

EUREF-IP Pilot Project – Status Report

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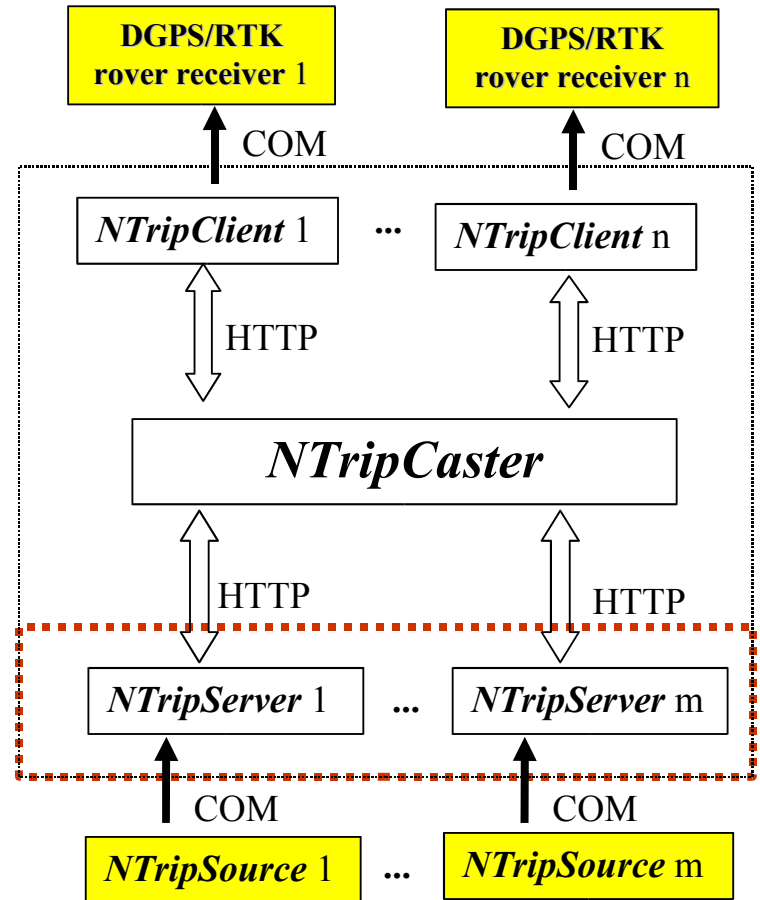
- **Ntrip concept and components**
- **Curren status concerning real-time**
 - **broadcaster**
 - **data streams**
- **Ntrip usage, examples**
 - **Networked DGPS/RTK**
 - **Navigation**

Networked Transport of RTCM via Internet Protocol (Ntrip)

- Method: IP Streaming, allows use of packet switched communication (GPRS, UMTS)
- Derived from Internet Radio Technology
- Standardized within RTCM
- Based on HTTP

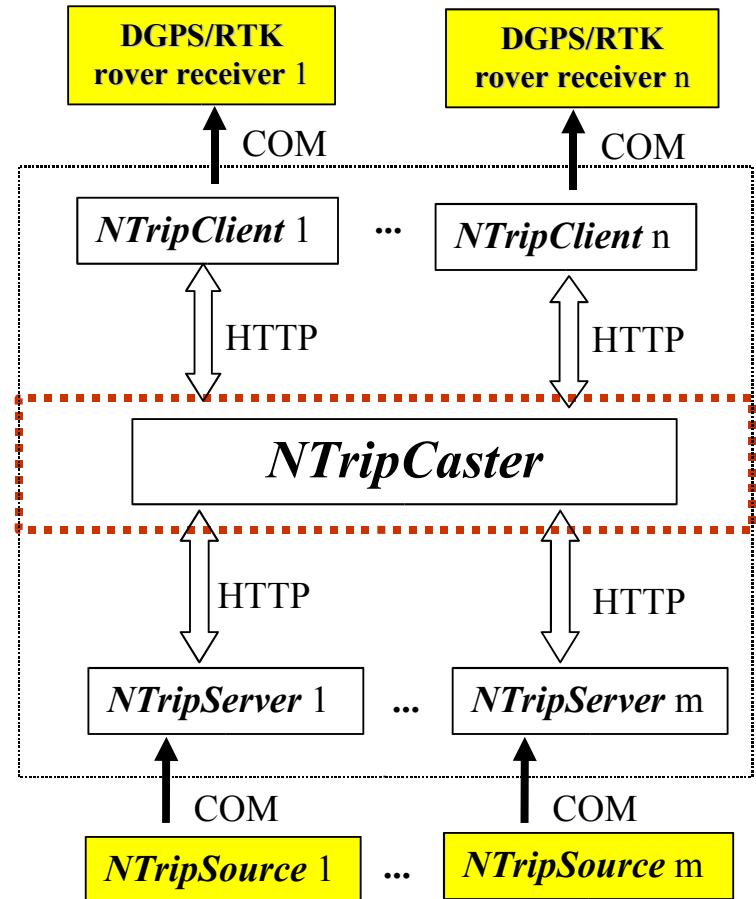
Ntrip Server

- NtripServer receives data of NtripSource and forwards it to NtripCaster
- Mountpoint and password are defined by administrator of NtripCaster for purpose of authentication
- NtripServer is a PC program sending data to NtripCaster after receiving them *e.g.* via the serial port



