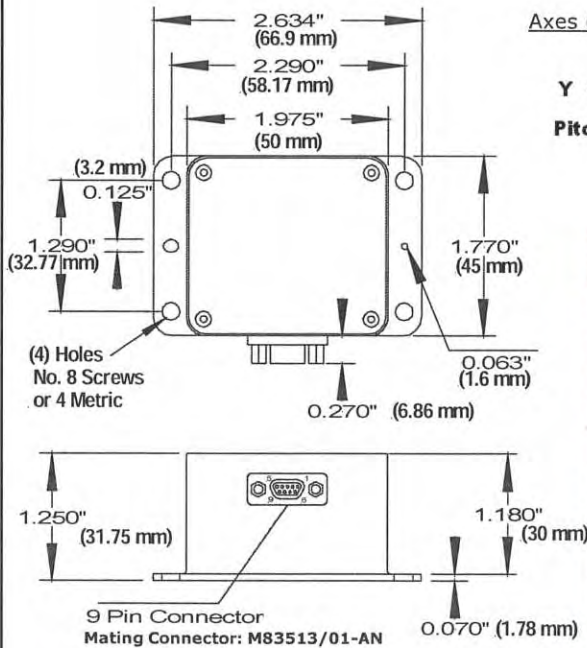
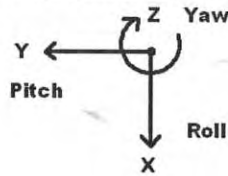


LandMark™ 20 Vertical Gyro (VG)



Axes (Top View) Right Hand Rule



LandMark™ VG

LMRK20VG-075-02-100 or -10
LMRK20VG-150-02-100 or -10
LMRK20VG-300-02-100 or -10

Specification

PARAMETER	RATE AXES			ACCEL AXES	
	±75°/sec	±150°/sec	±300°/sec	±2 g's	±10 g's
Range	±75°/sec	±150°/sec	±300°/sec	±2 g's	±10 g's
Bias (Over Temp.)	<0.05°/sec typical			< 1.0mg 1σ	< 1.5mg 1σ
Bias (In Run Stability)	15°/hour 1σ			0.02mg 1σ	0.1mg 1σ
Scale Factor Error %	≤0.1% (over temperature)				
Resolution	0.005°/sec			0.025mg	0.08mg
Angle Random Walk (Typical)	0.01°/ /sec-√Hz 1σ			0.05mg/ /√Hz 1σ	0.16mg/ /√Hz 1σ
Pitch & Roll Angles	± 0.25° typical				
Alignment	1mrad typical				
G-Sensitivity	<0.02°/sec/g typical				
Self Test On	Δ 50 ± 25°/sec			Δ 1.5 ±0.5g	Δ 0.3 ±0.2g
	Logic 1 = 3V to 5V at Pin 9 (open = off)				
Temp Range	Operating: -40°C to +85°C Non-Operating: -55°C to +85°C				
Pitch & Roll	± 0.25° typical				
Update Rate	100 Hz (user selectable)				
Temp Sensors	Internal Temperature Sensors				
Start-up Time	< 0.65 sec AHRS 200 Hz Spec Mode				
Input Power	+3.1V to 5.5V Max. Input (single sided)				
Power Consumption	400 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 ³			
	Metric:	5 x 4.5 x 3.2 = 72 cm ³			
Weight	105 grams				
Mounting	4ea No.8 or M4 Screws				
Shock	500g's ½ sine 30 msec powered				
Vibration	6gRMS (20Hz to 2KHz ~ 10g accelerometers)				
MTBF	55,279 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 Input (0V to 5V)
5	+3.1V to +5.5V Input Power
6	External Sync Input (1kHz or 1pps)
7	+5V Regulator Out
8	Signal Ground
9	Self Test

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, Zero Yaw
15, 16, 17	AC Velocities: (X), (Y) & Vertical Velocity: (Z)
18, 19, 20	No Altitude, Temp, Forward Velocity (As Input)

Specification subject to change without notice



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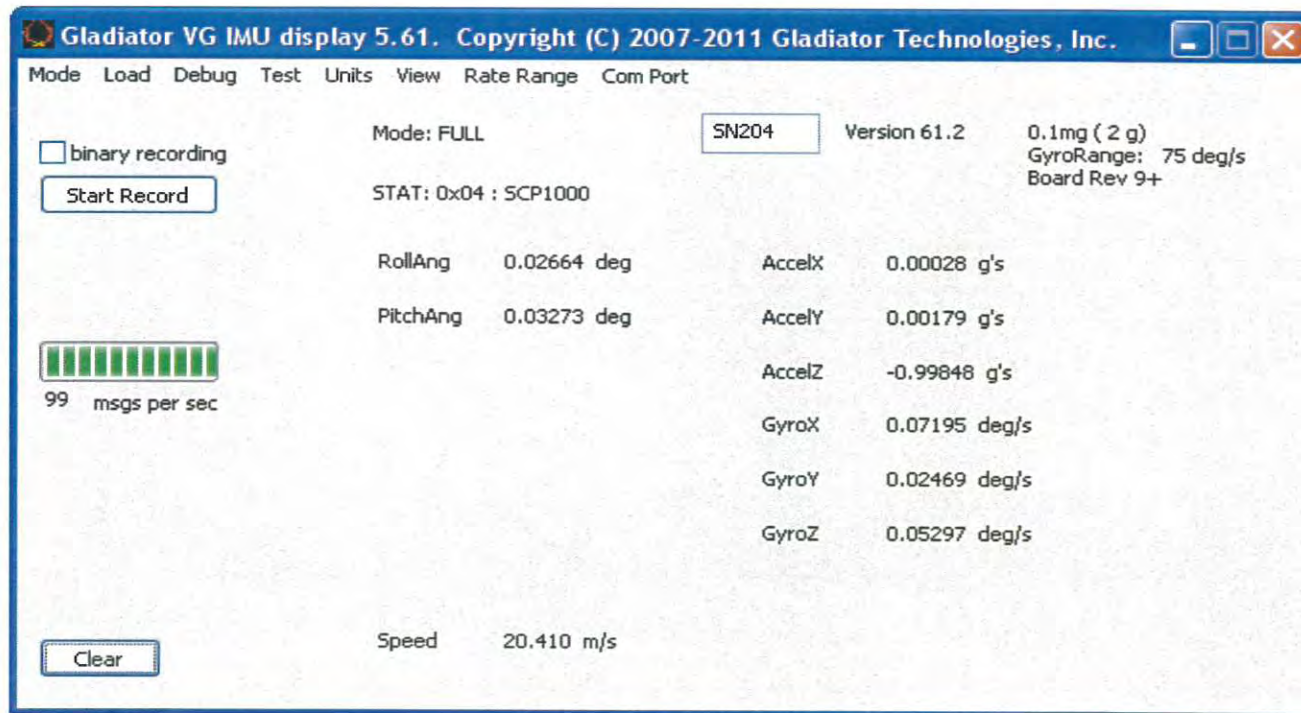


