
MITEE Mouse 13

MINOS '11
Royal Holloway
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MITEE Mouse 13

- Experimental vehicle for investigations in inertial navigation
 - » 3-axis accelerometer mounted in center of mouse below axle
 - » 3-axis accelerometer mounted in center of mouse above axle
 - » Gyroscope to measure yaw

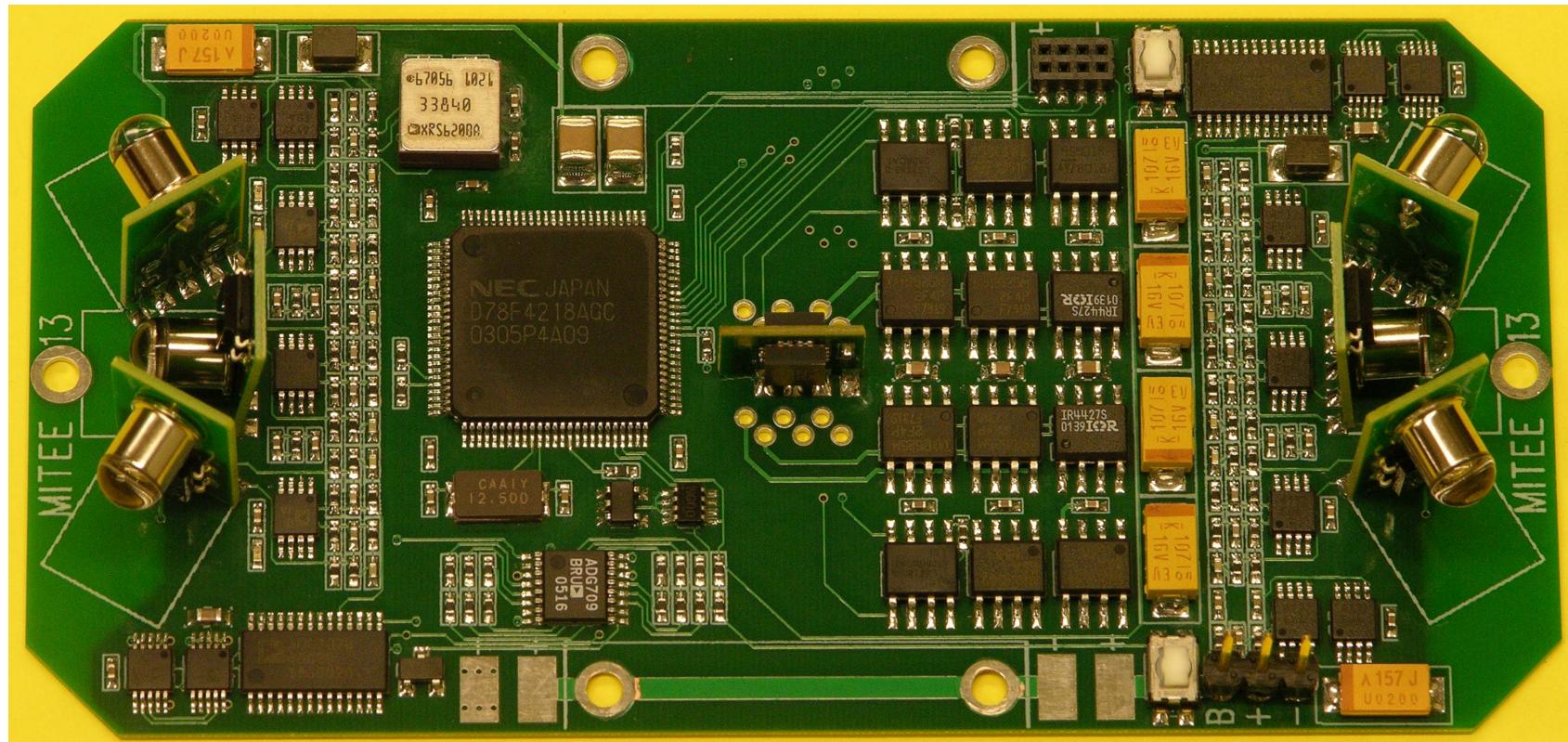


Additional M13 Features

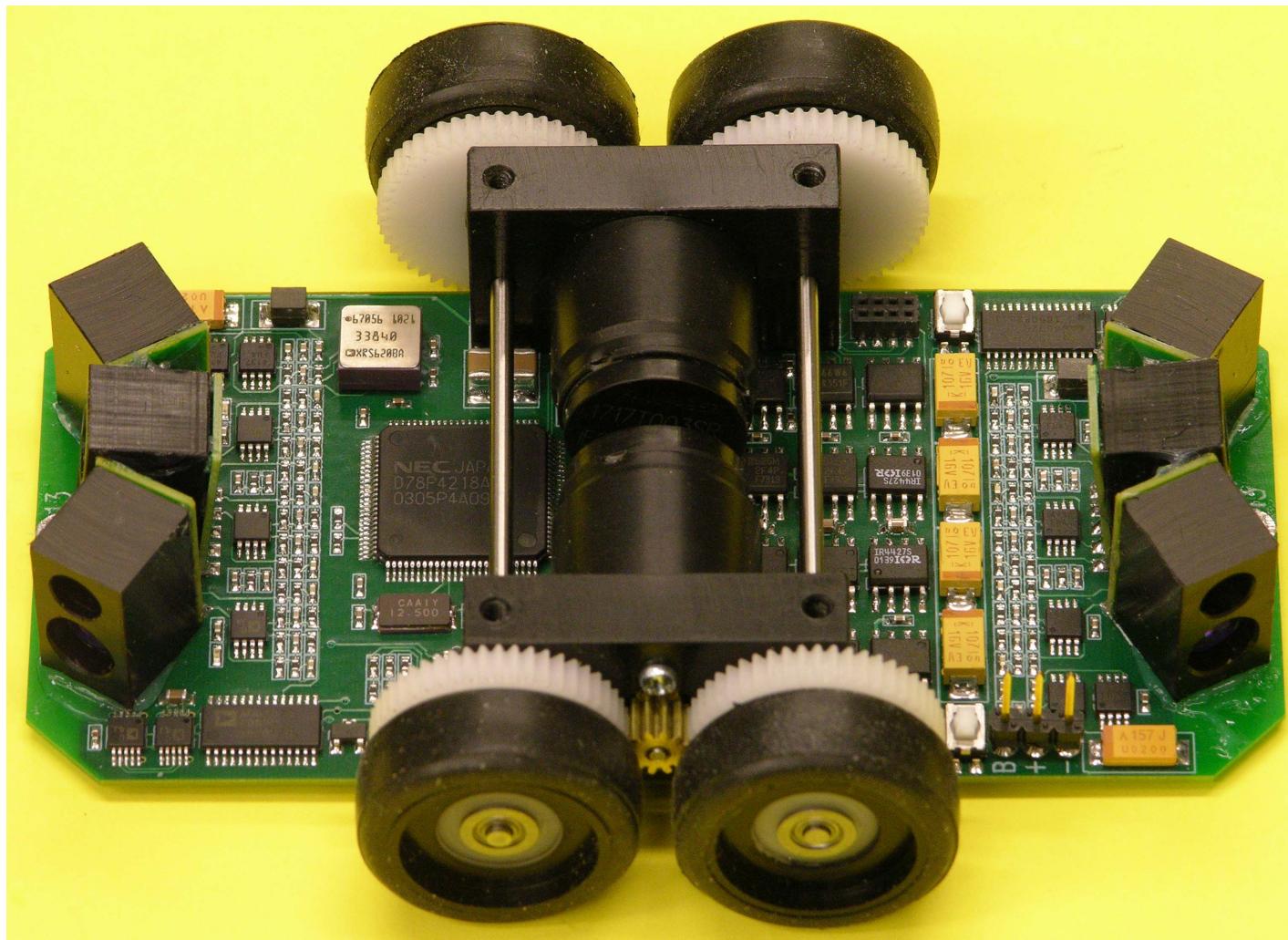
- 6 mm focal length optics instead of 9 mm to reduce size and weight of sensors
- Narrower tires
- Smaller batteries – 130 mAh @ 7.4 v
- Lighter – 100.2 g



