The project is to design, build, and test a NanoSat Ground Test Platform. The objective is to facilitate testing of attitude control system performance of small spacecraft, up to the 6U configuration, in a situation that closely approximates the environment in which they will be deployed. The features must include:

- Full motion in three rotational degrees of freedom while being constrained in three translational degrees of freedom. This allows verification of recovery from an initial deployment tumble and operational scenarios for constant spinning applications.
- Minimal addition of inertia to that of the NanoSat itself. This allows testing with unaltered control system gains for performance that will closely anticipate that on-orbit.
- Apparatus to adjust the center of gravity of the supported spacecraft to coincide with the center of rotation. This minimizes disturbance torques that must be counteracted by the attitude control system while operating in either the three-axis stabilized or spinning mode.
- Electronics to determine attitude to the test article and enable balancing. As a minimum:
  - Sense triaxial acceleration
  - Sense triaxial magnetic field
  - Communicate sensor telemetry to a remote transceiver
  - Operate on battery power
- Visibility for optical sensors to view a target or scene generator. This capability may have a restricted amount of rotational motion that provides an unobstructed view.

A surrogate 6U test unit is needed to demonstrate operation and balancing performance independent of the eventual test article. The mechanical requirements are to provide a standard CubeSat interface and to adjust the center of gravity over the range acceptable for the deploying device. The surrogate could optionally have the functionality of a basic NanoSat with capability to:

- Operate on battery power
- Use the sensors and transceiver from the balancing electronics
- Drive a triad of magnetic torque rods
- Drive a triad of reaction wheels
- Control attitude by either an on-board or remote processor

These features provide the minimal test platform for the NanoSat control actuators and sensors to interact with the ambient magnetic field. The desirable extension of the test platform is an apparatus that:

- Cancels the ambient magnetic field and creates a field in an arbitrary direction in the vicinity of the center of rotation. The field stimulates magnetometers, used for an attitude reference, and interacts with magnetic torque rods used for attitude control.
- Either displays a scene or illuminates the spacecraft with collimated light at an arbitrary radial direction from the center of rotation. The objective is to stimulate attitude sensors with a source that appears at “infinite” distance.

Further, it is desirable to drive the magnetic field by computer control. This simulates changing conditions with orbital position. This capability should be considered as a design option even if not undertaken for the prototype.