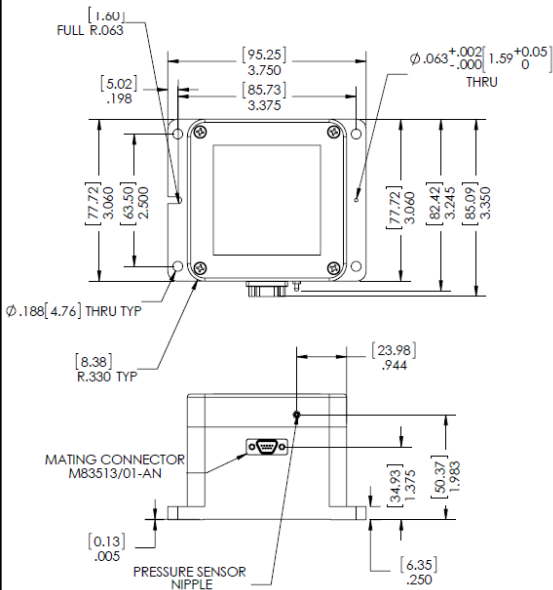
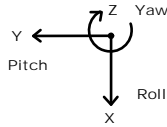


# LandMark™ 50 AHRS



Axes (Top View)  
Right Hand Rule



## Standard LandMark™ 50 AHRS

LMRK50AHR-075-02-100 or -06 or -10  
 LMRK50AHR-100-02-100 or -06 or -10  
 LMRK50AHR-175-02-100 or -06 or -10  
 LMRK50AHR-300-02-100 or -06 or -10

## Specification

PARAMETER	LandMark™ 50 AHRS					
	RATE AXES			ACCEL AXES		
Range	±100°/sec	±175°/sec	±300°/sec	±2 g's	±6 g's	±10 g's
Heading	± 0.5° typical					
Pitch & Roll	± 0.1° typical					
Altitude	± 3m typical					
Bias (In Run Stability)	1°/hr	1.5°/hr 1σ	2°/hr	0.02mg	0.04mg 1σ	0.05mg
Angle Random Walk	0.0009°	0.0025° /sec/√Hz 1σ	0.003°	0.02	0.065 mg/√Hz 1σ	0.07
Bias (Over Temp.)	<0.01°/sec	<0.02°/sec 1σ	<0.02°/sec	<1.0mg	<1.3mg 1σ	<1.5mg
Scale Factor Error %	≤0.06% (over temperature)					
Non-Linearity % of FS	<0.1	<0.5	<2	<0.025	<0.025	<0.05
Sensor Resolution	0.0005°/sec	0.0012°/sec	0.0015°/sec	0.02mg	0.05mg	0.06mg
Alignment	< 0.5 mrad 1σ					
G-Sensitivity	<0.002°/sec/g 1σ					
Self Test On	N/A			Δ 1	Δ 0.35	Δ 0.35
	±0.5g ±0.25g ±0.25g					
	Logic 1 = 3V to 5V at Pin 9					
Temp Range	Operating: -40°C to +85°C					
	Non-Operating: -55°C to +100°C					
RS422/485 Update Rate	100Hz or 10Hz (user selectable)					
Temp Sensors	6 Internal Temperature Sensors					
Start-up Time	< 0.65 sec					
Input Power	<b>+6.0V to +36V Max. Input K8</b> <b>(Input Transient Protection to 80V)</b>					
Power Consumption	640 mW at +12V typical					
	730 mW at +12V maximum					
U.S.:	3.0 x 3.06 x 2.13 = 19.6 in³					
	Metric:	7.62 x 7.8 x 5.4 = 321cm³				
Weight		≤ 450 grams				
Mounting	4ea No.8 or M4 Screws					
Shock	500g's ½ sine 2 msec powered					
Vibration	6 gRMS (20Hz - 2KHz ~ 10g accelerometers)					
MTBF	22,700 hrs (per MIL-STD-217F, Notice 2 based on AIC environment with ambient temperature at 40°C)					

Pin No.	Assignment
1	RS-422/RS-485 A (+)
2	RS-422/RS-485 B (-)
3	Power Ground
4	Analog/Digital Input (0V to 5V)
5	<b>+6.0V to +36V Input Power</b>
6	External Sync Input (1kHz)
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	Magnetometers: (X), (Y), (Z)
11	Pressure
12, 13, 14	Angles: Roll, Pitch, Yaw
15, 16, 17	Altitude, Temp, Forward Velocity

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

Specification subject to change without notice



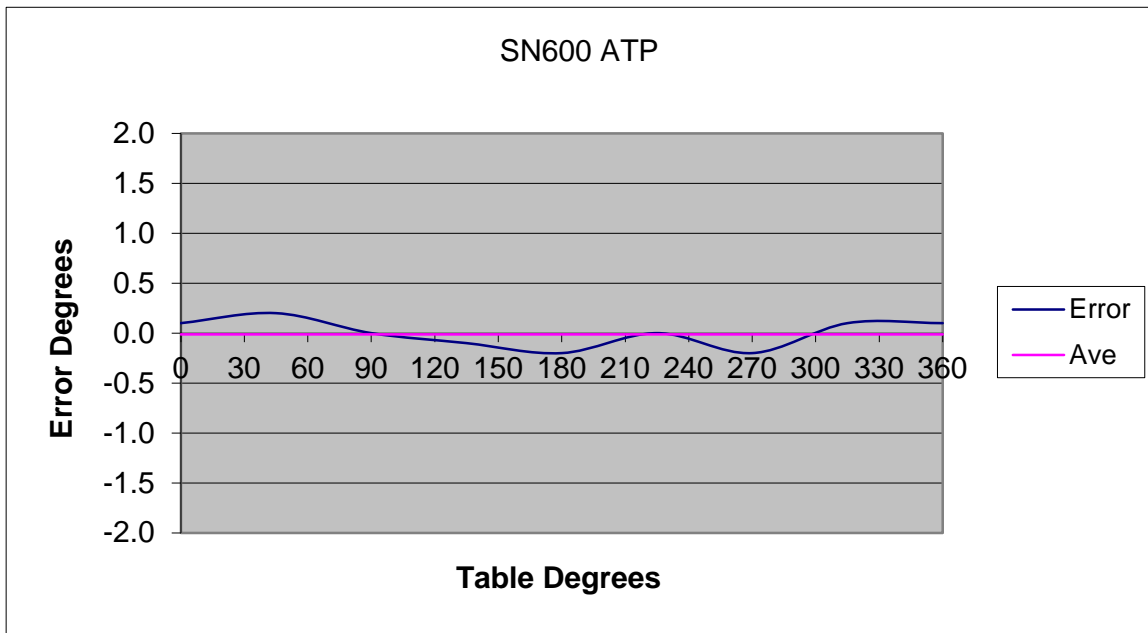
**Gladiator Technologies**



High Performance Inertial MEMS

Rev. 14Aug26  
SN: 600

Table Position degrees from N	Heading AHRS °	Error degrees	Average degrees
0	0.1	0.1	0.0
45	45.2	0.2	0.0
90	90.0	0.0	0.0
135	134.9	-0.1	0.0
180	179.8	-0.2	0.0
225	225.0	0.0	0.0
270	269.8	-0.2	0.0
315	315.1	0.1	0.0
360		0.1	0.0
ave err =		0.0	