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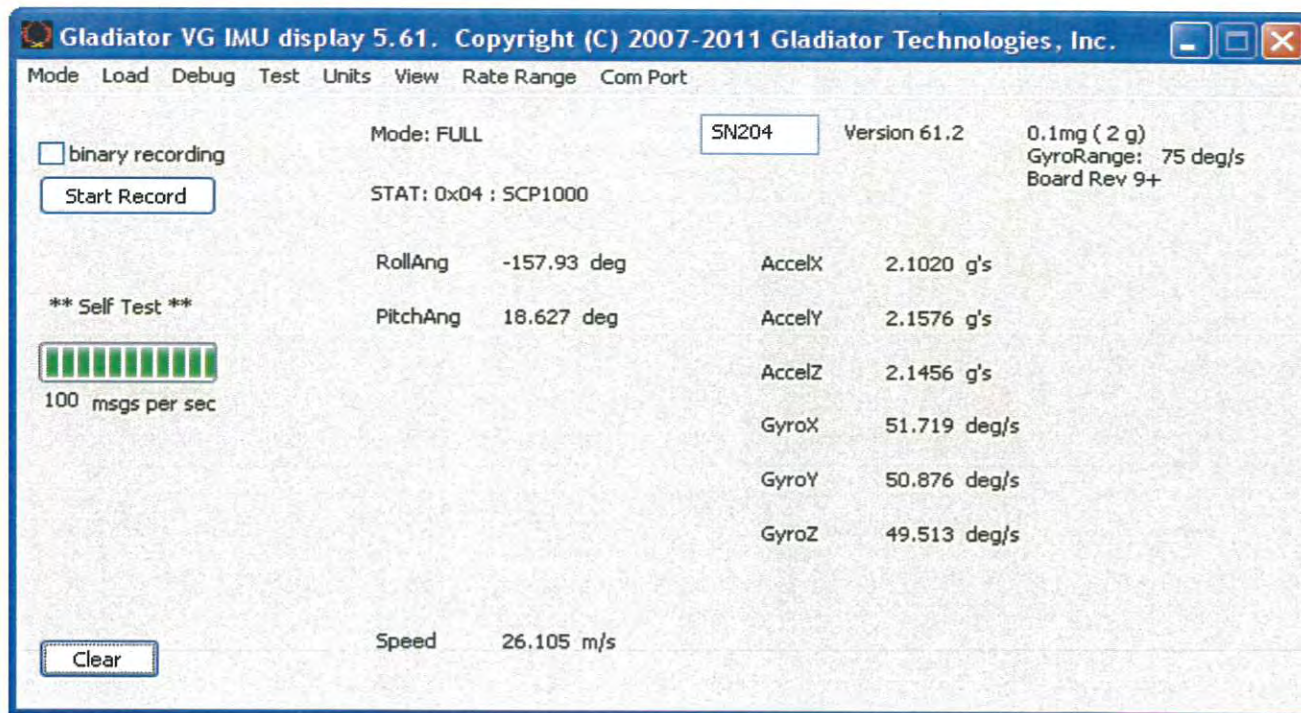
8022 Bracken Place SE
Snoqualmie, WA 98065 USA
Tel: 425.396.0829 Fax: 425.396.1129
Email: sales@gladiatortechnologies.com
Web: www.gladiatortechnologies.com

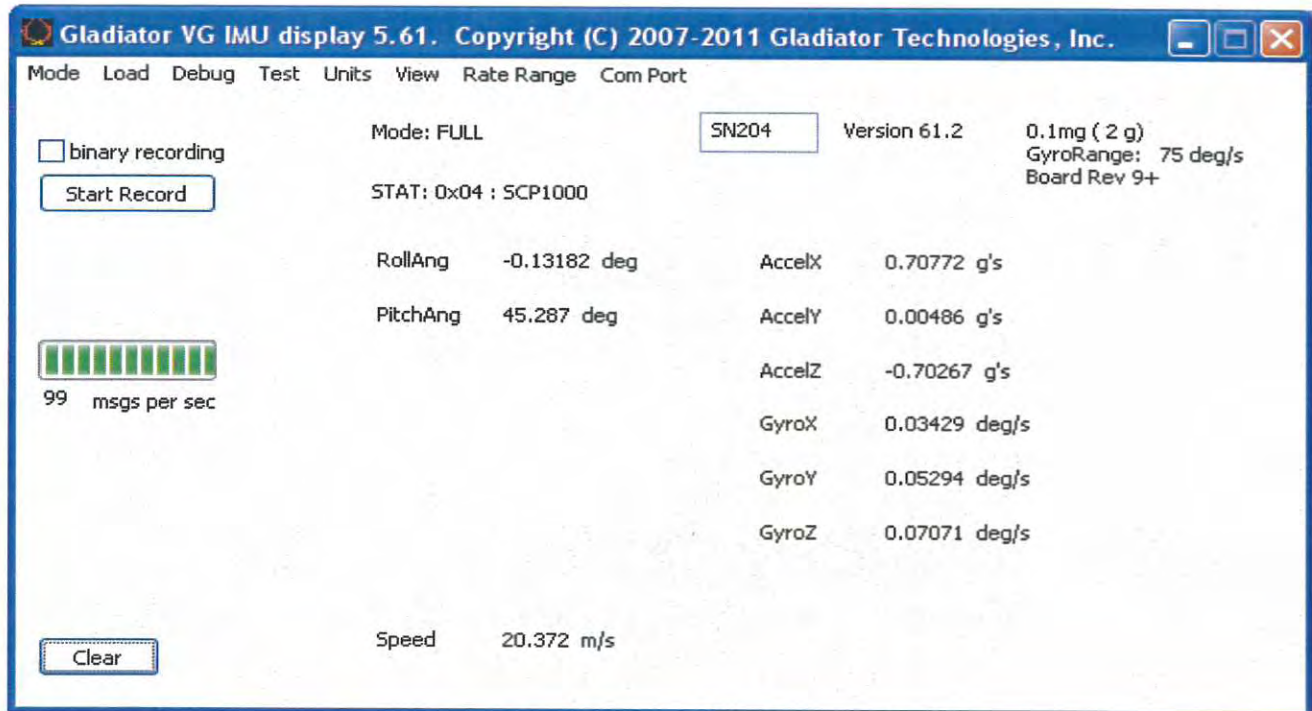
Rev. Jan1212
SN: 150



Initial Bench Readout (above)