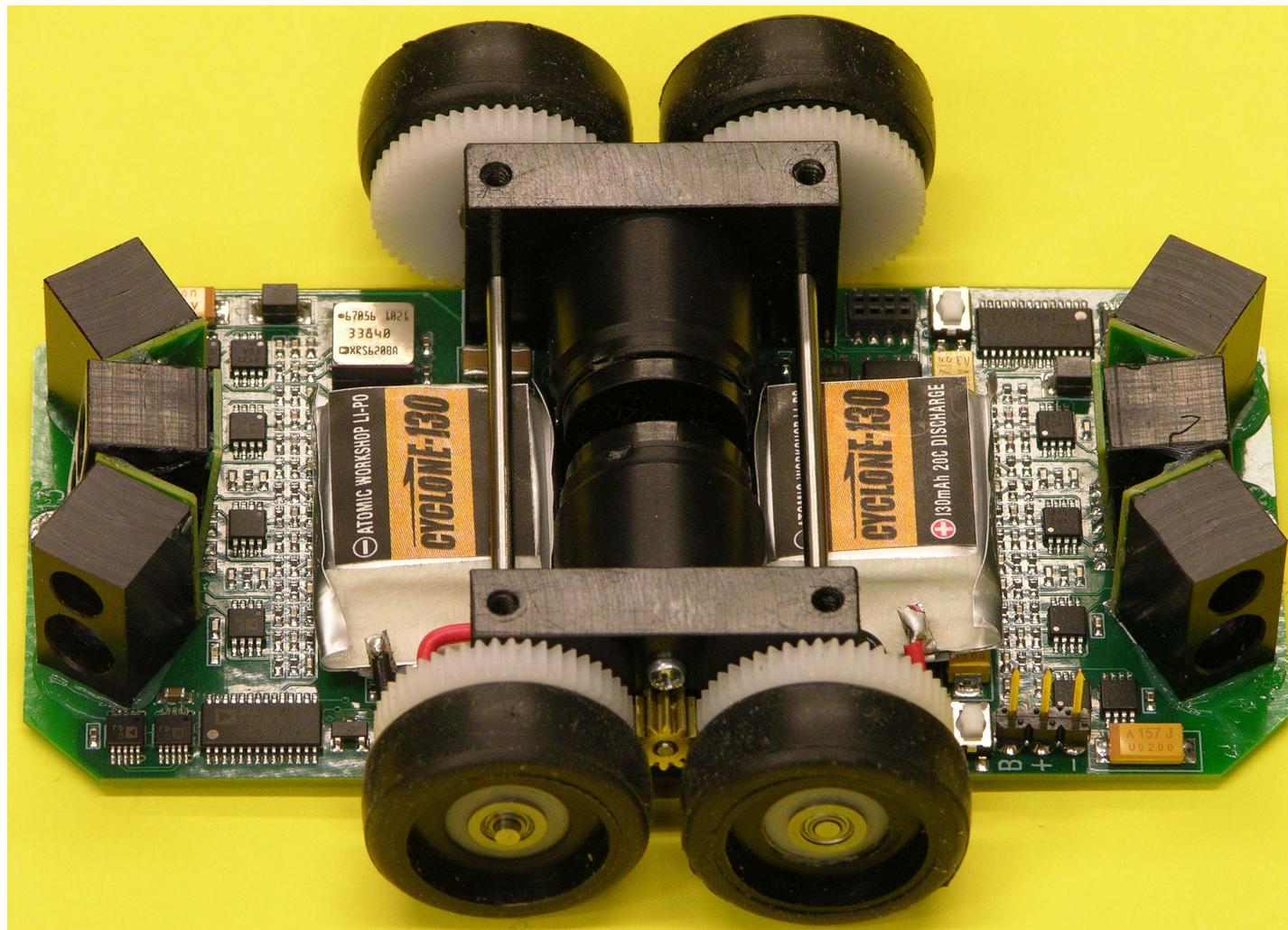
M13 PCB



M13 Without Batteries

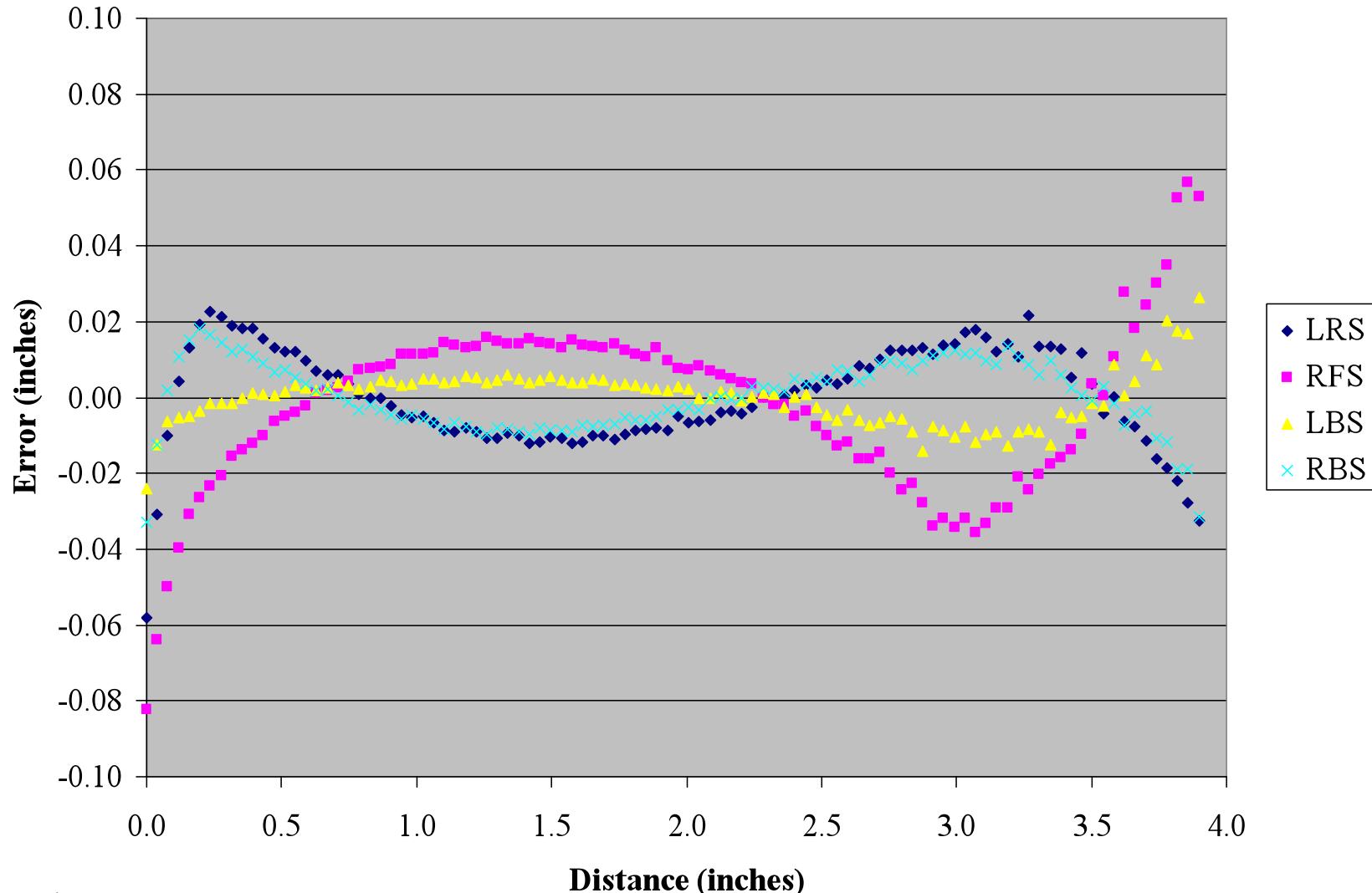


M13 Top View



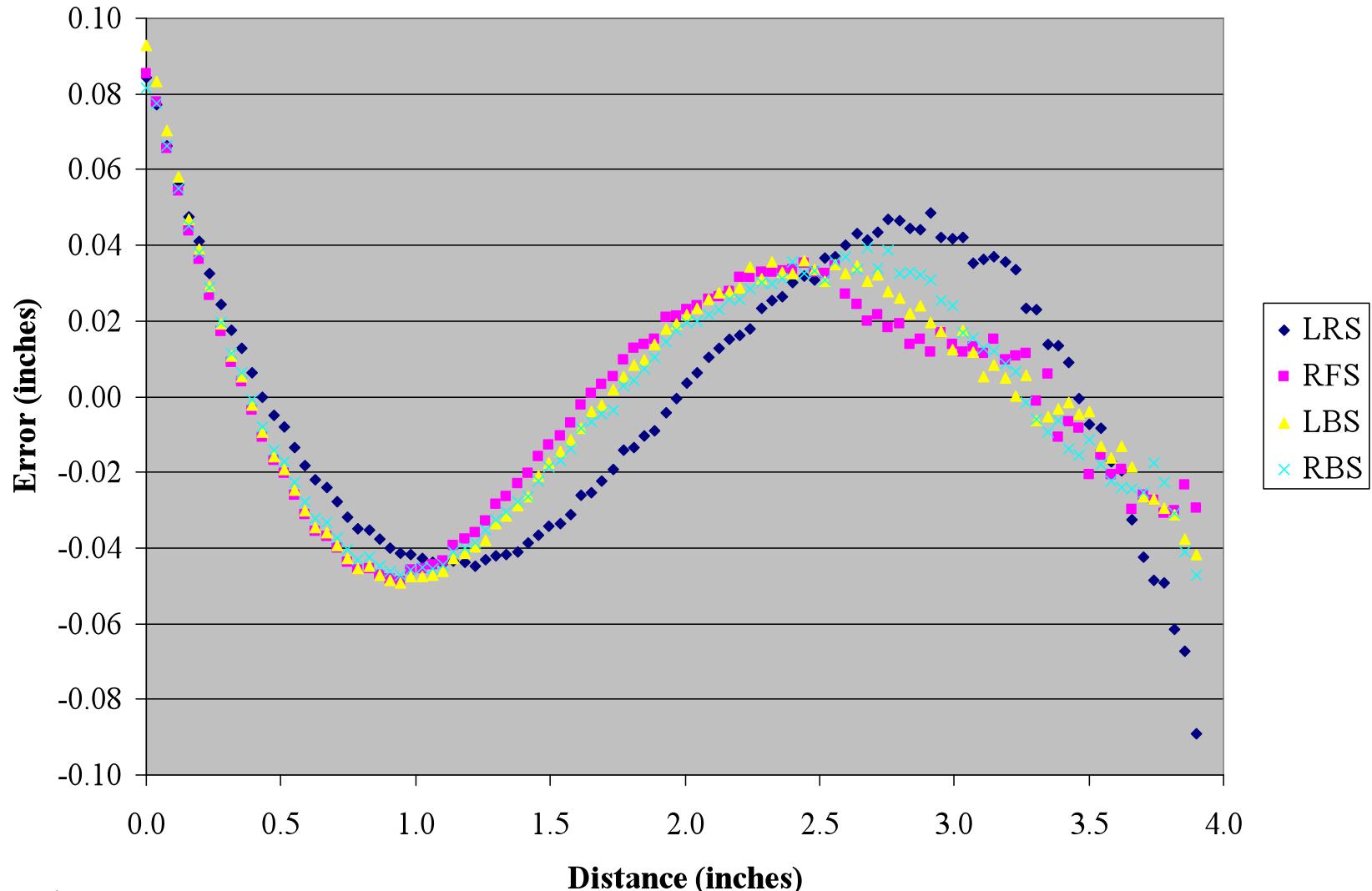
M11 Sensor Linearization Error

FL = 9 mm, Detector = 3.5 mm



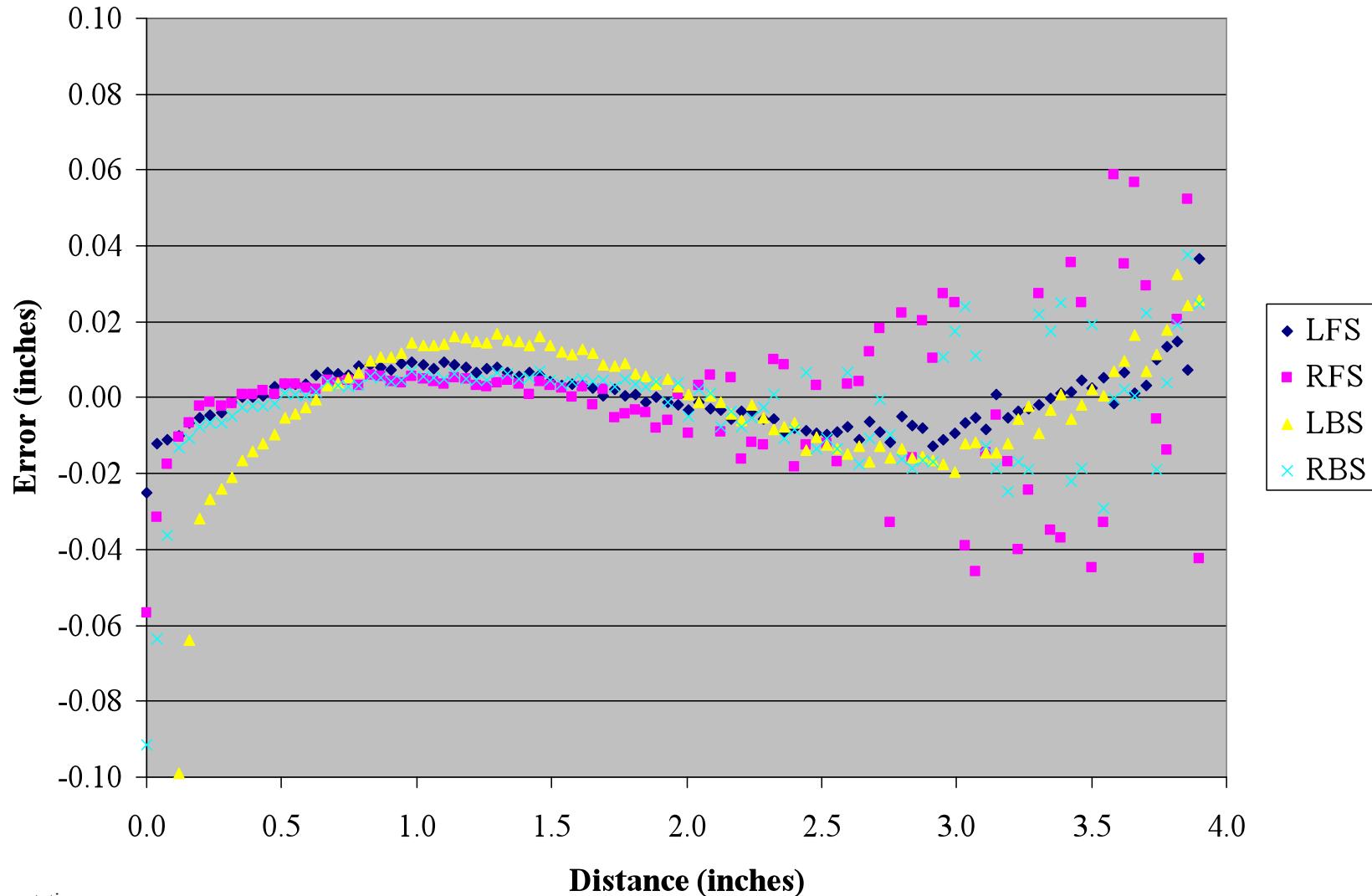
M12 Sensor Linearization Error