**Gladiator Technologies**



High Performance Inertial MEMS

# SN600 ATP

8/12/2014

LMRK50AHR5-100-06-100

Rate Spin Test

Test	gyroX	gyroY	gyroZ	accelX	accelY	accelZ	temp X
PX	14399.64	-7.174	4.904	-0.1385	0.3715	-0.944	2872.322
NX	-14400.9	-7.634	2.208	-0.178	-1.8855	-3.5605	2873.402
Diff/2	14400.27	0.23	1.348	0.01975	1.1285	1.30825	-0.54
Ave	-0.63	-7.404	3.556	-0.15825	-0.757	-2.25225	2872.862
PY	-4.305	14397.8	5.196	-1.4995	-0.059	-1.168	2860.828
NY	-6.486	-14402.09	1.221	0.753	-0.095	-3.522	2862.292
Diff/2	1.0905	14399.95	1.9875	-1.12625	0.018	1.177	-0.732
Ave	-5.3955	-2.146	3.2085	-0.37325	-0.077	-2.345	2861.56
PZ	-6.2	-6.219	14402.28	-2.559	2.2355	0.1575	2850.992
NZ	-4.815	-6.26	-14396.74	-4.7445	-0.3055	0.1085	2851.004
Diff/2	-0.6925	0.0205	14399.51	1.09275	1.2705	0.0245	-0.006
Ave	-5.5075	-6.2395	2.773	-3.65175	0.965	0.133	2850.998
RSF Norm	1.000019	0.999996	0.999966				Temp °C 28.62

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

Gyro Mis-align mrad	Input Rate			
x		0.08	-0.05	x
y	0.02		0.00	y
z	0.09	0.14		z

Accepted by:





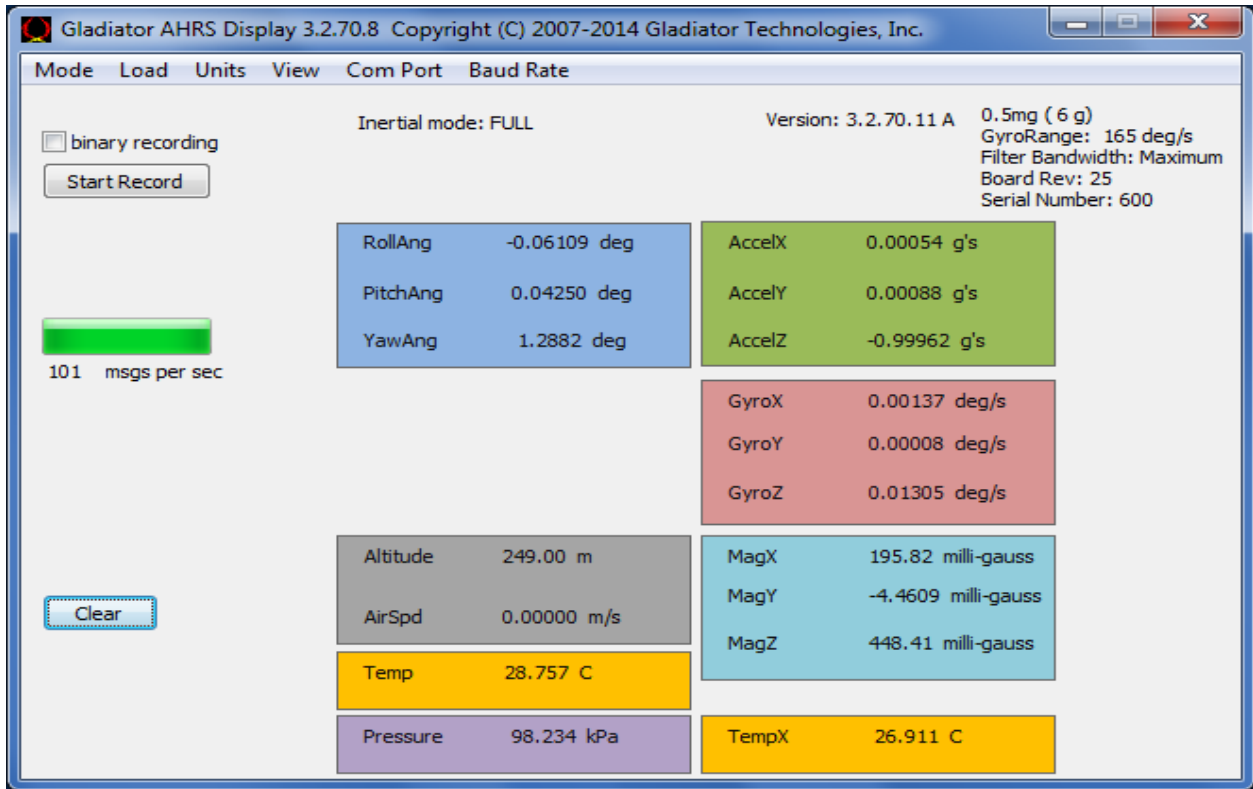
LMRK50AHR5-100-06-100  
Accelerometer Tumble Test

Test	gyroX	gyroY	gyroZ	accelX	accelY	accelZ	temp X
PX	0.122	-0.133	0.663	999.0325	-0.369	-0.265	2858.754
NX	-0.036	-0.39	0.824	-1000.99	0.1835	-0.143	2857.308
Diff/2	0.079	0.1285	-0.0805	1000.011	-0.27625	-0.061	0.723
Ave	0.043	-0.2615	0.7435	-0.9785	-0.09275	-0.204	2858.031
PY	0.082	-0.594	0.369	-0.159	999.8295	-0.1245	2868.744
NY	-0.269	0.12	0.557	-0.3905	-999.934	-0.117	2871.082
Diff/2	0.1755	-0.357	-0.094	0.11575	999.8818	-0.00375	-1.169
Ave	-0.0935	-0.237	0.463	-0.27475	-0.05225	-0.12075	2869.913
PZ	-0.021	0.179	0.361	0.082	-0.271	1000.276	2870.06
NZ	-0.052	-0.619	0.419	-0.0255	-0.683	-999.8	2867.12
Diff/2	0.0155	0.399	-0.029	0.05375	0.206	1000.038	1.47
Ave	-0.0365	-0.22	0.39	0.02825	-0.477	0.23775	2868.59
Bias %s,mg	0.000	-0.001	0.003	-0.12	-0.28	-0.16	28.66
ASF Norm				1.0000	0.9999	1.0000	Temp °C

Gyro %s /g	Input g =			Accel In g's
x	0.000	0.001	0.000	x
y	0.001	-0.002	0.002	y
z	0.000	0.000	0.000	z

