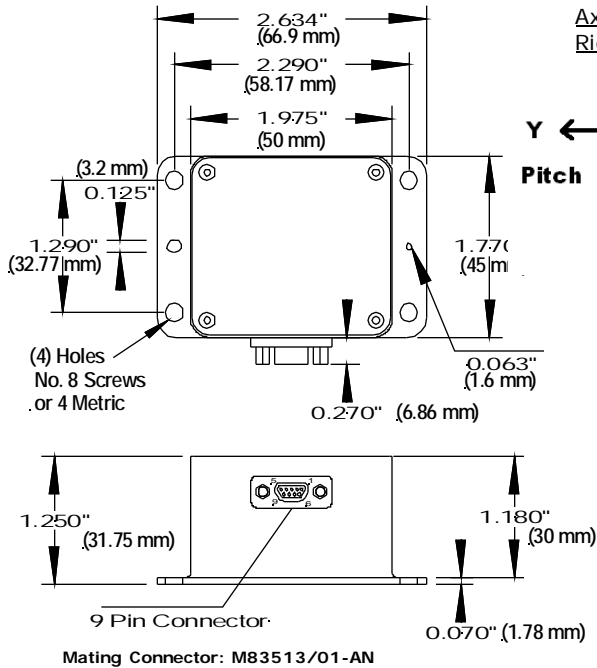
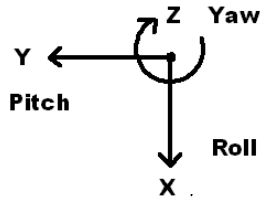


# LandMark™ 40 VG



Axes (Top View)  
Right Hand Rule



## LandMark™ 40 VG

LMRK40VG-075-02-100 or -10  
LMRK40VG-100-02-100 or -10  
LMRK40VG-300-02-100 or -10

## Specification

PARAMETER	RATE AXES		ACCEL AXES	
Range	±100°/sec	±300°/sec	±2 g's	±10 g's
Bias (Over Temp.)	<0.1°/sec 1 σ	<0.15°/sec 1 σ	< 0.5mg 1 σ	< 1.5mg 1 σ
Bias (In Run Stability)	6°/hour 1 σ		0.02mg 1 σ	0.08mg 1 σ
Scale Factor Error %	≤0.1% (over temperature)			
Sensor Resolution	0.001°/sec		0.02mg	0.06mg
Angle Random Walk	0.002° /sec/Hz 1 σ	0.004° 1 σ	0.04mg /√Hz 1 σ	
Alignment	1mrad 1 σ			
G-Sensitivity	<0.01°/sec/g 1 σ			
Self Test On	N/A		Δ 1.5 ±0.5g	Δ 0.3g ± 0.2g
Temp Range	Logic 1 = 3V to 5V at Pin 9 (open = off)			
Operating:	-40°C to +85°C			
Non-Operating:	-55°C to +85°C			
Pitch & Roll	± 0.25° stationary 1 σ			
Update Rate	100 Hz (full VG mode)			
Temp Sensors	Internal Temperature Sensors			
Start-up Time	< 0.65 sec			
Input Power	<b>+3.1V to 5.5V Max. Input (single sided)</b>			
Power Consumption	430 mW at 3.3V typical 450 mW at 3.3V maximum			
Size	U.S.:	1.97 x 1.77 x 1.25 = 4.4 in <sup>3</sup>		
	Metric:	5 x 4.5 x 3.2 = 72 cm <sup>3</sup>		
Weight	≤ 103 grams			
Mounting	4ea No.8 or M4 Screws			
Shock	500g's ½ sine 30 msec powered			
Vibration	6gRMS (20Hz to 2KHz ~ 10g accelerometers)			
MTBF	53,869 hrs (per MIL-STD-217F, Notice 2 based on AIC environment with ambient temperature at 40°C)			

Pin No.	Assignment
1	RS-485 A (+)
2	RS-485 B (-)
3	Power Ground
4	Analog/Digital Velocity Input (0V to 5V)
5	<b>+3.1V to +5.5V Input Power</b>
6	External Sync Input (1kHz or 1pps)
7	+5V Regulator Out
8	Signal Ground
9	Self Test

Note: Any unused inputs (Pins 4, 6, 9) must be connected to signal ground (Pin 8).

Outputs	Serial Sequence at 100Hz
1, 2, 3	Gyros: Roll (X), Pitch (Y), Yaw (Z)
4, 5, 6	Accelerometers: (X), (Y), (Z)
7	IMU Temperature
8, 9, 10	No Magnetometers: (X), (Y), (Z)
11	No Pressure
12, 13, 14	Angles: Roll, Pitch (No Yaw)
15, 16, 17	AC Velocities: (X), (Y) & (Z)
18, 19, 20	No Altitude, Temp, Forward Velocity (As Input)

User to provide either analog or external velocity for velocity functions to be enabled (pin 4).

