNAR-2 is a ***3***U CubeSat, with the dimensions of ***3*** stacked 10 cm X 10 cm X 10 cm CubeSat modules (giving an overall dimension for each satellite of 10 cm X 10 cm X ***34*** cm.) The total mass is about 3 kg.

**Figure 1 PRCUNAR-2 Spacecraft**




The satellite contains the following systems: Attitude Determination, Control and Navigation, Command and Data Handling, Communications, Electrical Power, Structure and payload.

**Attitude Determination, Control and Navigation Subsystem (ADCNS):**

The PRCuNaR2 uses a Passive Control System that uses a permanent magnet to align the CubeSat with the earth's magnetic field and a paramagnetic material to adjust the rotation. For navigation, it has an IMU with which you can determine the satellite's attitude, determine when the satellite is stable, and perform the scientific experiment.

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**Command and Data Handling (CDH) Subsystem:** This System is composed of the flight computer board Rev. D from pumpkin Inc. The flight computer board is responsible for coordinating when each subsystem must perform its task.

**Communications Subsystem (COMMS):** It is composed of an ARV radio from the aerospace corporation Inc that works at a downlink and uplink frequency of 914.7 MHz and using a patch antenna.

**Electrical Power Subsystem (EPS)**: It is composed of an array of 12 solar panels located on the X + and -, Y + and - faces. With a Power Module Type I with 3 battery packs (31.2 Wh power capacity) and EPS module from Endurosat.

**Structure Subsystem:** The experiment will be housed in a 3U CubeSat frame 6061 aluminum structure from Pumpkin Inc.

**Payload:** The scientific payload consists of: (1) the experiment test cell (ETC) subsystem, and (2) a camera system to record high-frame-rate video of the collisional evolution of the test particles. The scientific portion of the satellite occupies approximately 1U of the total satellite volume.