Current Sweep Test (5/3/2023)

Purpose: This test is done to visualize and find the full range of current from the prototype generator into a 250 ohm load. It is also done to test the isolated voltage and current sensor when it is integrated into the system.

Description: First, the generator is brought to max RPM using the throttle servo control. The current is measured with the in-system current sensor and with a multimeter current sensor. Next, the generator is swept from min throttle to max throttle and the current is logged from the system current sensor and plotted using python. The data is logged using a serial transmission from the controller and Teraterm.

Results:

Table 1: Comparison of in system current sensor to hall effect multimeter

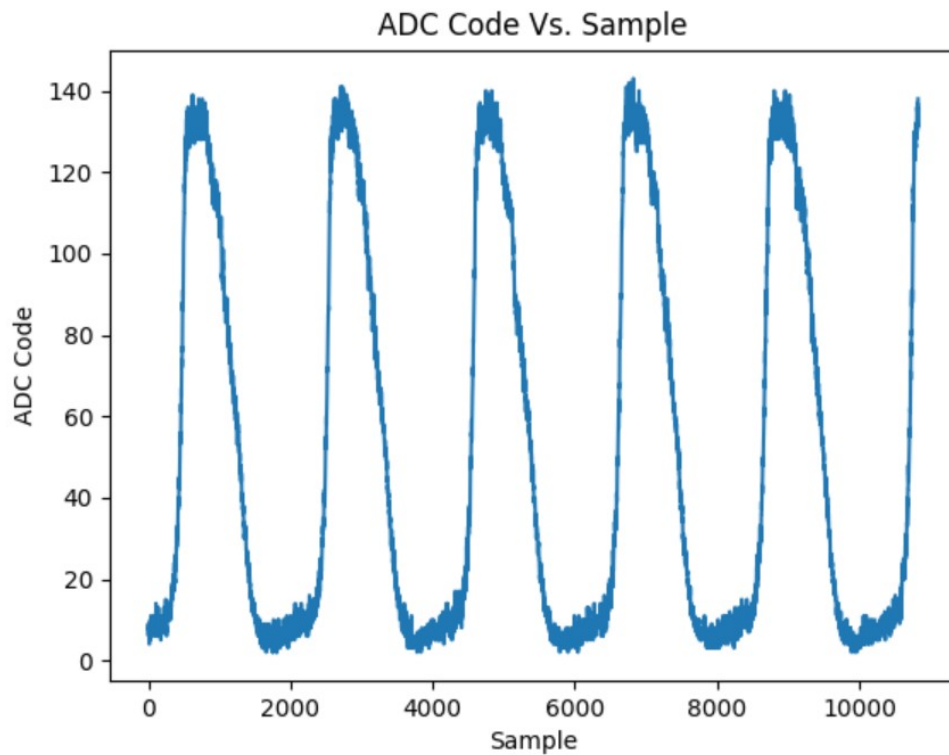| Max Current Measured with in System Sensor (A)	Current Measured With Meter (A)
1.15	1.2

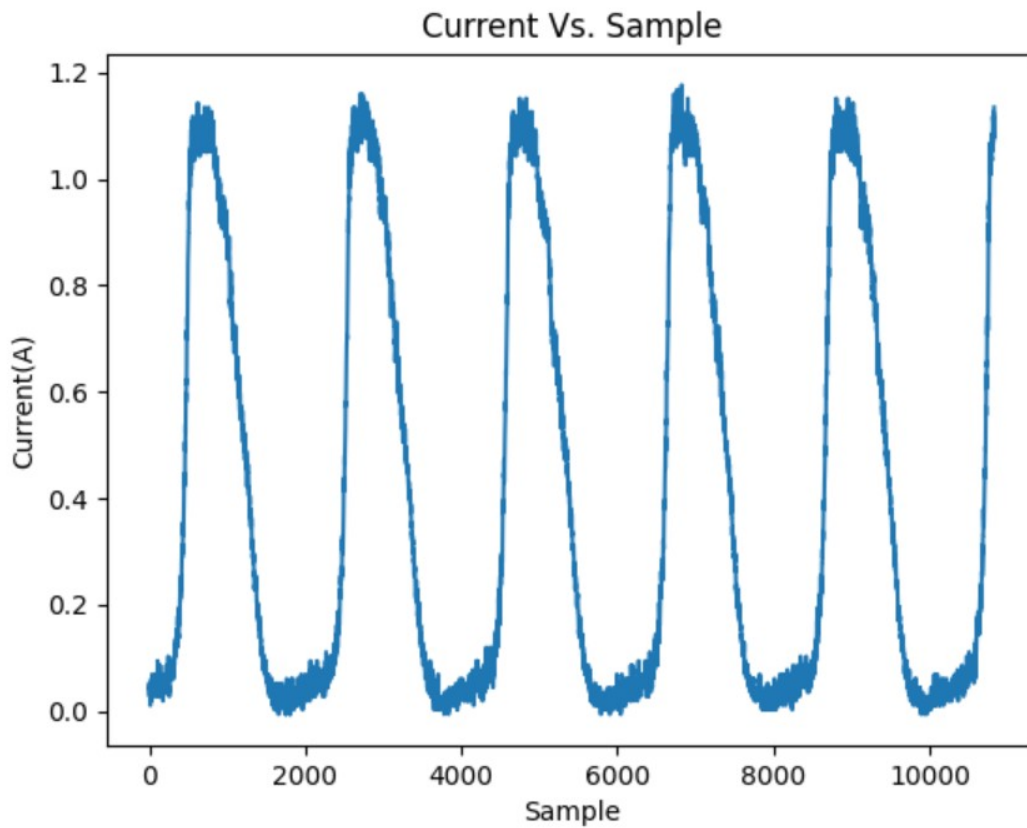*Figure 1: Plot of the ADC code over time*

Figure 2: Plot of current over time

Attachments:

```
313  ISR(TIMER0_COMPA_vect)
314  {
315      // DEBUG
316      servo_change_delay++;
317
318      if(servo_change_delay >= 1)
319      {
320          if(OCR1A >= LOW_THROTTLE_COMPARE_MATCH && going_up)
321          {
322              going_up = 0;
323          }
324          if(OCR1A <= FULL_THROTTLE_COMPARE_MATCH && !going_up)
325          {
326              going_up = 1;
327          }
328
329          if(going_up)
330          {
331              OCR1A += 1;
332          }
333          else
334          {
335              OCR1A -= 1;
336          }
337          servo_change_delay = 0;
338      }
339      // DEBUG
340  }
341
```

Figure 3: Code that executes in the interupt to sweep the generator