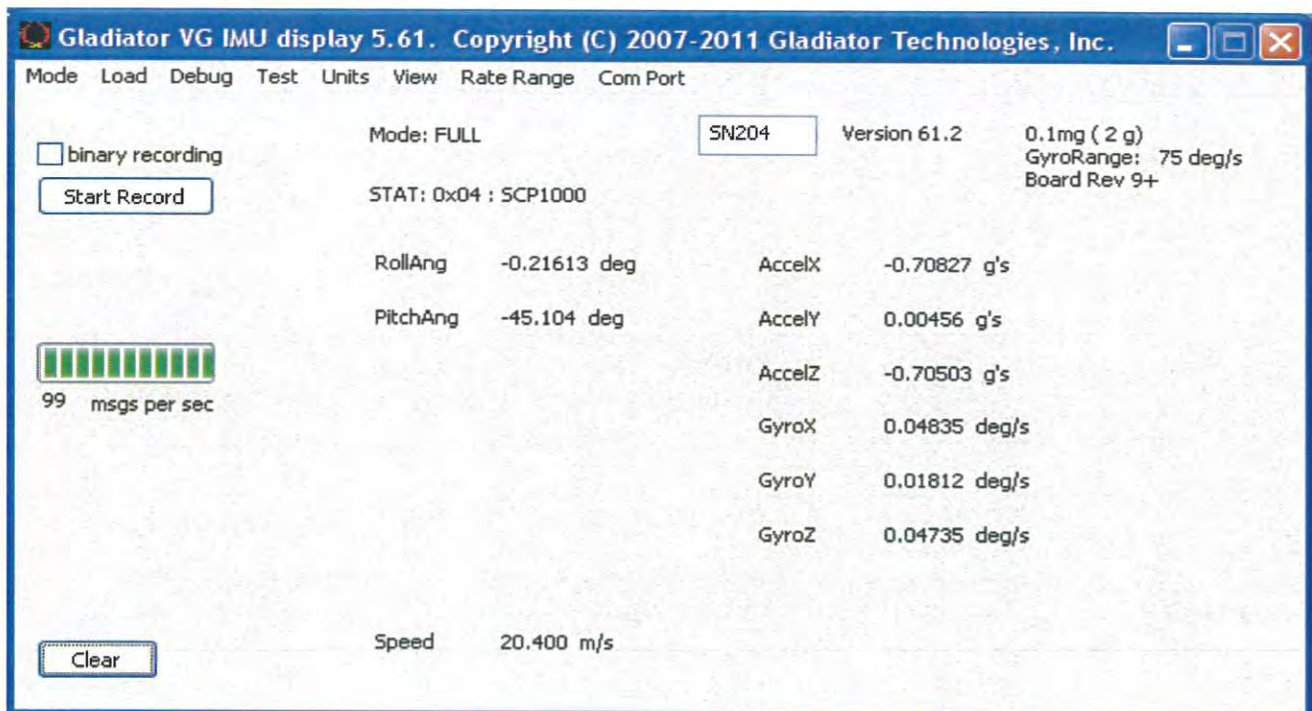
Self Test (below)

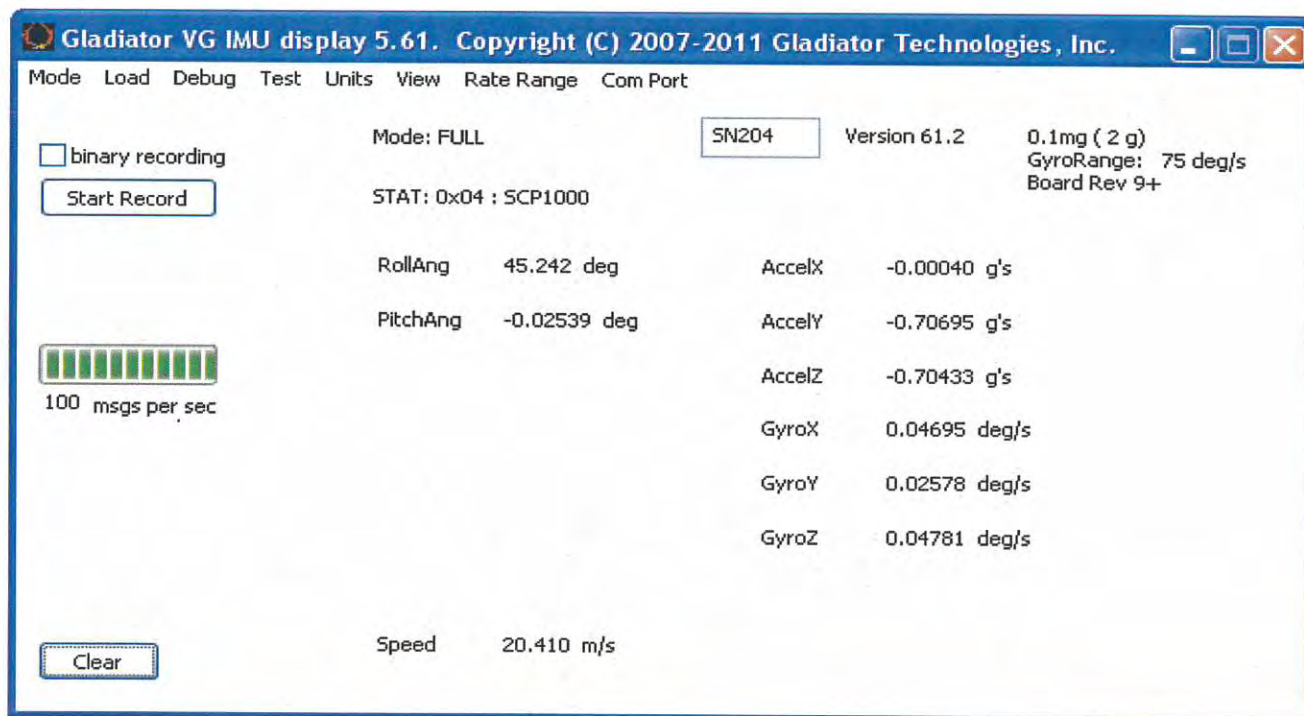




Pitch Up 45° (above)

