Real-time services

Landmælingar Íslands have established RTK network from 18 stations. The shortest baseline is 42.3 km. (NYLA-REYK) and the longest is 324 km. The goal is to cover whole Iceland in a few years. The Geo++ GNSMART software have been used for monitoring, processing and RTCM output.

Stations of the network:

Station	Location	Receiver type
AKUR	Akureyri University	NOV OEM638
ISAF	Isafjordur	TRIMBLE NETR5
HEID	Heidarsel	TRIMBLE NETR5
HVEL	Hveravellir	TRIMBLE NETRS
MYVA	Myvatn	LEICA GR10
INTA	Inntakshus(Karahnjukar)	TRIMBLE NETRS
FJOC	Fjordungsalda	TRIMBLE NETRS
REYK	Reykjavik University	LEICA GR25
HOFN	Hofn i Hornafjordur	LEICA GR25
KALF	Kalfafell	TRIMBLE NETRS
GUSK	Gufuskalar	TRIMBLE NETR5
RHOF	Raufarhofn	TRIMBLE NETR9
NYLA	Nylenda	TRIMBLE NETRS
SELF	Selfoss	TRIMBLE NETRS
RHOL	Reykholar	TRIMBLE NETR5
SKHA	Skardshamrar	TRIMBLE NETR5
ISAK	Isakot	TRIMBLE NETR9
VMEY	Vestmannaeyjar	TRIMBLE NETR9

If you want to use real-time services make sure that your receiver can communicate in a bidirectional way.

Services provided by the network:

Mountpoint	Identifier / Description	Format	Format Details (Rate)
FKP2	FKP23	RTCM 2.3	1, 3(10), 14(60), 16(300), 20, 21, 22(10) 23(10), 24(10)
VRS3	VRS30	RTCM 3.0	1004(1), 1005(10), 1007(30), 1012, 1030(30), 1031(30), 1032(10), 1033(60)
MAC	MAC	RTCM 3.1	1004, 1005(10), 1007(10), 1012, 1014(10), 1017(10), 1030(30), 1031(30), 1033(60), 1039(10)
RTCM30	RTCM30	RTCM 3.0	1004(1), 1005(10), 1012, 1033(10)
FKP3	FKP31	RTCM 3.1	1004, 1005(10), 1007(30), 1012, 1030(30), 1031(30), 1033(10), 1034(10), 1035(10)
RTCM23	RTCM23	RTCM 2.3	1, 3(17), 14(61), 16(300), 20(1), 21(1), 22(17), 23(17), 24(17)
VRS2	VRS23	RTCM 2.3	1, 3(10), 14(60), 16(300), 20, 21, 22(10), 23(10), 24(10)

MAC – The user sends his approximate position in NMEA-GGA to the central computing facility string only once. The nearest reference station is assigned as master station once at the beginning of the connection. The chosen station is kept even if the rover moves closer to another station. If the rover

wants to switch to another station, it has to disconnect and reconnect to RTCM_OUT. This limitation is necessary, because today's rovers do not expect a switch in reference station during a running connection.

The coordinate differences between master and auxiliary stations and geometric/ ionospheric correction differences are send out back to the rover. The computation and adjustment of final correction data (individualization) is done on the rover which requires therefore additional software and processing (CPU) resources.

MAC is rather equivalent to FKP. Both use the output for the master station, which is unchanged compared to a single (stand-alone) reference station, and add information about spatial variations of the corrections. FKP sends these spatial variations as ppm values in North and East directions. MAC sends the spatial variations for discrete points (auxiliary stations).

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The model of the distance dependent errors (FKP) is transmitted to the rover. The interpretation of the FKP and the individualization of the corrections are done at the rover, the rover can for itself compute the individualized corrections.

FKP describe the horizontal gradients of the corrections. The correction of a real reference station are used in combination with the FKPs to compute the individualized corrections for the rover position.

VRS – The user sends his approximate position in NMEA-GGA to the central computing facility and by return receives individualized observations to be used for baseline positioning. The distance dependent errors are corrected. In opposite to the „classical“ Virtual Reference Station (VRS) takes the movement of a rover into account for the individualization hence, the corrections are always optimized for the last known rover position.

RTCM 3.0/RTCM 2.3 – Single base RTK. It can be provided DGPS for GPS and also GLONASS, if reference station of your choice tracks GLONASS. It involves a reference receiver transmitting observation corrections to a rover. The data processing at the rover site includes ambiguity resolution of the differenced carrier phase data and coordinate estimation of the rover position. One significant drawback of this single base RTK approach is that the maximum distance between reference and rover receiver must not exceed 10 to 20 kilometers in order to be able to rapidly and reliably resolve the carrier phase ambiguities.

The user sends his approximate position in NMEA-GGA to the central computing facility string only once. The nearest reference station is assigned once at the beginning of the connection. The chosen station is kept even if the rover moves closer to another station. If the rover wants to switch to another station, it has to disconnect and reconnect to RTCM_OUT. This limitation is necessary, because today's rovers do not expect a switch in reference station during a running connection.

References

[1] IAG working group 4.5.1: networkRTK (2003-2007). Introduction to network RTK.

[2] http://www.geopp.de/index.php?bereich=0&kategorie=31&artikel=46&seite=2
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