FL = 6 mm, Detector = 3.5 mm

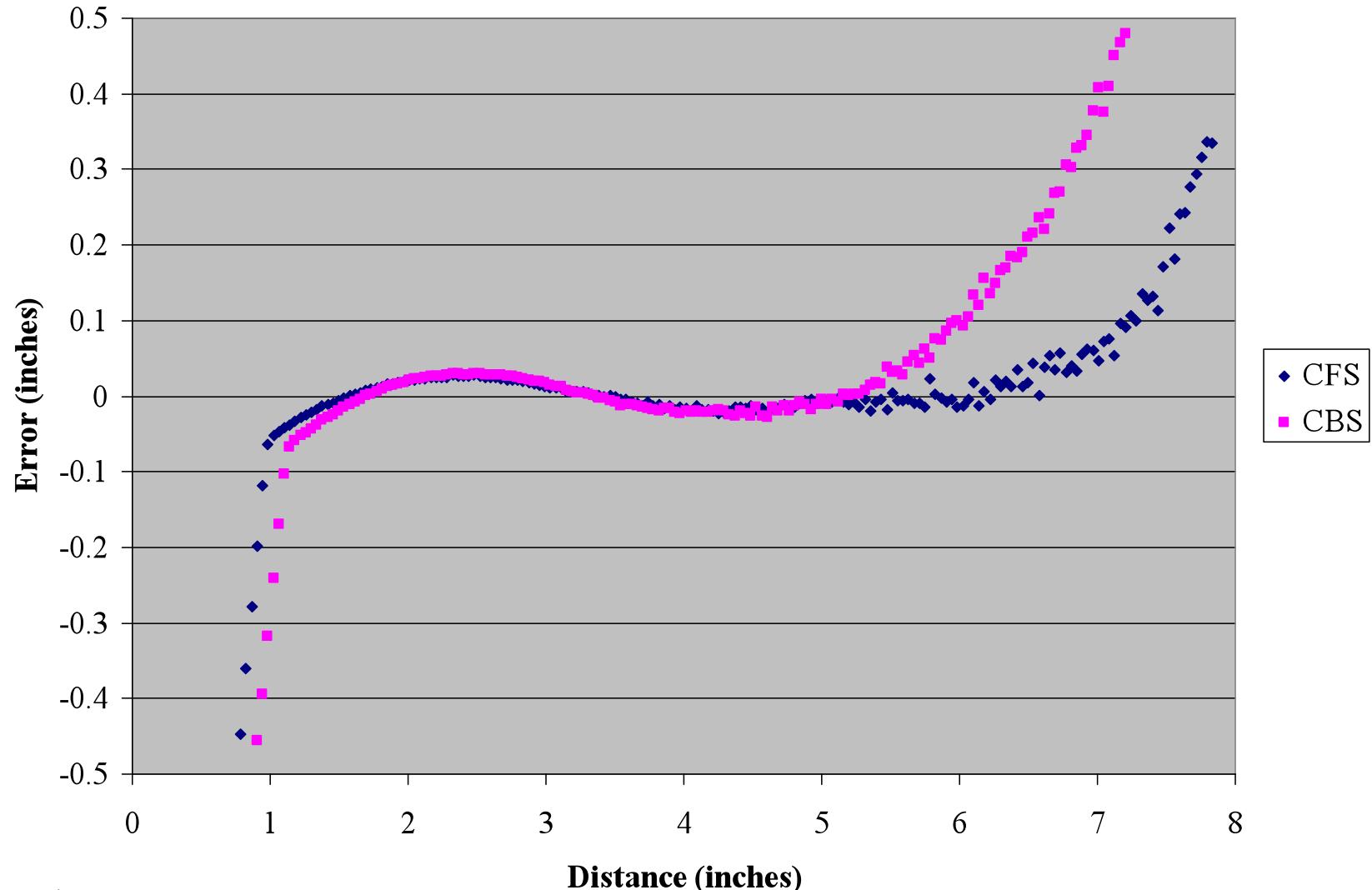


M13 Sensor Linearization Error

FL = 6 mm, Detector = 2 mm



Center Sensor Linearization Error

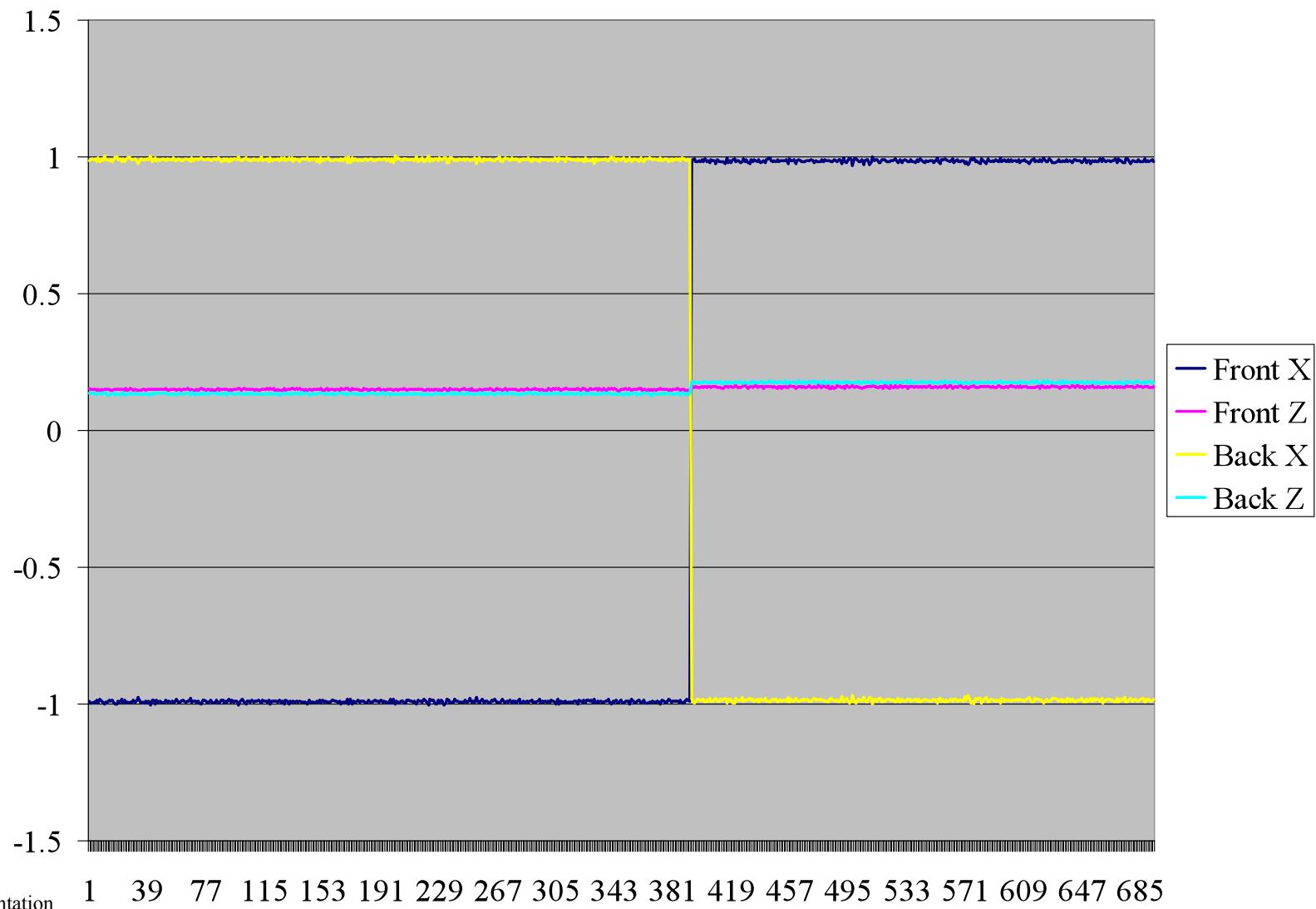


Accelerometer Calibration Results

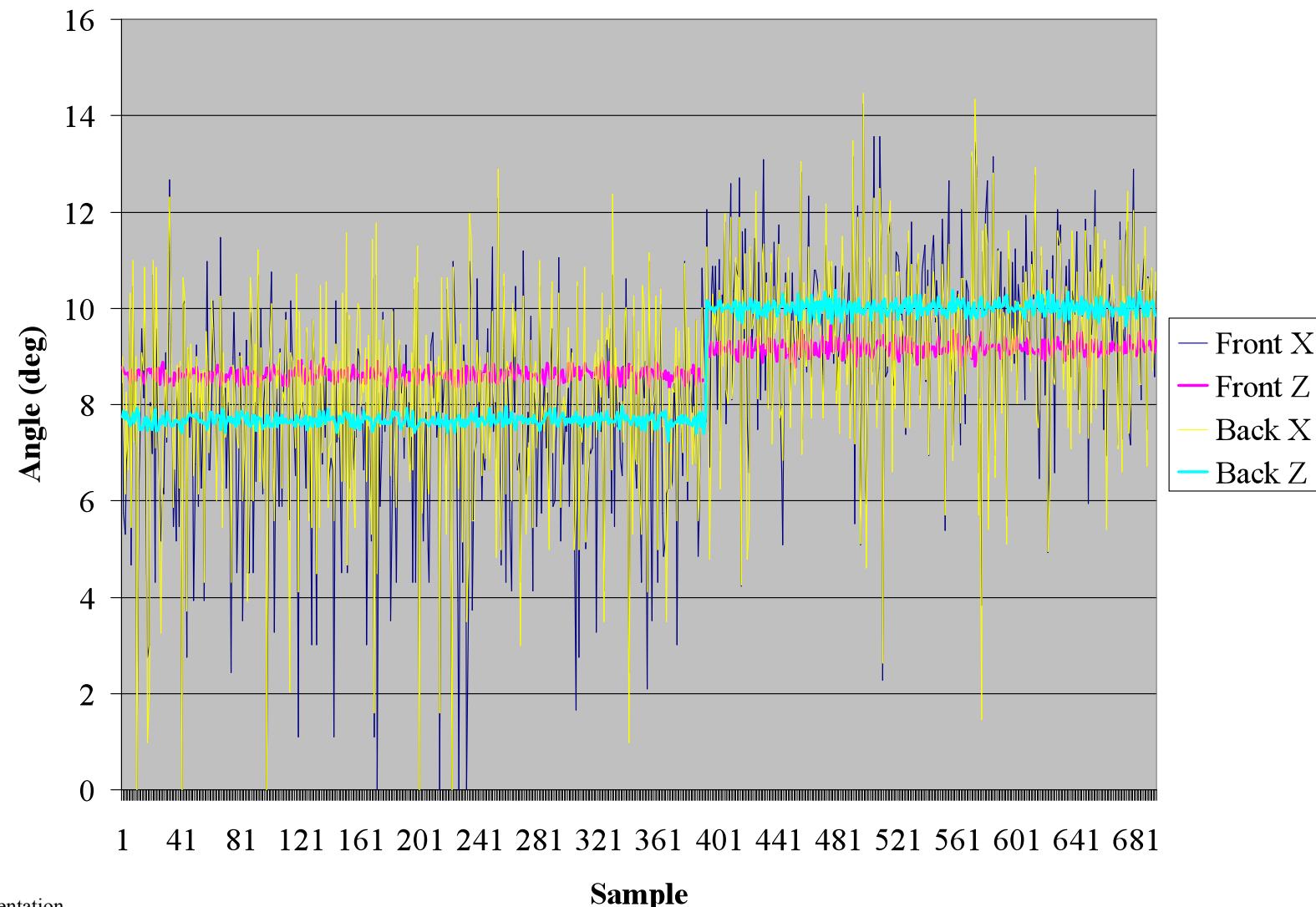
