Trimble GPSNet 2.5 Software for GNSS Infrastructure: New Features

Martin Janousek - Trimble
Technical Support - Infrastructure

Trimble

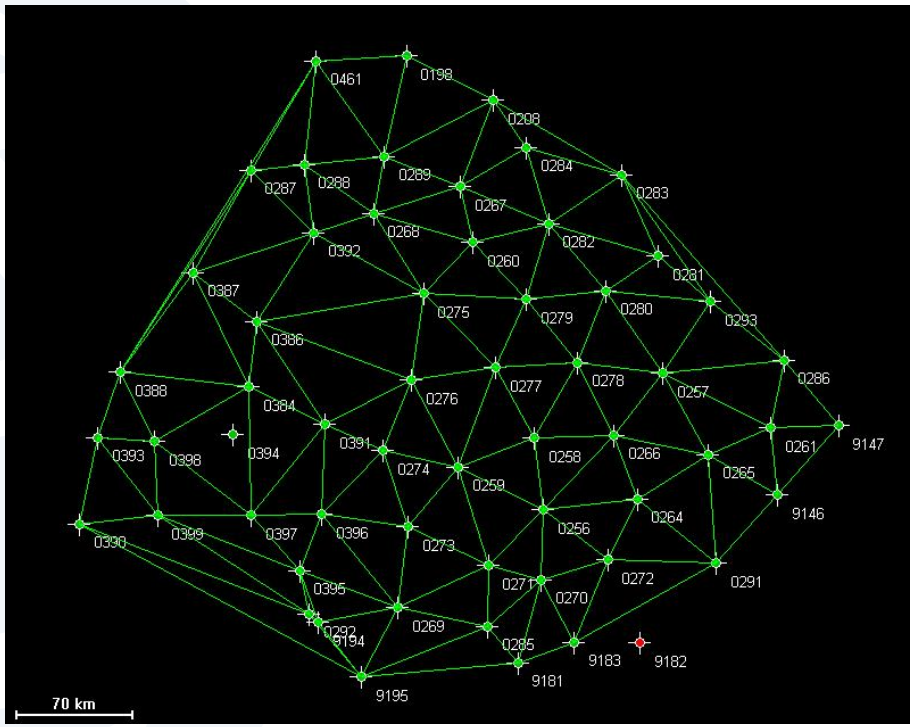
GPSNet Users Seminar – Munich, March 30th/31th 2006

Overview

- Support for large networks
- Improved ambiguity resolution
- New GLONASS features
- RTCM 3 network messages
- L2C
- IGS site log
- Trimble NTRIP Caster
- Trimble Ephemeris Download

Support for large networks

- Up to 100 reference stations and 200 RTCM generators can be processed on one single server
- New technology based on parallelization of filters
- For GPS networks only
- > 3.5 GHz, 2 GB RAM, dual-processor required.

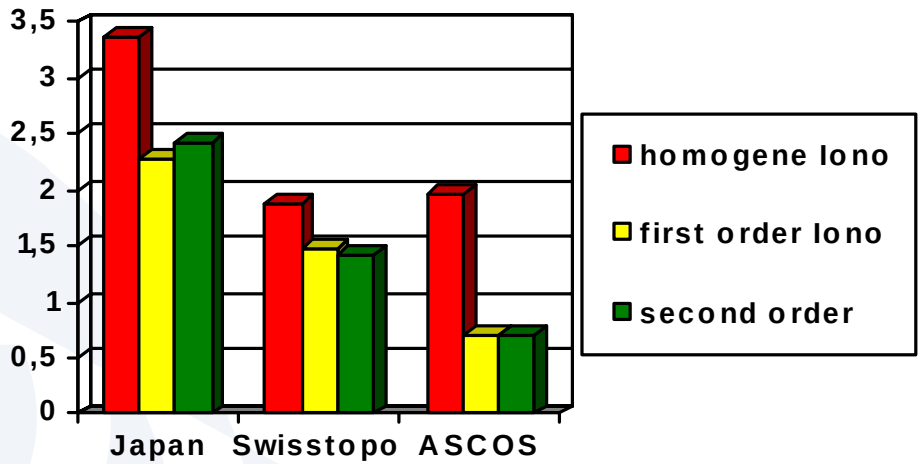


Improved ambiguity resolution

- Japanese network
  - homogene Iono: 96.68 %
  - first order Iono: 97.73 %
  - second order: 97.58 %
- Swisstopo network
  - homogene Iono: 96.68 %
  - first order Iono: 98.52 %
  - second order: 98.57 %
- ASCOS network
  - homogene Iono: 98.03 %
  - first order Iono: 99.29 %
  - second order: 99.29 %