Specification subject to change without notice

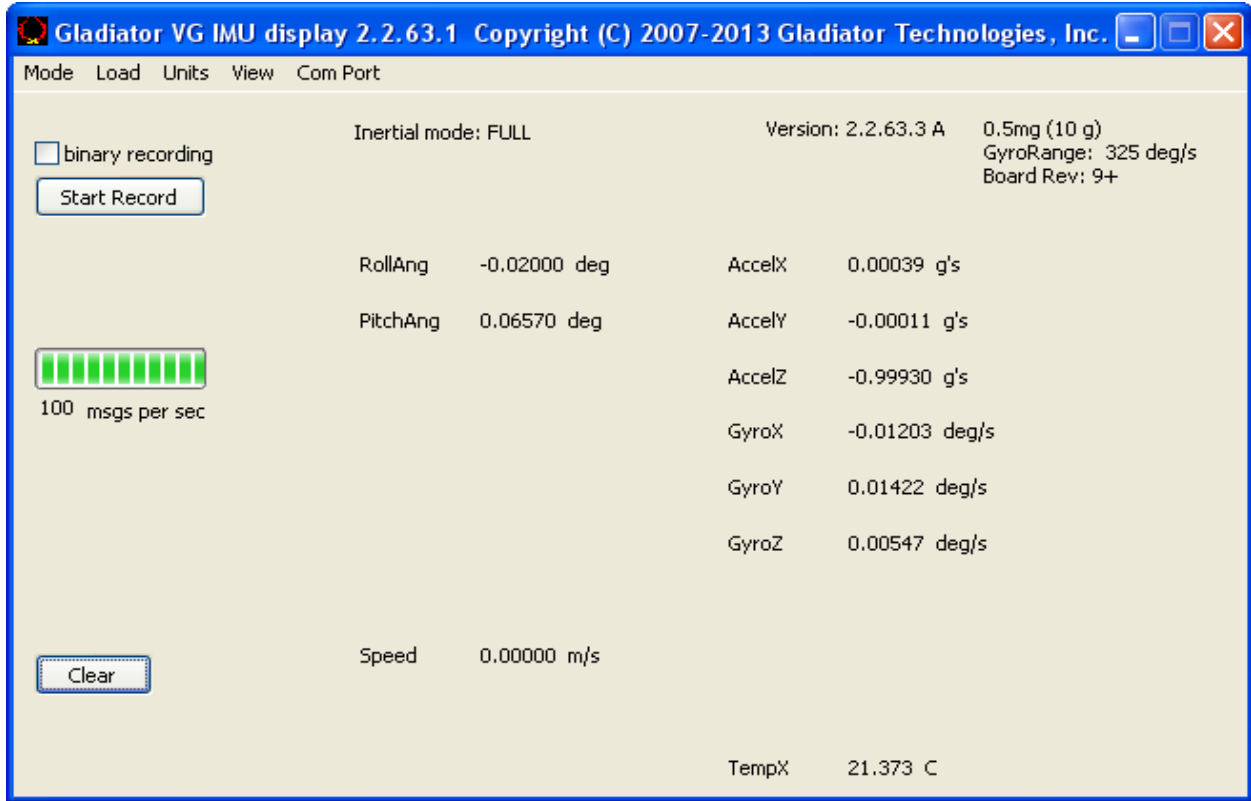


**Gladiator Technologies**



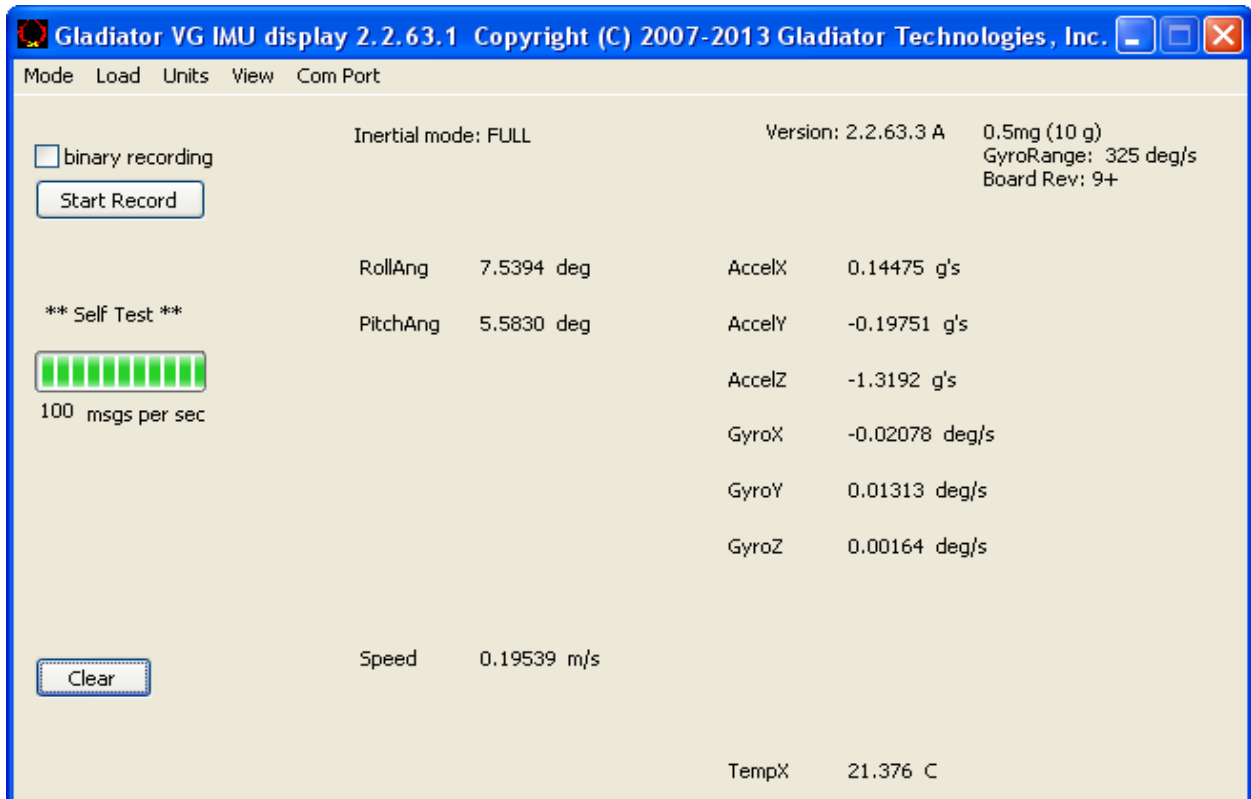
High Performance Inertial MEMS

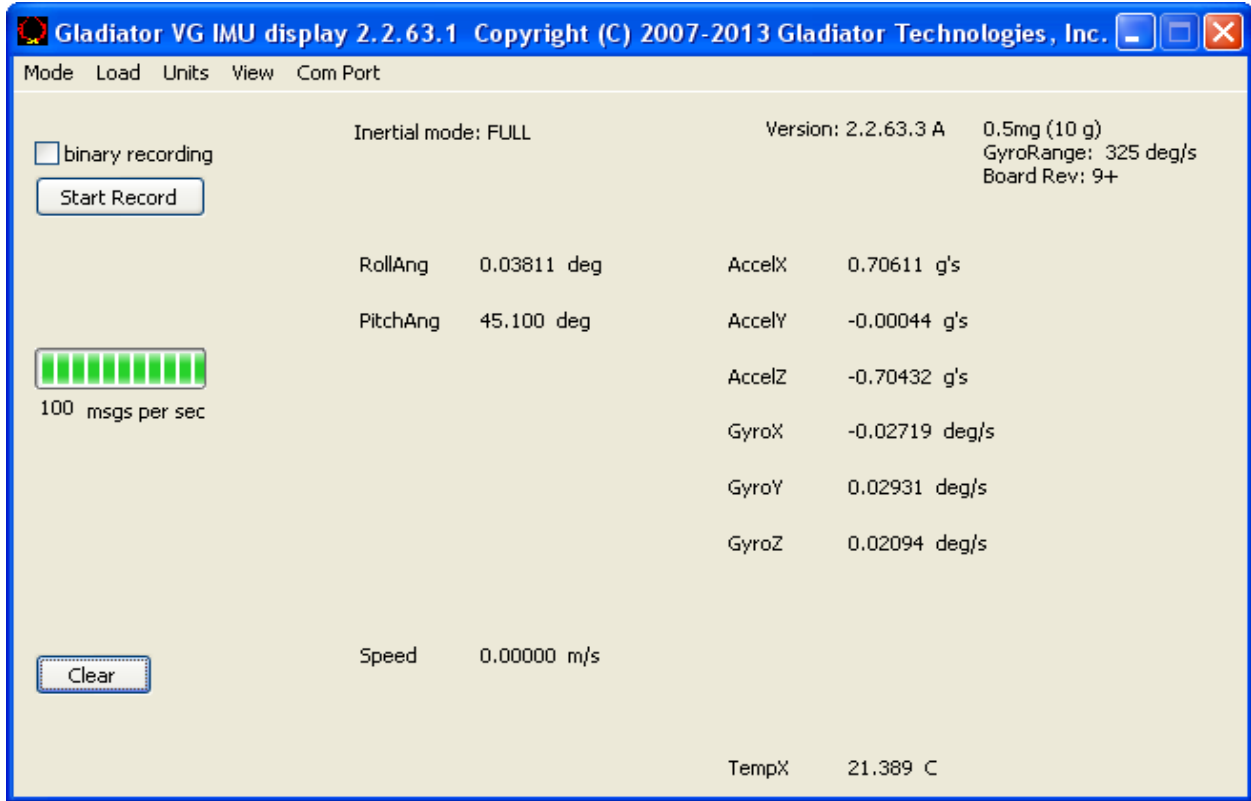
Rev. 13Feb15  
SN: 192



Initial Bench Readout (above)