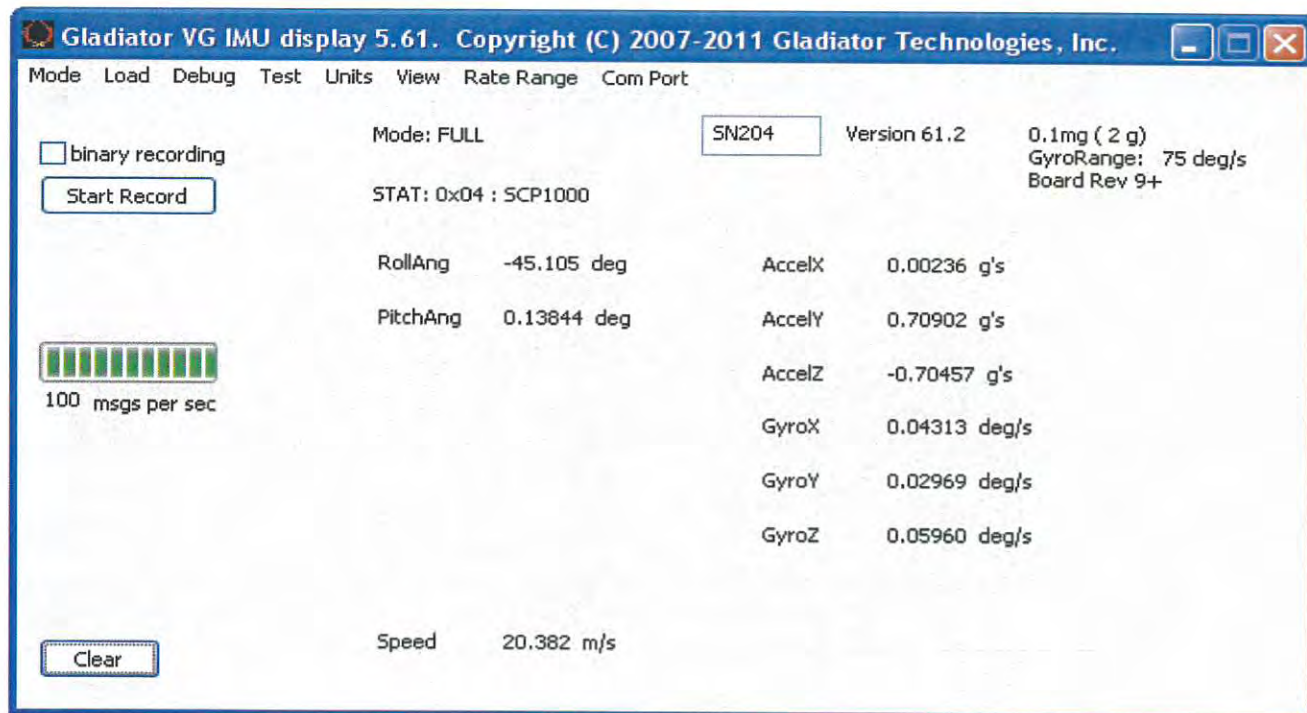
Pitch Down 45° (below)





Roll 45° (above)

Roll -45° (below)





LMRK20VG-075-02-100
VG eXT
Rate Spin Test

Test	gyroX	gyroY	gyroZ	accelX	accelY	accelZ	temp X
PX	3598.496	-1.582	1.039	-0.4904	-3.1617	-1.5006	2294.482
NX	-3599.46	-3.519	0.085	-0.4361	-2.0721	-2.1465	2293.533
Diff/2	3598.976	0.9685	0.477	-0.02715	-0.5448	0.32295	0.4745
Ave	-0.4795	-2.5505	0.562	-0.46325	-2.6169	-1.82355	2294.008
PY	-1.359	3597.656	0.52	1.6619	-1.1111	-1.4322	2289.675
NY	-1.486	-3601.43	-0.536	0.5929	-1.2083	-2.1361	2290.336
Diff/2	0.0635	3599.545	0.528	0.5345	0.0486	0.35195	-0.3305
Ave	-1.4225	-1.889	-0.008	1.1274	-1.1597	-1.78415	2290.006
PZ	-2.597	-2.464	3601.014	-2.3598	-2.7663	0.5683	2276.188
NZ	-0.919	-2.577	-3601.14	-1.2538	-3.7414	0.5278	2276.08
Diff/2	-0.839	0.0565	3601.075	-0.553	0.48755	0.02025	0.054
Ave	-1.758	-2.5205	-0.0605	-1.8068	-3.25385	0.54805	2276.134
RSF Norm	0.999715	0.999874	1.000298				Temp °C 22.87

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

Gyro Mis-align mrad				Input Rate
x		0.02	-0.23	x
y	0.27		0.02	y
z	0.13	0.15		z





LMRK20VG-075-02-100

VG eXT

Accelerometer Tumble Test

Test	gyroX	gyroY	gyroZ	accelX	accelY	accelZ	temp X
PX	-0.823	-0.78	0.496	999.9655	-1.2121	2.6078	2286.319
NX	-1.124	-0.387	0.615	-1000.25	-1.2719	1.1106	2288.281
Diff/2	0.1505	-0.1965	-0.0595	1000.107	0.0299	0.7486	-0.981
Ave	-0.9735	-0.5835	0.5555	-0.1415	-1.242	1.8592	2287.3
PY	0.143	-0.31	1.723	-0.7239	999.4043	1.9174	2295.346
NY	-1.808	-0.435	-0.202	-0.1679	-1000.59	2.1582	2295.227
Diff/2	0.9755	0.0625	0.9625	-0.278	999.9969	-0.1204	0.0595
Ave	-0.8325	-0.3725	0.7605	-0.4459	-0.5926	2.0378	2295.287
PZ	-1.972	-0.839	0.879	-0.4834	0.3643	1001.645	2295.76
NZ	-0.496	-0.427	0.771	-0.4605	0.2808	-997.685	2294.747
Diff/2	-0.738	-0.206	0.054	-0.01145	0.04175	999.6652	0.5065
Ave	-1.234	-0.633	0.825	-0.47195	0.32255	1.98005	2295.254
Bias %/s,mg	-0.01	-0.01	0.01	-0.46	-0.46	1.95	22.93
ASF Norm				1.0001	1.0000	0.9997	Temp °C