Trimble

Improved ambiguity resolution

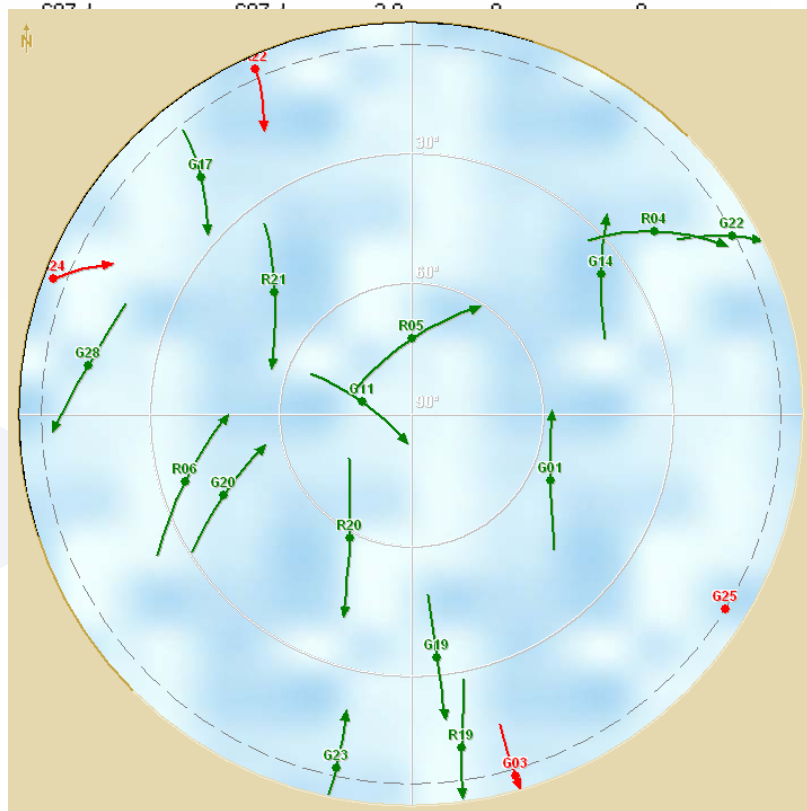


GLONASS

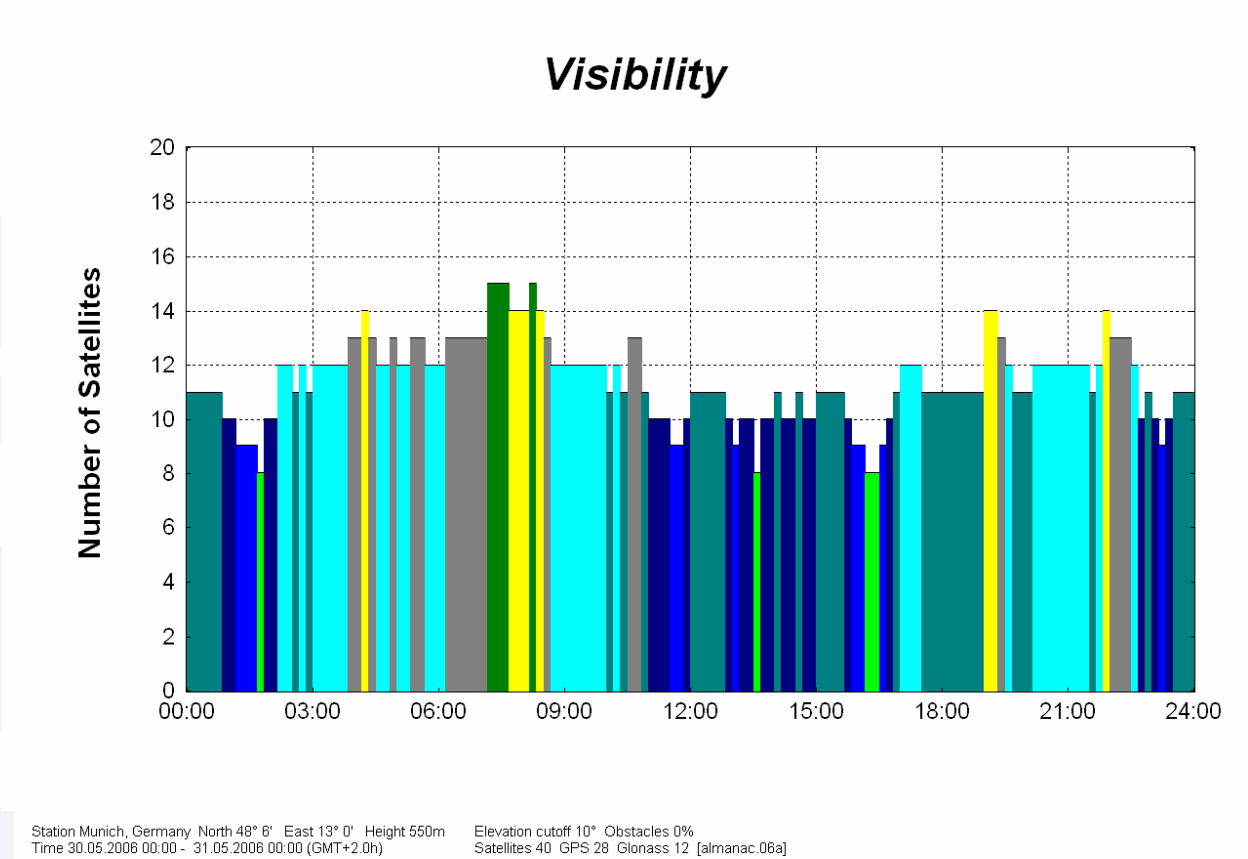
- Supporting new Trimble RS receiver **NetR5**
  - GLONASS
  - L2C
  - L5
  - Web interface
  - New antenna: Zephyr Geodetic 2
- GLONASS Storage for RINEX and dat files
- GLONASS is now supported in RINEX Merger and Virtual RINEX File Generator.

GLONASS

	Sat	El [°]	Az [°]	SNR (CA/P1)	SNR (L2/L2C)	CA/P1	L2/L2C	URA	Health (eph)	Health (alm)
	GLN 4	20	53	44 / 42	35 / -	697 / 697	697 / -	2.0	0	0
	GLN 5	73	0	44 / 42	43 / -	697 / 697	697 / -	2.0	0	0
	GLN 6	36	253	49 / 45	38 / -	697 / 697	697 / -	2.0	0	0
	GLN 19	12	171	42 / 41	32 / -	697 / 697	697 / -	2.0	0	0
	GLN 20	58	207	50 / 49	46 / -	697 / 697	697 / -	2.0	0	0
	GLN 21	48	312	49 / 47	42 / -	697 / 697	697 / -	2.0	0	0
	GLN 22	3	336	- / -	- / -	- / -	- / -	N/A	N/A	0
	GPS 1	54	115	52 / -	38 / -	697 / -	697 / -	2.0	0	0
	GPS 3	4	164	- / -	- / -	- / -	- / -	2.0	0	0
	GPS 11	79	284	49 / -	40 / -	697 / -	697 / -	2.0	0	0
	GPS 14	36	54	48 / -	30 / -					
	GPS 17	17	319	43 / -	27 / 40					
	GPS 19	34	174	47 / -	33 / -					
	GPS 20	43	246	50 / -	36 / -					
	GPS 22	6	61	41 / -	20 / -					
	GPS 23	6	192	39 / -	20 / -					
	GPS 24	2	291	- / -	- / -					
	GPS 25	5	122	- / -	- / -					
	GPS 28	15	280	44 / -	24 / -					



GLONASS


Visibility
Number of Satellites
0
2
4
6
8
10
12
14
16
18
20
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
24:00
Station Munich, Germany North 48° 6' East 13° 0' Height 550m
Time 30.05.2006 00:00 - 31.05.2006 00:00 (GMT+2.0h)
Elevation cutoff 10° Obstacles 0%
Satellites 40 GPS 28 Glonass 12 [almanac.06a]

