

The EUREF Ntrip-Broadcaster: Real-Time GNSS data for Europe

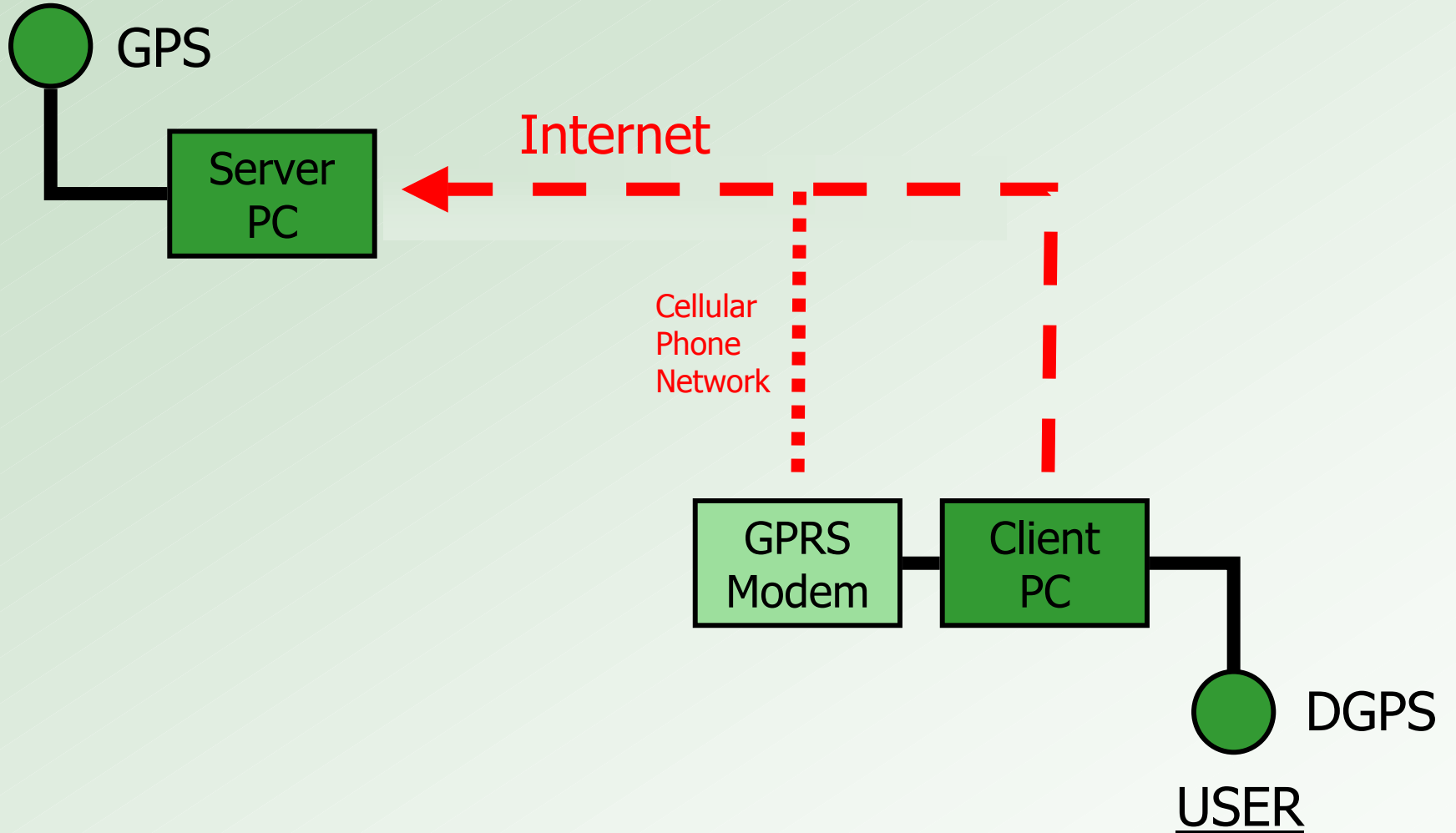
D. Dettmering, G. Weber

Federal Agency for Cartography and Geodesy, BKG, Frankfurt

IGS 2004 Workshop, Bern, March 1-5, 2004

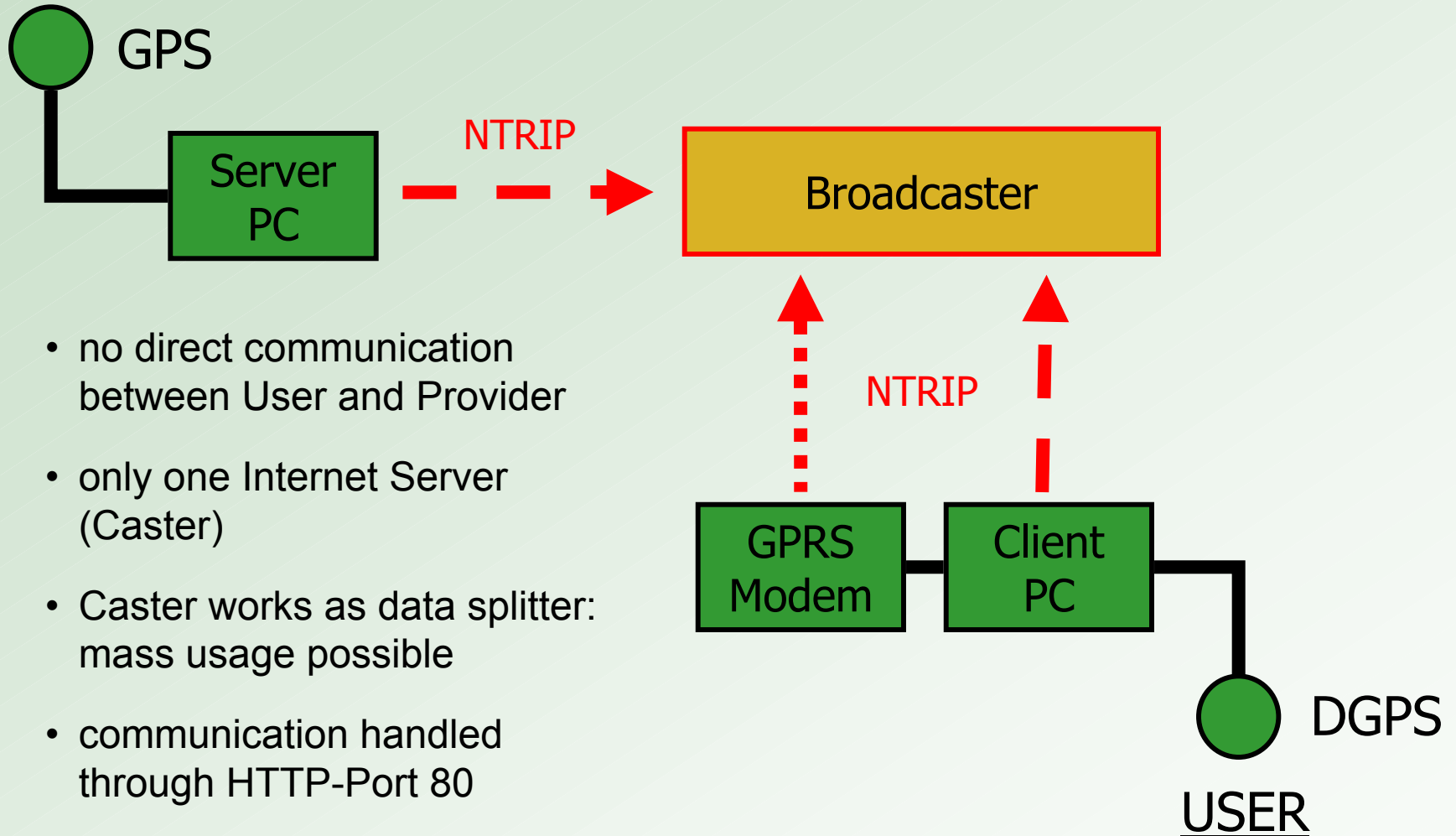