	Front X	Front Z	Back X	Back Z
Scale	4136	4108	4115	4100
Zero	33292	32672	32788	33006
Zero	33284	32696	32723	32964
Zero	33300	32683	32853	33082
Stdev	7.62	12.25	64.99	59.61
mg	1.84	2.98	15.79	14.54



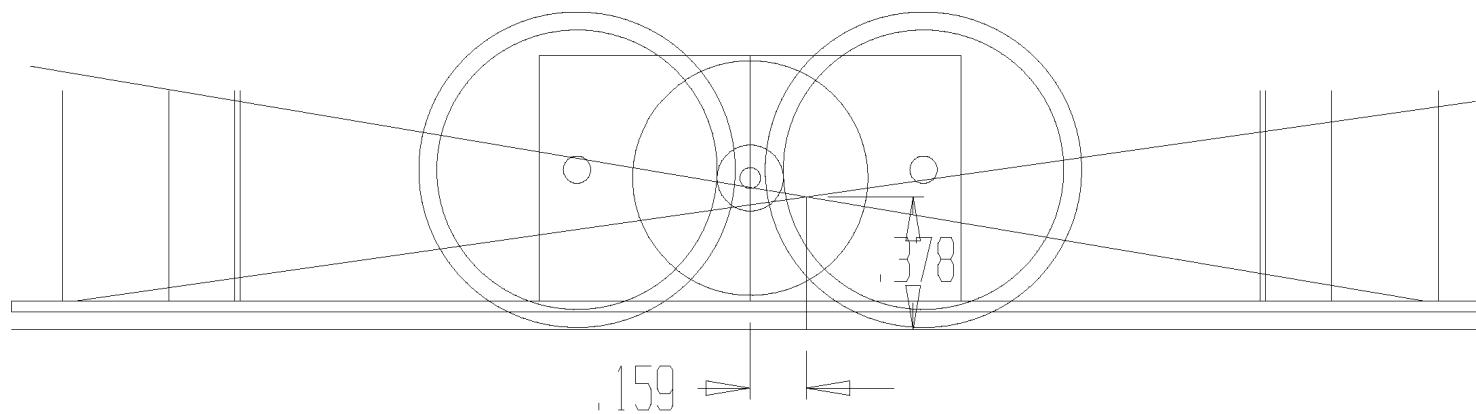
Accelerometer Output when Hanging by a String