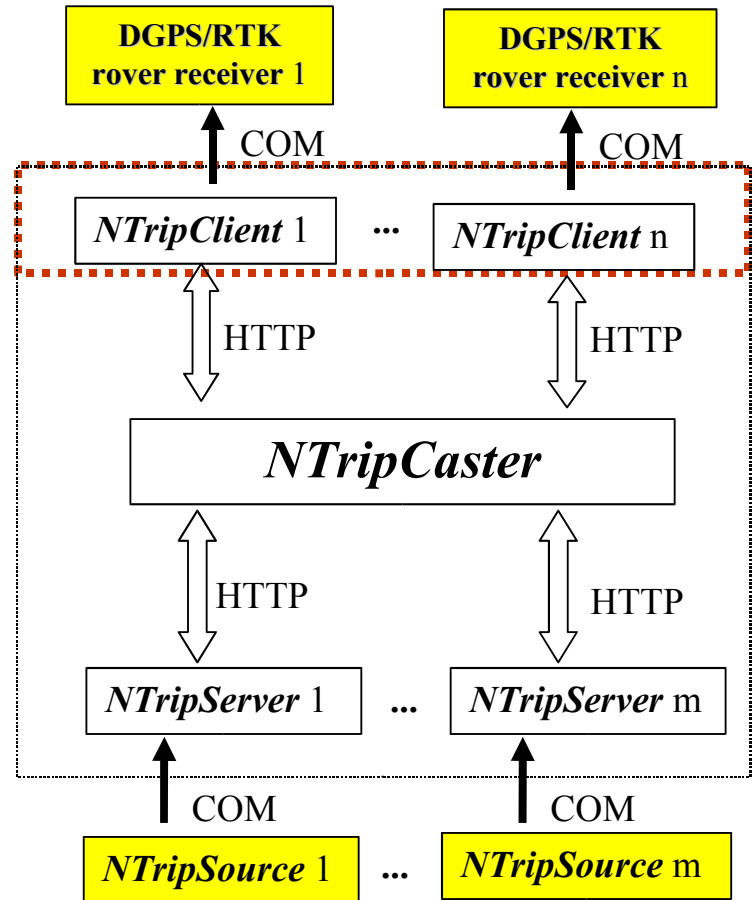
Ntrip Caster

- Is the component for stream splitting and broadcasting
- Acts as "switch board" for connecting NtripClients to required streams
- Is an HTTP server supporting a subset of HTTP messages, NtripClient and NtripServer act as HTTP clients