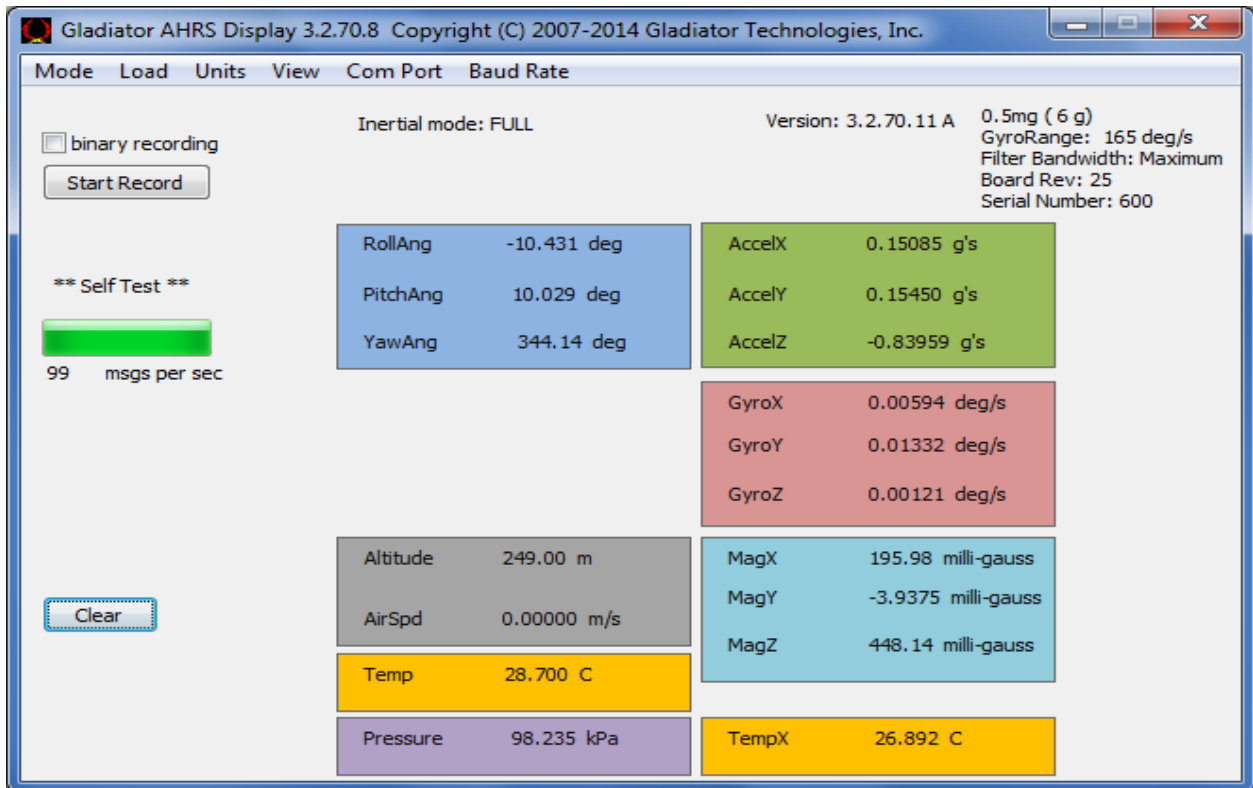
Accel Mis-Align	mrad	Accel In
0.12	0.05	x
-0.28	0.21	y
-0.06	0.00	z

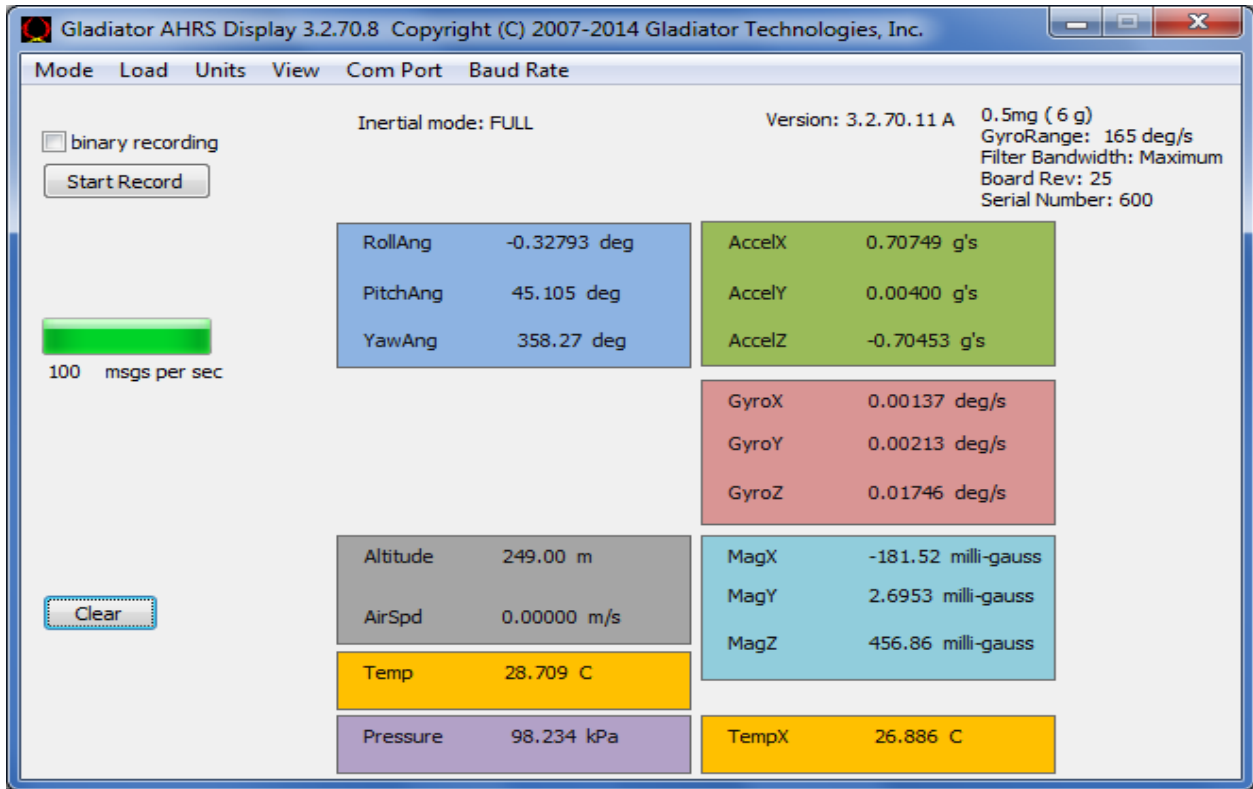
Accepted by:



Initial Bench Readout (above)