L2C

- PRN17 transmits the new civil L2C signal
- L2C provides better signal tracking on rover and reference receivers
- GPSNet 2.5 uses now L2C when available for:
  - Improved ambiguity resolution
  - Improved ionospheric modeling
  - Improved network corrections
- RINEX 2.11:
  - Additional oberservable for L2C
  - Observation identifier for L2C: C2
- Web server / RINEX Shop:
  - Full support for L2C in RINEX Merger and Virtual RINEX File Generator.

Trimble

L2C

Sat	El [°]	Az [°]	SNR (CA)	SNR (L2/L2C)	CA	L2/L2C	URA	Health (eph)	Health (alm)
GPS 1	54	117	52	42 / -	856	856 / -	2.0	0	0
GPS 3	3	164	-	- / -	-	- / -	2.0	0	0
GPS 11	79	281	52	45 / -	856	856 / -	2.0	0	0
GPS 14	37	55	47	32 / -	856	856 / -	2.0	0	0
GPS 17	17	319	42	- / 42	856	- / 856	2.8	0	0
GPS 19	34	174	48	36 / -	856	856 / -	2.8	0	0
GPS 20	42	245	50	38 / -	856	856 / -	2.0	0	0
GPS 22	7	61	39	18 / -	856	856 / -	2.0	0	0
GPS 23	5	192	40	20 / -	45	35 / -	2.0	0	0
GPS 24	2	290	-	- / -	-	- / -	2.0	0	0
GPS 25	4	123	-	- / -	-	- / -	N/A	N/A	ff
GPS 28	15	280	39	22 / -	856	856 / -	2.8	0	0

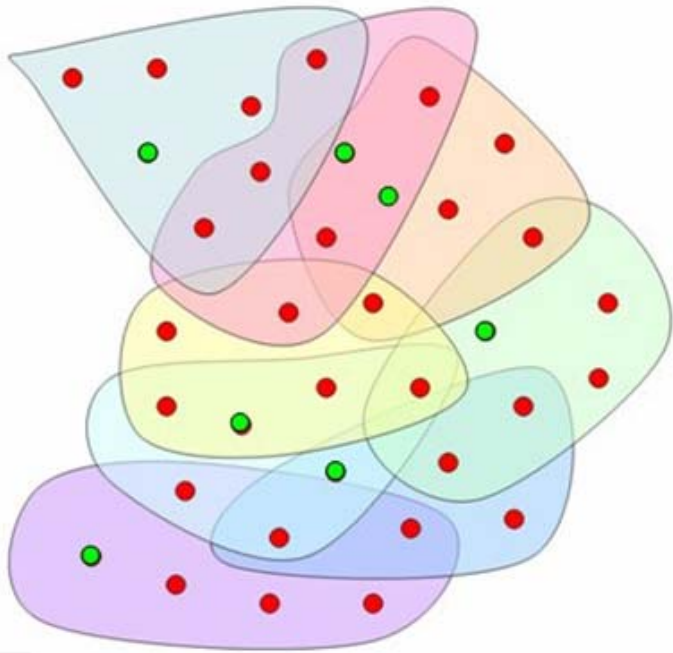
Sat	El [°]	Az [°]	SNR (CA/P1)	SNR (L2/L2C)	CA/P1	L2/L2C	URA	Health (eph)	Health (alm)
GLN 4	20	53	44 / 42	35 / -	697 / 697	697 / -	2.0	0	0
GLN 5	73	0	44 / 42	43 / -	697 / 697	697 / -	2.0	0	0
GLN 6	36	253	49 / 45	38 / -	697 / 697	697 / -	2.0	0	0
GLN 19	12	171	42 / 41	32 / -	697 / 697	697 / -	2.0	0	0
GLN 20	58	207	50 / 49	46 / -	697 / 697	697 / -	2.0	0	0
GLN 21	48	312	49 / 47	42 / -	697 / 697	697 / -	2.0	0	0
GLN 22	3	336	- / -	- / -	- / -	- / -	N/A	N/A	0
GPS 1	54	115	52 / -	38 / -	697 / -	697 / -	2.0	0	0
GPS 3	4	164	- / -	- / -	- / -	- / -	2.0	0	0
GPS 11	79	284	49 / -	40 / -	697 / -	697 / -	2.0	0	0
GPS 14	36	54	48 / -	30 / -	697 / -	697 / -	2.0	0	0
GPS 17	17	319	43 / -	27 / 40	697 / -	697 / 697	2.8	0	0
GPS 19	34	174	47 / -	33 / -	697 / -	697 / -	2.8	0	0
GPS 20	43	246	50 / -	36 / -	697 / -	697 / -	2.0	0	0
GPS 22	6	61	41 / -	20 / -	697 / -	697 / -	2.0	0	0
GPS 23	6	192	39 / -	20 / -	181 / -	181 / -	2.0	0	0
GPS 24	2	291	- / -	- / -	- / -	- / -	2.0	0	0
GPS 25	5	122	- / -	- / -	- / -	- / -	N/A	N/A	ff
GPS 28	15	280	44 / -	24 / -	697 / -	697 / -	2.8	0	0

