DATASHEET COMPARISON

How does the RT3000 v4 compare?

Key features:

+ Quad constellation
+ Dual antenna
+ RTK
+ 90% average improvement in heading, pitch, roll, velocity, and slip angle accuracy
+ 50% smaller and 70% lighter
+ Wider power input range and lower power consumption
+ Extended operating temperature range

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Specification Comparison

SPEC	RT3000 v4	RT3003 v2
GNSS	GPS L1 L2 GLO L1 L2 GAL E1 E5b BDS B1 B2	GPS L1 L2 GLO L1 L2 (optional)
Position accuracy (m)	0.01 RTK 0.6 SBAS 1.5 SPS	0.01 RTK 0.6 SBAS 1.5 SPS
Heading accuracy (deg)	0.04 (1m baseline)	0.1 (2m baseline)
Roll/pitch accuracy (deg)	0.01	0.03
Velocity accuracy (km/h)	0.025	0.05
Slip angle accuracy (deg)	0.05	0.15
Update rate (Hz)	100	100
Gyro range (deg/s)	490	100
Gyro bias stability (deg/hr)	0.8	2
ARW (deg/√hr)	0.12	0.2
Accel range (g)	8	10
Accel bias stability (mg)	0.005	0.002
VRW (m/s/√hr)	0.012	0.005
Weight (g)	690	2400
Dimensions (mm)	120 x120 x120	234 x 120 x 80
Supply voltage	10 - 48 V dc	10 - 25 V dc
Power (W)	6	20 W
Operating temp (deg C)	-40 to 70	-10 to 50
Environmental protection	IP65	IP65
Internal storage	32 GB	2 GB

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Functional Upgrades

FEATURE	WHY IT'S GOOD	WHAT YOU GET
Quad-constellation GNSS receivers	+ More RTK and satellite coverage globally. + Improved visibility in challenging environments.	+ More data at centimetre-level accuracy. + Increased reliability and robustness of positioning.
New IMU design	+ Smaller and lighter. + Lower power consumption. + Shorter warmup time.	+ Higher accuracy when measuring dynamics like roll/pitch, and accelerations. + Greater confidence in your data. + Begin testing faster so you can test longer.
New processor	+ More powerful. + Capable of running RT-Range. + Additional processing power.	+ Streamline your setup. + Additional processing power futureproofs your product against new developments and upgrades
New firmware	+ Fully supported firmware. + GNSS enhancements. + RT-Range enhancements. + PTP synchronisation. + Indoor positioning. + Future roadmap of enhancements.	+ Better quality data. + Use your GNSS/INS in more environments. + Performance will improve as future functionality added.
New interfaces	+ CAN-FD interface. + Integrated NTRIP modem. + Additional ethernet interfaces.	+ Meet the higher bandwidth requirements of modern vehicles. + No need for a direct radio link to a base station. + Get accurate test data on the open road.
ITAR-free	+ No restrictions when exporting globally. + Reduced time and hassle exporting devices.	+ Expand into new markets more easily. + Demo or testing in other territories.

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Real world performance comparison