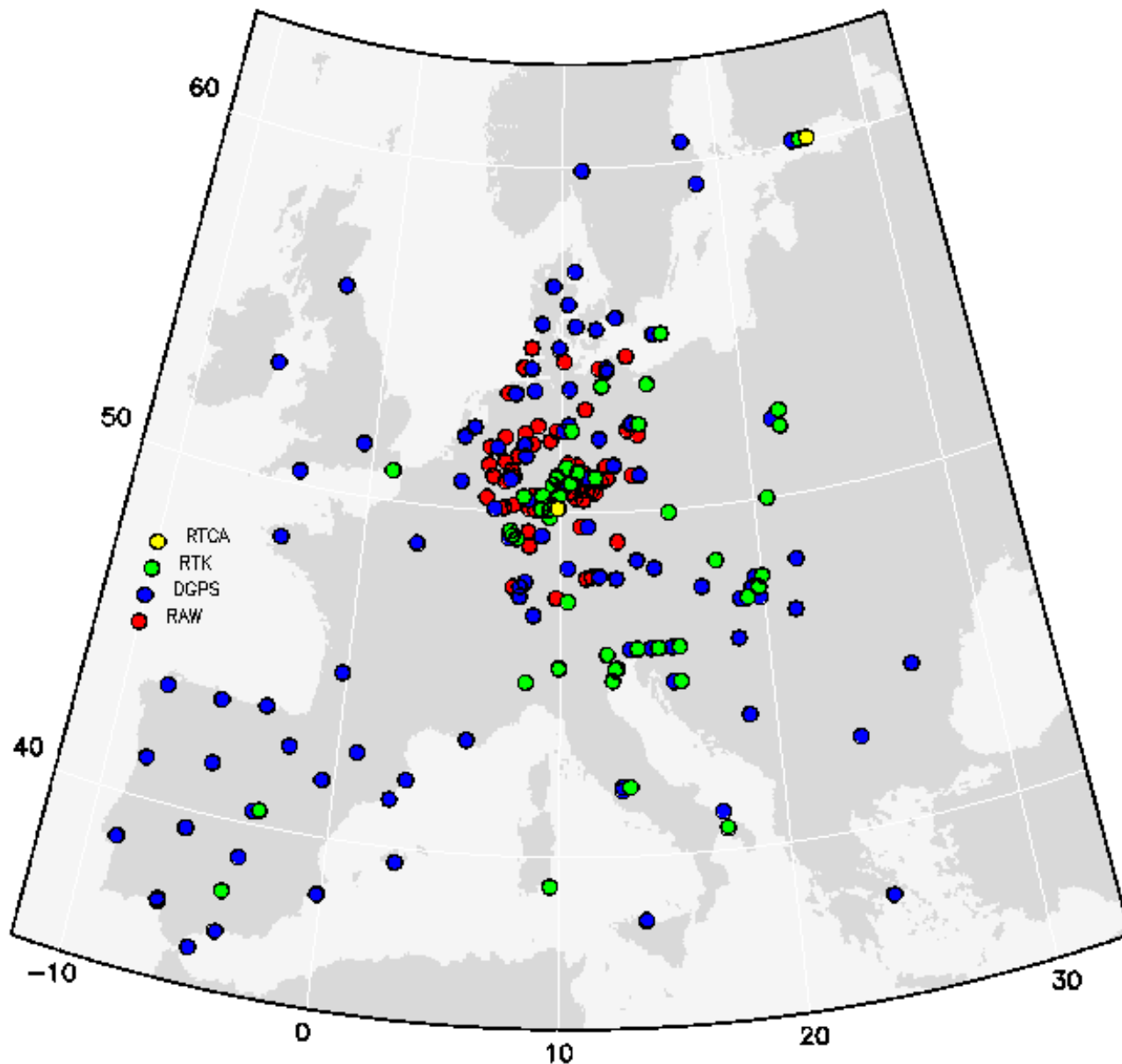


Ntrip Client

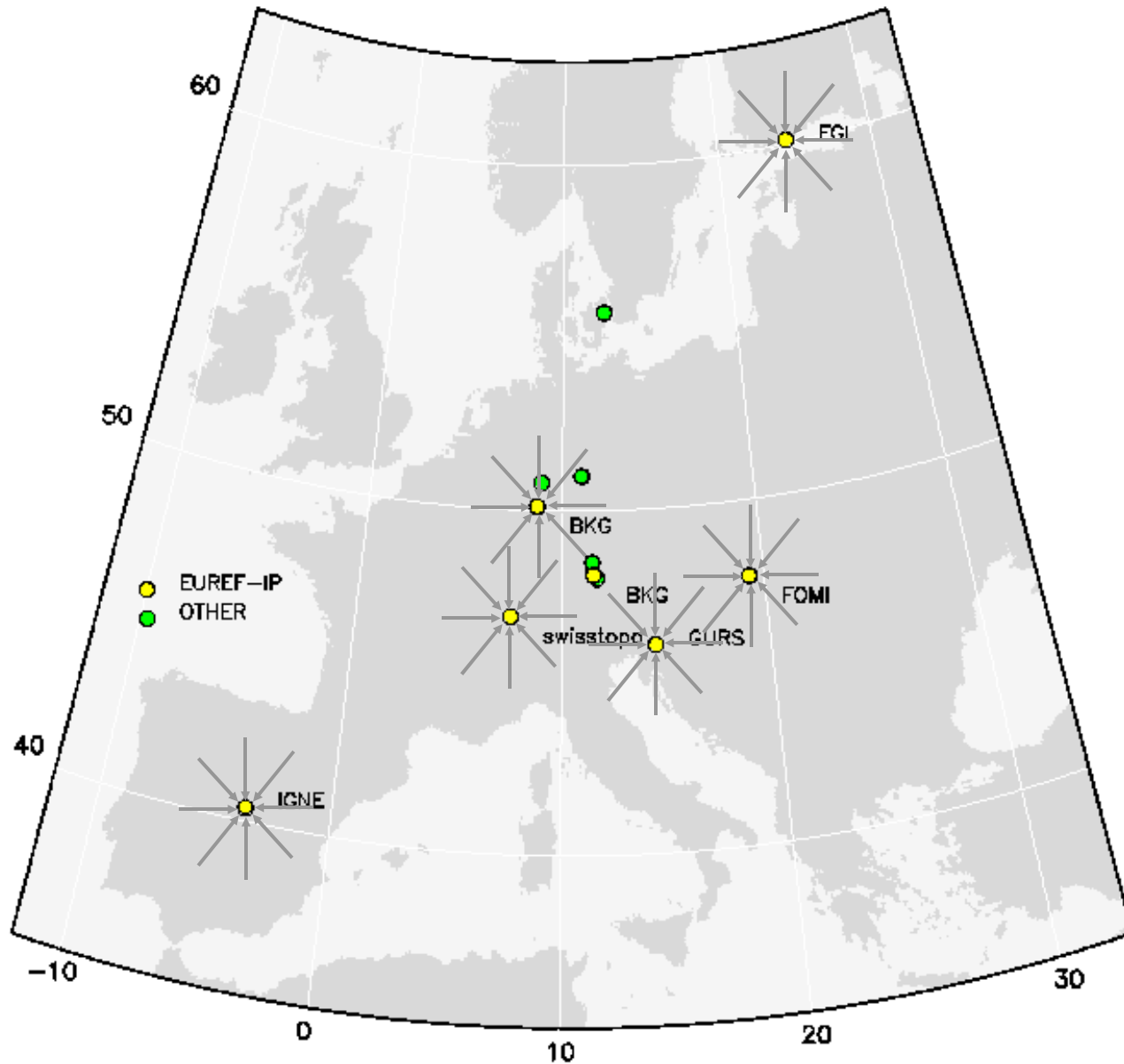
- Sends and receives data to and from NtripCaster, may retrieve list of available NtripSources
- Forwards data either to rover RTK GPS receiver or to processing software in an application terminal for calculating position



