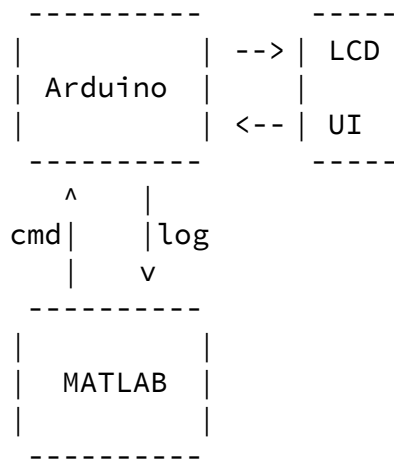*Needles in Ultrasound* **Project Nick van de Berg, Delft University of Technology**

User Interface and Serial Communiction codes
v1.2 16 November 2018

diagram:

```
     ----------        -----
    |          | --> | LCD |
    | Arduino  |     |     |
    |          | <-- | UI  |
     ----------        -----
       ^      |
    cmd|      |log
       |      v
     ----------
    |          |
    |  MATLAB  |
    |          |
     ----------
```

operation:
- set rotation angle and speed with buttons and LCD
- or: set rotation and speed over a serial link, e.g. from serial host (e.g. MATLAB)
- start and stop of movement with buttons, or by serial command from serial host
- Arduino logs over serial connection with event IDs (e.g. start, stop, settings programmed)

event-ID's:

    100   <millis>   power on
    101   <millis>   motor on
    102   <millis>   motor off
    103   <millis>   motor stop requested
    104   <millis>   stepper disabled

    120   <millis>   serial synced

    150   <millis>   main menu
    151   <millis>   zero position mode
    152   <millis>   position mode
    153   <millis>   speed mode
    154   <millis>   speed and position mode
    155   <millis>   external mode

    161   <millis>   move to 0
    162   <millis>   make current position new 0

    171   <millis>   position set to,<pos>
    172   <millis>   speed set to,<speed>

    901   <millis>   impossible mode

serial commands:

    !   sync byte from serial host
    M x v   move (to_this_pos_x[d°], with_this_speed_v[d°/second])
    V v   move (inf, with_this_speed_v[d°/second])
    C1   control(start): start movement
    C0   control(stop): stop movement
    C5   control(zero): make current position the new 0-position
    C9   control(release): disable stepper to move motor around freely