SAT$^2$

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Mission Statement

- Develop a small student built satellite for the purpose of tracking animals
- Demonstrate innovative satellite technologies that will not interfere with the primary purpose of the satellite
Mission Objectives

• **Primary Objectives**
  – Tracking of transmitter equipped animals
  – Low cost
  – Simple

• **Secondary Objectives**
  – Demonstrate new satellite technology
  – Political tool for AAE department/Purdue
Possible Customers

• Animal Tracking
  – Endangered Species Tracking
    • Hyenas in Kenya
    • Contact: Kay Holekamp, Michigan State University
  – Livestock Tracking
  – Pet Tracking

• Technology Demonstration
  – Batteries
  – Solar Panels
    • PowerSphere, Aerospace Corporation???
Communications

- Uplink GPS telemetry from transmitters
  - HVF frequency range: 140-175 MHz
  - VHF beacon life: Over 2 years
- Downlink data to various ground stations along orbital path, including Purdue.
- Omni-directional Antenna
- Total Communications Payload Size: 20x20x20 cm³
SAT² Specifications

• Mission Design
  – 400-600 km near polar orbit preferred
  – Life: 2-3 years

• Power
  – NiCd Batteries
  – Solar Panels

• Thermal Control
  – Passive Thermal System
  – Temperature Range: -45°C to 85°C
• No Propulsion
• Attitude Control
  – Magnetic Torquer / Magnometer
• Command and Data Handling
  – On the ground post-processing
  – Minimum 16 bit processor, 512 Kbytes SRAM, and 64 Kbytes ROM
Mission Restrictions

- **Launch Restrictions**
  - Max. Dimensions: 45x45x45 cm$^3$
  - Max. Mass: 50 kg
  - Min. Orbit Inclination: 40 degrees

- **Power**
  - Transmission: 1.5 A
  - Receiving: 60 mA