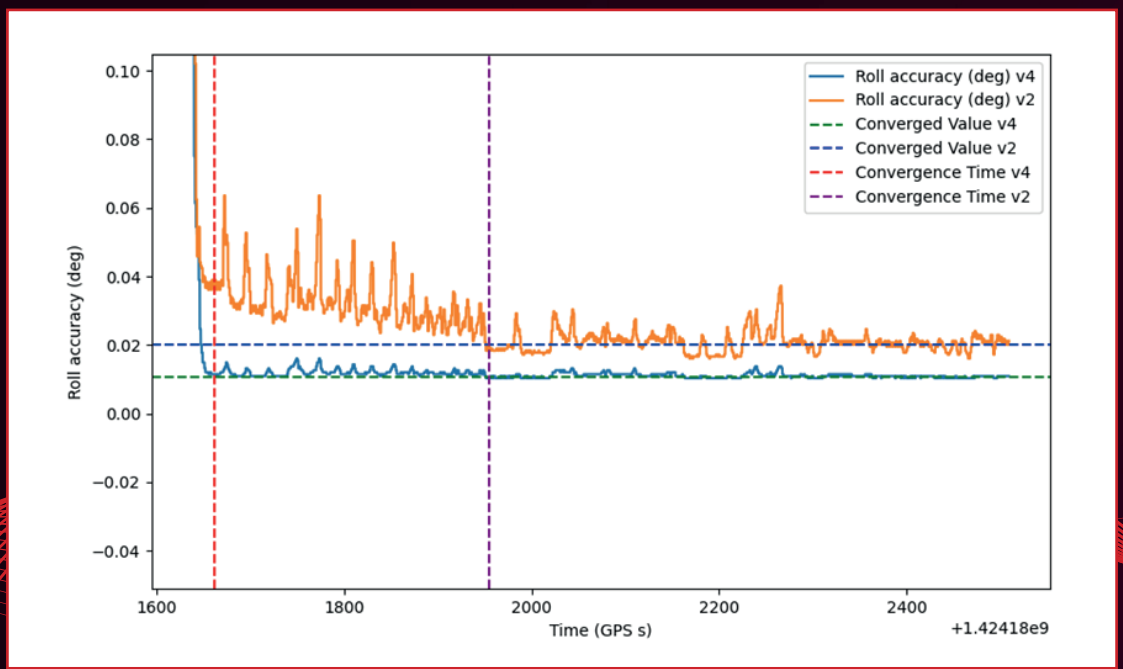
Highlights

+ 6x faster warm up
+ Average of 90% improvement across dynamics measurements
+ Enhanced data clarity and quality

Warm up

During warm up, pitch and roll accuracies converge in under a minute, with the accuracies being almost twice as good as the v2. For vehicle dynamics testing where precision measurement of vehicle motion is key, the v4 gives you more confident data, quicker.

	v2	v4	% IMPROVEMENT
Pitch convergence time (s)	328.94	45.98	615%
Pitch convergence value (deg)	0.020	0.011	89%
Roll convergence time (s)	343.94	51.98	562%
Roll convergence value (deg)	0.020	0.011	90%
Average convergence time (s)	336.44	49.98	587%
Average convergence value (deg)	0.020	0.011	90%



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Dynamic Manoeuvers

A variety of dynamic manoeuvres were performed after the warm up period, including straight line acceleration and braking, slalom, emergency lane change, and circle manoeuvres.

Overall, the RT3000 v4 provides ~90% improvement in position and dynamic measurements compared to the RT3000 v2.

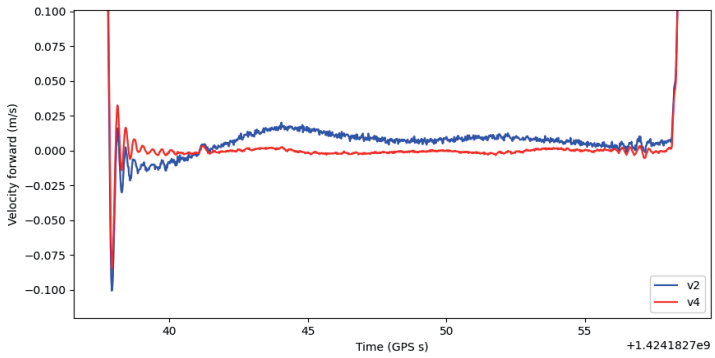
The performance of each system was evaluated by comparing the forwards processed and backwards processed data of each device to create two independent data sets with roughly equivalent errors between them for each device. The difference between the forwards and backwards processes were then calculated for the metrics shown in the table below.

	v2	v4	% IMPROVEMENT
DiffPosNorth (m) Std:	0.0122	0.0071	72.7%
DiffPosEast (m) Std:	0.0109	0.0083	31.2%
DiffPosHorizontal (m) Std:	0.0163	0.0109	50.1%
DiffVelNorth (m/s) Std:	0.0084	0.0039	117.8%
DiffVelEast (m/s) Std:	0.0079	0.0054	45.9%
DiffVelHorizontal (m/s) Std:	0.0116	0.0067	73.6%
DiffHeading (deg) Std:	0.0742	0.0313	136.6%
DiffPitch (deg) Std:	0.0181	0.0097	87.1%
DiffRoll (deg) Std:	0.0195	0.0077	153.9%
DiffAccelForward (m/s^2) Std:	0.2055	0.1714	19.9%
DiffAccelLateral (m/s^2) Std:	0.3039	0.1707	78.0%
DiffYawRate (deg/s) Std:	0.2624	0.1013	159.0%

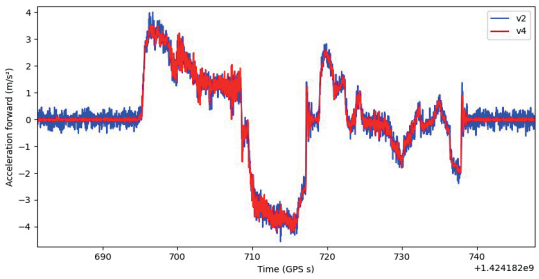
The plots in the following sections show extracts of the data output by each system during the different dynamic manoeuvres.