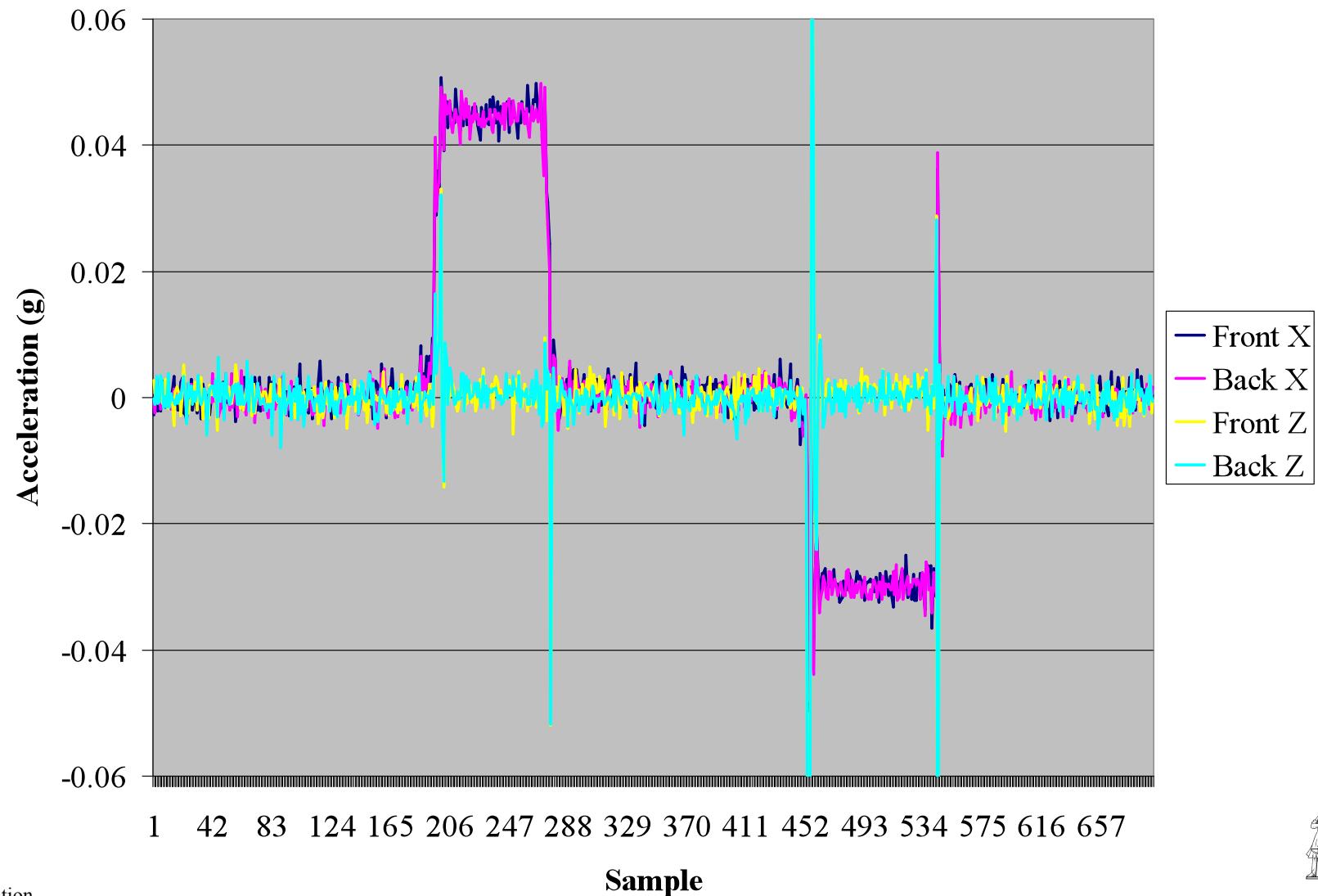
Angle When Hanging by a String



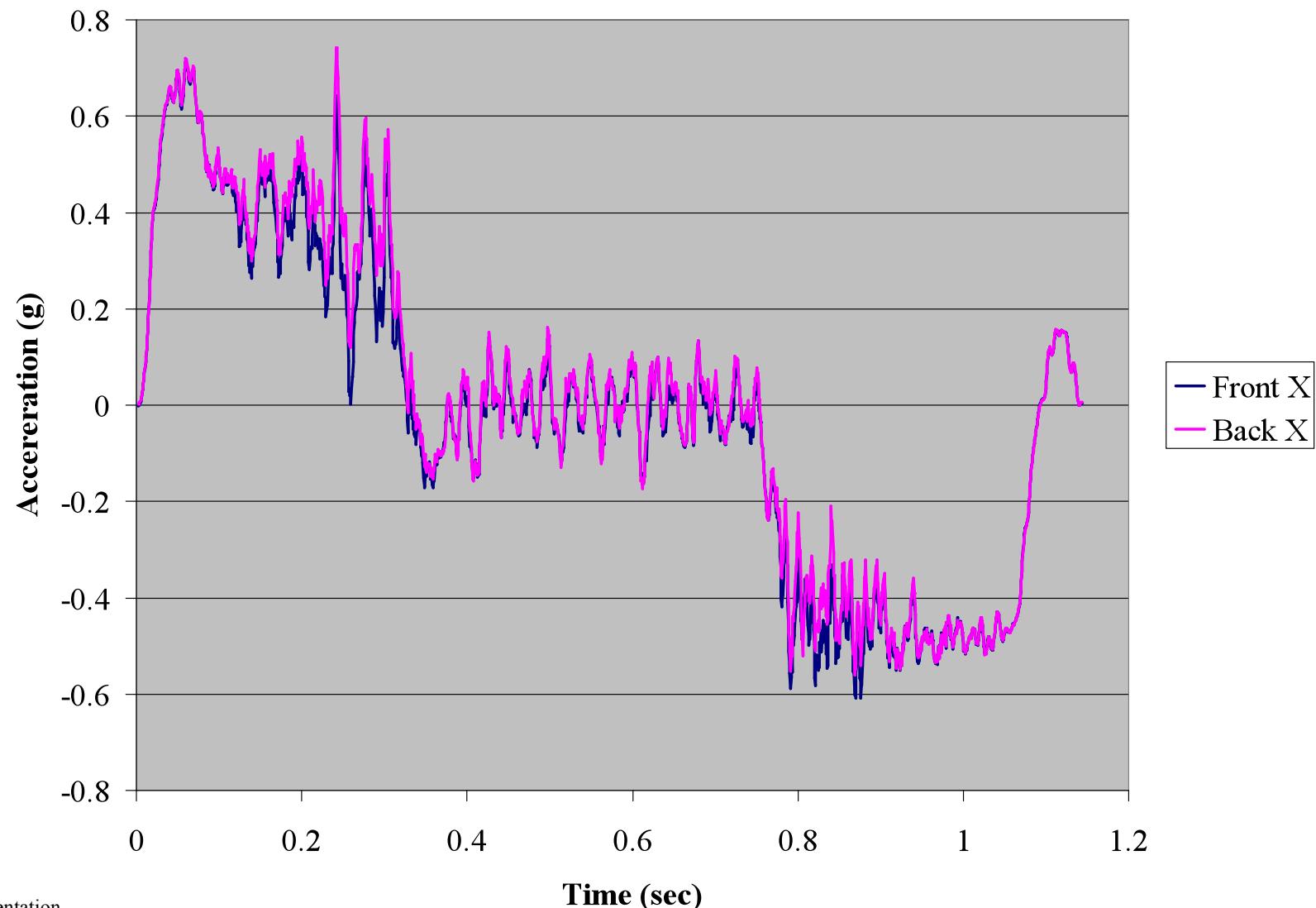
Center of Gravity



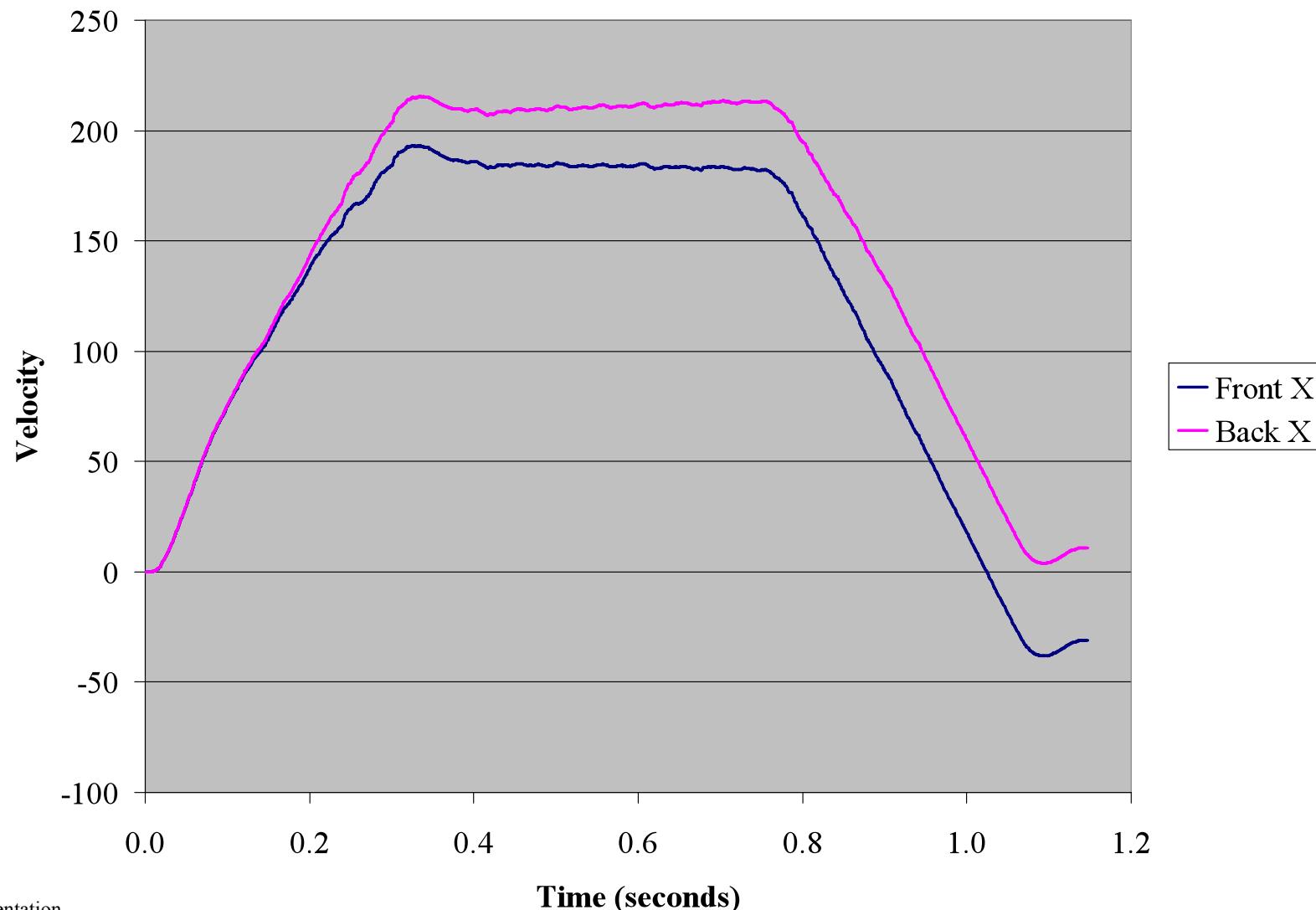
Change in Acceleration During Rock toward Front, then Back