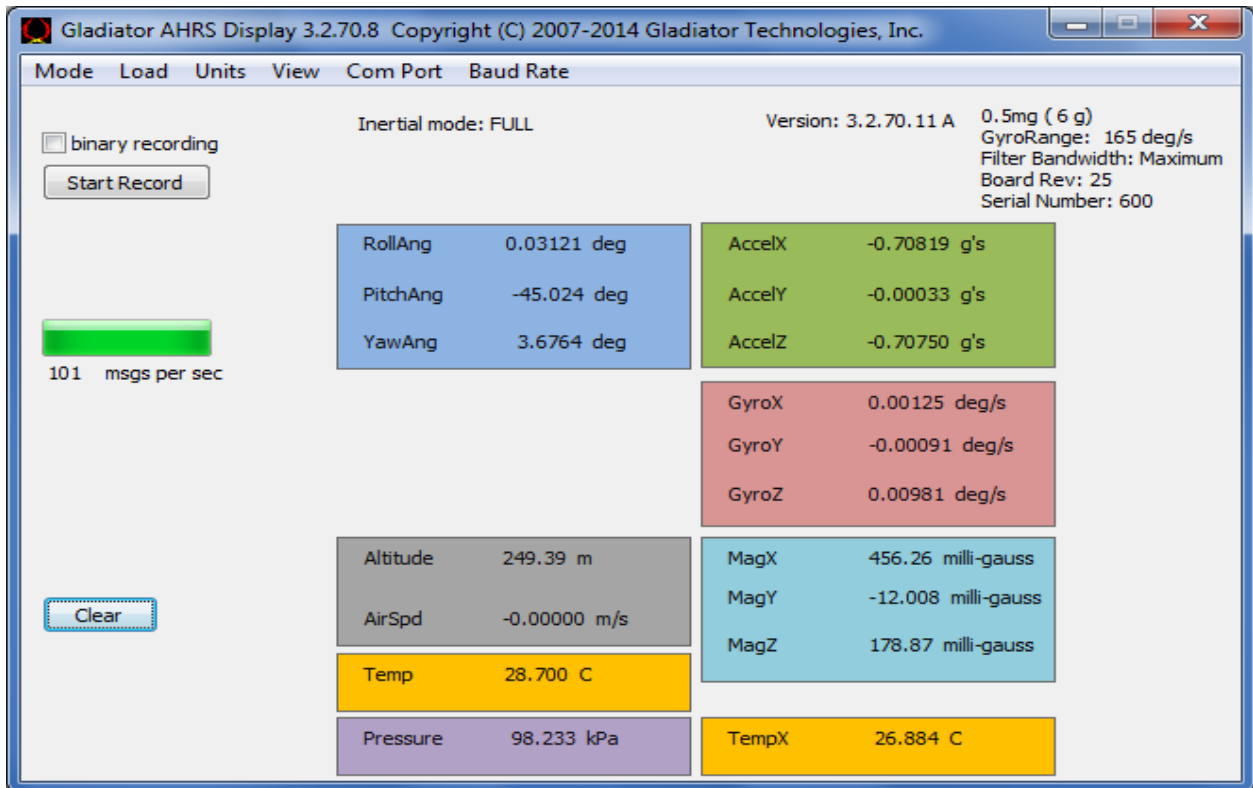
Self Test (below)

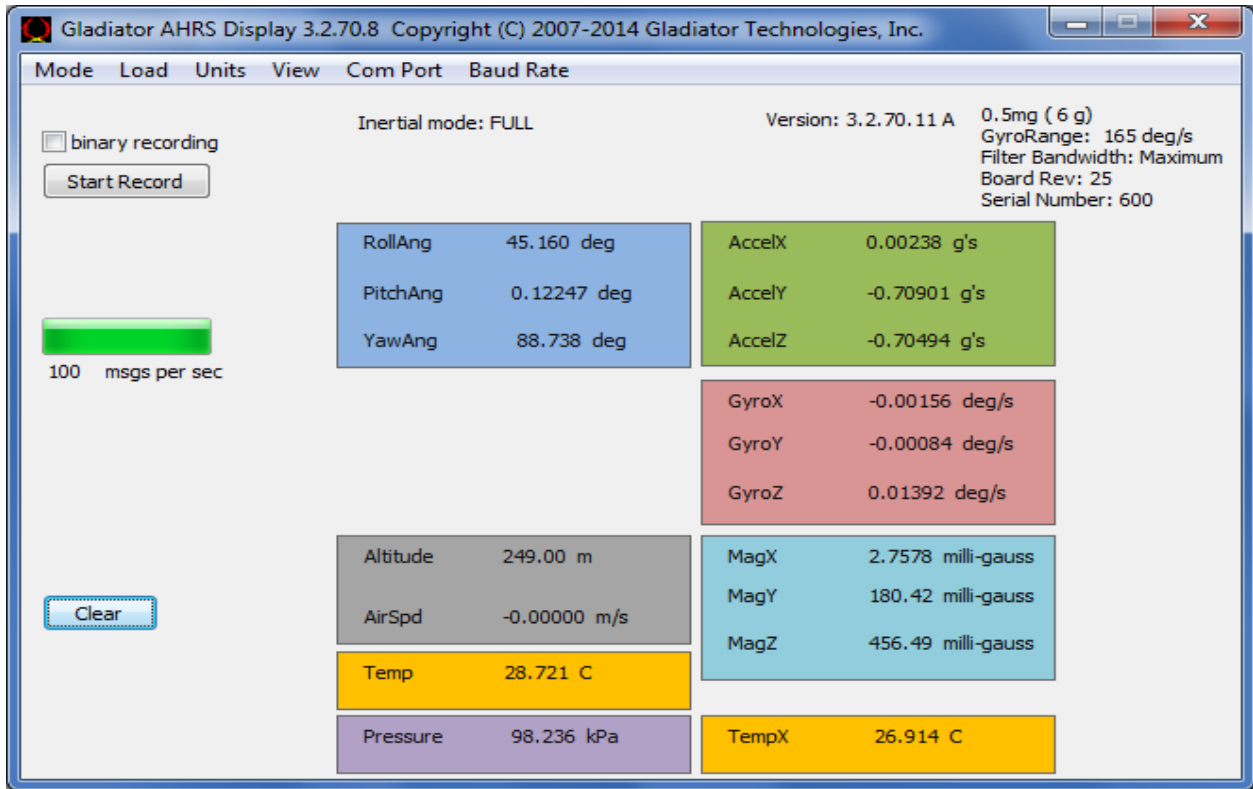




Pitch Up 45° (above)

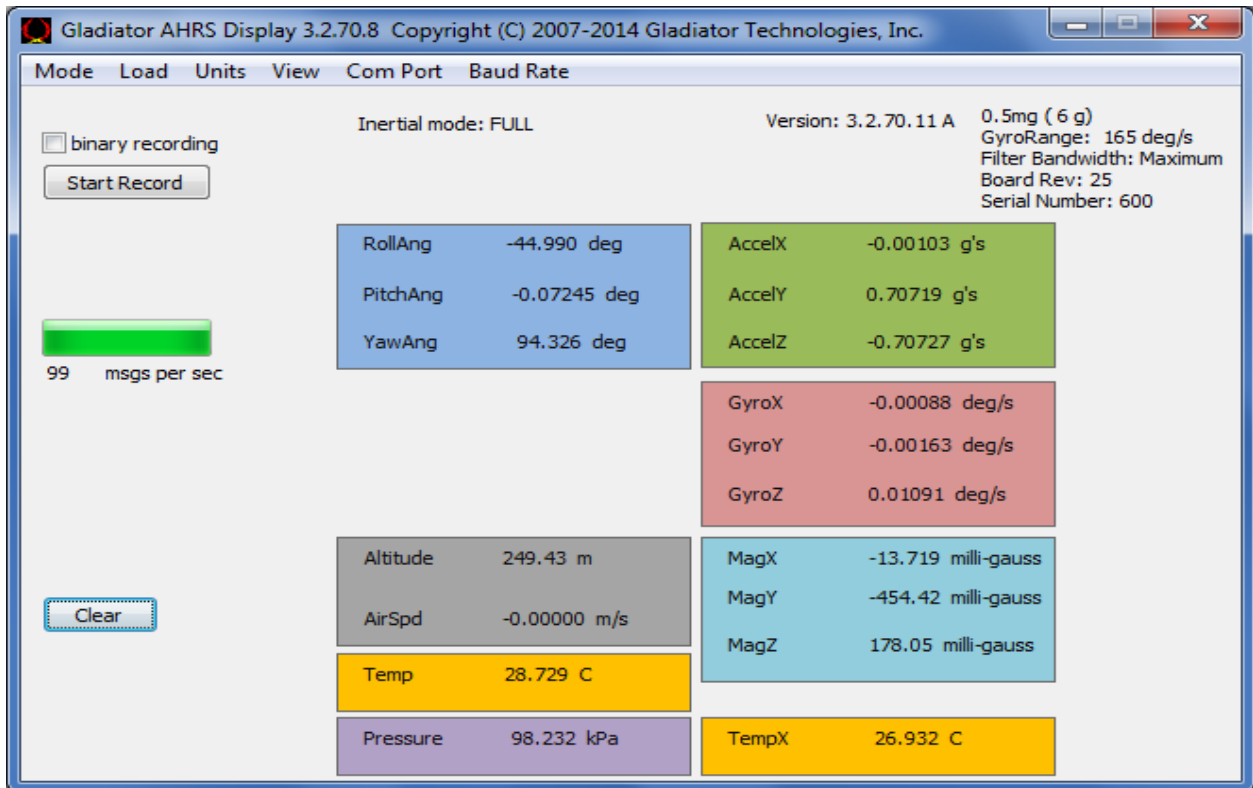
Pitch Down 45° (below)