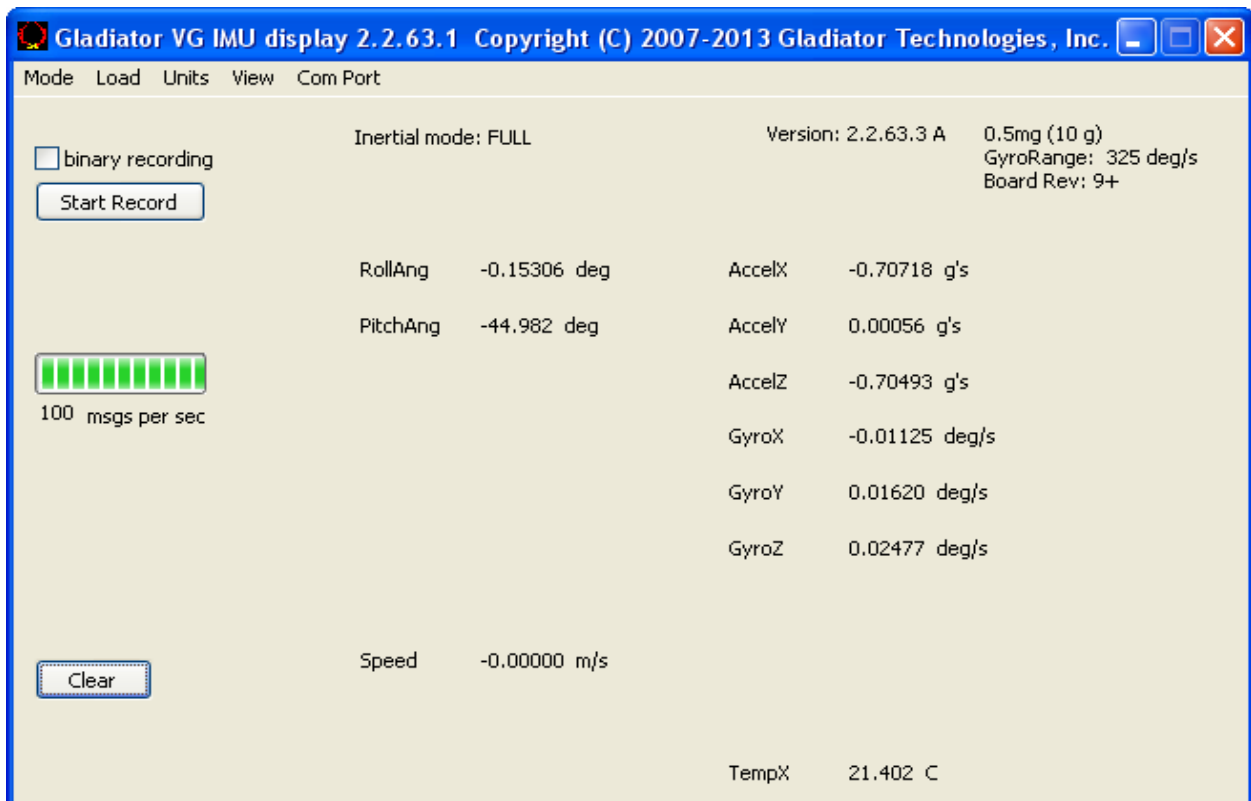
Self Test (below)

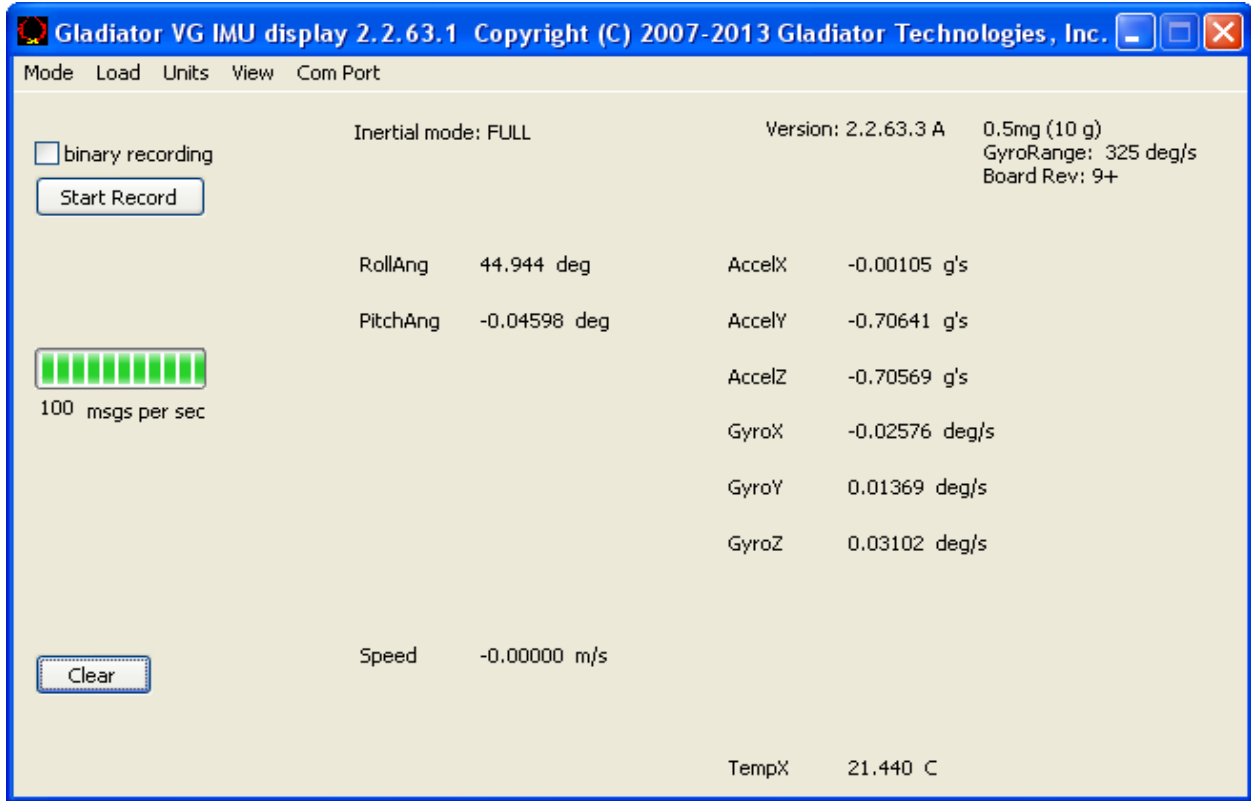




Pitch Up 45° (above)