Trimble

RTCM 3 network messages

- RTCM 3 network message can be used in:
  - Broadcast mode = preconfigured master and auxiliary stations
  - Dial-in mode (Auto-select Cell = automatic selection of master and auxiliary stations based on the NMEA rover position)

- Network subdivided in cells
- Each cell consists of:
  - 1 master station
  - Up to 31 auxiliary stations (typically 6-8)



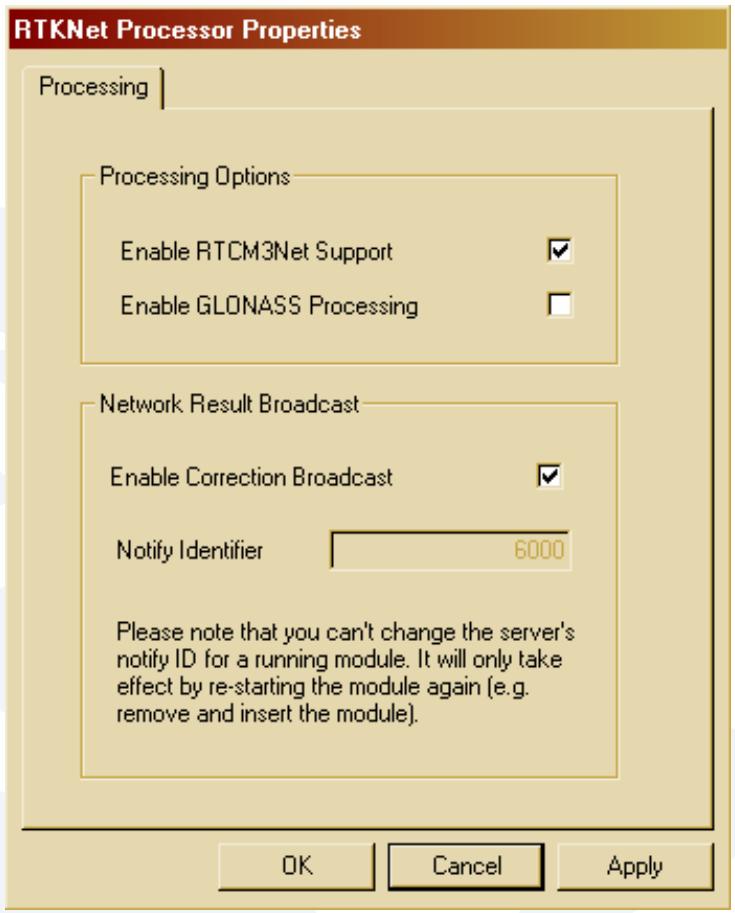
RTCM 3 network messages

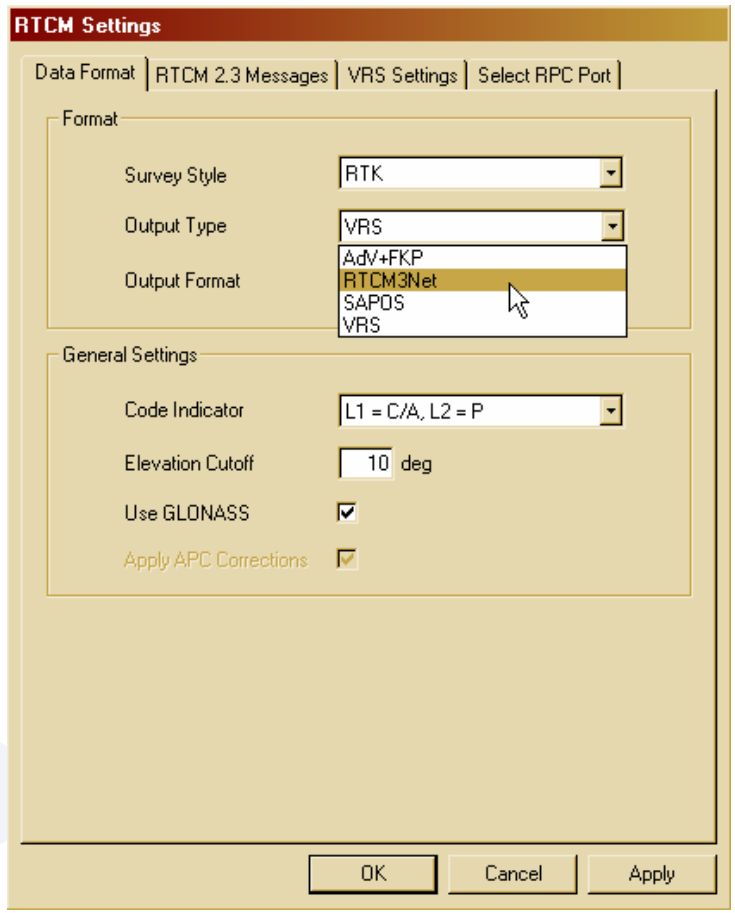
- Messages
  1014: aux. station info
  1015: ionospheric correction message
  1016: geometric correction message
  1017: compressed iono and geo corrections in one message (alternative to 1015/1016)

- Distribute messages over several epochs to reduce bandwidth
- Needs to be enabled in RTKNet processor properties
- RTCM Network format is supported for GPS only

