TU WIEN

ST Space Team

Project GECKO
GEneric Cansat Kit One

Space Team of the
Vienna University of Technology

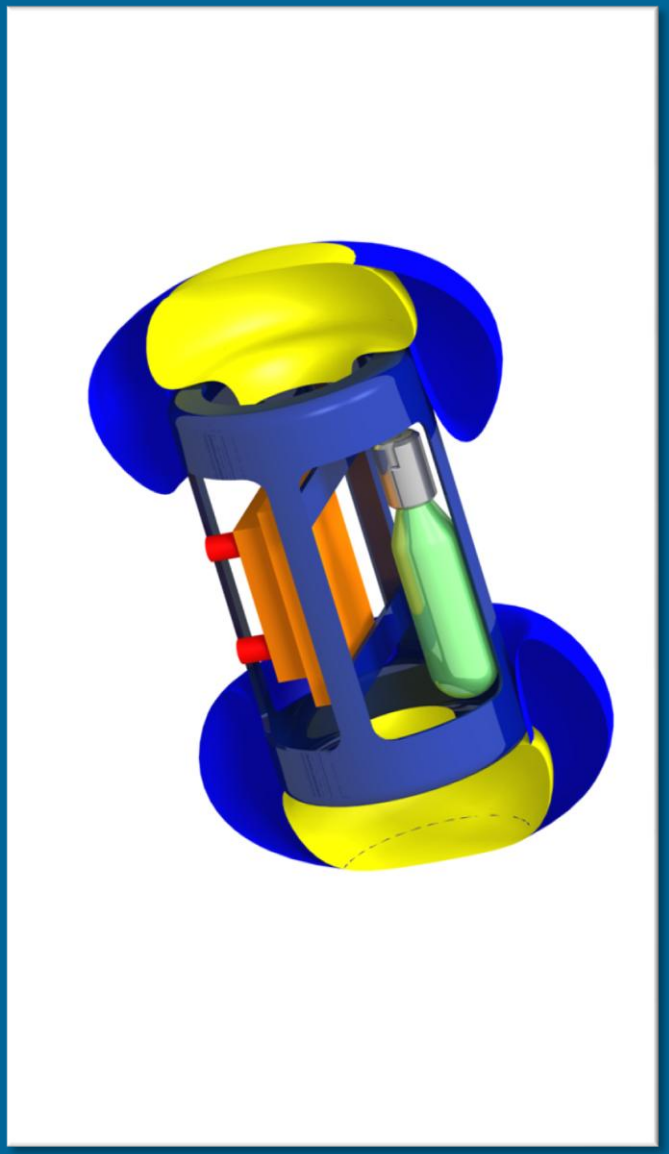
"To boldly go where no student has gone before."

Goals

- Create a modular, easily modifiable platform for CANSAT missions
- Design modules which can be used in a strictly volume/weight-constrained CANSAT and the harsher environment of the Space Team Rocket 01
- Land safely using an airbag