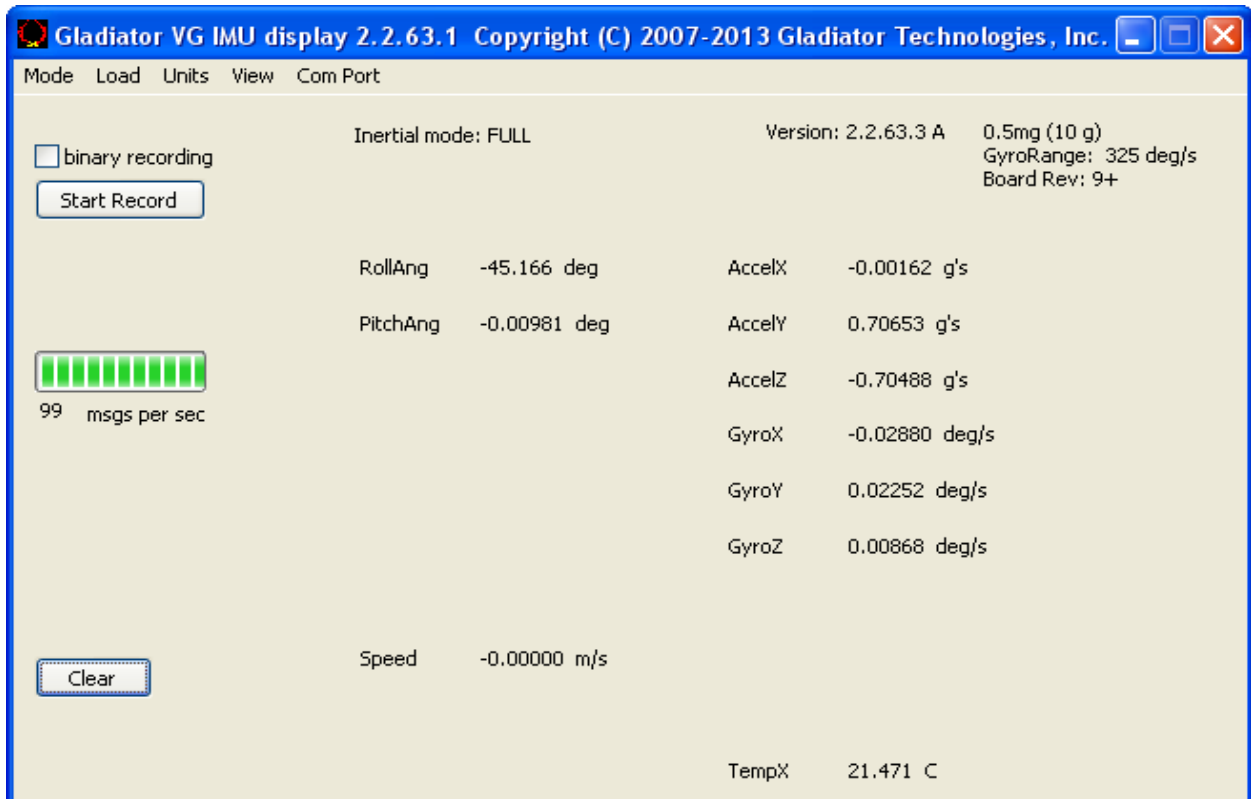
Pitch Down 45° (below)





Roll 45° (above)

Roll -45° (below)





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High Performance Inertial MEMS

SN150 ATP

1/29/2014

LMRK40VG-300-10-100

Rate Spin Test

Test	gyroX	gyroY	gyroZ	accelX	accelY	accelZ	temp X
PX	14398.02	-11.334	2.761	0.0865	-0.0215	-18.228	2662.613
NX	-14400.96	-10.541	4.048	-0.098	0.4	-18.1425	2659.607
Diff/2	14399.49	-0.3965	-0.6435	0.09225	-0.21075	-0.04275	1.503
Ave	-1.474	-10.9375	3.4045	-0.00575	0.18925	-18.18525	2661.11
PY	-21.327	14403.32	6.229	0.0555	-0.1705	-18.031	2648.521
NY	2.332	-14396.15	6.887	-0.5675	-0.12	-18.007	2645.724
Diff/2	-11.8295	14399.74	-0.329	0.3115	-0.02525	-0.012	1.3985
Ave	-9.4975	3.582	6.558	-0.256	-0.14525	-18.019	2647.123
PZ	-8.16	-10.088	14405.39	-0.244	0.051	-0.7295	2640.63
NZ	-10.047	-10.161	-14392.48	0.0835	0.0585	-0.67	2638.883
Diff/2	0.9435	0.0365	14398.94	-0.16375	-0.00375	-0.02975	0.8735
Ave	-9.1035	-10.1245	6.456	-0.08025	0.05475	-0.69975	2639.757
RSF Norm	0.999965	0.999982	0.999926				Temp °C 26.49

Gyro Mis-Align deg/sec	Input Rate			
x		-0.12	0.01	x
y	0.00		0.00	y
z	-0.01	0.00		z

Gyro Mis-align mrad	Input Rate			
x		-0.82	0.07	x
y	-0.03		0.00	y
z	-0.04	-0.02		z

Accepted by:

**GTI**  
**8**



LMRK40VG-300-10-100  
Accelerometer Tumble Test

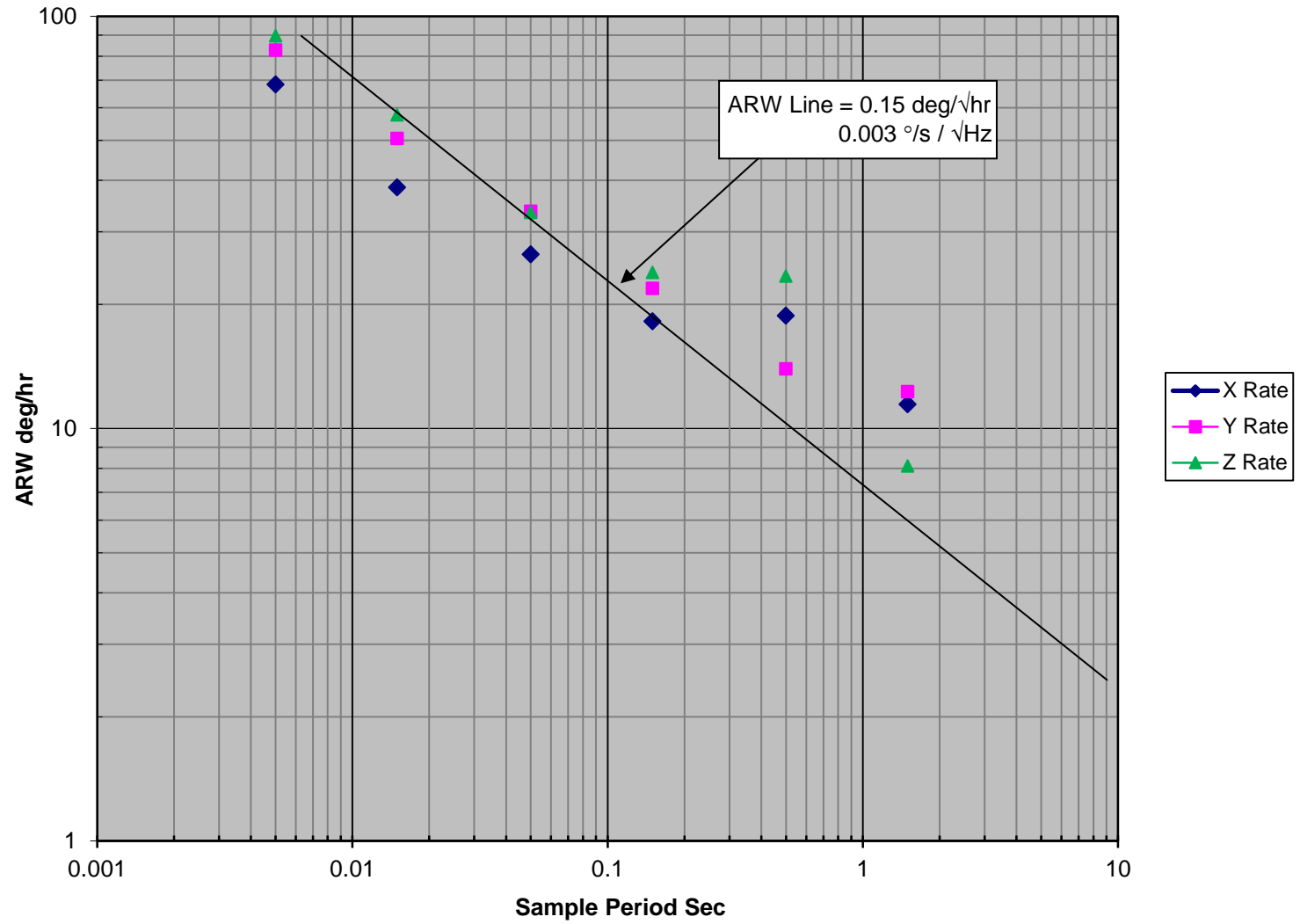
Test	gyroX	gyroY	gyroZ	accelX	accelY	accelZ	temp X
PX	-0.494	0.172	-1.117	999.4995	0.3625	-0.5705	2652.232
NX	0.482	-0.462	-0.002	-1000.7	-0.8975	0.3655	2653.972
Diff/2	-0.488	0.317	-0.5575	1000.1	0.63	-0.468	-0.87
Ave	-0.006	-0.145	-0.5595	-0.60025	-0.2675	-0.1025	2653.102
PY	-0.037	-1.775	0.267	-0.115	999.956	0.309	2670.765
NY	0.247	-0.713	-0.409	0.1695	-1000.339	-0.5095	2666.467
Diff/2	-0.142	-0.531	0.338	-0.14225	1000.147	0.40925	2.149
Ave	0.105	-1.244	-0.071	0.02725	-0.19125	-0.10025	2668.616
PZ	0.556	-0.885	-0.103	-0.001	0.483	1000.746	2669.194
NZ	-0.4	-1.067	0.417	0.257	0.8985	-999.28	2672.874
Diff/2	0.478	0.091	-0.26	-0.129	-0.20775	1000.013	-1.84
Ave	0.078	-0.976	0.157	0.128	0.69075	0.733	2671.034
Bias %s,mg	0.001	-0.008	-0.002	0.08	0.21	-0.10	26.64
ASF Norm				1.0001	1.0001	1.0000	Temp °C

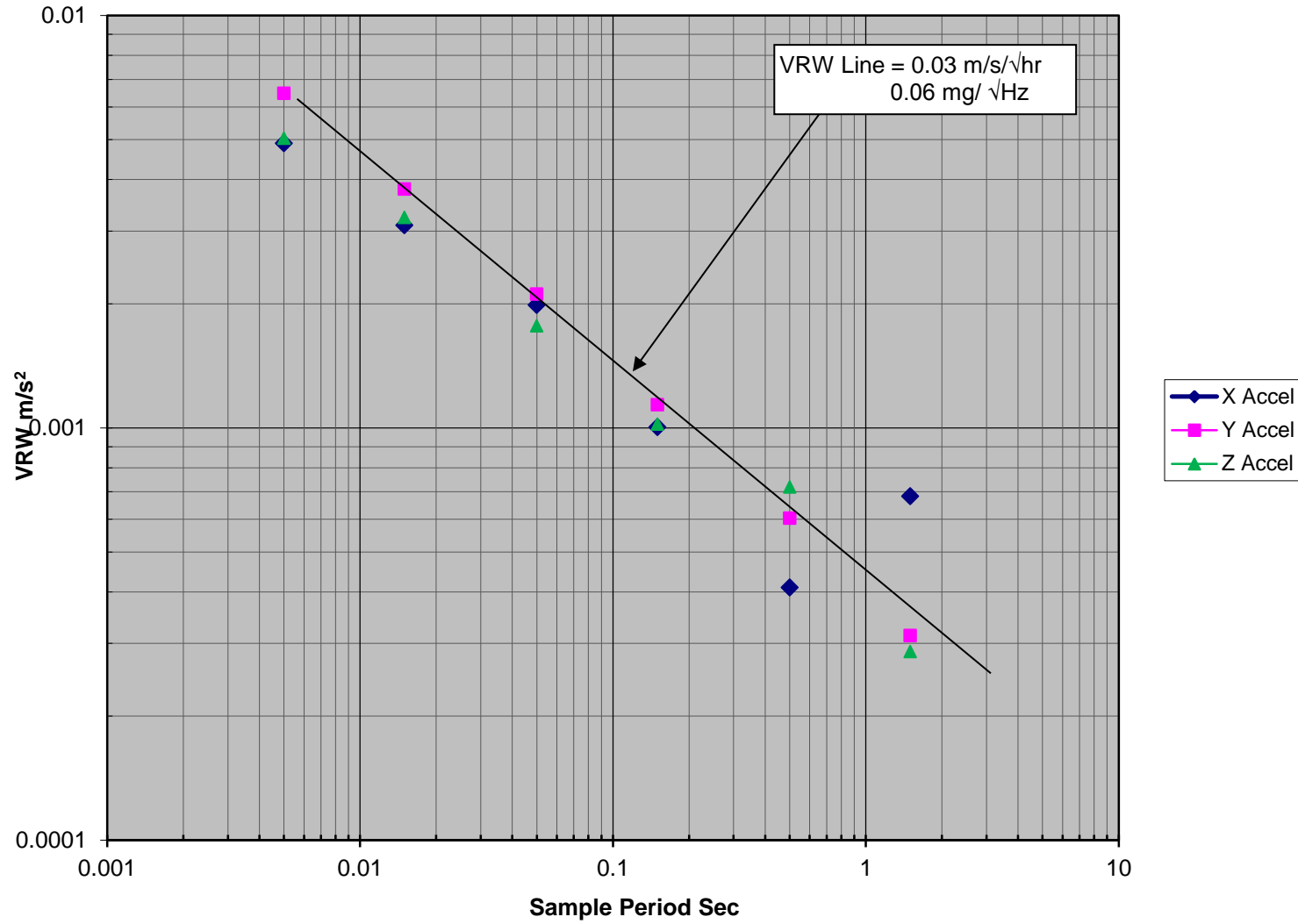
Gyro %s /g	Input g =			Accel In g's
x	-0.005	-0.001	0.005	x
y	0.003	-0.005	0.001	y
z	-0.006	0.003	-0.003	z