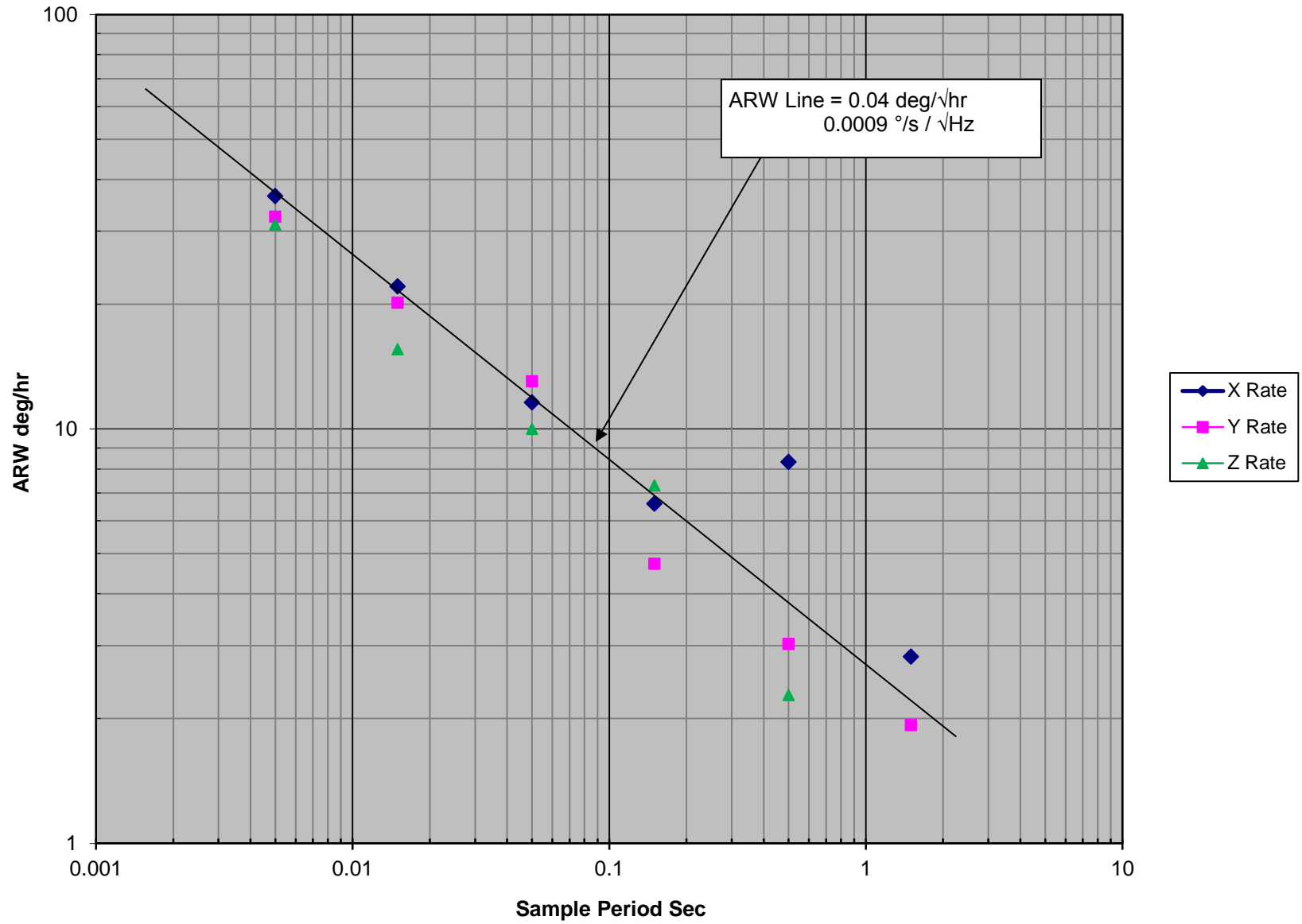




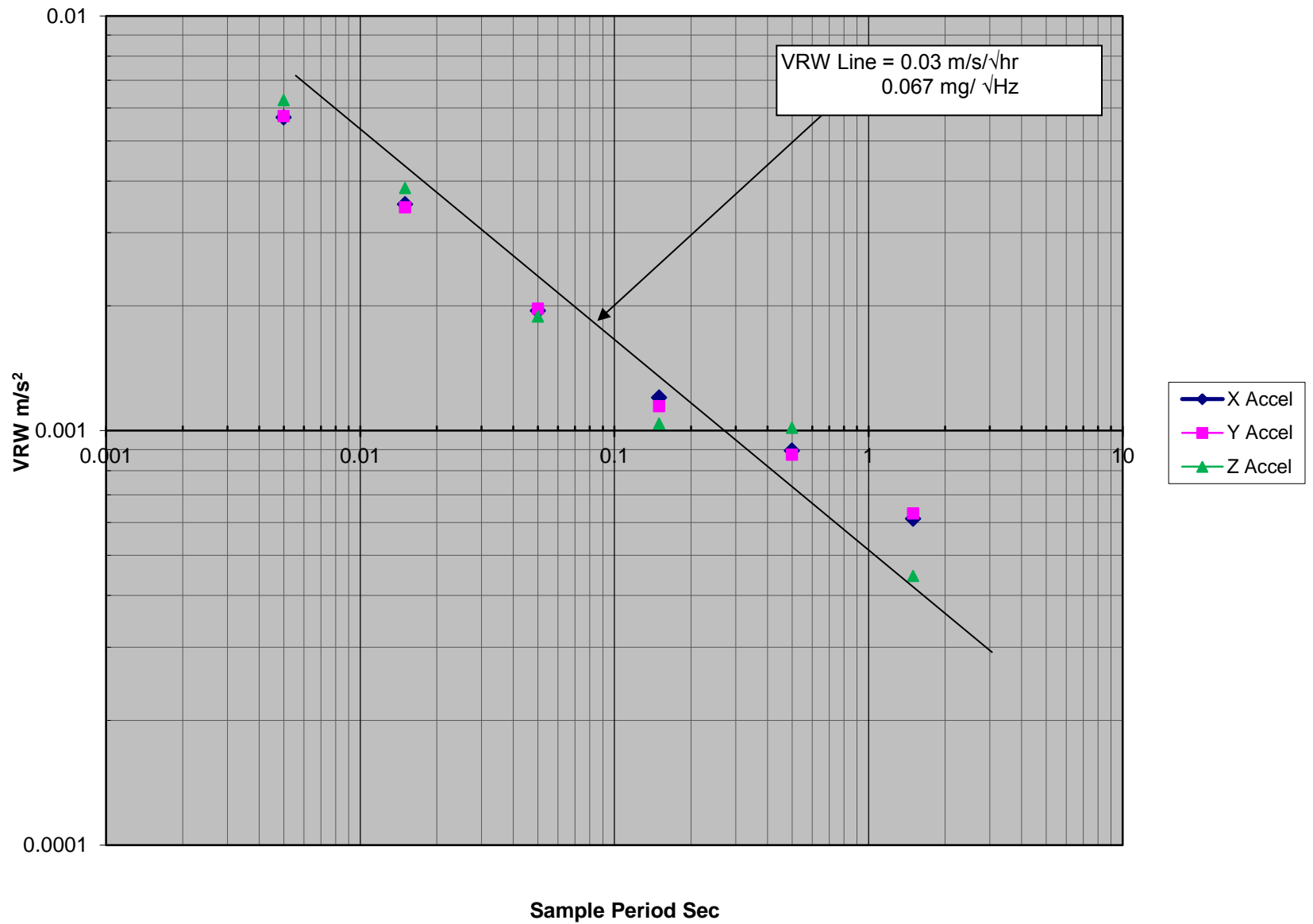
Roll 45° (above)

Roll -45° (below)