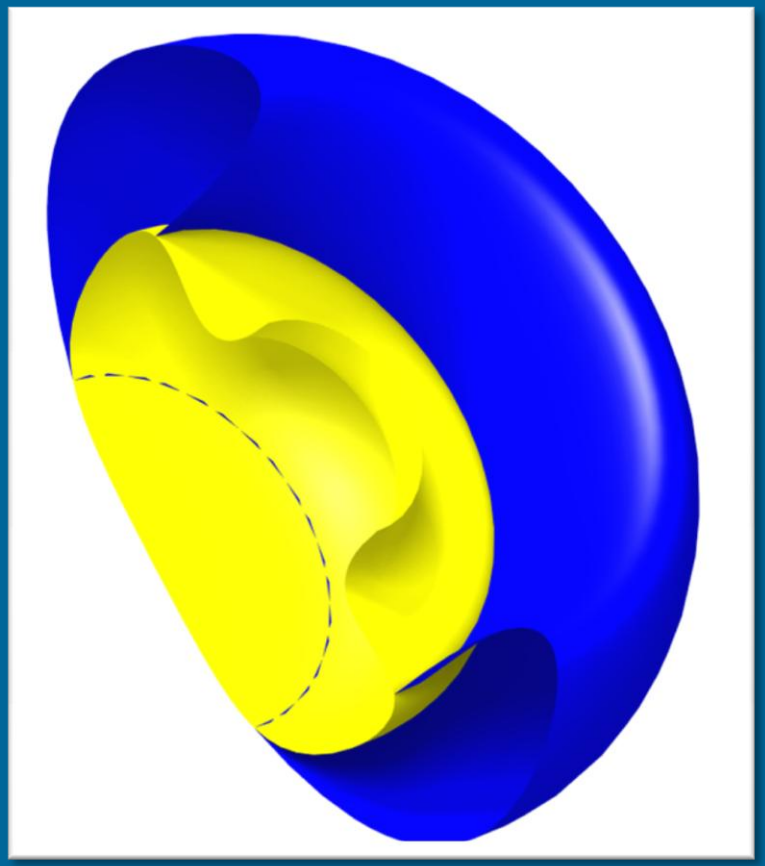
Mechanical Concept

- Sideways descent possible for increased sensor area towards the ground
- Empty volume from top to bottom for big mission-specific modules
- Composite housing for lightweight purposes



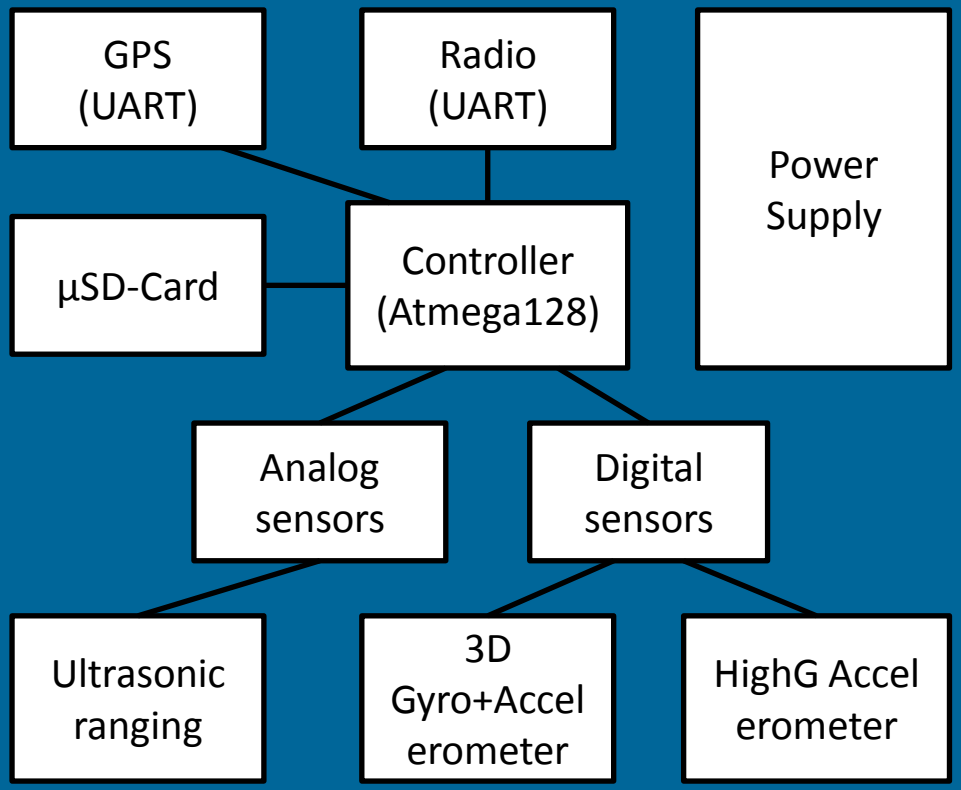
Airbag

- Bar-Bell shape prevents ground collision of the CANSAT while minimizing internal airbag-volume
- Pressure supply with NO2 gas cartridge
- Deployment via fast-melting membrane