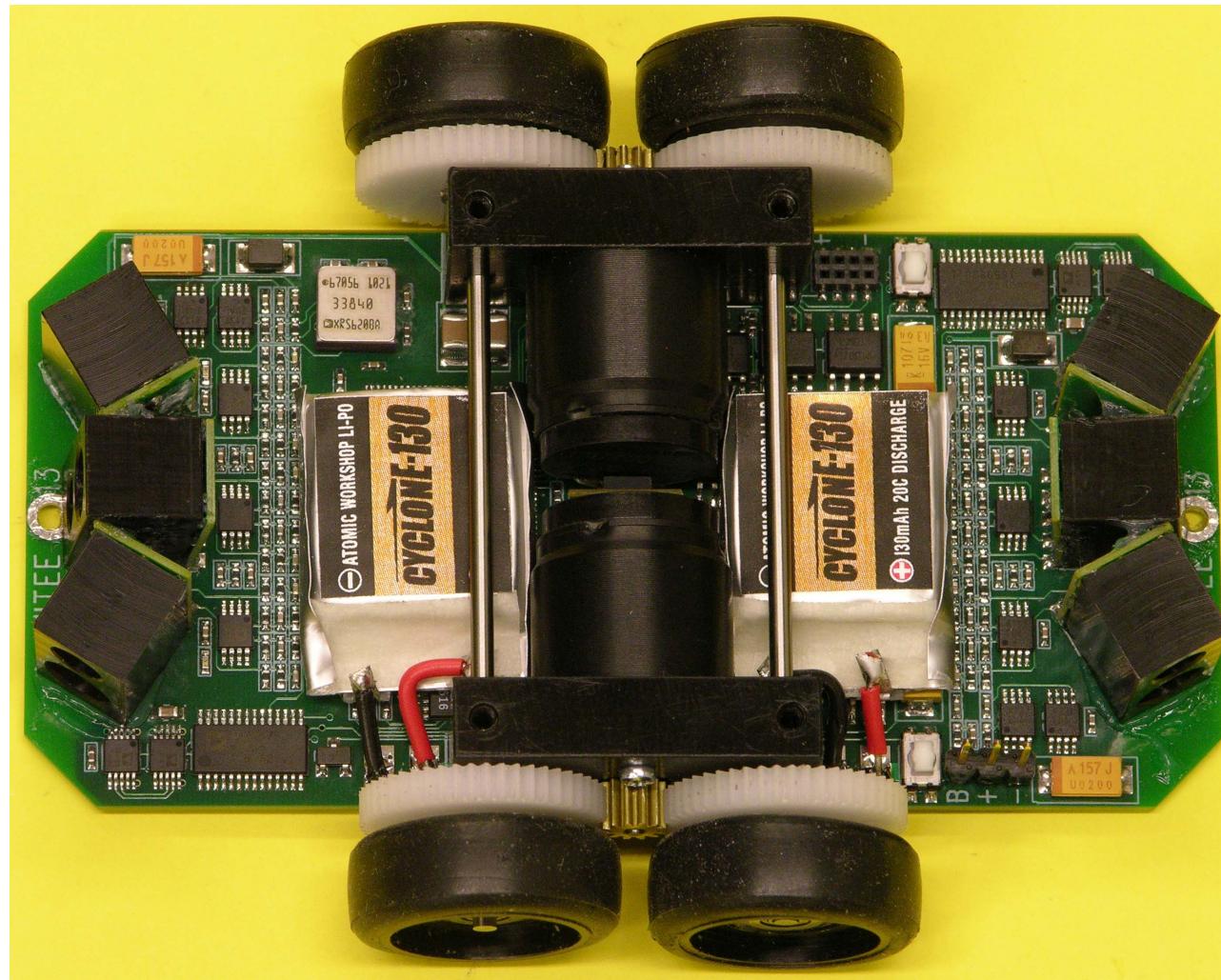
9-point Averaged Accelerometer Data



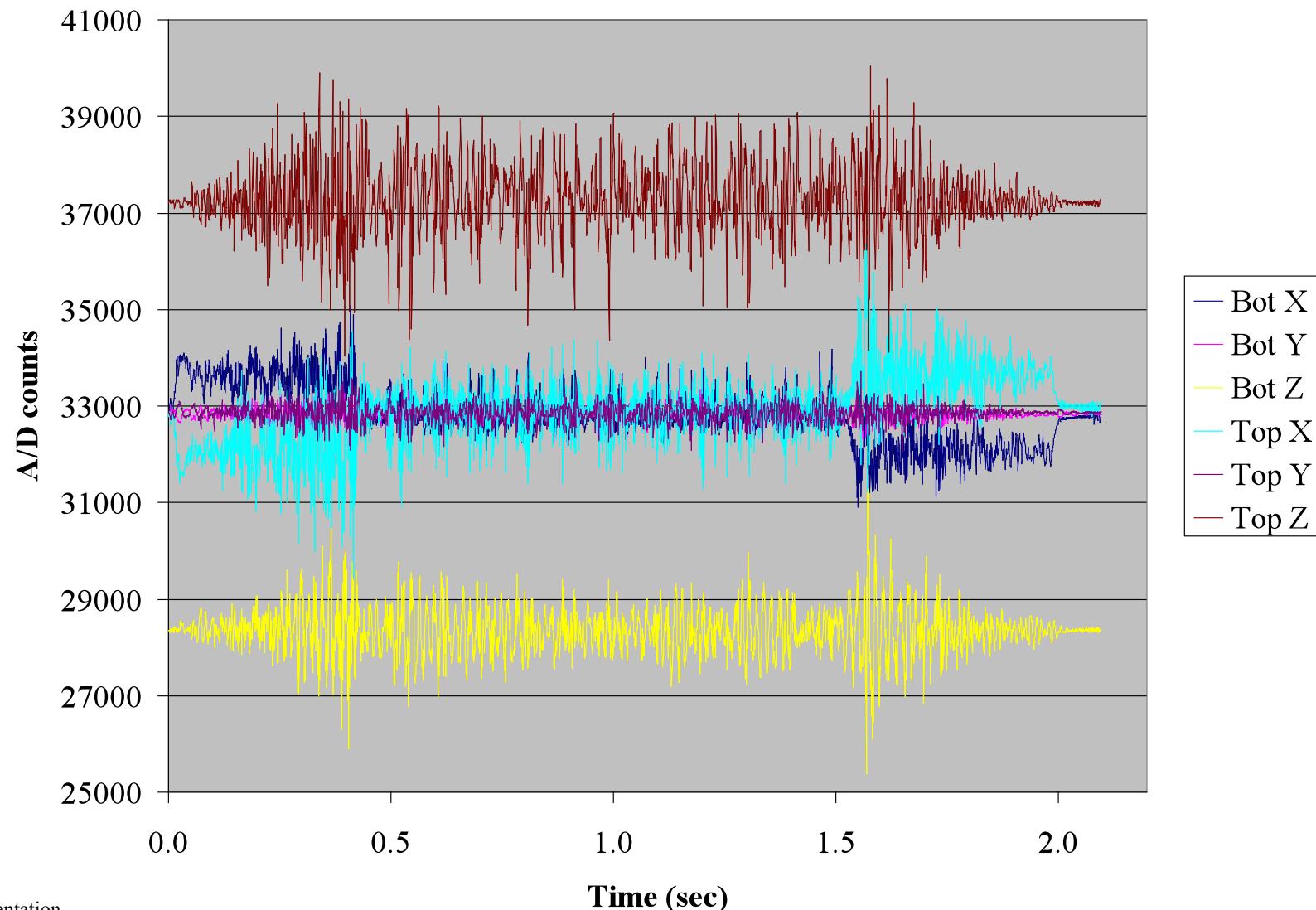
Velocity Computed from Integrated Accelerometer Data



