

NovAtel OEM4 Kinematic Test Results

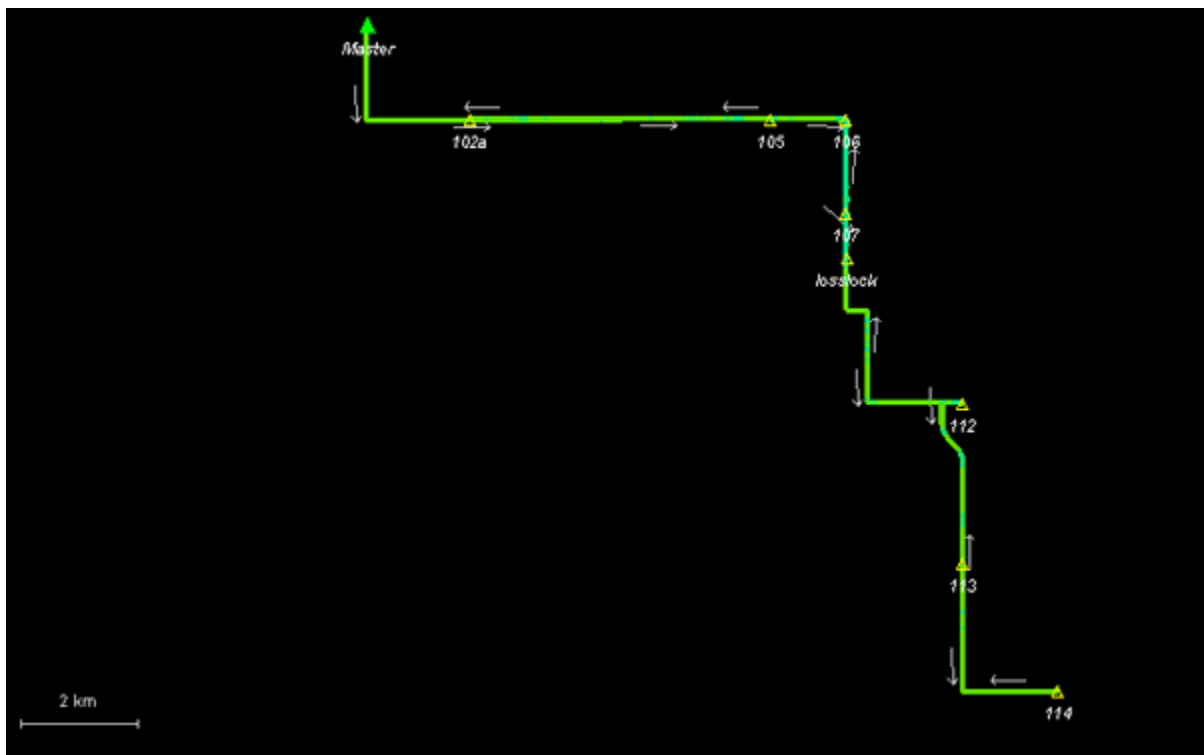
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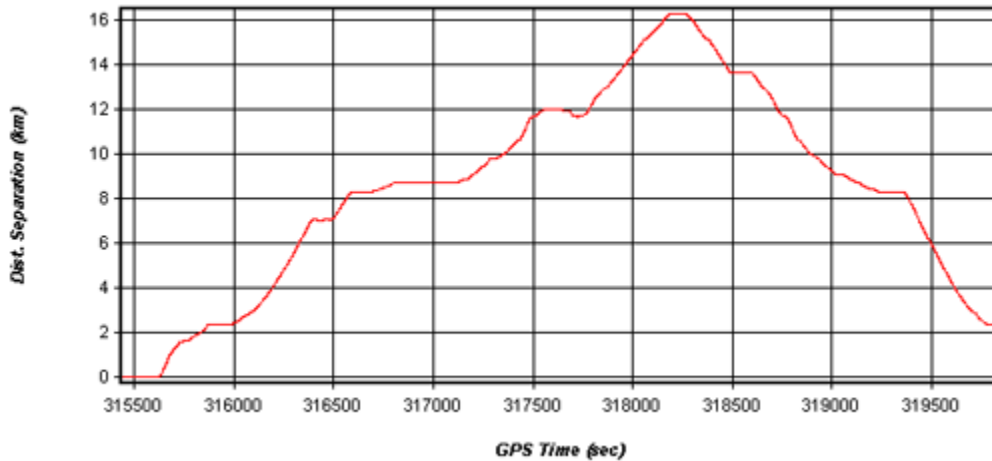
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Description

The following report looks at the results for two dual frequency NovAtel OEM4 receivers tested in a kinematic survey. The purpose of the survey was to test the effectiveness of the OEM4 in on-the-fly (OTF) kinematic ambiguity resolution. The data was collected on July 12, 2000, in the prairies east of Calgary AB. A collection of markers with known coordinates are used to test the accuracy of the receivers. The remote antenna was located on top of a vehicle. The survey began with the master and remote stations close together. The vehicle was then driven to each of the markers. Processing was done with Waypoint's GrafNav software. Below is a map of the area surveyed.