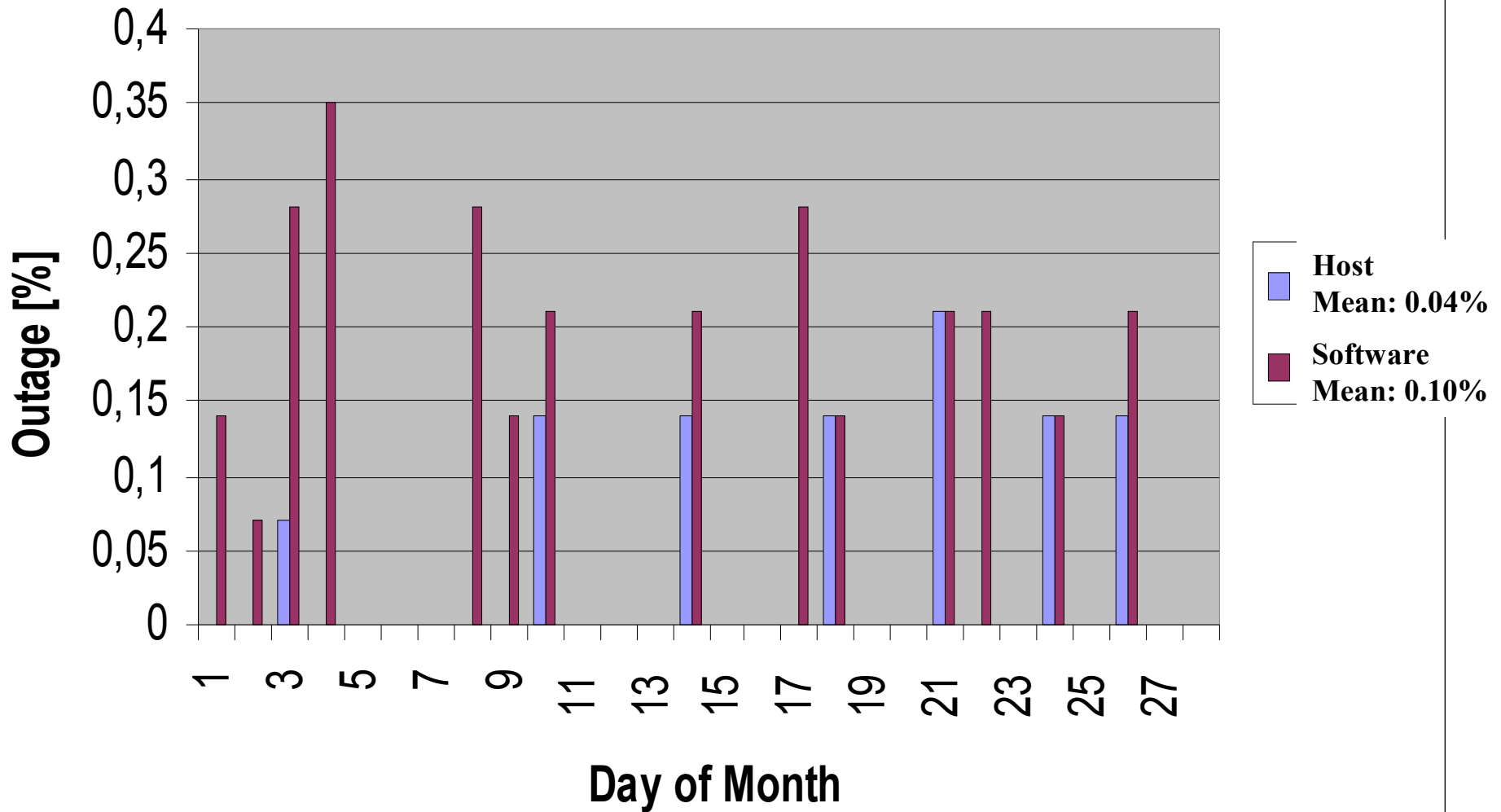
What's available today in Europe via EUREF's Ntrip?



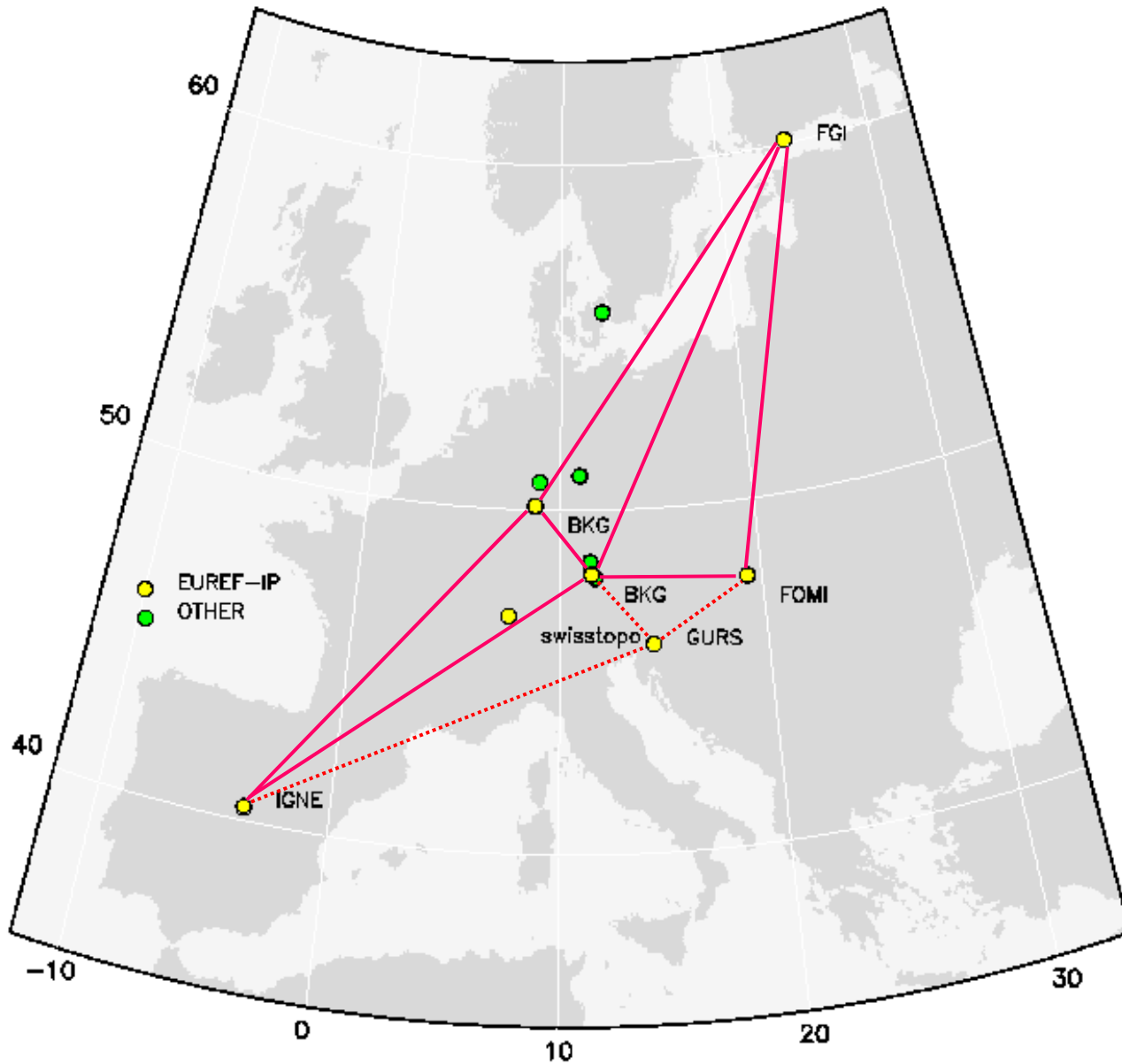
Today's EUREF-IP Ntrip Broadcaster Implementations