Accel		
Mis-Align	mrads	Accel In
-0.14	-0.13	x
0.63	-0.21	y
-0.47	0.41	z

Accepted by:

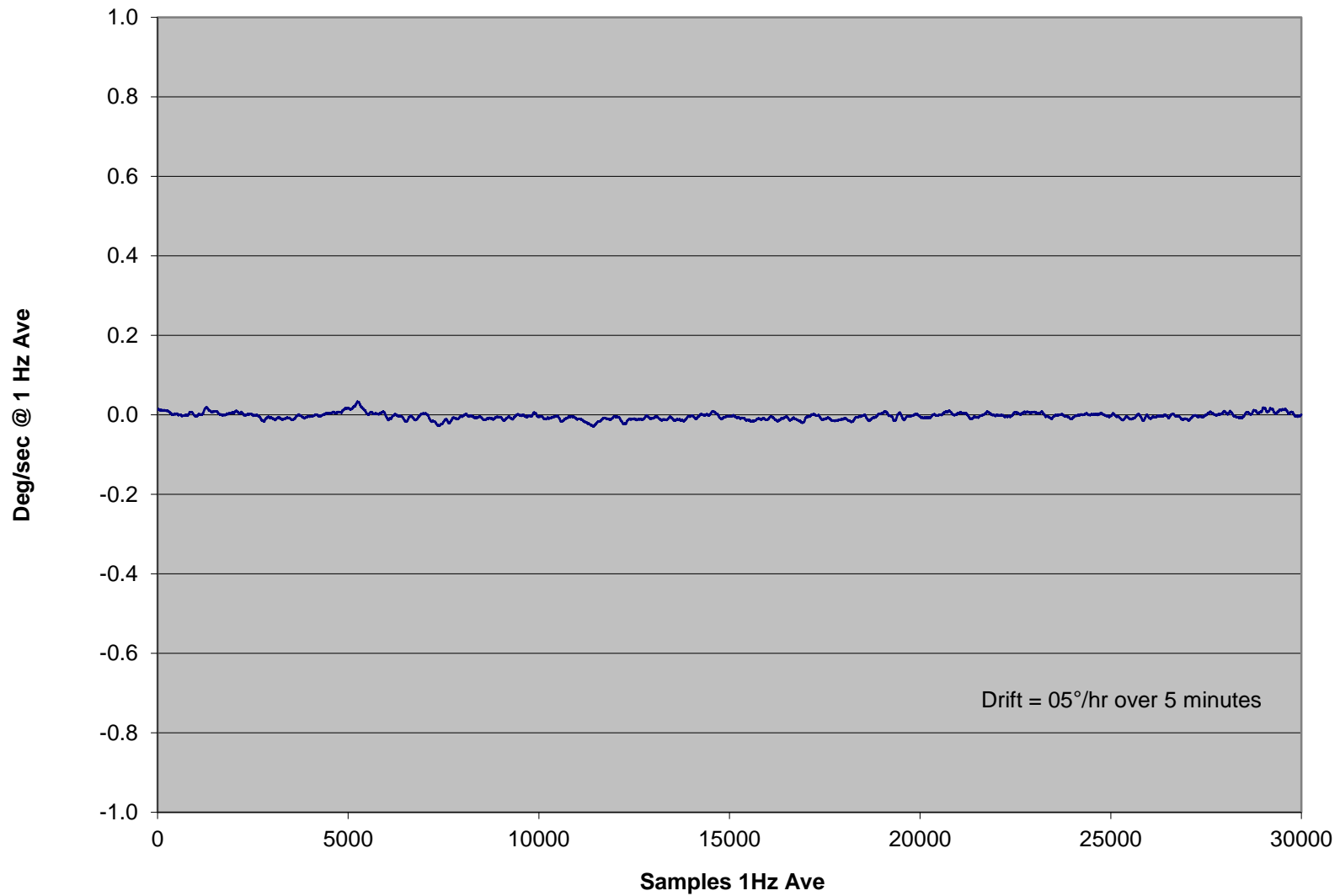




