1. TSUBAME Mission

**TSUBAME** has 3 missions:

- X-ray polarimetry for GRBs (Science mission)
  - Demonstration of high-speed attitude control with Control moment gyroscopes (CMGs)
  - Visible earth observation using small camera

**TSUBAME** has 5 gamma-ray counters.

2. BUS System

**Size**: 50 x 50 x 47 cm³
**Mass**: 50 kg
**Orbit**: 600 km (Sun Synchronous)
**Launch**: No sooner than Oct 2014

**Electrical Power Supply (EPS)**
- Cell: InGaP/InGaAs/Ge
- Power: 134 W (EOL)
- Battery: Li-Polymer

**Command & Data Handling (C&DH)**
- Tx: S-band (BSPK-100 bps)
- Rx: VHF AFSK-1200 bps

**Attitude Determination and Control Systems (ADCS)**
- Actuator: Control Moment Gyro. / Magnetic Torquers
- Sensor: Gyro (MEMS/FOG), Sun Sensor, Magnetometer, Star Tracker, GPS

3. Hard X-ray Compton Polarimeter (HXCP)

Linearly polarized photons tend to be scattered perpendicular to the polarization plane. HXCP measures GRB polarization using this angular dependence.

4. Wide-field Burst Monitor (WBM)

WBM consists of five detectors mounted on the five faces of the satellite. Monitoring the count rate, it detects GRBs and determines the position of the GRB with an accuracy of ~ 5 deg.

5. Trigger System

To detect GRBs on board CPU checks the variation of gamma-ray count rate every 125 msec. WBM employs 4 trigger systems with different time constants which covers short GRBs and long GRBs simultaneously.

6. Operation

**TLE**
- SAA map, known source coordinate, ground station coordinate, trigger mode, etc...

**Graphical command check sheet for TSUBAME**
- Check by eyes
- Command (HEX, ~2 kbyte)
- Uplink via FM 140MHz band

**Downlink**
- Observation data 6 M Byte / GRB via S-band
- HK data 72 Byte / frame via FM (430 MHz band)

7. Integration Test

In Aug 2014, we assembled TSUBAME and performed an integration test. We operated TSUBAME continuously during ~2 weeks, and fixed all bugs. We successfully operated all the sequence.

The development of TSUBAME was almost finished. **TSUBAME** will be launched in **Oct 2014** or later.