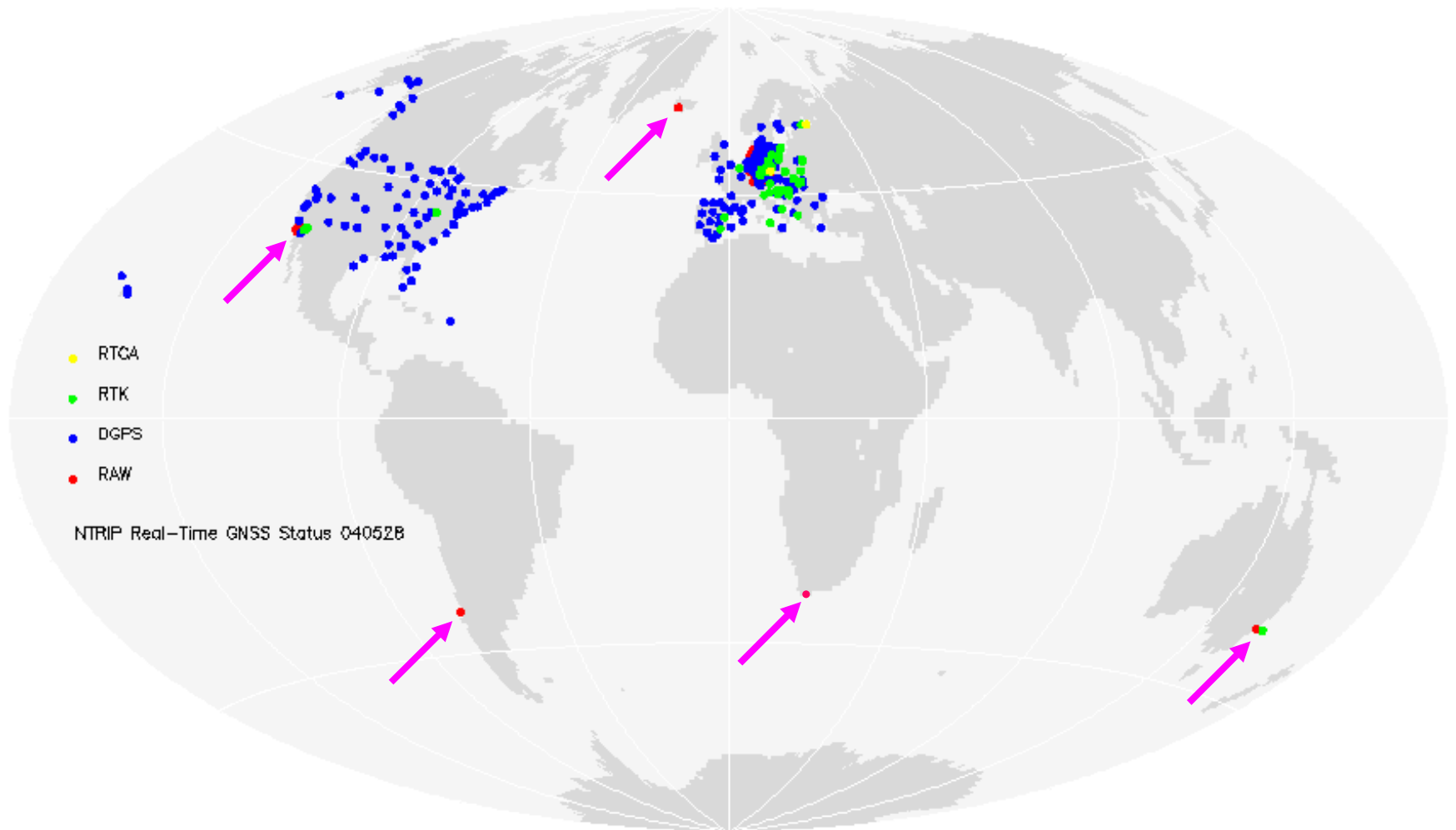
Daily EUREF-IP Broadcaster Outages May 04