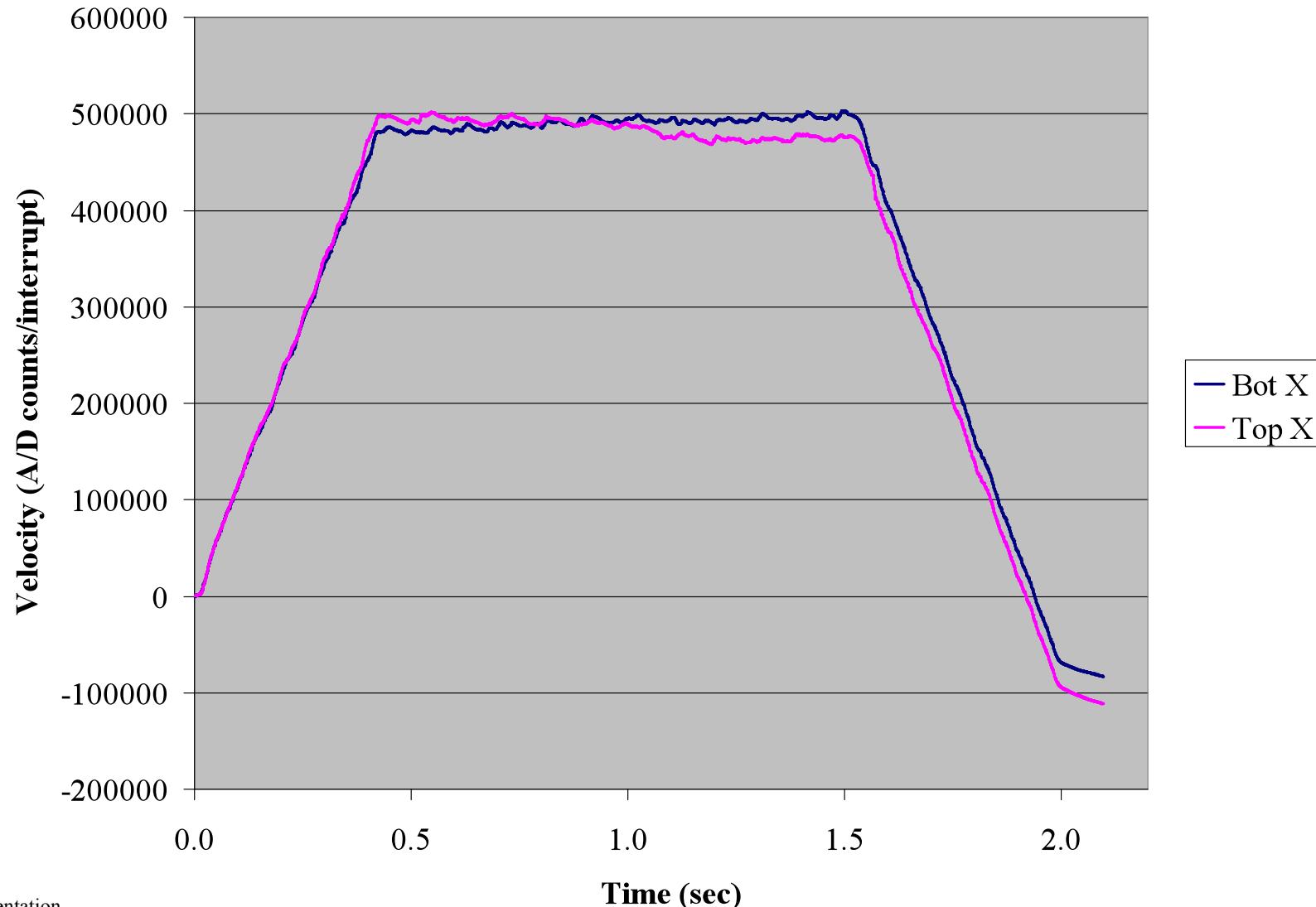
M13 Top view



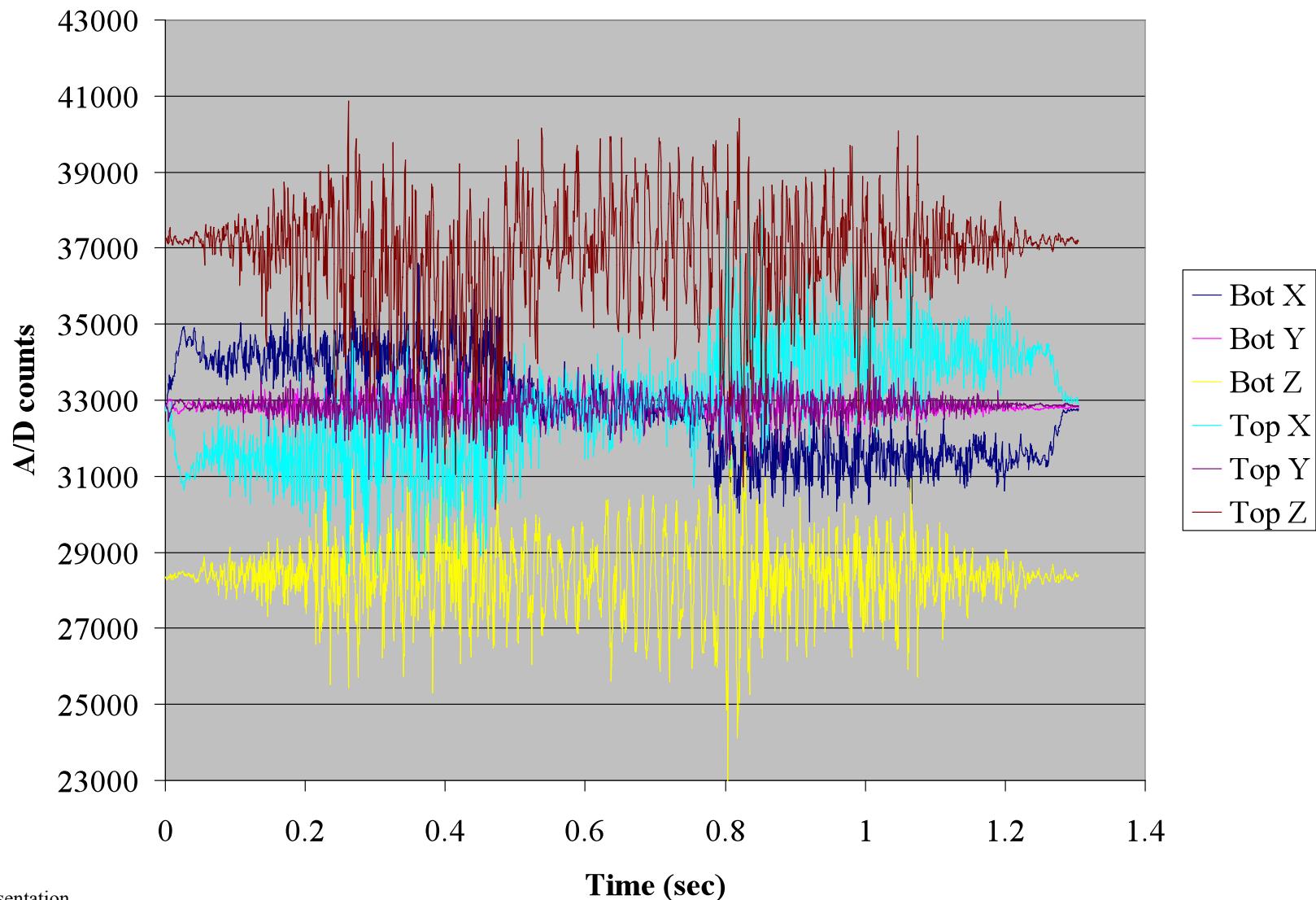
Accel - Constant Velocity - Decel



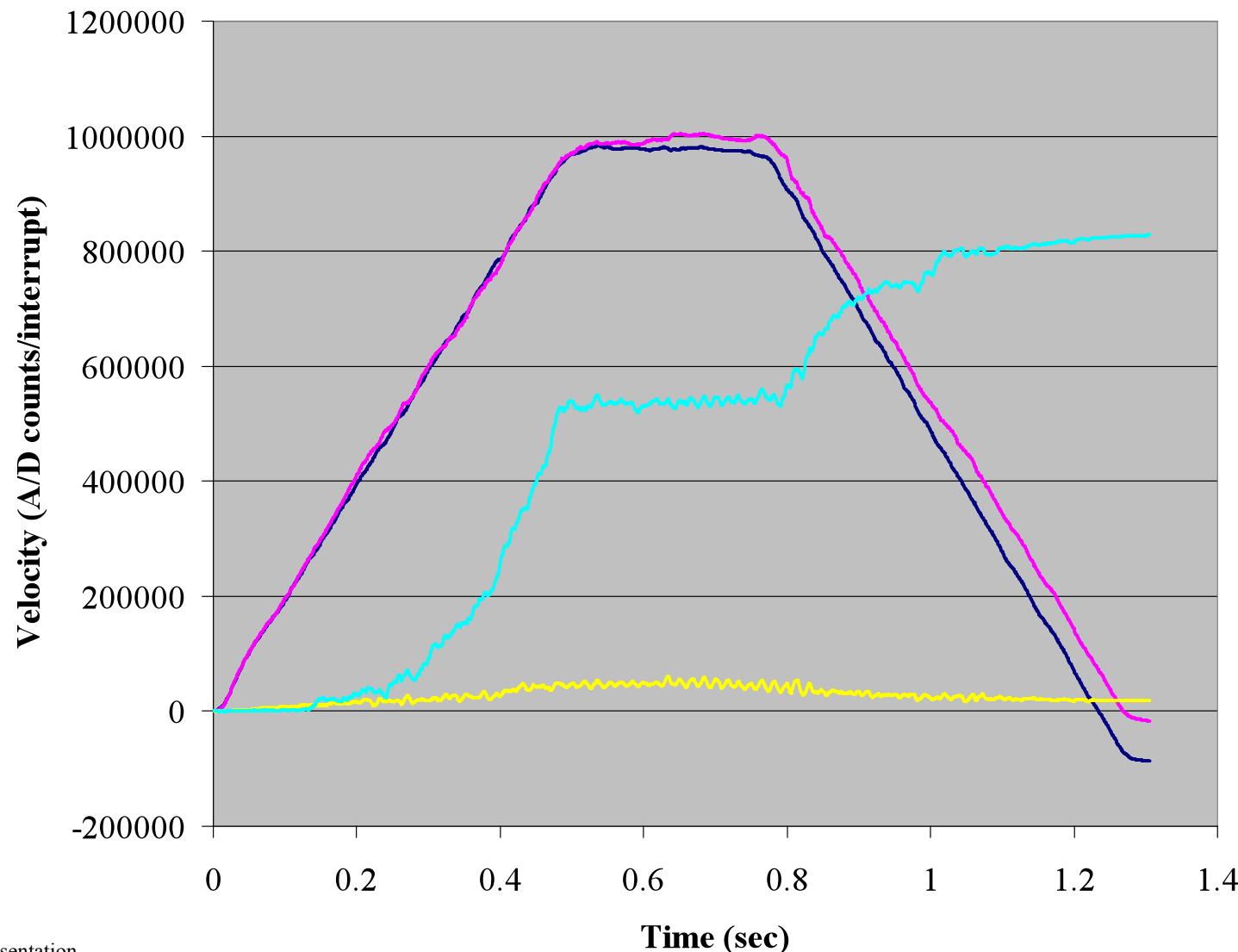
Integrated Accelerometer Signals



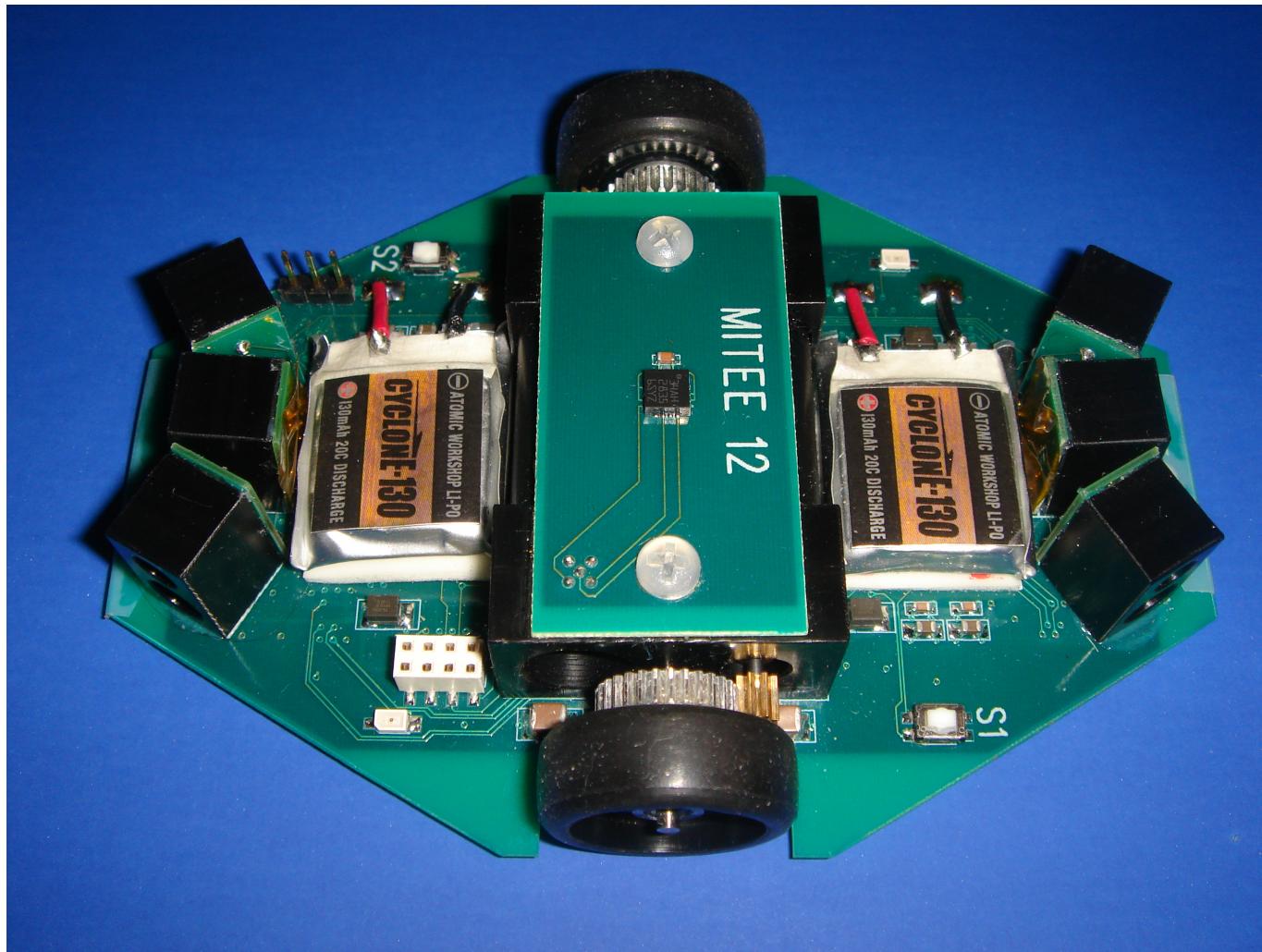
Higher Acceleration and Velocity