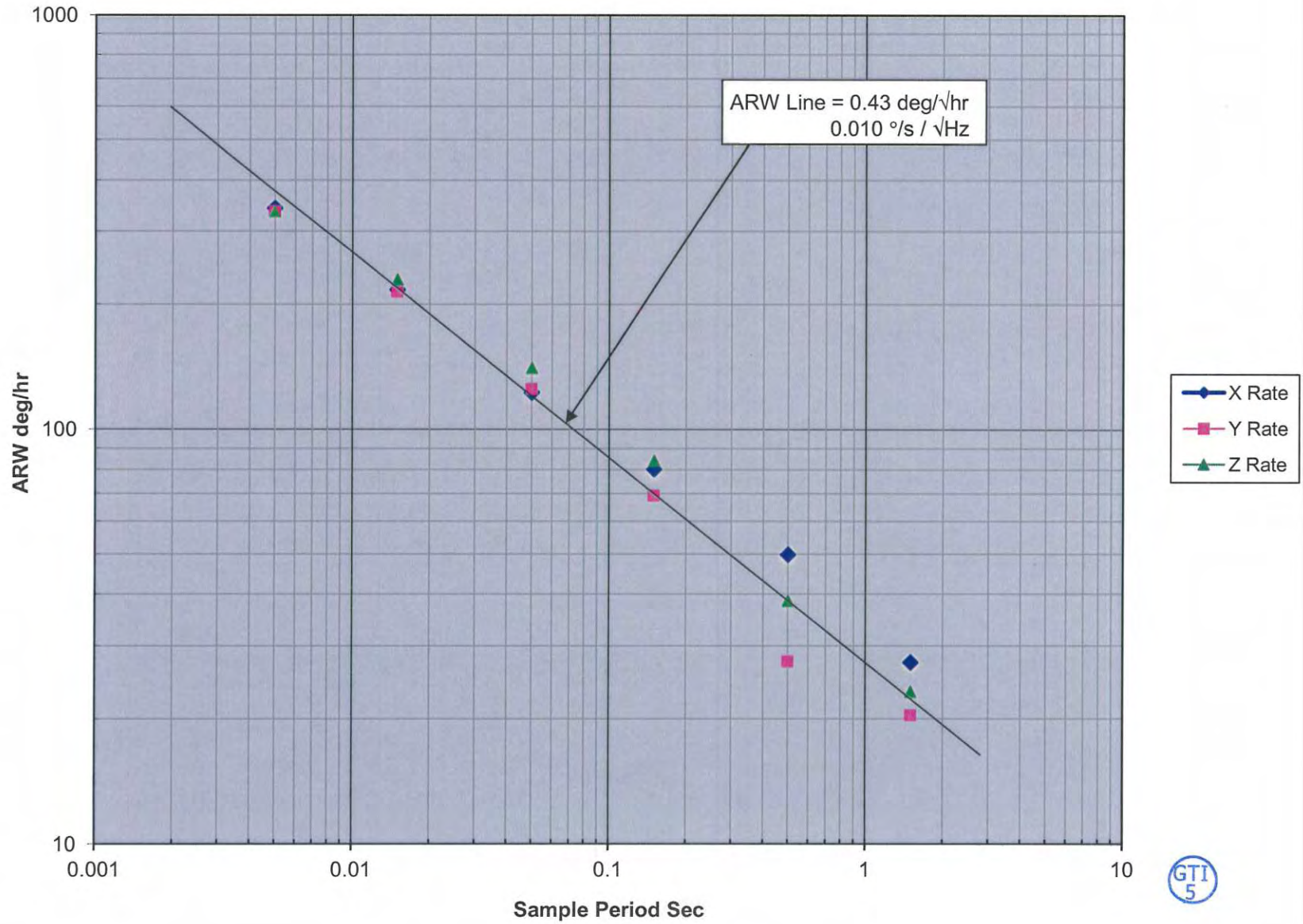
Gyro %/s /g	Input g =			Accel In
	x	y	z	g's
x	0.002	0.010	-0.007	x
y	-0.002	0.001	-0.002	y
z	-0.001	0.010	0.001	z

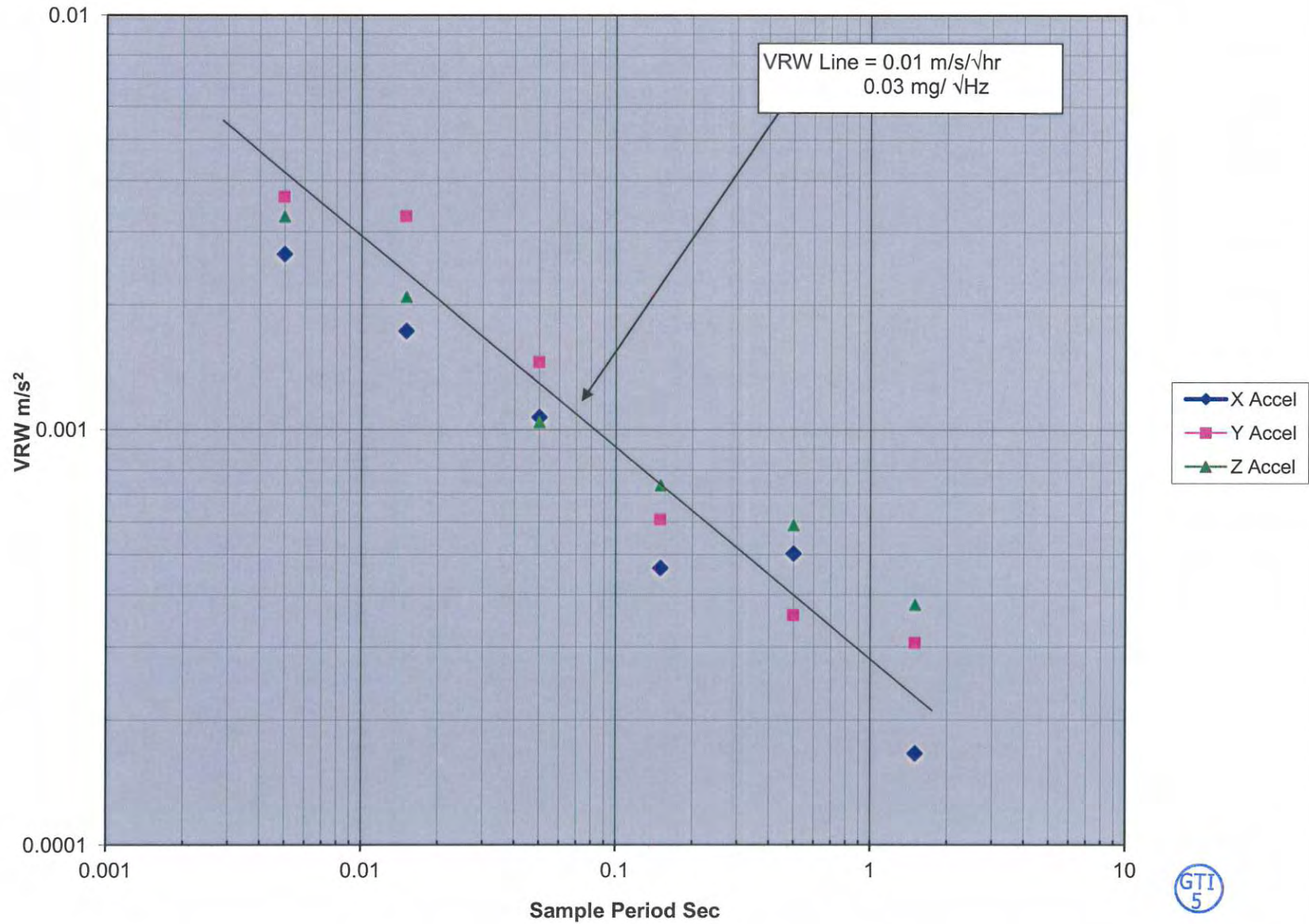
Accel	Mis-Align	mrads	Accel In
	-0.28	-0.01	x
0.03		0.04	y
0.75	-0.12		z