Broadcaster Monitoring & Fallback Concept

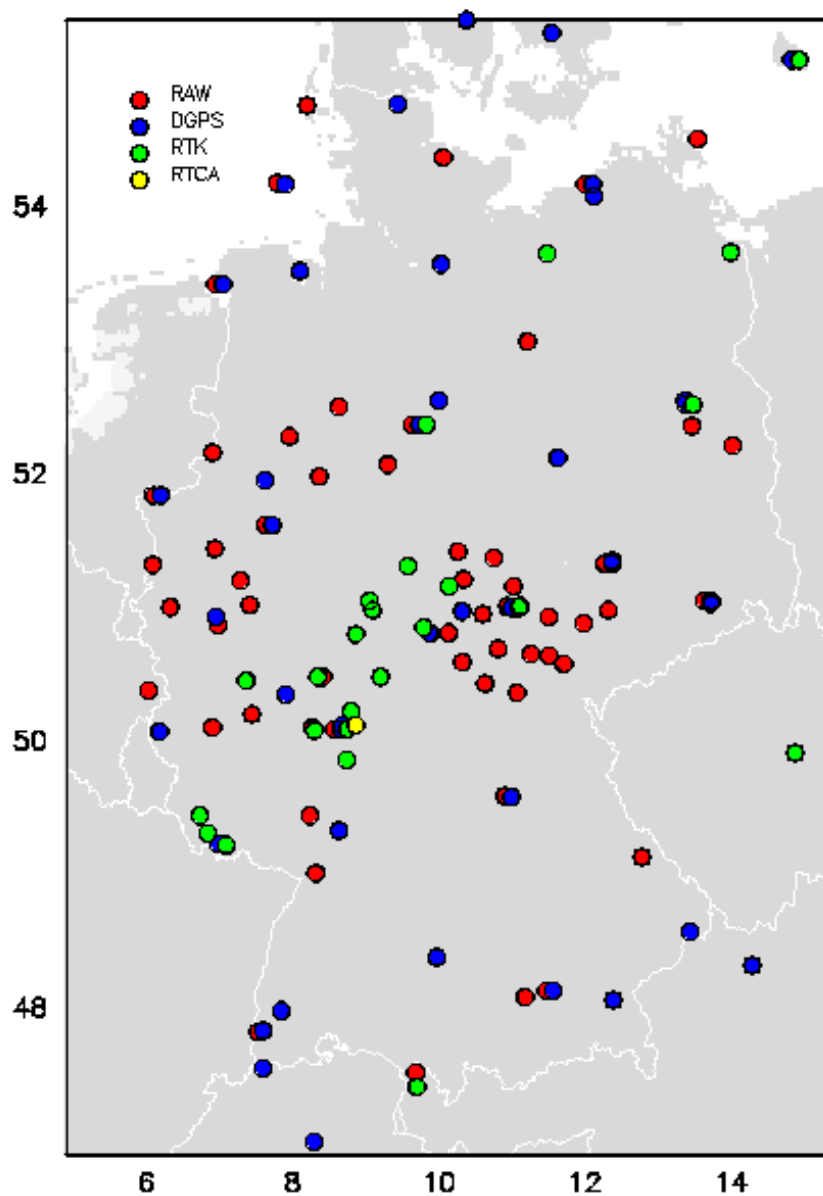


Global Ntrip Real-Time Network

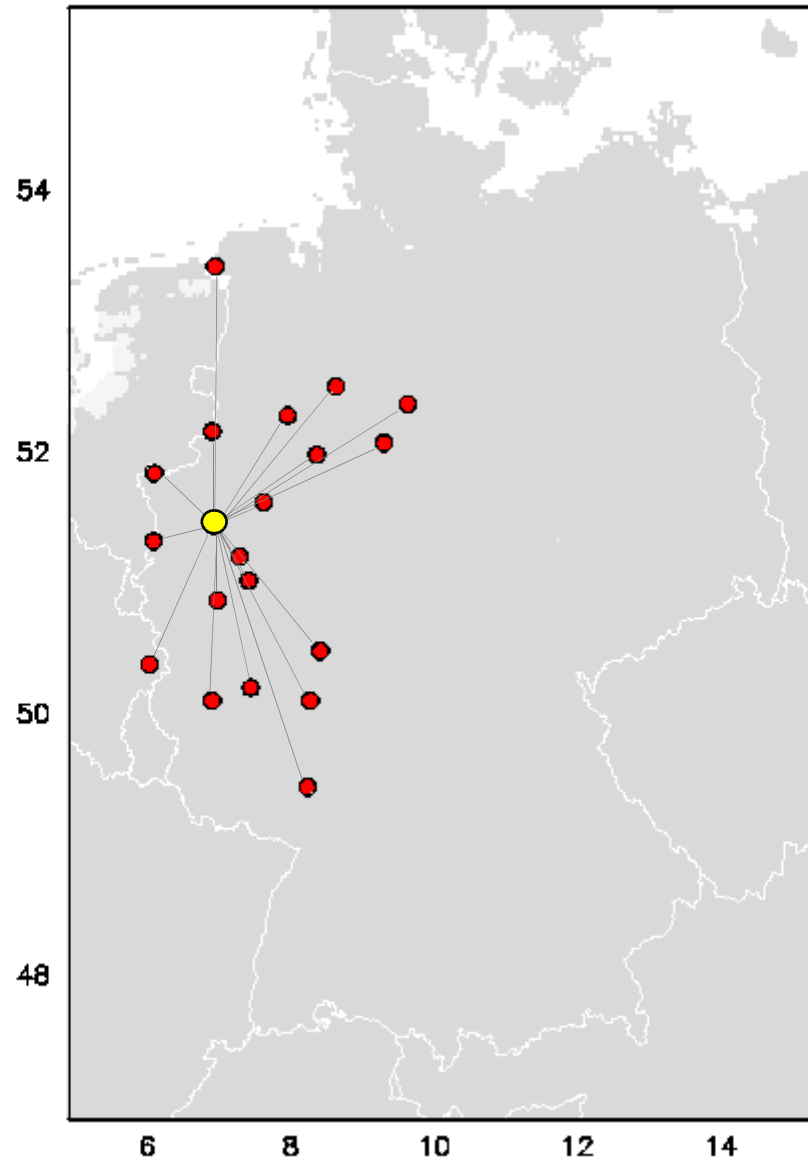


Purpose: Tracking below horizon

What's available via EUREF's Ntrip Protocol in Germany?



