

Date: 7/31/12
Location: ACRC
Aircraft: Thor
Pilot: Arion Mangio
Flights: 4 with Thor

Weather
Sunny, temps around 80F.

METAR (Anoka, MN): KANE 311645Z 03004KT 10SM SCT250 27/14 A3002

Adhika, Andrei, Arion, and Will arrived at ACRC at 9 am to run some tests related to the IMU and throttle issue on Thor. A new IMU was installed, and internal filter settings were adjusted. The weather was calm and sunny. The very first flight used the data logger with the 10 extra signals added. It was not able to log the data correctly, so the old data logger was then used. There was also a flight in which the flight computer stopped working correctly after 35 seconds of running. Everything worked smoothly after a second try. Besides these two setbacks, all flight ops ran smoothly.

The first flight (53) consisted of multiple touch and goes, staying in the landing pattern. The internal IMU filter was using default bandwidth settings. The EKF filtered flight data was not accurate. Software used was [trunk/Software/FlightCode rev 866](#) ***NOTE: In IMU_iSensor.c, the " Send command" lines 68:70 were commented out in order to use default filter settings.**

The second flight (54) consisted of multiple landing patterns, but without actually touching down. The internal IMU filter was set to a bandwidth cutoff frequency of around 50 Hz. The EKF filtered flight data was still not accurate. The software used was the same as flight 53, except the " Send command" lines 68:70 were uncommented, and the Internal Digital Filter bandwidth setup was "command[0] = 0xB803; Cutoff 50 Hz"

Flight 55 consisted of taxiing up and down the runway in order to obtain data with the engine on, but without actually flying the airplane. It is interesting that the EKF filtered data was actually accurate for this test. The software used was the same as in flight 54.

The fourth flight (56) consisted of multiple landing patterns without touching down. The internal IMU filter was set to a bandwidth cutoff frequency of around 16 Hz. The EKF filtered flight data was not accurate yet again. The software used was the same as flight 53, except the " Send command" lines 68:70 were uncommented, and the Internal Digital Filter bandwidth setup was "command[0] = 0xB804; Cutoff 16 Hz"

Flight 53 tested the newly installed IMU using default internal digital filter settings. Rx data: A017, L018, F001, H000

[Thor Flight 53](#)

Flight 54 tested the EKF filter using IMU internal filter cutoff frequency at 50 Hz Rx data: A002, L029, F000, H000

[Thor Flight 54](#)

Flight 55 tested the EKF filter when taxiing up and down the runway at low throttle setting

[Thor Flight 55](#)

Flight 56 tested the EKF filter using IMU internal filter cutoff frequency at 16 Hz Rx data:
A028, L048, F000, H000

Thor Flight 56