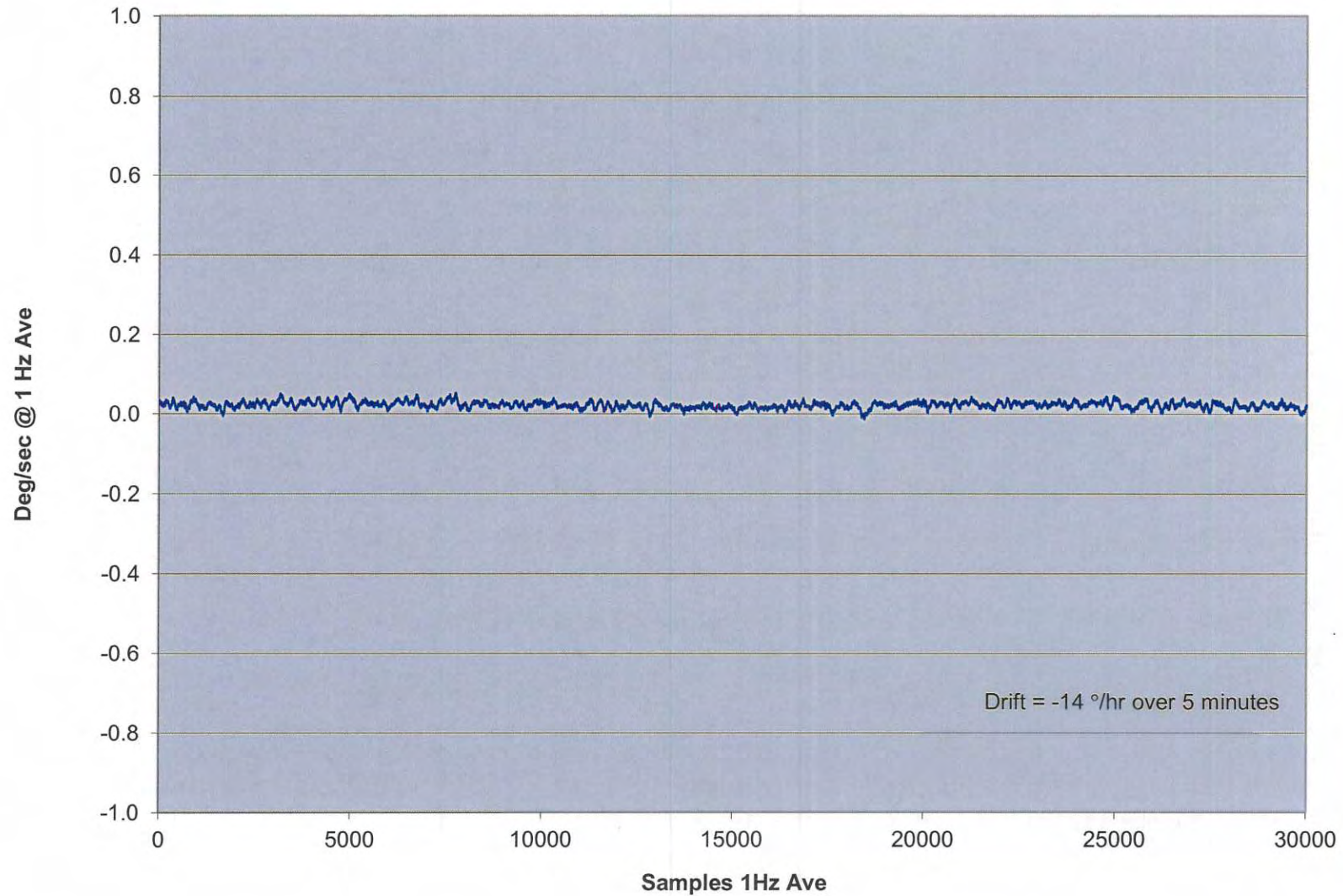
Ray Fritch

Accepted by:

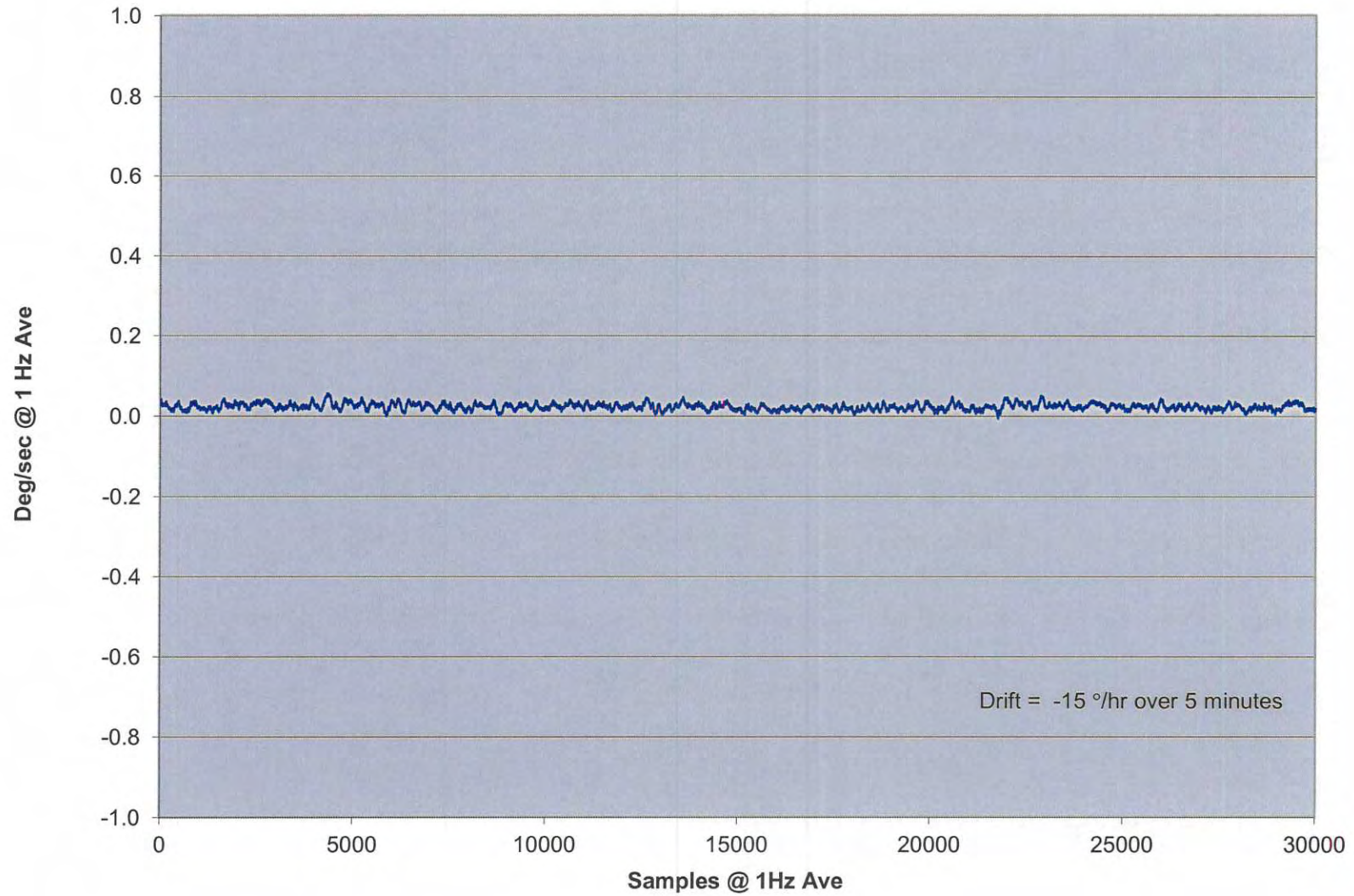




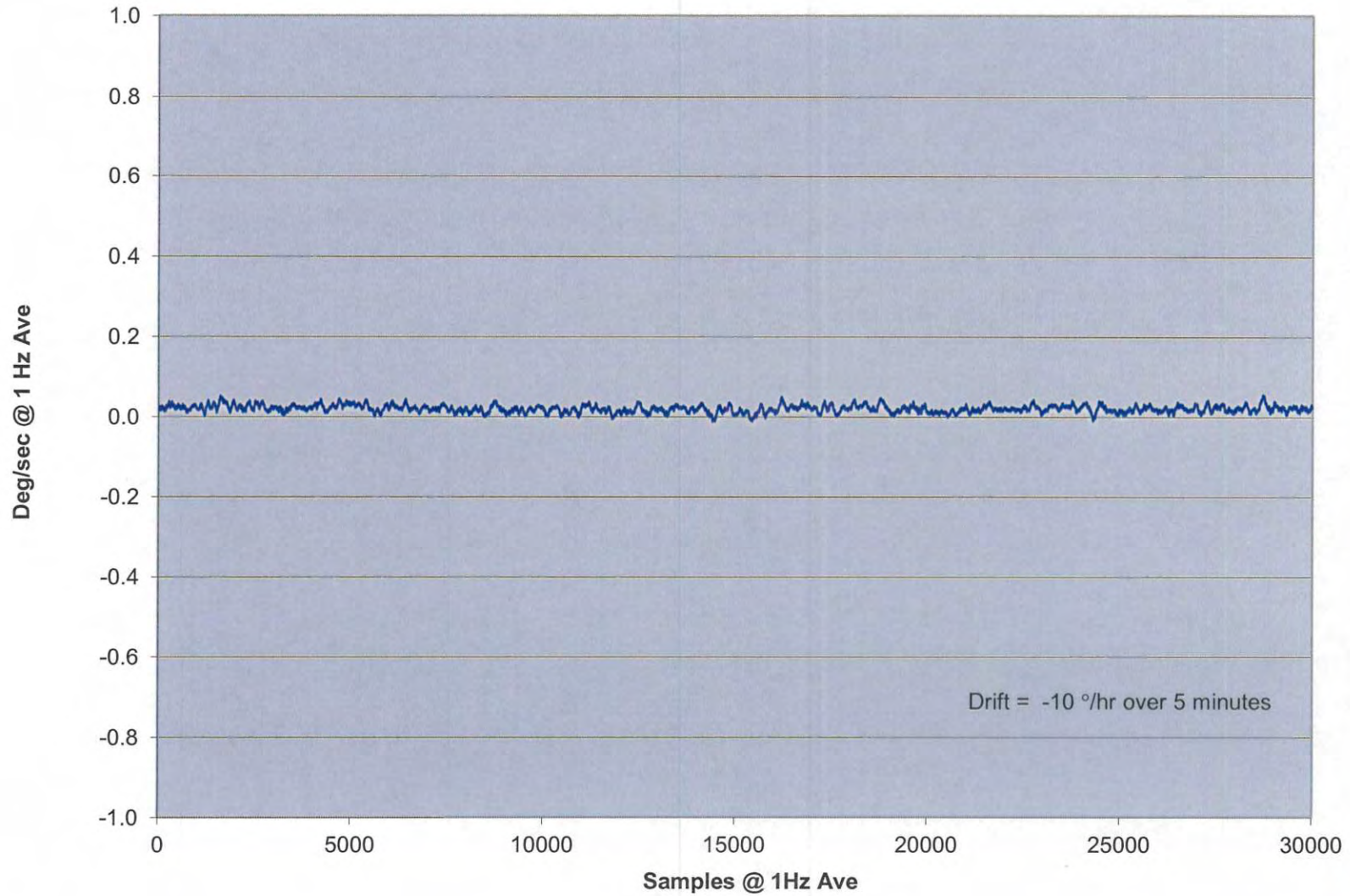
X Gyro In-Run Bias



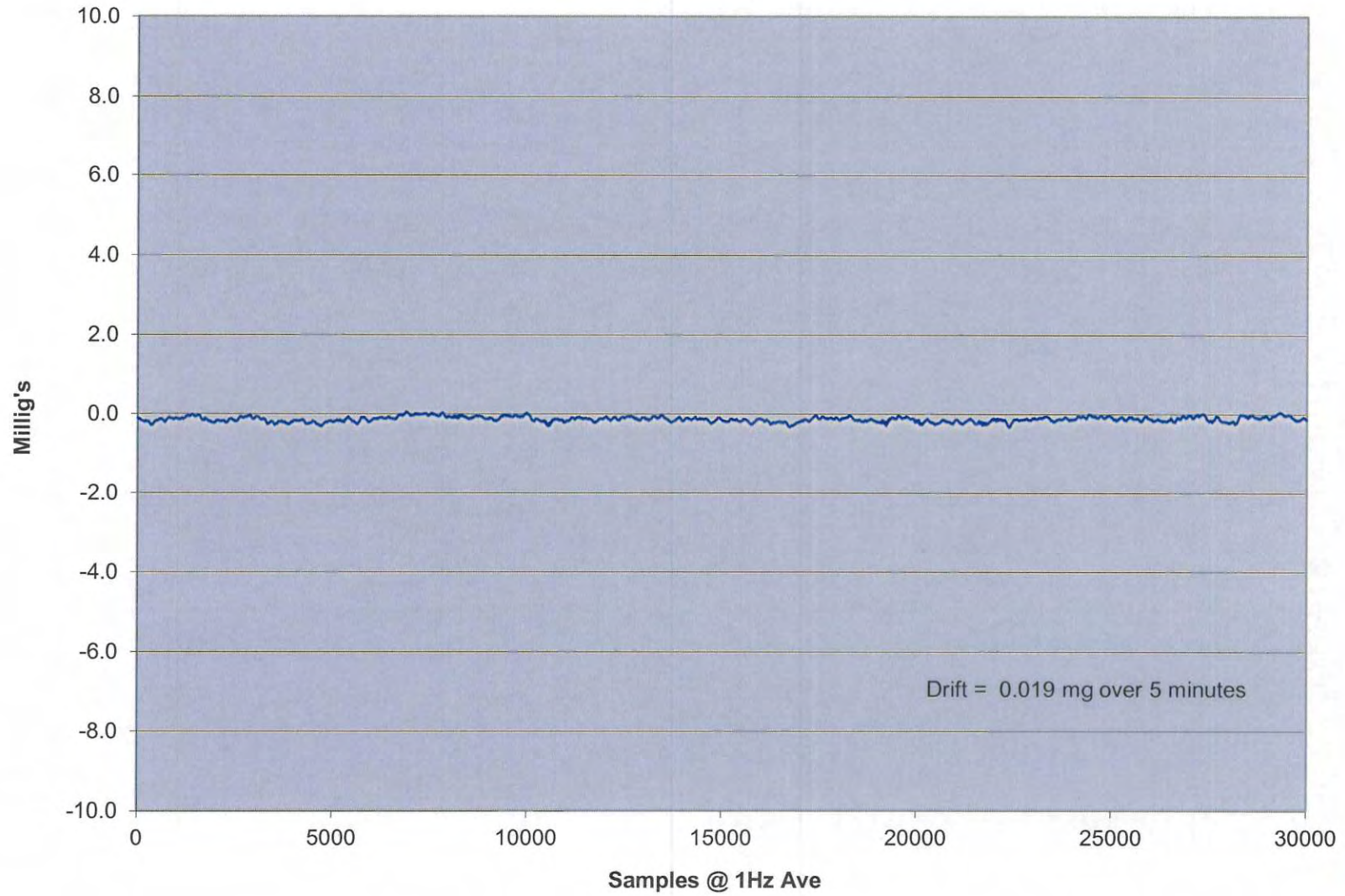
