

# MCTX3420 Team 4: Progress Report #11

Jeremy Tan, Sam Moore, Rowan Heinrich, Callum Schofield, Justin Kruger, James Rosher

## Work Done:

1. GUI Design
  - a. Started implementation of graph page in new GUI with selectable axes
    - i. Can plot sensors against actuator values (or other sensors), not just time.
    - ii. Can select the time ranges to plot.
  - b. Designed/Implemented data download page and help page
  - c. Begun Merging GUI into a unified design
2. Refactor Sensors/Actuators code
  - a. Previously sensors/actuators were controlled through a single function using a switch statement
  - b. This has been redesigned (modularised) to simplify the design and addition of sensors/actuators
    - i. A sub folder each for all sensors/actuators.
    - ii. Each *type* of sensor/actuator is implemented in a .h and .c file
    - iii. 1 function (sensor: Read, actuator: Set) *must* be implemented
    - iv. 3 functions (Initialisation, Cleanup, Sanity Checks) are optional
    - v. Sensor\_Add or Actuator\_Add called at initialisation to add the device to the software
  - c. Sensors/Actuators can now be selected by *name* in the API not just their *id* (although this is slower)
  - d. The sampling rate of Sensors can be set using the server API
  - e. Actuators can now be controlled with a piecewise step function (not just setting a single value).
    - i. Specify the start value, time to wait on each step, amount to change the value each step, and total number of steps.
3. Failed to resolve problem with ADC reading occasionally failing
  - a. Wrote single threaded test program to determine if the problem is related to multithreading
    - i. Problem still occurs. This appears to be an issue with the BeagleBone linux kernel driver.
  - b. Storing timestamps in software and designing algorithms to deal with a non constant sample rate is the only solution (doesn't require modifications to software, as we already store the timestamp).
4. Got the C170 webcam and the USB Microscope to work in OpenCV
  - a. Both suffer from the same issues with the driver. Need to use a reduced resolution (352x288).
  - b. Improved dilatometer test algorithm including modelling can expansion (with noise)
5. Login and Authentication
  - a. UWA has yet to respond about permission to query the LDAP server (pheme)
  - b. Explored use of PHP for creating and maintaining a unix style authentication file (plain text)
    - i. No modifications to the server API needed. Some amount of boilerplate PHP required.
  - c. Explored use of django for creating and maintaining a database of users
    - i. Infeasible modifications to the server needed; python function needs to be called from within our C server program to access the database.

## Work Todo:

1. GUI Design
  - a. Fix issues with new Graph page
    - i. Issue with clearing the JavaScript timeout when the axes are changed - graph crashes
    - ii. Variables do not maintain the same colour when the axes are changed
    - iii. Graph needs labelling. Add a second Y axis to plot variables with different units.
  - b. Continue development of Control page (set pressure, specify sampling rates, etc)
  - c. Continue development of Data Download page
  - d. Merge all code into a unified web system
2. Login and Authentication
  - a. Server program needs modification to keep track of who owns an experiment and user permission level.
3. Microscope and dilatometer
  - a. Continue to improve dilatometer algorithm
  - b. Add dilatometer to the software as a Sensor
  - c. If possible, take a higher resolution image using external software and pass to OpenCV
4. Sensors: Add pressure sensors to software and collaborate over calibration