Trimble

RTCM 3 network messages

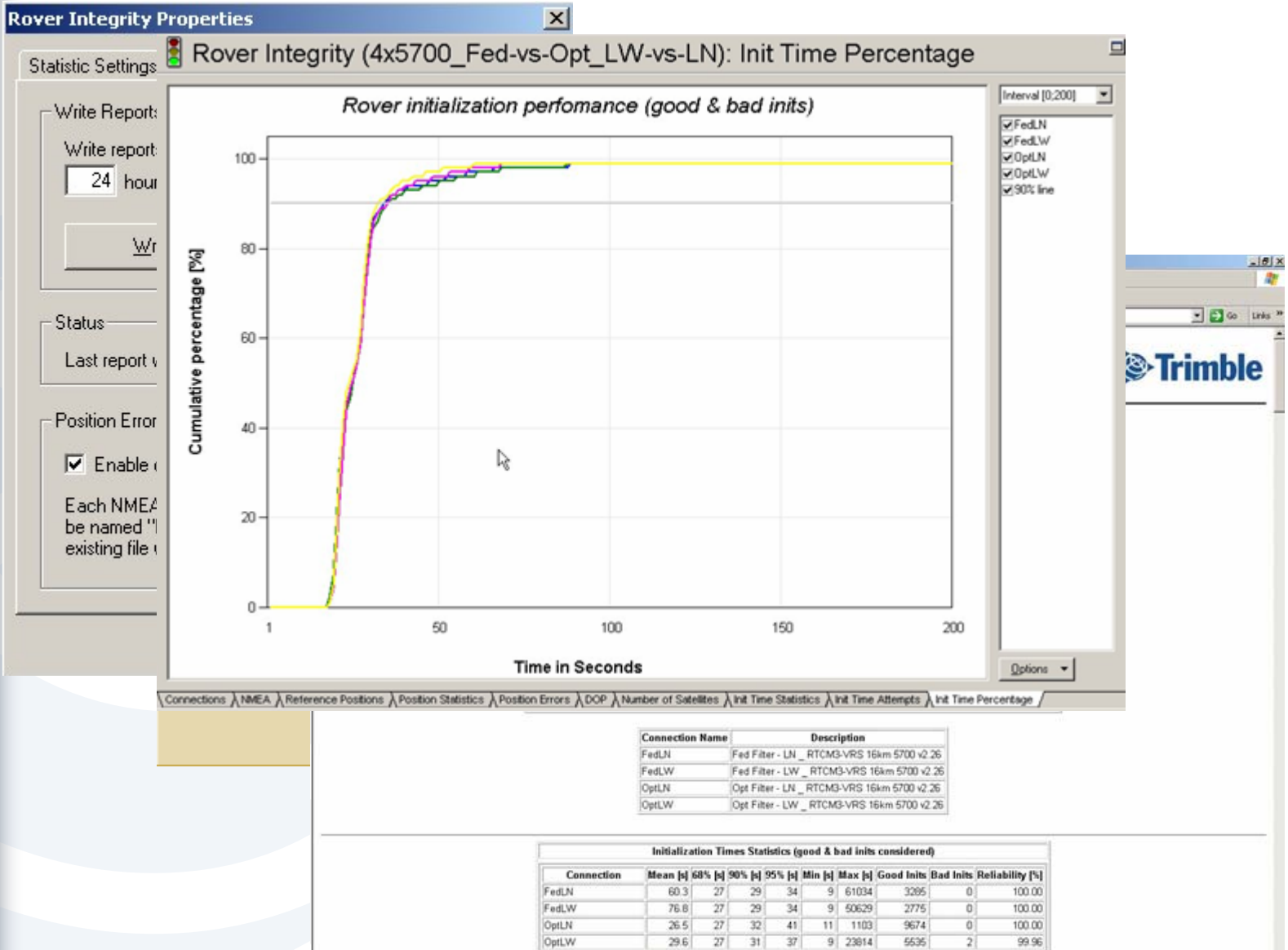




Rover Integrity

- Allows now to run more than one rover receiver at a time
- Complete re-design of the module
- Alarms
- Rover Integrity Report
- Enable report over File / Reporting:
  - Init Time Percentage
  - Init Time Attempts
  - Init time Statistics
  - Number of satellites
  - DOP values
  - Position Errors
  - Position Statistics

Rover Integrity



Connection Name	Description
FedLN	Fed Filter - LN _ RTCM3-VRS 16km 5700 v2.26
FedLW	Fed Filter - LW _ RTCM3-VRS 16km 5700 v2.26
OptLN	Opt Filter - LN _ RTCM3-VRS 16km 5700 v2.26
OptLW	Opt Filter - LW _ RTCM3-VRS 16km 5700 v2.26

Initialization Times Statistics (good & bad inits considered)

Connection	Mean [s]	68% [s]	90% [s]	95% [s]	Min [s]	Max [s]	Good Inits	Bad Inits	Reliability [%]
FedLN	60.3	27	29	34	9	61034	3285	0	100.00
FedLW	76.8	27	29	34	9	60629	2775	0	100.00
OptLN	26.5	27	32	41	11	1103	9674	0	100.00
OptLW	29.6	27	31	37	9	23814	5535	2	99.96

IGS site log

- You can now import and export IGS site logs to update reference station information
- Enables you to easily exchange station information between service providers
- Following information are provided:
  - Site identification of the monument
  - Site Location Information
  - GNSS Receiver and Antenna information

- Format defined by the IGS Central Bureau: igscb.jpl.nasa.gov/igscb/station/general/blank.log

Trimble NTRIP Caster

- Replacement for NTRIP Functionality in iGate Module
- Support of several NTRIP ports
- Import of iGate mountpoints possible
- Support of multiple network cards
- Support TCP/IP and UDP for communication
- New colomn in Users.mdb (table: PWD) after updated DB from 2.4 to 2.5 "MaxNtripConn"
- User Authentication:
  - Support of digest authentication
  - Support of multiple users with same password

Trimble Ephemeris Download

- New tool to download ultra-rapid orbits from the Internet via FTP/HTTP
- Replaces old tcl scripts
- Windows UI

Questions