Straight line acceleration and braking

Comparison of Velocity forward [m/s] between v4 and v2

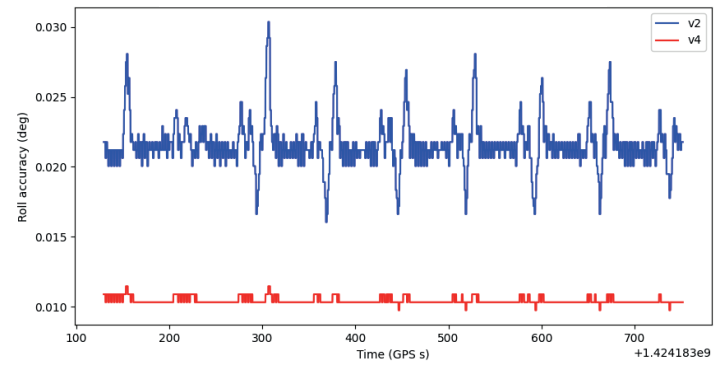


Comparison of Acceleration forward [m/s²] between v4 and v2

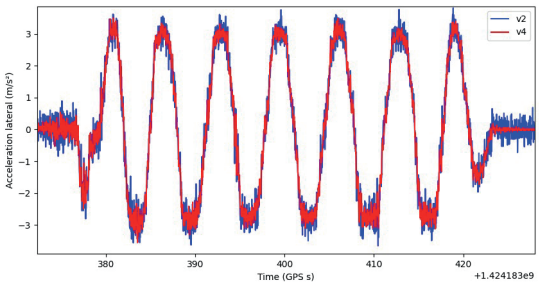


Slalom

Comparison of Roll accuracy [deg] between v4 and v2



Comparison of Acceleration lateral [m/s²] between v4 and v2



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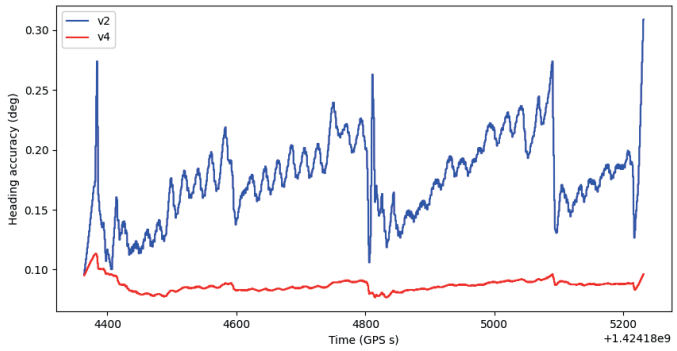
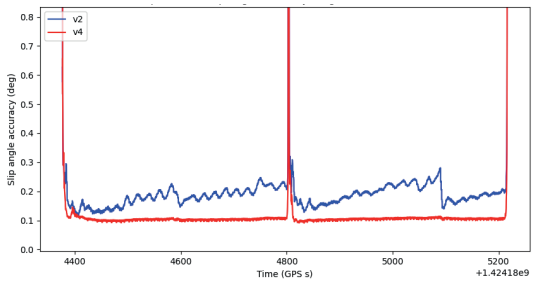
Circles

Comparison of Heading accuracy (deg) between v4 and v2

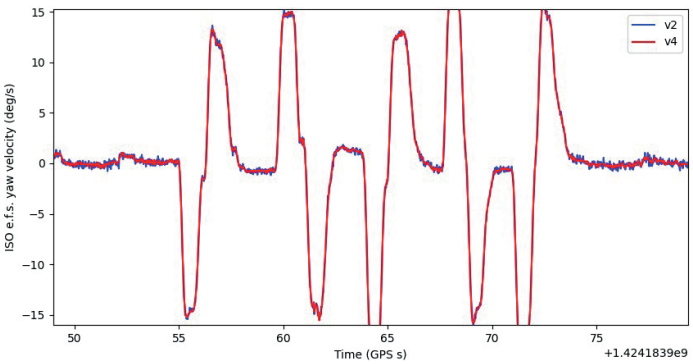


Comparison of Slip angle accuracy (deg) between v4 and v2

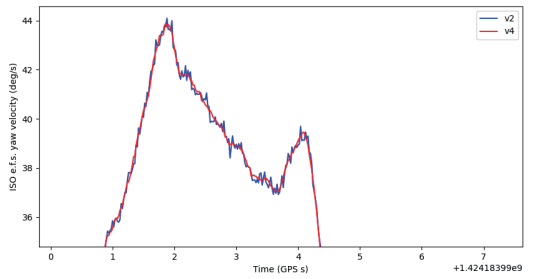


Lane change

Comparison of ISO e.f.s. yaw velocity (deg/s) between v4 and v2



Comparison of ISO e.f.s. yaw velocity (deg/s) between v4 and v2



If you are interested in better performance, spending less time setting up, and enhanced data clarity, contact us today to trade-in.

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