Y Gyro In-Run Bias



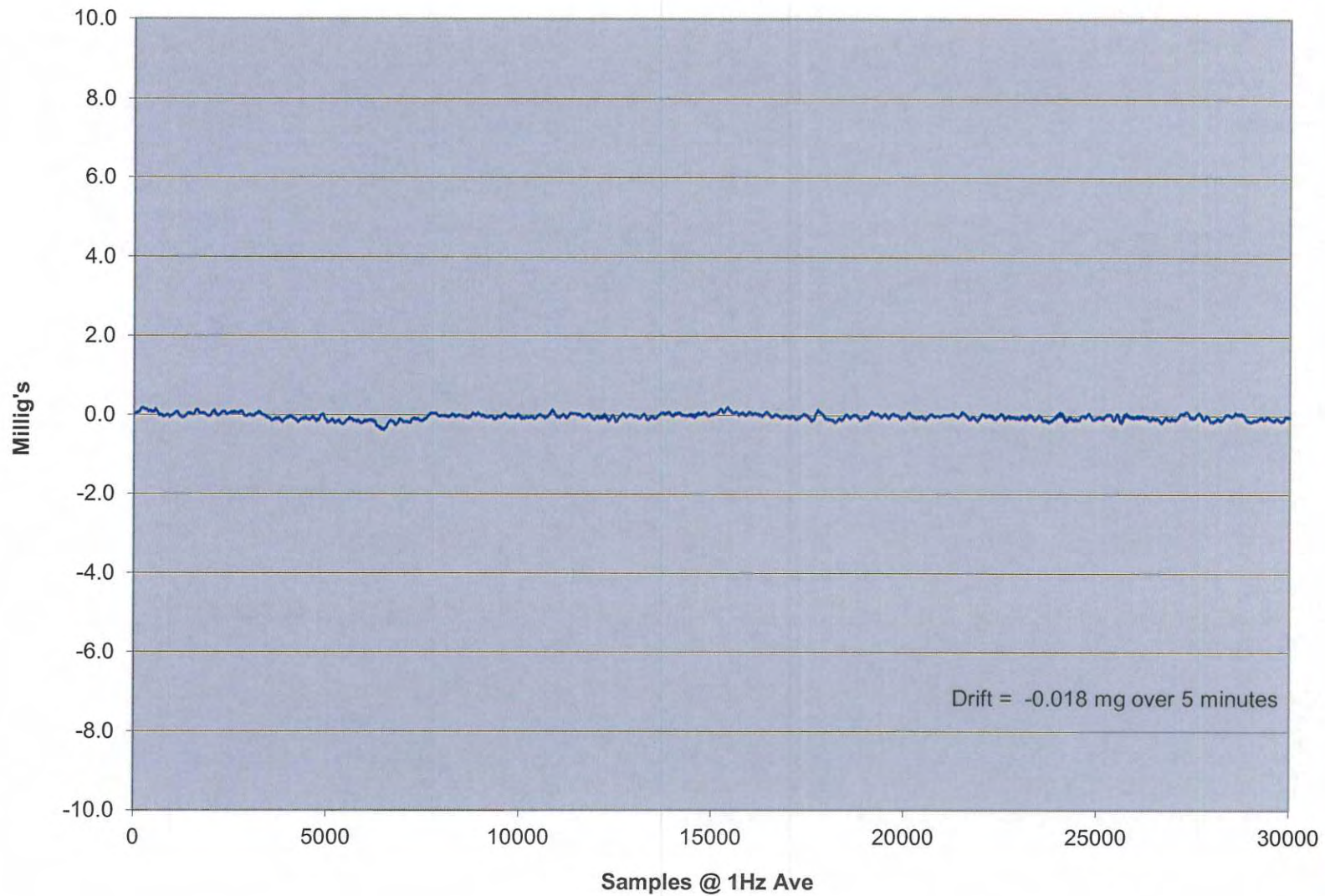
Z Gyro In-Run Bias



X Accel In-Run



Y Accel In-Run



Z Accel In-Run

