

SMG GAIA-FIELD 1.1 / Scintrex CG6

Instrument Performance Intercomparison

Comparison of GAIA-FIELD against Scintrex CG6 gravimeter in real world conditions

1. Heydon Test Line. 30 mGal range in field conditions 60s readings
2. Staircase Test Line. 1 mGal range 60s readings and 120s readings

Instruments Used

SMG GAIA-FIELD 1.1 Production unit. Built in May 2026. Powered for <7 days.

Scintrex CG6 serial #39. Sept 2017. Powered for 30+ days.



Heydon Test Line

- 5 Station locations
- Station Time 5 x 60 s
- Rural area, roadside traffic
- Vehicle transport between stations

Key Results

- r^2 Correlation **0.999997**
- Average Difference **+2 μ Gal**
- GAIA Avg Station StDev **6 μ Gal**
- CG6 Avg Station StDev **5 μ Gal**

Analysis

- 5 stations repeatedly measured over 4 hours
- Station 1 In/Out drift correction applied to both devices
- Excellent correlation between both instruments
- GAIA Max Station StDev **16 μ Gal**
- CG6 Max Station StDev **19 μ Gal**



Example Station

Station_#	Repeats	CG6 Rel Grav	GAIA Rel Grav	CG6 Station Stdev	GAIA Station Stdev	Diff	
1_1	5	0.000	0.000	0.001	0.011	0.000	
2_1	5	-4.539	-4.545	0.001	0.005	-0.005	
3_1	5	-14.258	-14.234	0.006	0.009	0.024	
4_1	5	-20.094	-20.111	0.004	0.004	-0.017	
5_1	5	-29.004	-29.001	0.002	0.004	0.002	
4_2	5	-20.095	-20.118	0.011	0.005	-0.022	
3_2	5	-14.233	-14.238	0.031	0.007	-0.005	
2_2	5	-4.537	-4.544	0.002	0.006	-0.007	
1_2	5	-0.002	0.003	0.002	0.004	0.005	
2_3	5	-4.541	-4.531	0.002	0.006	0.010	
3_3	5	-14.263	-14.224	0.004	0.009	0.039	
4_3	5	-20.098	-20.077	0.003	0.007	0.021	
5_2	5	-28.999	-29.013	0.002	0.004	-0.014	
4_4	5	-20.092	-20.097	0.002	0.005	-0.005	
3_4	5	-14.262	-14.238	0.002	0.009	0.024	
2_4	5	-4.538	-4.545	0.001	0.003	-0.007	
1_3	5	0.002	0.000	0.002	0.008	-0.001	
				Avg	0.005	0.006	0.002
				Stdev	0.007	0.002	0.016

Station_#	Repeats	CG6 Rel Grav	GAIA Rel Grav	CG6 Station StDev	GAIA Station StDev	Diff	
1	15	0.000	0.000	0.002	0.008	0.000	
2	20	-4.539	-4.542	0.002	0.007	0.003	
3	20	-14.254	-14.234	0.019	0.010	-0.019	
4	20	-20.095	-20.102	0.006	0.016	0.007	
5	15	-29.001	-29.008	0.003	0.007	0.007	
				Avg	0.006	0.010	0.000
				Stdev	0.007	0.004	0.011

All values in mGal

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Two field tests

1. Heydon Calibration Line. 30 mGal range in field conditions.
2. Staircase Test Line. 1 mGal range 60s readings and 120s readings

Scintrex CG6 serial #39. Built in Sept 2017. Powered for 30+ days.

GAIA-FIELD 1.1 Production unit. Built in May 2026. Powered for <7 days.



FAT Staircase Test Line

- 3 Station locations
- Station Time 5 x 60 s then 3 x 120 s
- Commercial area, some footfall
- Hand carried between stations

Key Results

- r^2 Correlation **0.99992**
- Average Difference **-11 μ Gal**
- GAIA Avg Station StDev **5 μ Gal**
- CG6 Avg Station StDev **1 μ Gal**

Analysis

- 3 stations repeatedly measured over 2 hours
- Excellent correlation between both instruments
- GAIA Max Station StDev 7 μ Gal
- CG6 Max Station StDev 2 μ Gal
- Both devices show excellent station repeatability through out test.
- Average individual & repeat station differences between instruments <17 μ Gal

Station	Repeats	CG6 Rel Grav	GAIA Rel Grav	CG6 Station Stdev	GAIA Station Stdev	Diff
1_1	5 x 60s	0.000	0.000	0.001	0.004	0.000
2_1	5 x 60s	-0.512	-0.495	0.001	0.009	0.017
3_1	5 x 60s	-1.073	-1.058	0.001	0.005	0.014
2_2	5 x 60s	-0.513	-0.500	0.002	0.006	0.013
1_2	5 x 60s	-0.002	0.005	0.001	0.003	0.007
1_3	3 x 120s	-0.001	0.003	0.001	0.002	0.004
2_3	3 x 120s	-0.508	-0.501	0.001	0.008	0.007
3_2	3 x 120s	-1.071	-1.062	0.001	0.004	0.009
2_4	3 x 120s	-0.511	-0.501	0.000	0.006	0.010
1_4	3 x 120s	0.000	0.004	0.000	0.001	0.003
Avg				0.001	0.005	0.008
Stdev				0.001	0.003	0.006

Station	Repeats	CG6 Rel Grav	GAIA Rel Grav	CG6 Station Stdev	GAIA Station Stdev	Diff
1	16	0.000	0.000	0.002	0.004	0.000
2	16	-0.511	-0.502	0.002	0.007	0.009
3	8	-1.071	-1.063	0.001	0.005	0.009
Avg				0.002	0.005	0.006
Stdev				0.000	0.002	0.005

All values in mGal