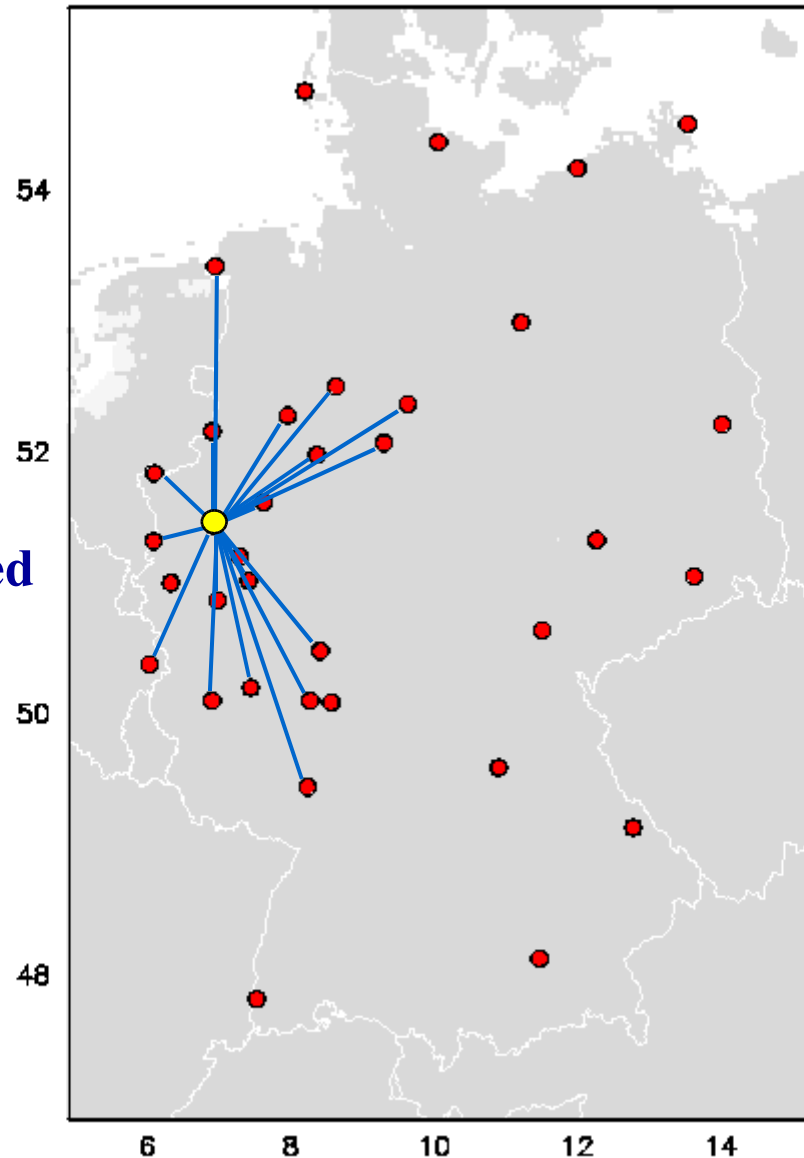
Commercial DGPS/RTK Network ASCOS, Germany



Commercial DGPS/RTK Network ASCOS, Germany

**Real-Time
Integration
of EUREF/IGS
Streams**

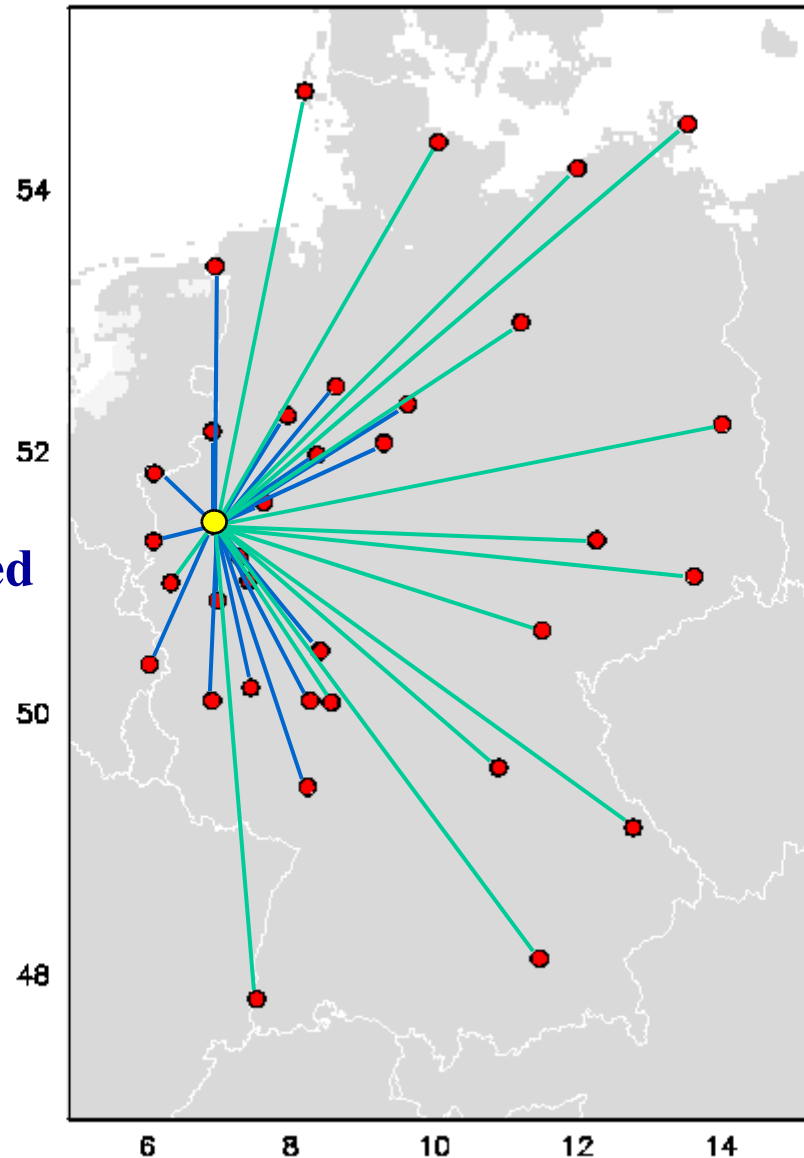
**Makes sure that
coordinates
continuously related
to ETRS89**



