Coding Guidelines -
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Step 1: Segment transcript into decision discussions

Identifying a Design Decision Discussion: A design decision discussion is conversation about some specific aspect of the design, discussion of some need that implies a change in the design, or discussion of alternatives for a design decision. A decision may also involve discussion of alternatives for the design of a system component, a testing plan related to the decision, or design of testing equipment related to the decision, or the results of tests that bear on the decision.

Coding asides or interruptions of design decision or test discussion: If the interruption itself is not something we code (not a new decision) and is brief, and the conversation following seems to be a continuation of the same discussion then we just include it in the design decision.

Step 2: Code segments with components mentioned

Mobility Effectors / Actuators: These propel the entire robot

- Tracks (treads and wheels)
- Wheels (that drive the tracks)
- Shocks
- Motors, gears for mobility purposes
- Motor controllers - Low level motor controls for robot mobility
- Firmware - Low level software that does low level controls
- HDL (Hardware Description Language - e.g. Verilog or VHDL) files for FPGA (Field Programmable Gate Array) or other reprogrammable motor-driving chips, motor control systems from an electrical engineering perspective
- "Limping home" system effectors
- Flight components - to help it fly! (e.g. helicopter blades)
- Ability to dynamically change features of the mobility system (e.g. change track profile)

Mission Specific Effectors / Actuators: all other moving parts that don't move the robot as a whole - interacting with environment, robotic arms, etc.

- Motors, gears for mission specific purposes
- Motor controllers - Low level motor controls for mission specific functionality
- Firmware - Low level software that does low level controls
- HDL (Hardware Description Language - e.g. Verilog or VHDL) files for FPGA(Field Programmable Gate Array) or other reprogrammable motor-driving chips, motor control systems from an electrical engineering perspective

- Burrowing tools (e. g. giant drill, digging arm in Mars Rover)
- Pan and tilt mechanism for motors(motors, etc.)
- Ability to dynamically adjust shape of chassis (or other non-mobility components)

Sensors:

- Onboard sensor suite, including microphone & speaker
- Ultrasonic, tactile, Radar / Sonar range sensors, & other sensors
- Wiring between sensors & control system
- Visual Camera(s) (still & video)
- Thermal imaging / Smart thermal camera
- Halogen lighting used for camera (conditioning the environment for robot use)
- GPS, compass
- Attitude sensor (comparable to the IMU on the Xprize bot)
- Chemical detectors
- Particle sensors
- Medical monitoring system (to be with a victim until help could arrive)
- Low level sensor processing -
    - Processing computation which is done at the sensor (rather than at a central or more general purpose computing processor)
    - Processing computation done in the pipeline of communication between the sensor and the controller (up to where it is combined with other data - e.g compression for internal use)

Perception (software, and any dedicated hardware):

- terrain mapping
- environmental modeling
- object detection

Planning: software that controls flexible autonomy (fully autonomous is not always, and usually not, desired)

- Navigation / route planning software
- Mission Task Planning (e.g. deciding when and where to take pictures and video on the moon, deciding when and where to charge its batteries, etc. - X-Prize)
    - Search protocol seems to be discussed almost as if it's equivalent to a separate part

General purpose (or shared) **hardware**:

- Onboard computer, "Limping home" system controller,
- Non-volatile data storage: "Black box" data recording - commands and video
- Avionics box (X-Prize)

Structure: physical static structures

- Chassis/primary structure
- Fasteners (e.g. Frangibolt, shape memory attachments, weld joints, etc.)
- Docking components and ports
- Payload
- Portability - and any particular components (hinges, straps, etc) designed to make the robot easy to carry
- Tether for physical connection

- Protection of the structure from specific environmental hazards - *(note: component-specific protections go with whatever component they protect)*
    - Water resistance/waterproofing
    - Thermal coating, thermal glass (X-Prize)
    - Dust mitigation (X-Prize)

Power:

- Batteries
- Switches
- Power hub
- Connections between battery and robot
- Chargers
- Solar cells or other power generation devices
- Wires for power

Communications:

- Communications for mission objectives: 2-way audio
- Communications for control: commands, operator/display interface
- Communications infrastructure for external communication (not functionally distinguished):
    - Wireless (or wired) communications
    - Compression software (data modulation or processing),
    - Wireless Ethernet base units
    - Tether (wires for external communications functions e.g. talking to the lander)

Internal Relations - Project management, group process, task assignment

- Program Management - HR and tasks generally need to manage the team, payroll. Hiring new people, letting people go. ITAR/security clearance related issues and how to handle classified data fall in here too. I have also adding stuff regarding training people to take up say the Vac Chamber activities.
    - Leadership / tone-setting - clarifying norms
    - General feedback about performance
    - Division of labor - task assignment
- Team Collaboration (Tools, Research) - I'm assuming this relates to us, also Google Sites, mailing lists, etc. Configuring or integrating tools to share data.
- Team Collaboration Process - meeting scheduling, change in their practices, tools, communication plans (quad charts to highlight based all hands meeting, new teleconference, etc.)

External Relations - Acquiring external resources, publicity, media relations

- Team Representation Media - Creation of or discussion of Blogs, Videos, Website, Posters, Photos, T-Shirts: for external audiences
- Enterprise/Business Support - Investor relationships, business modeling, future revenue streams, grant writing