Electrical Concept

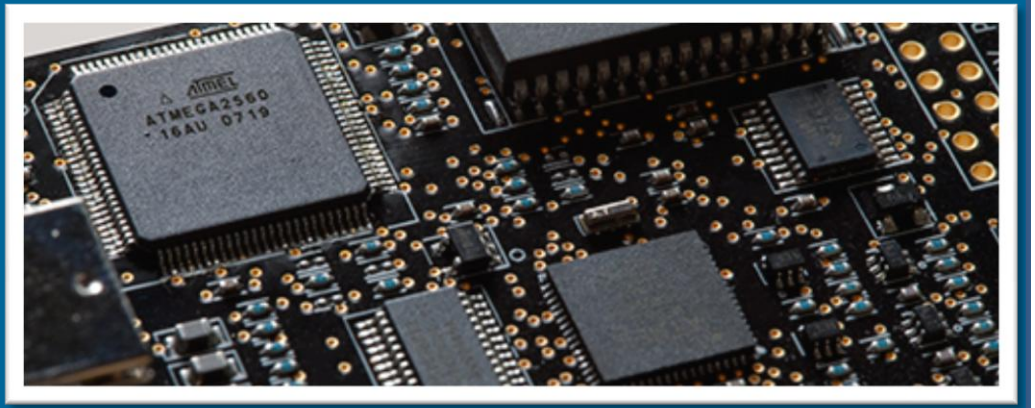
- **Central controller provides a multitude of digital interfaces and data storage for maximum versatility**
- **I²C-Bus and SPI-Bus easily extensible**



Controller

- ATmega128 provides a low-power 16MHz µC-solution with enough processing power for most missions

- data storage provided by a MicroSD-slot for several GB of nonvolatile memory and fast refitting



- GPS

➢ **Navilock NL-550:**

integrated antenna
high sensitivity
4Hz RS-232 data output

➢ Position data to be transmitted via telemetry to aid in recovery

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Sensors

3D Accelerometer + 3D Gyroscope

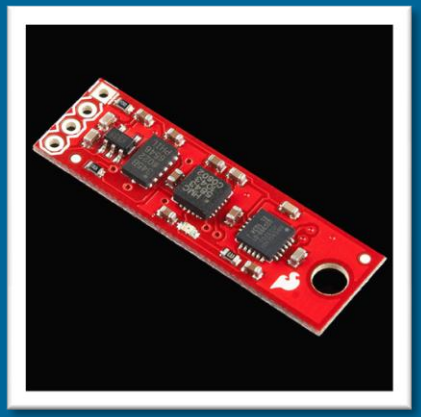
Accurate measurement of the CANSATs orientation and acceleration to measure the forces during descent and landing

3D Magnetometer

to compensate for drift-effects

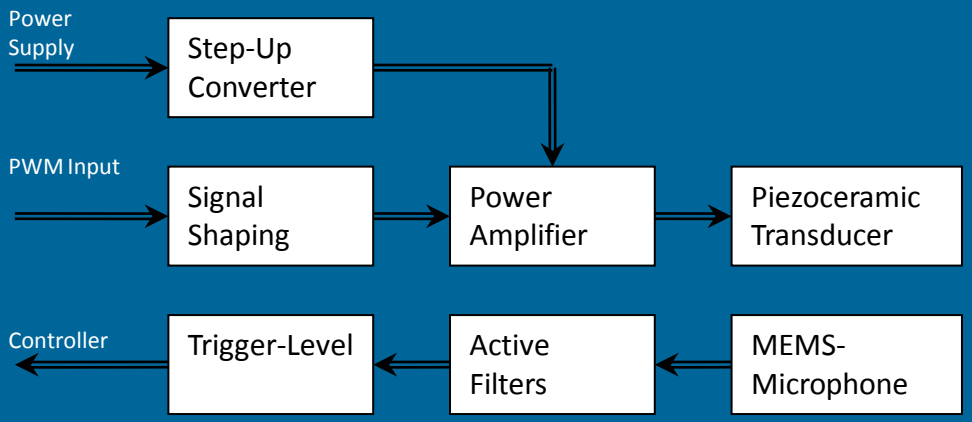
High-G Accelerometer

Detailed measurement of the forces during ground impact and parachute deployment



Sensors

- Ultrasonic Ranging Distance measurement based on time-of-flight of echo
- Trigger-Level TOF measurement provides a more compact, although less accurate, implementation than correlative methods



Measurements

- **During Flight:**

  GPS + Low-Bitrate Accelerometer/Gyroscope Measurements via telemetry

- **Post Flight:**

  Detailed analysis of the forces during parachute deployment and during the airbag landing

- **Analysis:**

  will be done in MATLAB, visualisation will utilize LabVIEW and <Google Earth>

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Current Status

Controller:	**working prototype**
GPS:	**working prototype**
Ultrasonic Ranging:	**testing transceivers**
Airbag:	**prototyping**