Feasibility Analysis: Lego satellites

I have listed below the best of the sensors and actuators that are available in the market. These have been taken from our literature survey report. Since this is a technology demonstration, we can choose our design parameters as long as they satisfy the achievable limit.

- GPS

  - Present accuracy: ± 20m

- Star tracker

  - Advantages
    * Only 1 needed, hence reducing complexity and error build-up (this itself can be a tech demo of sorts)
    * Always functional, no interference with albedo and such
    * 5 Hz update rate
    * 0.5 U size, 7-24 arc-second accuracy
    * Can also be used to measure angular rates, by using star smeared in the image and calculating it's radius of curvature, and thus removing need of gyro

  - Disadvantages
    * Gets disturbed by stray light. More than 1 might be needed in this case
    * Problematic during detumbling

- Active control dataset packages

  - 0.003^o pointing accuracy, 0.5W power consumption, 0.5U size
  - Sensors and actuators included
    * Magnetometer
    * IMU
    * Sun sensor
    * 3 reaction wheels
    * 3 torque rods

- Other instruments that might be needed

  - Normal Cameras
  - Infrared Cameras
  - Lights/Bulbs - In case we are going to do advertisements, or vision based inter-satellite distance measurement.