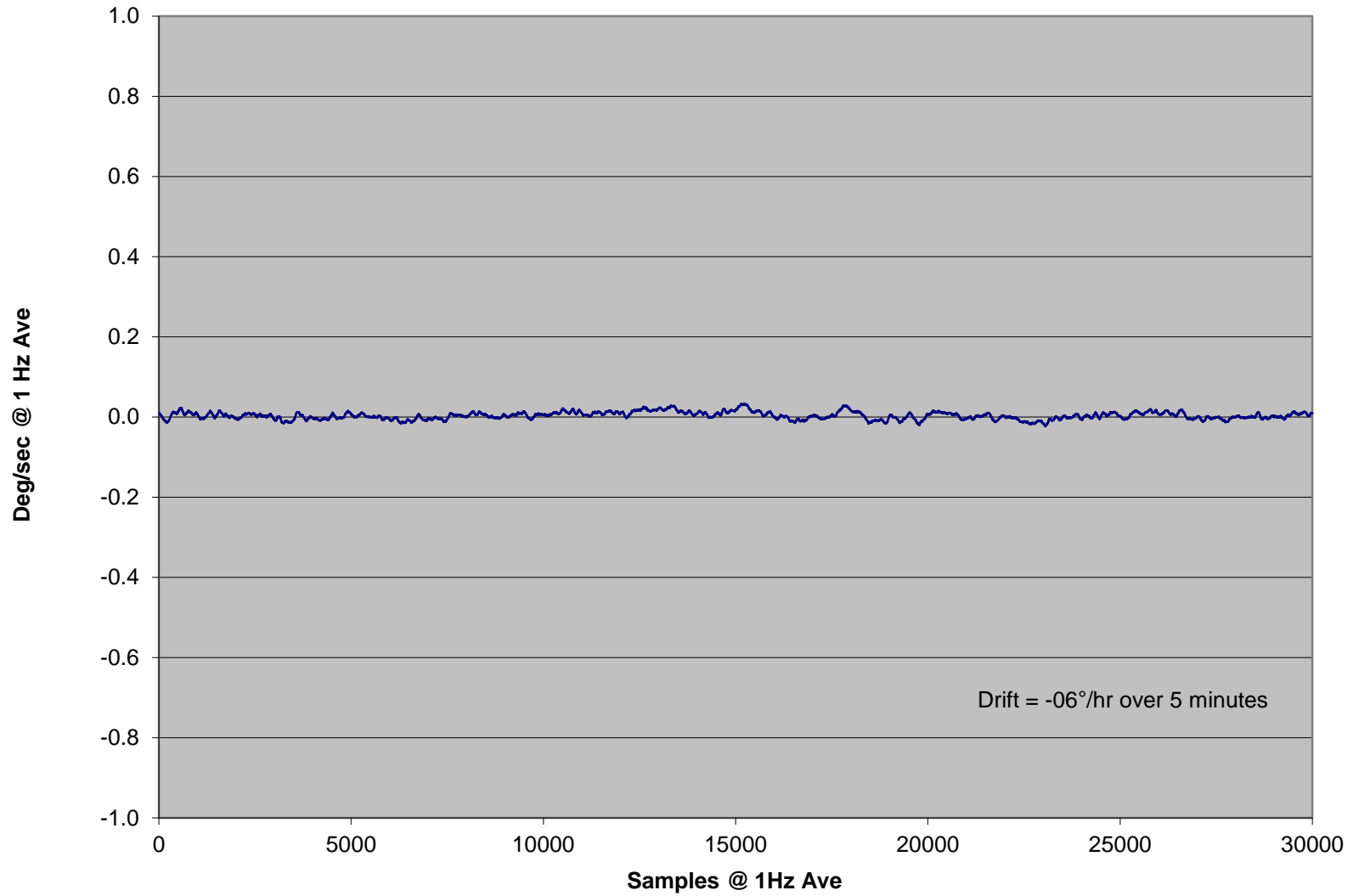




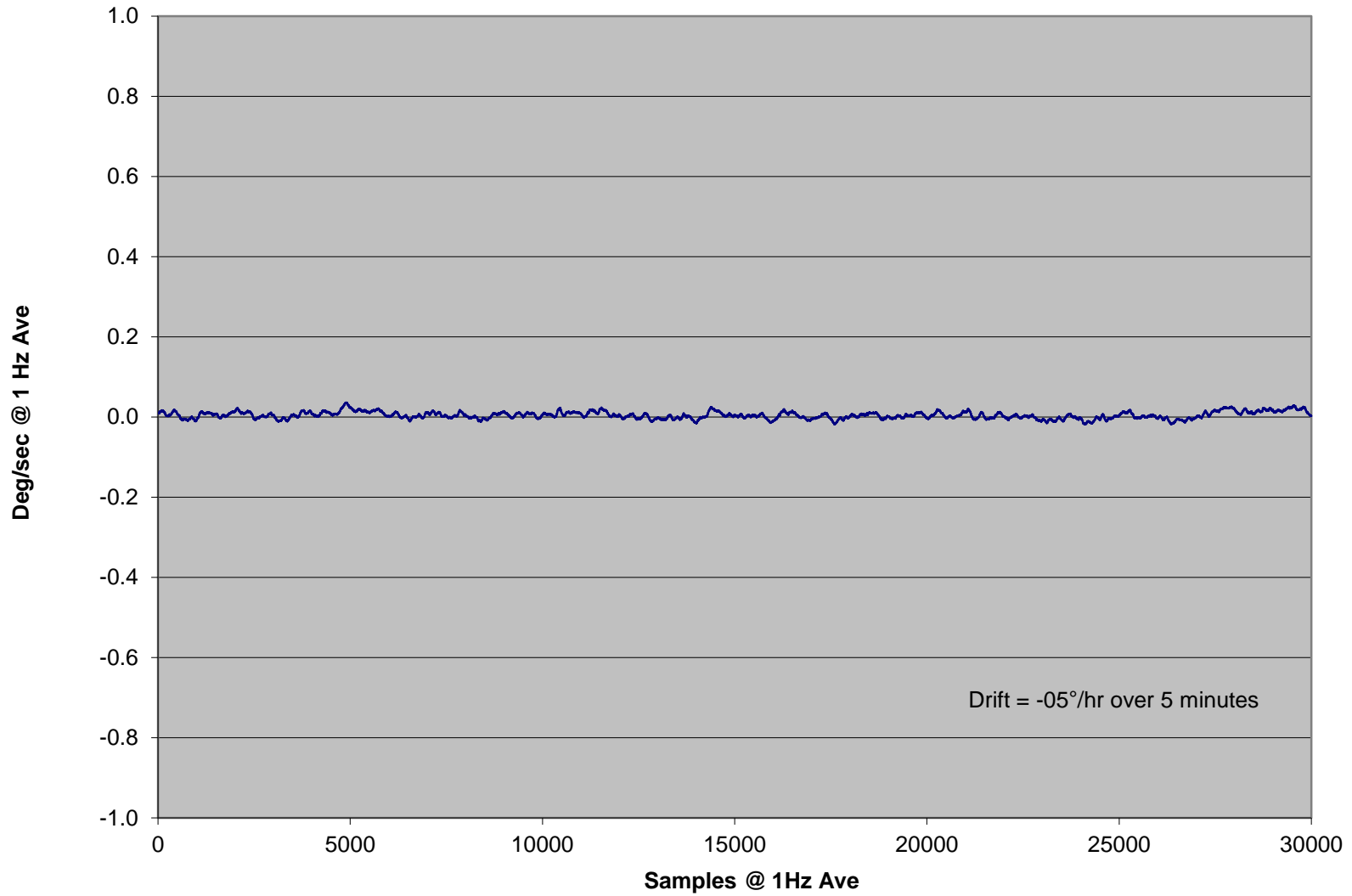
### X Gyro In-Run Bias



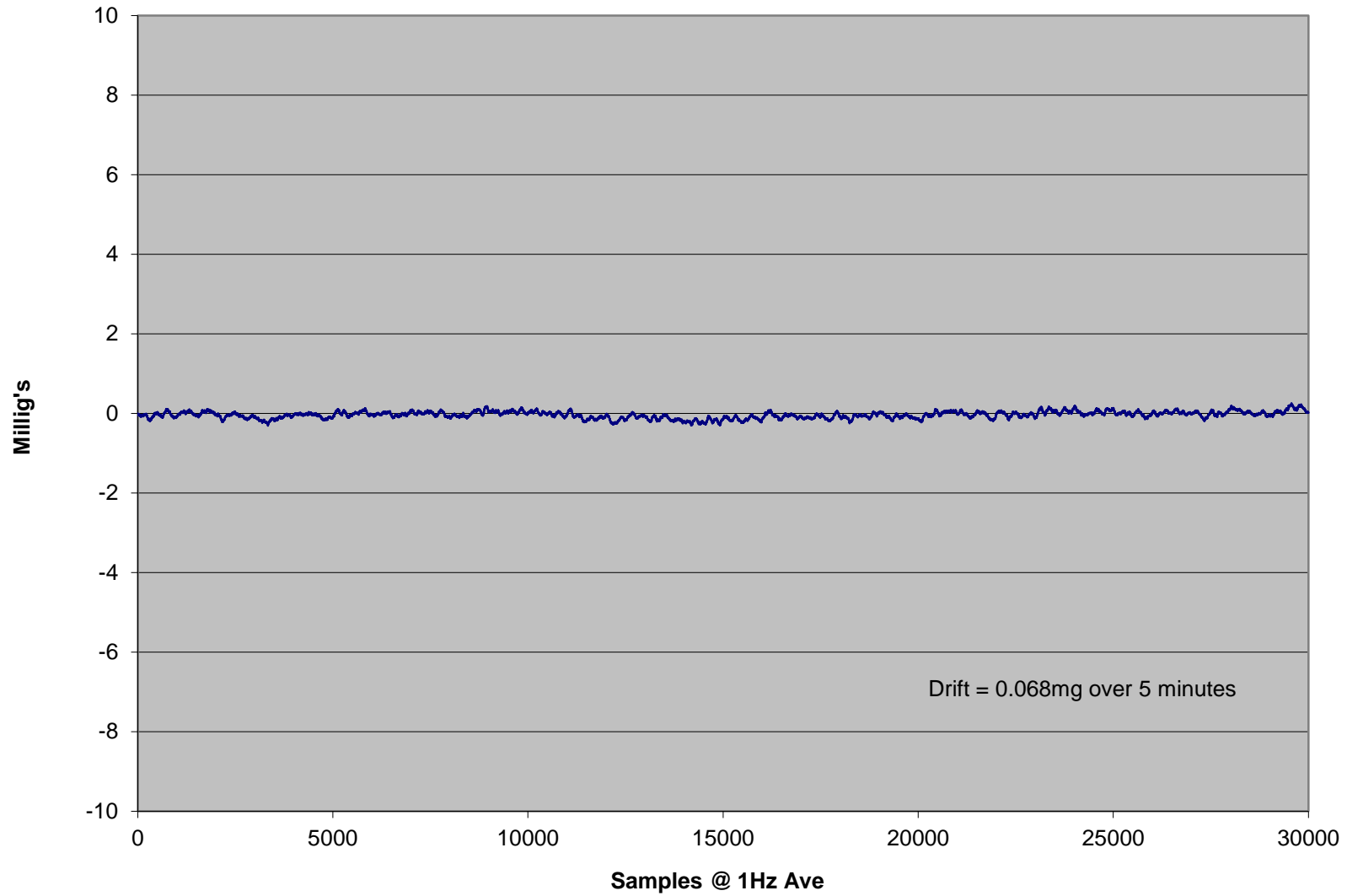