The following figure shows the master and remote separation with respect to GPS time. The figure shows that the maximum baseline distance is 16 KM.



In order to perform OTF at various baseline distances, GrafNav was set to automatically engage on-the-fly ambiguity resolution at 900 second intervals. It can be seen from the table below that OTF was successful at distances ranging from 100 m to 15 km.

OTF at Time	Time Used (s)	Baseline Distance (km)	Pass OR Failed
315421	120	0.1	Passed
316211	210	7	Passed
317111	235	12	Passed
318011	330	15	Passed
318911	120	8	Passed

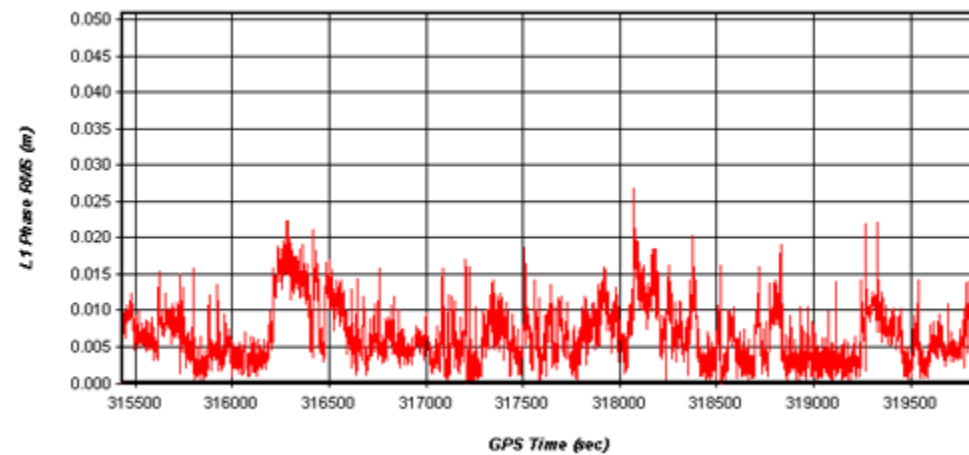
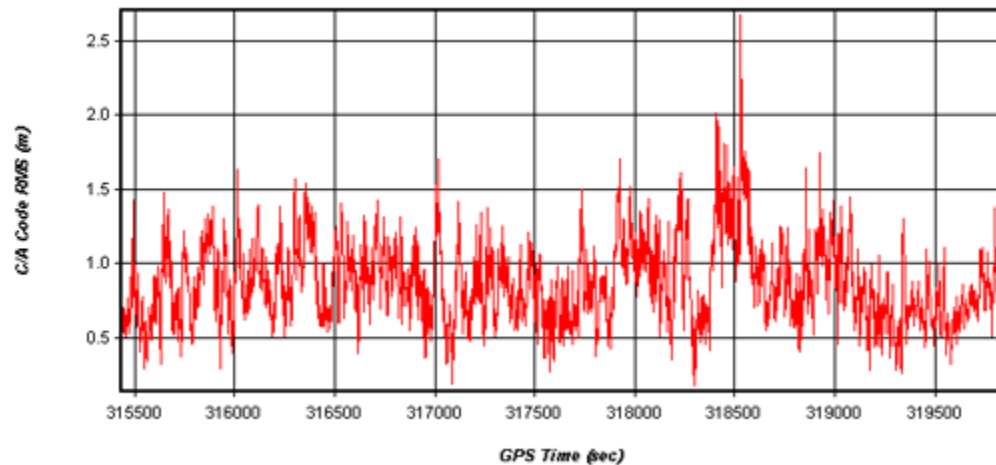
Coordinate Results

Station ID	GPS Time (Seconds of Week)	Baseline Distance (KM)	Error in Easting (m)	Error in Northing (m)	Error in Height (m)
102a	315946	2.4	0.006	0.007	0.032
105	316431	7.0	0.029	0.032	0.029
106	316626	8.3	0.026	0.043	0.011
107	316844	8.8	0.015	0.030	0.030
112	317589	12.0	0.008	0.042	0.012
114	318211	16.3	0.024	0.009	0.001
113	318542	13.7	0.006	0.005	0.016
106	319271	8.3	0.083	0.093	0.087
102a	319826	2.4	0.012	0.004	0.032



The reason for the error in point 106 is due a major loss of lock that occurred 3 minutes previous to the measurement at point 106. It can be seen from the closure at station 102a, that this is fixed shortly after.

Note that Waypoint's survey "monuments" are just conveniently located fence posts! A major source of error lies simply in centring the antenna on top of the post.



The plots above illustrate RMS code and phase residuals for the kinematic survey. It can be seen that overall the code residuals are sub meter and the phase residuals sub centimeter. The residuals are excellent for a kinematic data set.

Conclusions

The OEM4 demonstrated good OTF capabilities at distances up to 16 KM. It has been shown that kinematic coordinate determination of several centimeters are possible in OTF mode and furthermore the receiver displays excellent noise characteristics.