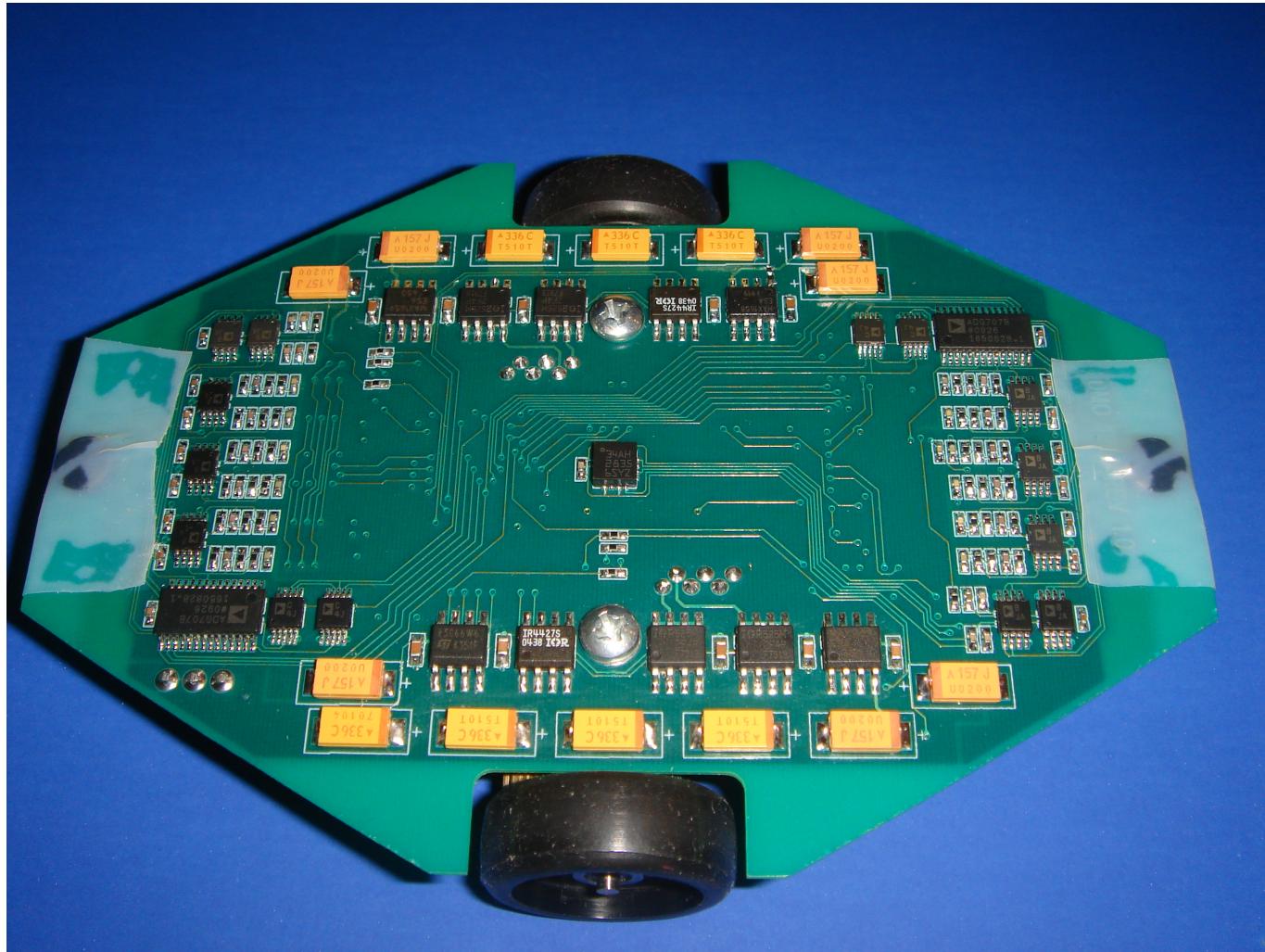
Integrated Accelerometer Signals



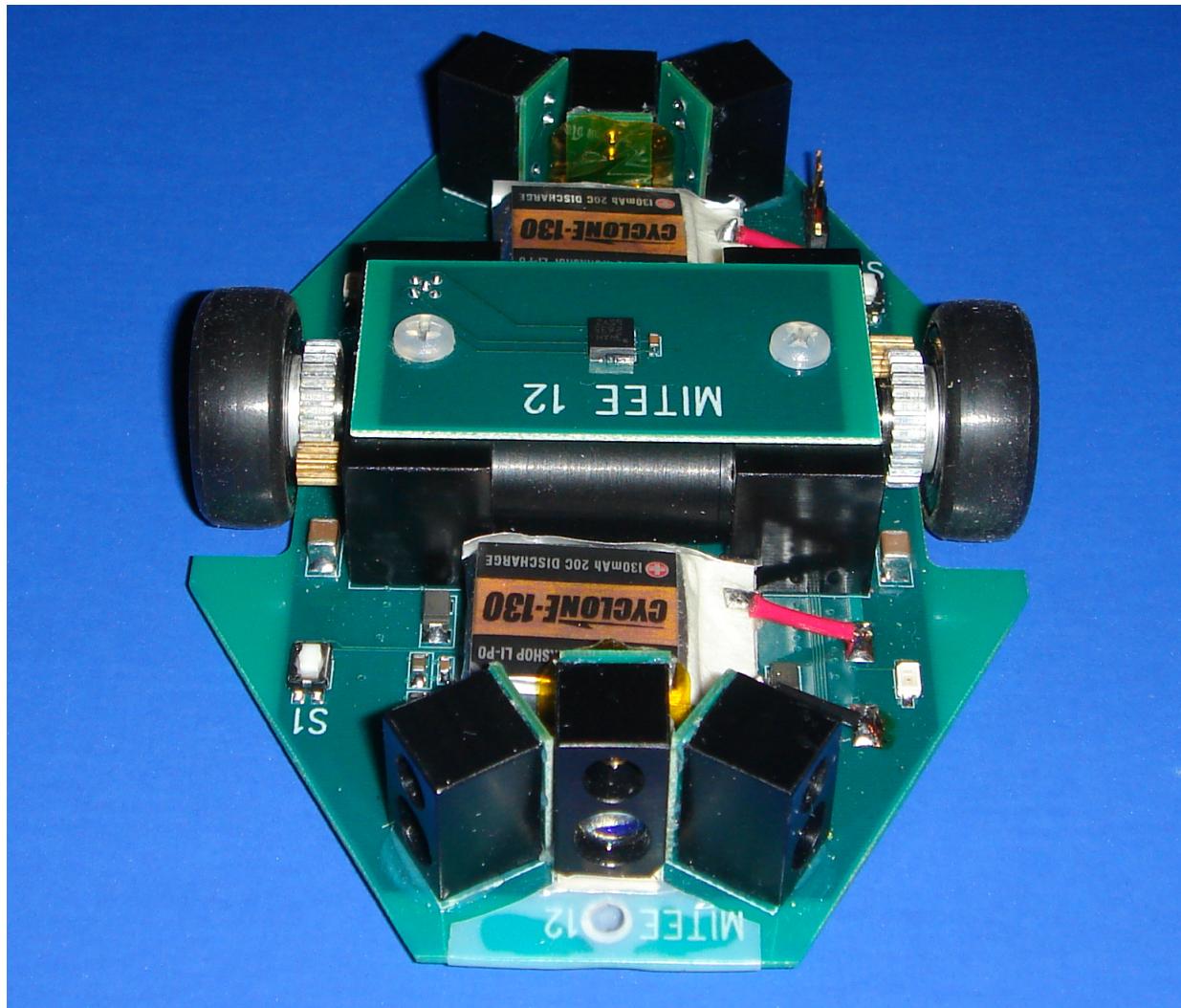
M12 Top View



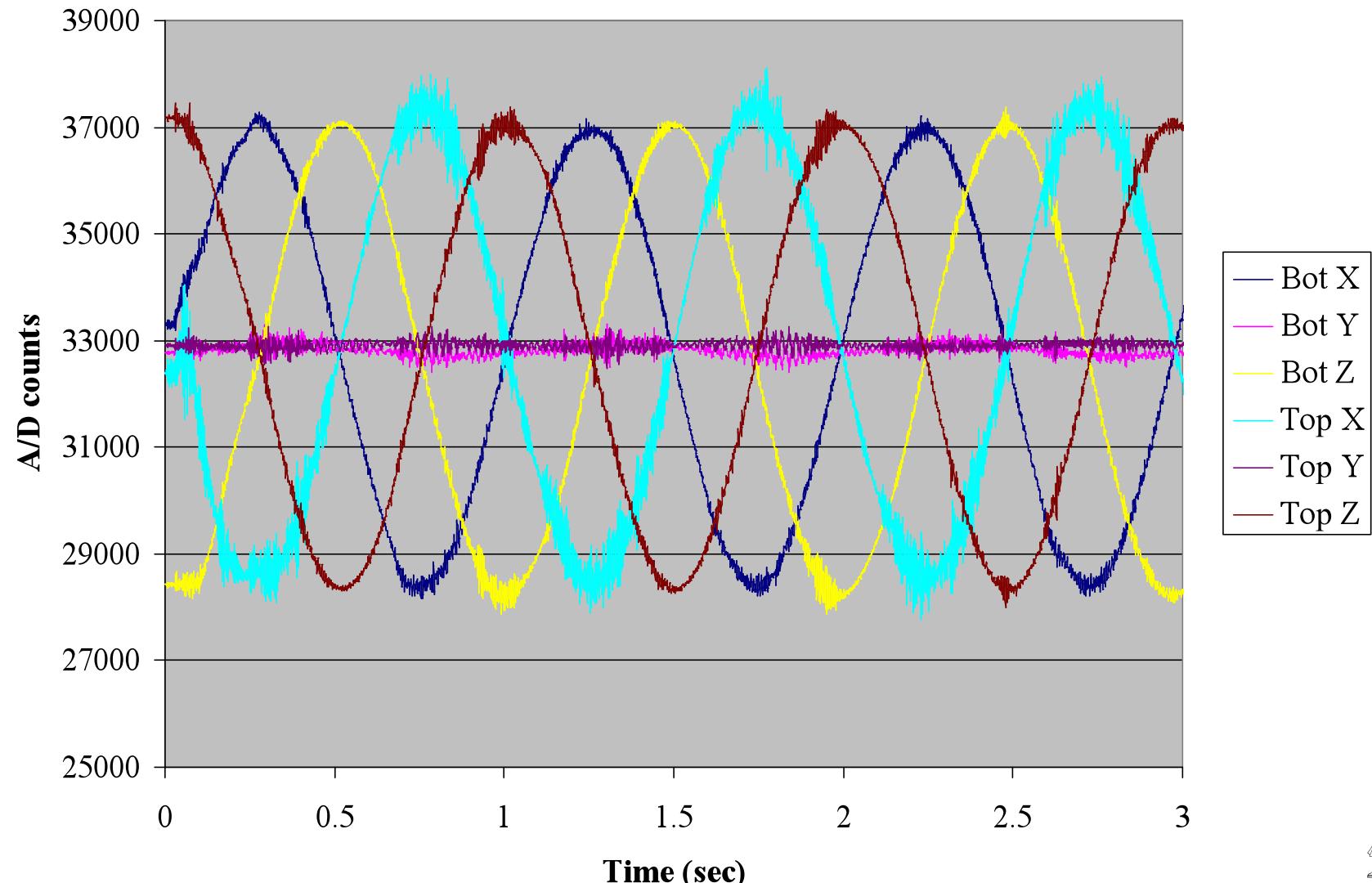
M12 Bottom View



M12 Front View



Response to Rotation about Axe



Center of Gravity