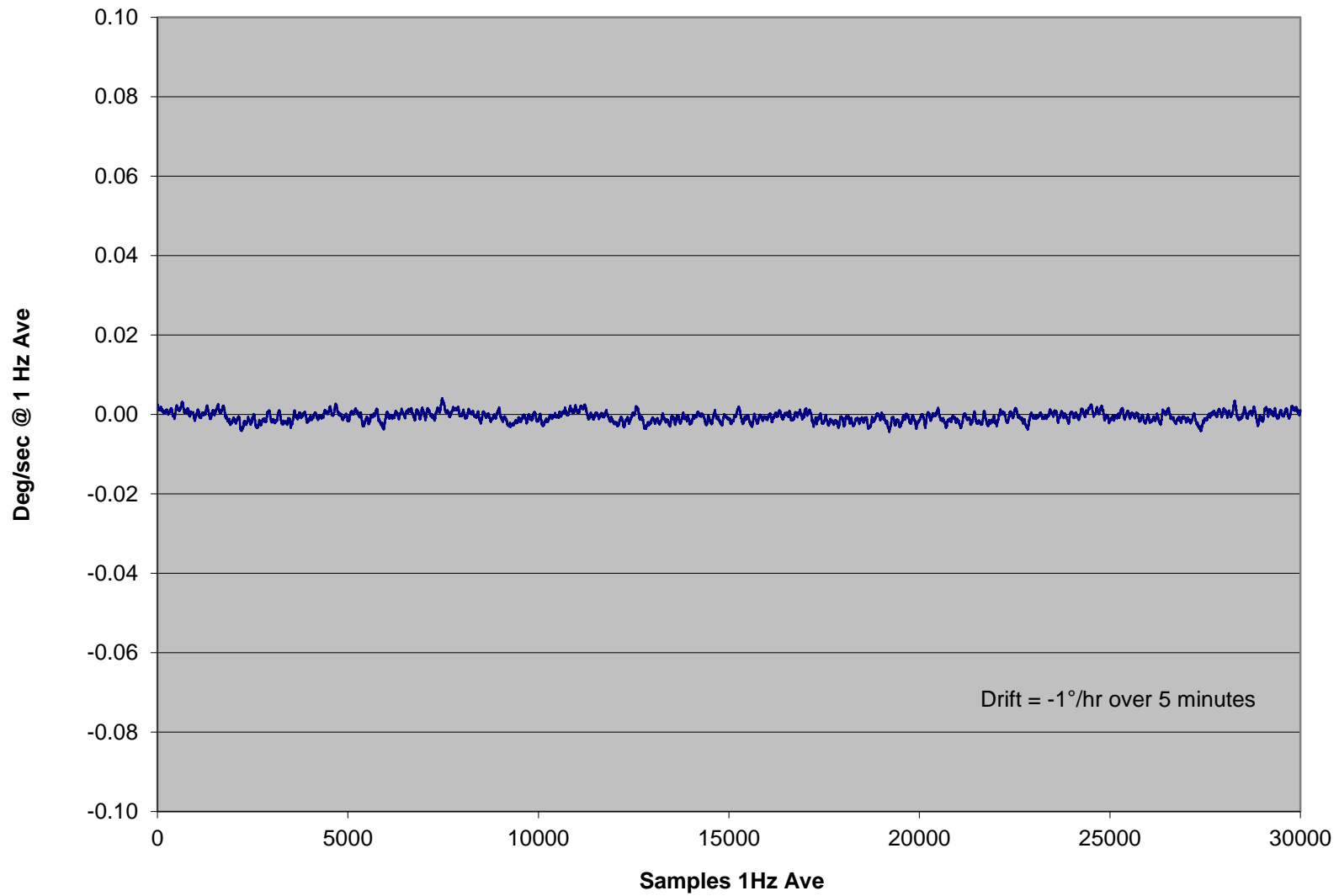




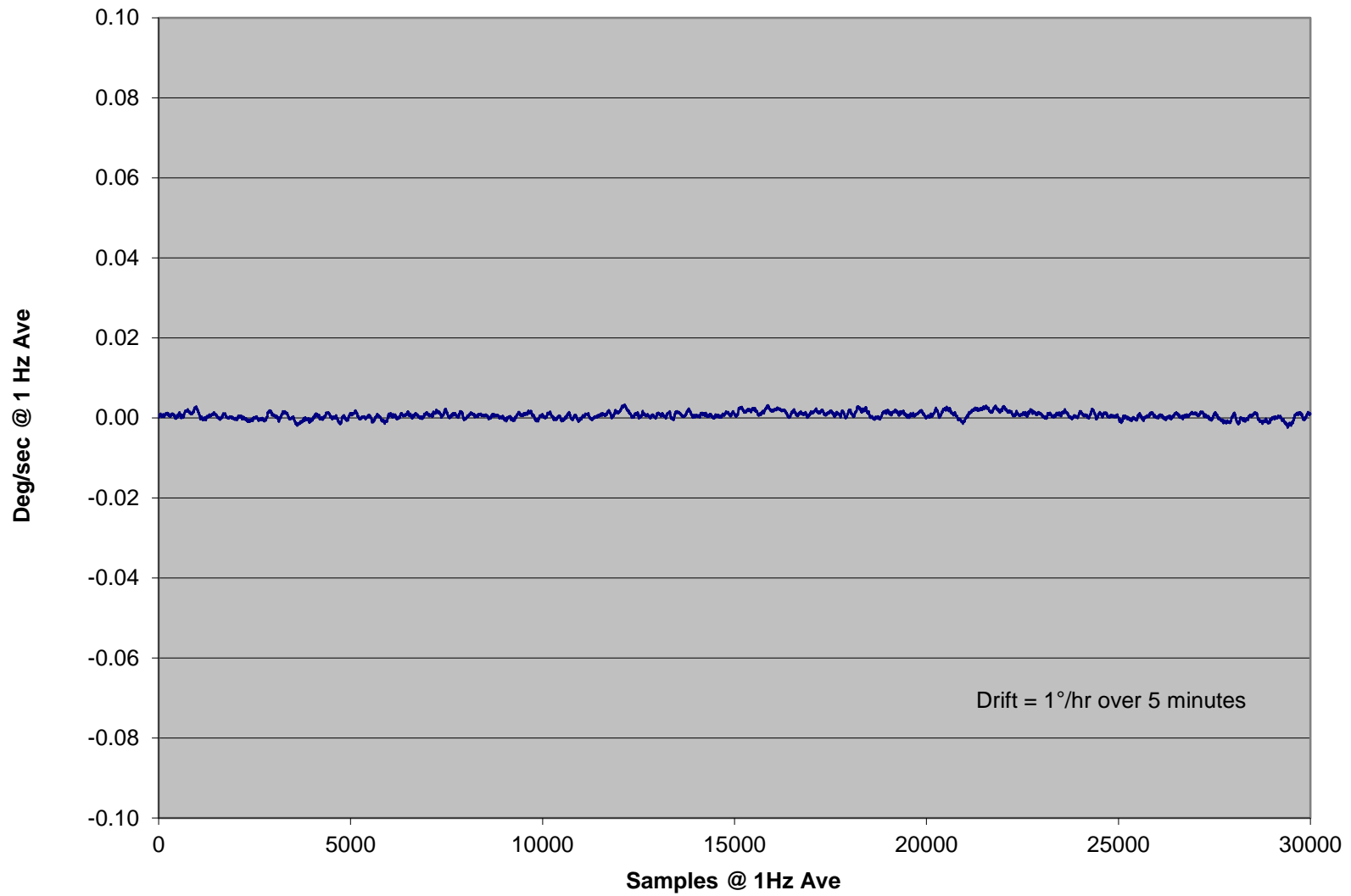




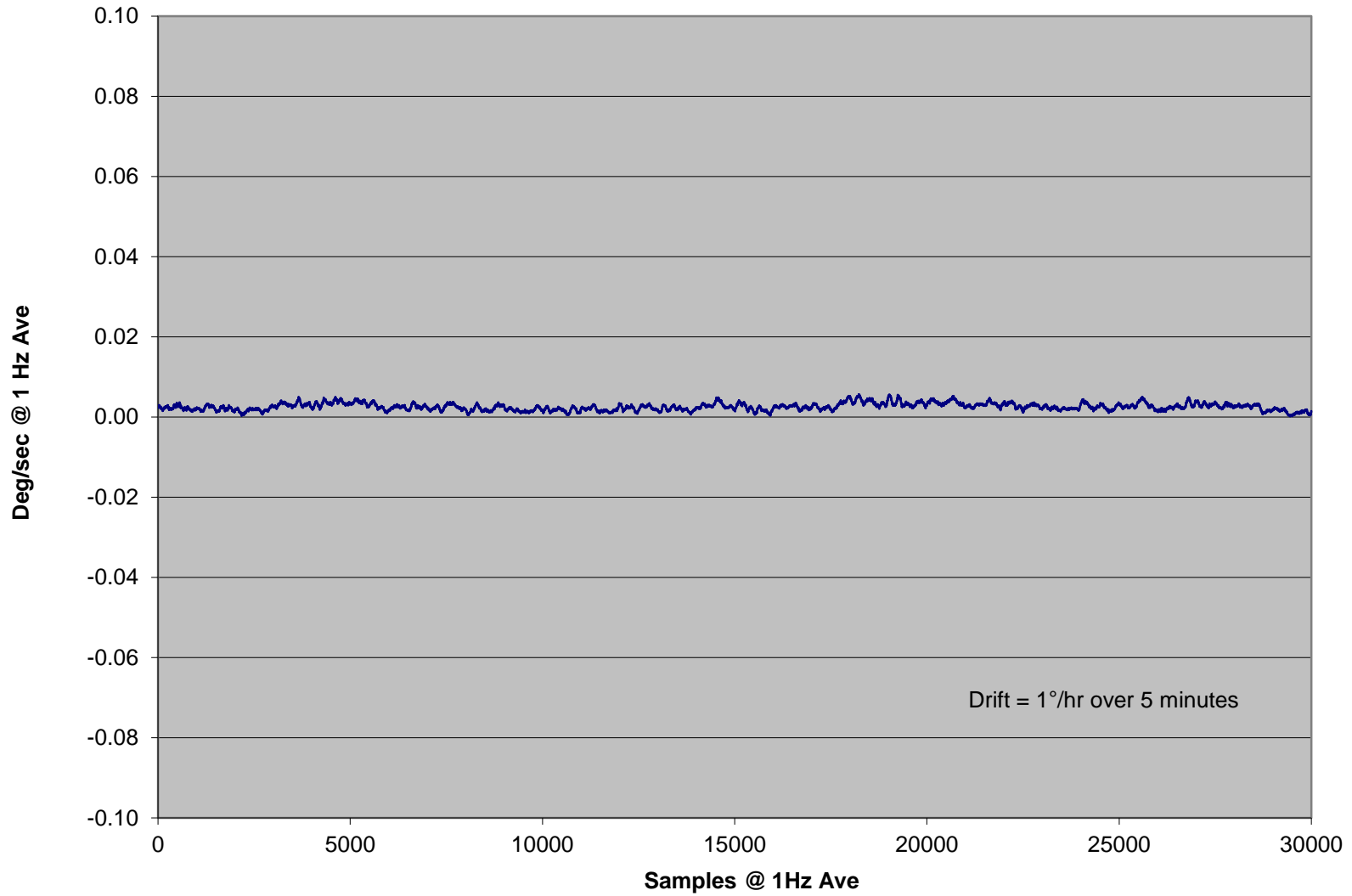