### Y Gyro In-Run Bias



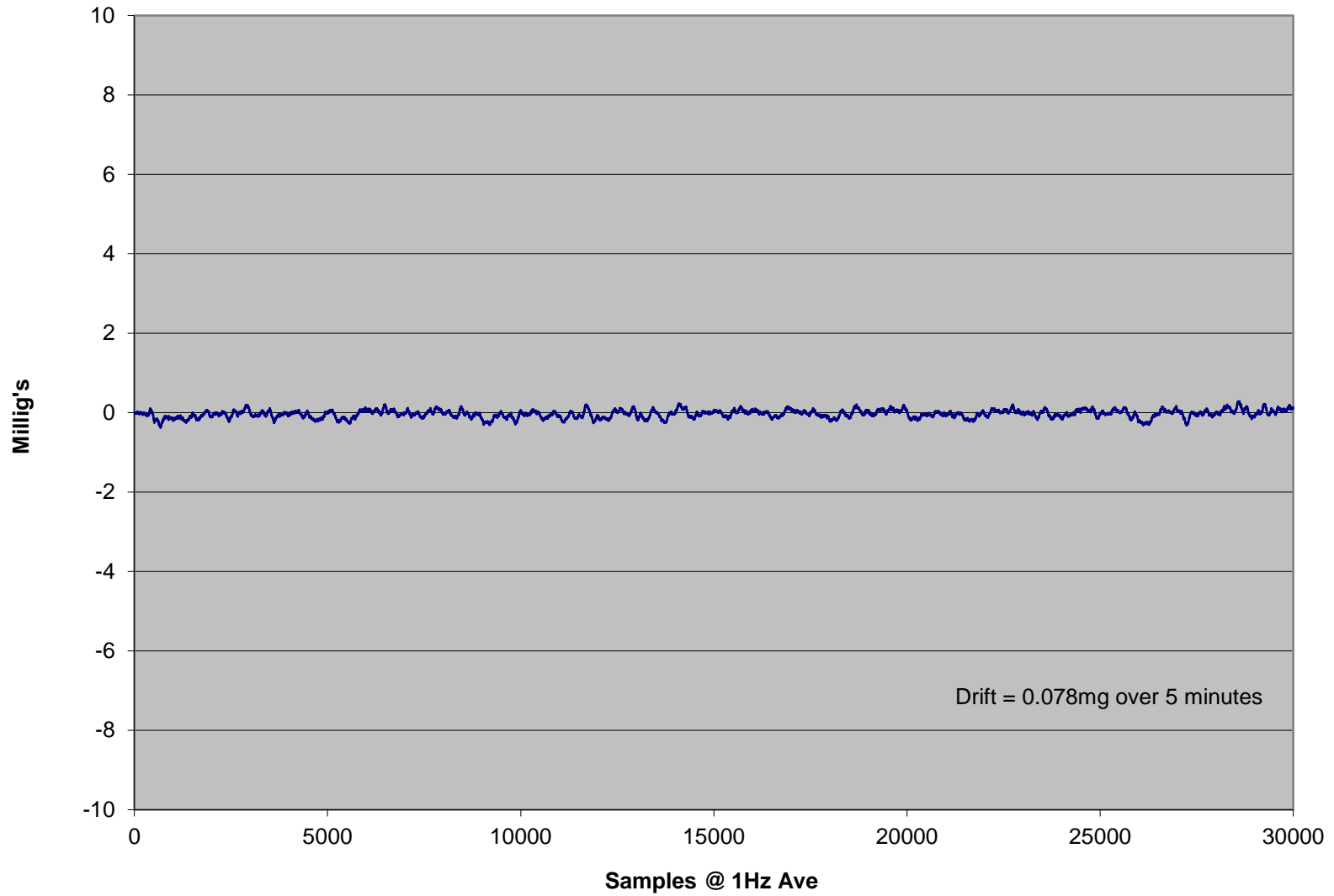
### Z Gyro In-Run Bias



### X Accel In-Run



### Y Accel In-Run



### Z Accel In-Run

