Video Acquisition System

- **Purpose:** connect and mount cameras to acquire images
- **Inputs:**
  - Light from objects
  - Camera selection from vision computer
- **Outputs:**
  - NTSC video
- **Notes:**
  - Cameras w/ NO brightness compensation
  - Video switch
Data Conditioner

- **Purpose:** filter sensor data for the computers
- **Inputs:**
  - Compass w/ tilt compensation (Precision Navigation TCM2-50)
  - Speedometer
  - GPS
  - Gyro
- **Outputs:**
  - Main computer
  - Vision computer
- **Notes:**
  - Programming (machine code)
  - Computer interfacing (ports)
  - Custom board
  - Parsed output
Vision Computer

- **Purpose:** video processing to provide obstacle positioning map
- **Inputs:**
  - NTSC video
  - Data conditioner
- **Outputs:**
  - Monitor switch
  - Video switch
  - Light for indicating recognition of an obstacle
- **Notes**
  - Programming (obstacle mapping, drivers)
  - Ethernet link to main computer
  - Matrox Meteor II video acquisition board
Main Computer

- **Purpose:** motion planning and vehicle control
- **Inputs:**
  - Vision computer
  - Data conditioner
- **Outputs:**
  - Monitor switch
  - Speed controller
  - Steering controller
- **Notes:**
  - Programming (motion planning, drivers, status output)
  - Ethernet link to vision computer
Steering Controller

- **Purpose:** achieve desired wheel angle
- **Inputs:**
  - Main computer
- **Outputs:**
  - Interface to steering column
- **Notes:**
  - Programming (machine code)
  - Motor/actuator
  - Steering position sensor
Speed Controller

- **Purpose:** achieve desired speed using voltage regulation
- **Inputs:**
  - Main computer
  - Speedometer
- **Outputs:**
  - Drive motor
  - Braking
  - Forward-backward switch
- **Notes:**
  - Programming (machine code)
  - Custom board interface to existing hardware
  - 5 mph limiter
Data Monitoring

- **Purpose:** output status to remote laptop/PDA screen
  - **Inputs:**
    - Data from main computer
  - **Outputs:**
    - Laptop/PDA screen
- **Notes:**
  - Programming (communication)
  - Wireless TX/RX
Power Distribution & System Connections

- **Purpose**: distribute power and signals
- **Inputs**:
  - Chargers
  - System inputs (to be determined)
- **Outputs**:
  - Powered devices
  - System outputs (to be determined)
- **Notes**:
  - Batteries, power inverters
  - Wires, connectors
  - Mounting (conduit)
  - Protection (interference, surge)
  - Diagrams
E-Stop System

- **Purpose:** emergency stopping

- **E-Stop Button:**
  - Input: screaming judge
  - Output: E-Stop circuit
  - Notes:
    - Red
    - Button diameter >1”
    - Mounting: rear, center, 2-4’ high

- **E-Stop RX/TX**
  - Inputs: wireless transmitter
  - Output: E-Stop circuit

- **E-Stop Circuit**
  - Inputs: button, wireless receiver
  - Outputs: motor cutoff, braking
Chassis Modifications

- Purpose - provide mounting for:
  - Computers: main, vision, data conditioner, monitor switch, monitor, keyboard, mouse
  - Sensors: cameras, compass, gyro, GPS, speedometer
  - Controllers: speed, steering
  - Other: E-Stop circuit, E-Stop receiver, transmitter for data monitoring, video switch
  - Cinder block
  - Rain cover
- Vibration isolators where necessary
- Logos and Stickers
Maintenance & Pit

- Purpose: support at competition
- UCF/STRICOM Poster
- Battery chargers
- Extension cords & power strips
- Mechanical toolbox & tools
- Soldering station
- Spares:
  - Wheels
  - Batteries
  - Other parts to be determined
Verification Courses

- **Purpose:** replicating competition environment
- **Orange and white construction drums**
- **Autonomous:**
  - Grass, pavement, or combination
  - Solid/dashed boundary lines (painted white/yellow)
  - Simulated pot holes (painted white)
  - Simulated sand traps (beige tarp)
  - 5-gallon white pales
  - Green wooden ramp
- **Navigation:**
  - Pavement
  - Light poles
  - Trees
  - GPS map