### X Gyro In-Run Bias



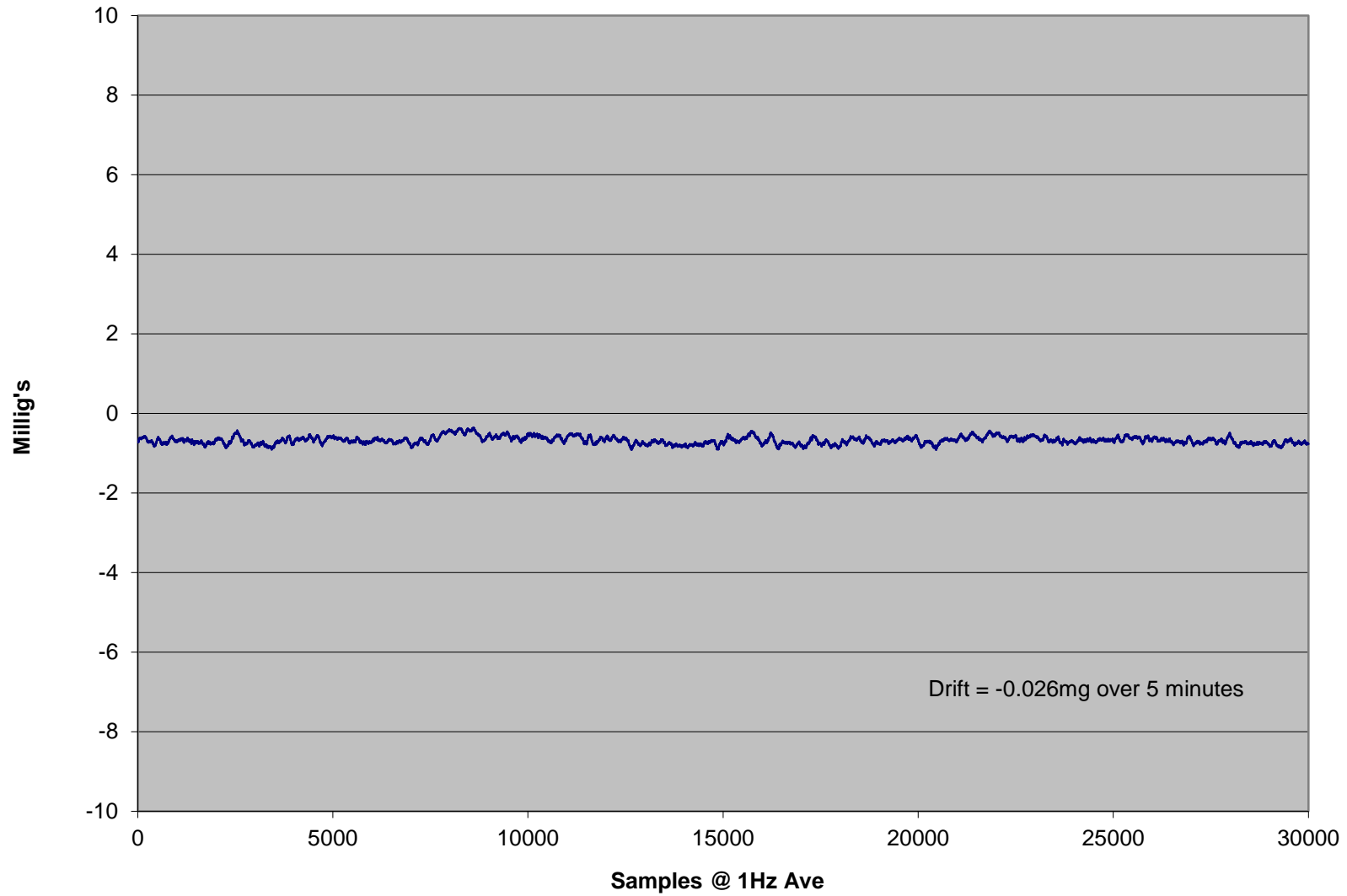
### Y Gyro In-Run Bias