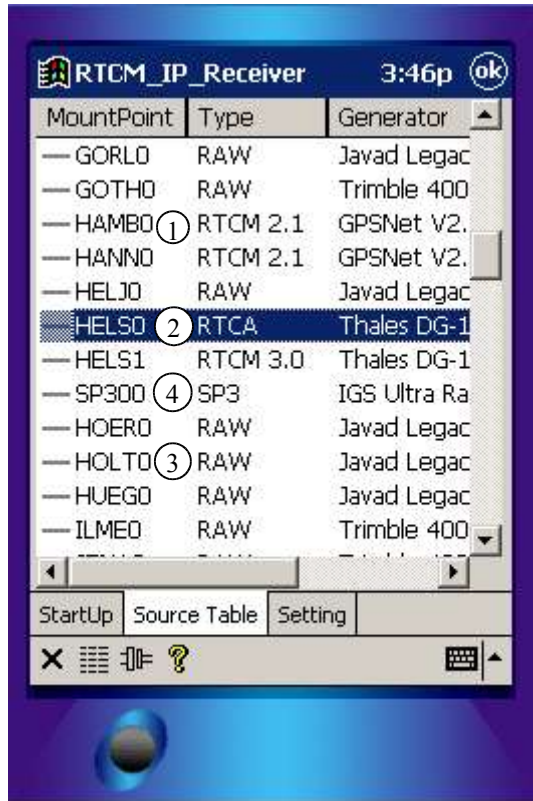
Commercial DGPS/RTK Network ASCOS, Germany

**Real-Time
Integration
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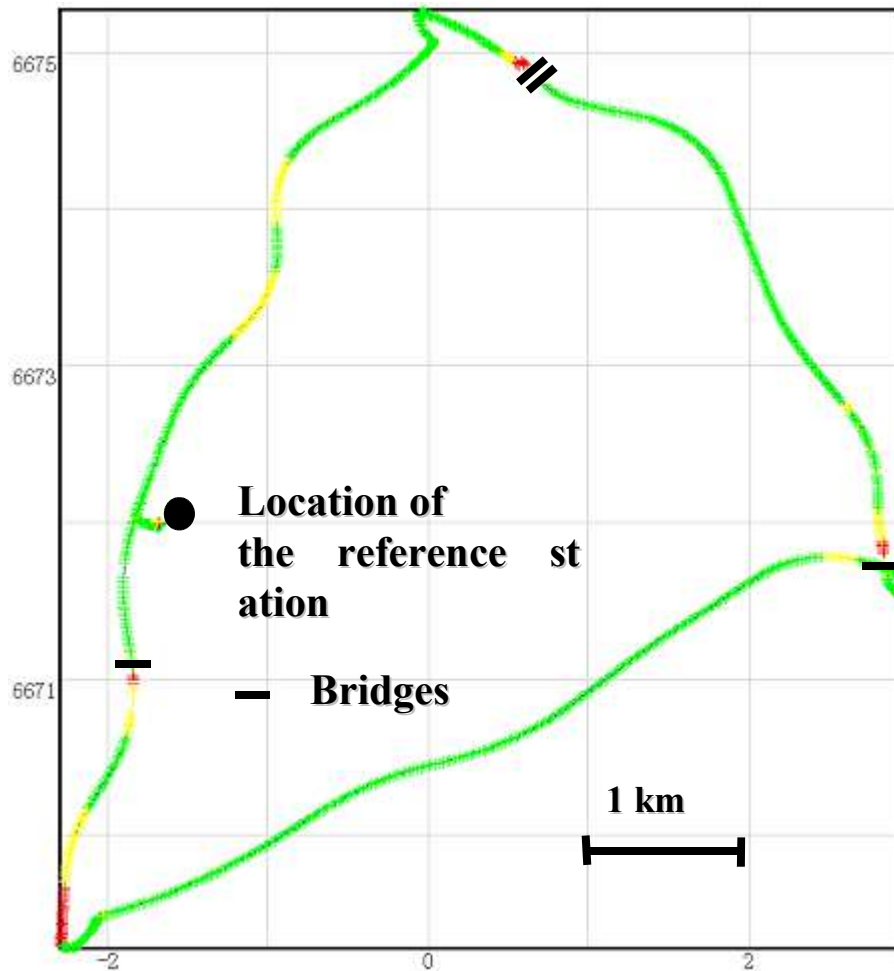
Ntrip Client Developed by FGI



Route of EUREF-IP Ntrip Driving Test



Results of the GSM Test Scenarios



Driving speed: upto 80 km per hour.

Driving route: 18 km (GL-Kivenlahti-Kauklahti-GL)

The vehicle passed under 4 bridges.

**Green: Fixed RTK solution
79%**

**Yellow: Floating RTK solution
12%**

**Red: GPS navigation solution
5%.**

GPS outage: 4%

Who has implemented EUREF's Ntrip Protokol in commercial products following RTCM's standardization?

- ArcNtrip ArcPad GIS Data Collection Software, NtripClient
- GART-2000 Rover Control & GIS Data Collection Software, NtripClient
- GNSMART DGPS & RTK Networking Software, NtripClient
- GPSBase Reference Station Software, NtripServer
- GPSNet DGPS & RTK Networking Software, NtripCaster
- MultiNET DGPS Networking Software, NtripServer
- MultiNAV Reference Station Software, NtripClient
- Rtca2Rtcm EGNOS/WAAS Format Conversion Software, NtripClient&Server
- SurveyController Rover Control Software, NtripClient
- TerraSync GIS Data Collection and Data Maintenance Software, NtripClient

EUREF-IP, Current Real-Time Activities

- Include more EPN stations in Europe
- Get additional Broadcasters up and running
- Maintain and distribute software & standard
- Include globally distributed stations
- Work on RTCM's Ntrip Version 2.0 (UDP)
- Work on coordination with IGS RTWG
- Galileo 6FP