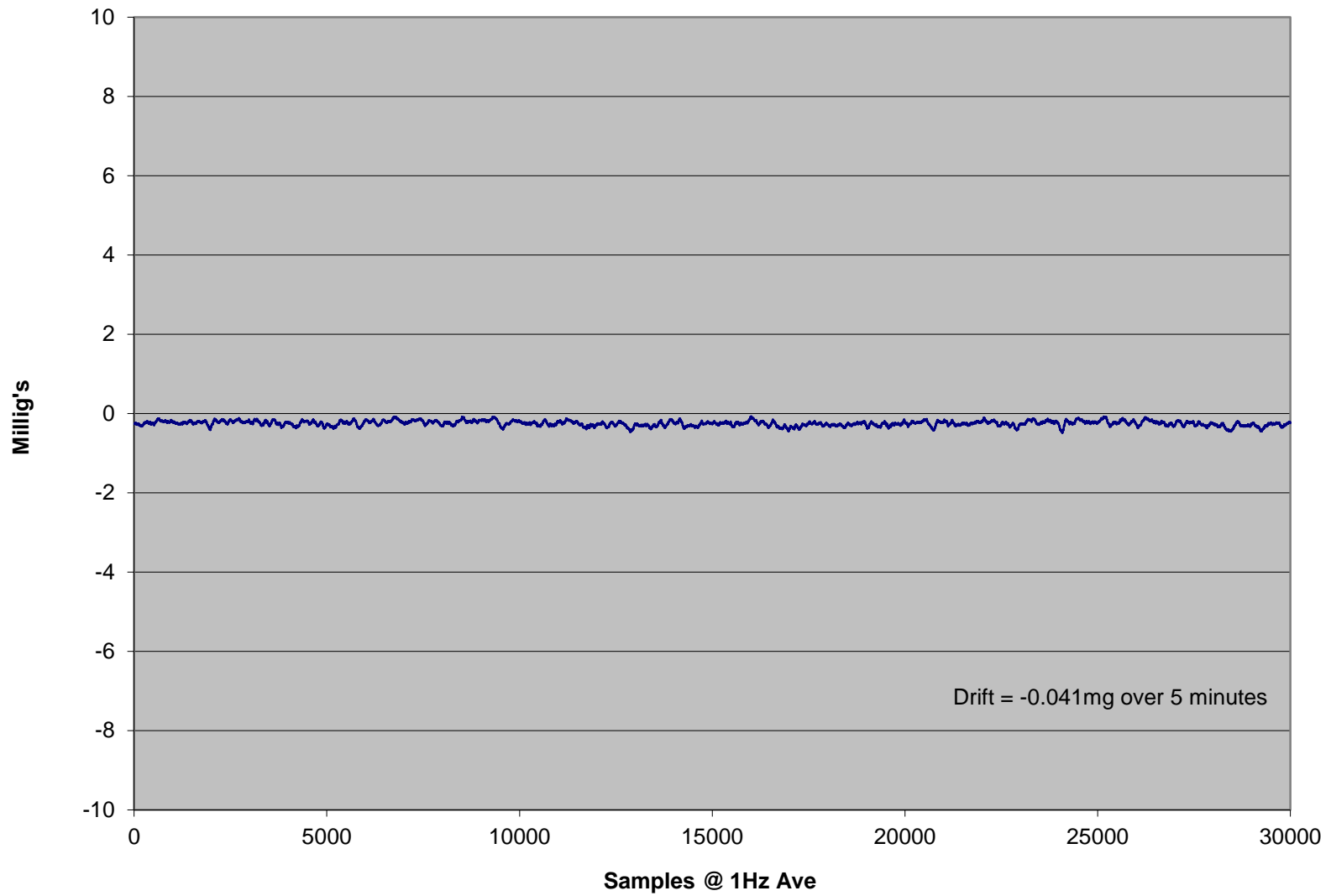
### Z Gyro In-Run Bias



### X Accel In-Run



### Y Accel In-Run



### Z Accel In-Run