DGPS & Internet - Classical Approach

PROVIDER



NTRIP: Networked Transport of RTCM via Internet Protocol

PROVIDER



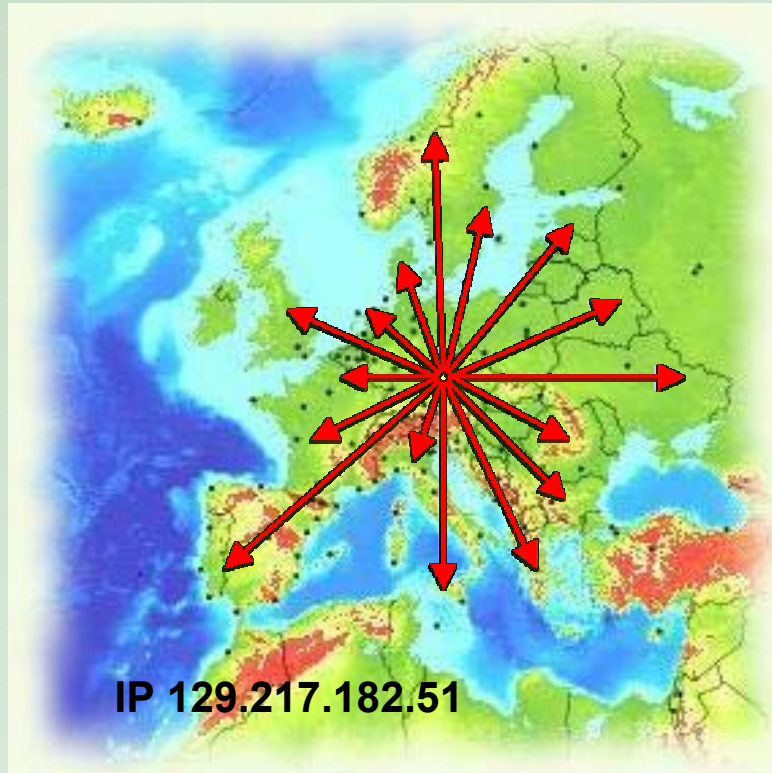
NTRIP: Networked Transport of RTCM via Internet Protocol

more about NTRIP in the Poster Session:

„Networked Transport of RTCM via Internet Protocol:
A HTTP based technique for streaming GNSS data over the Internet“

presented by: Harald Gebhard

EUREF-IP Ntrip Broadcaster



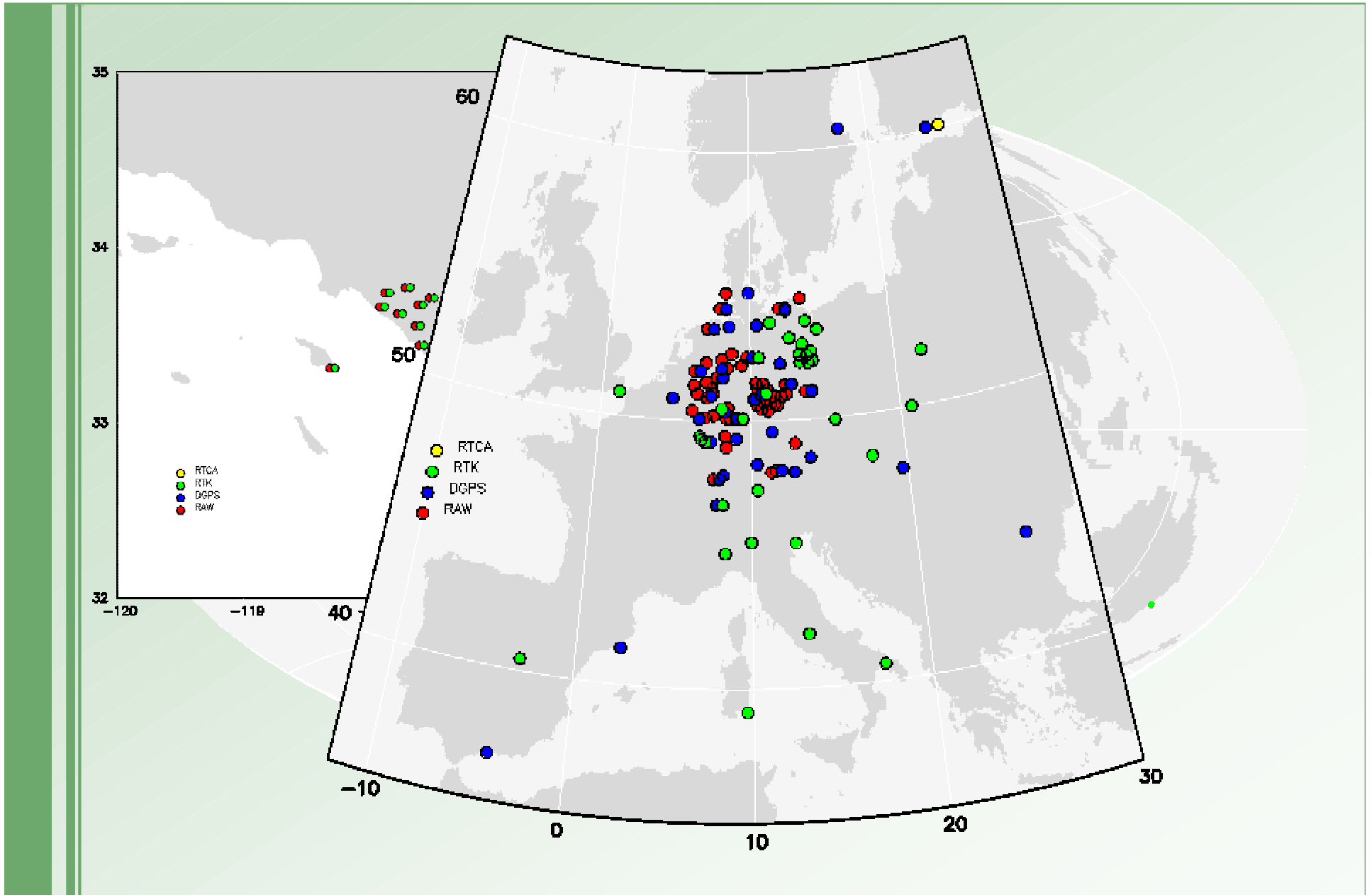
Capable of handling

- up to 300 real-time data streams
- and 1500 users

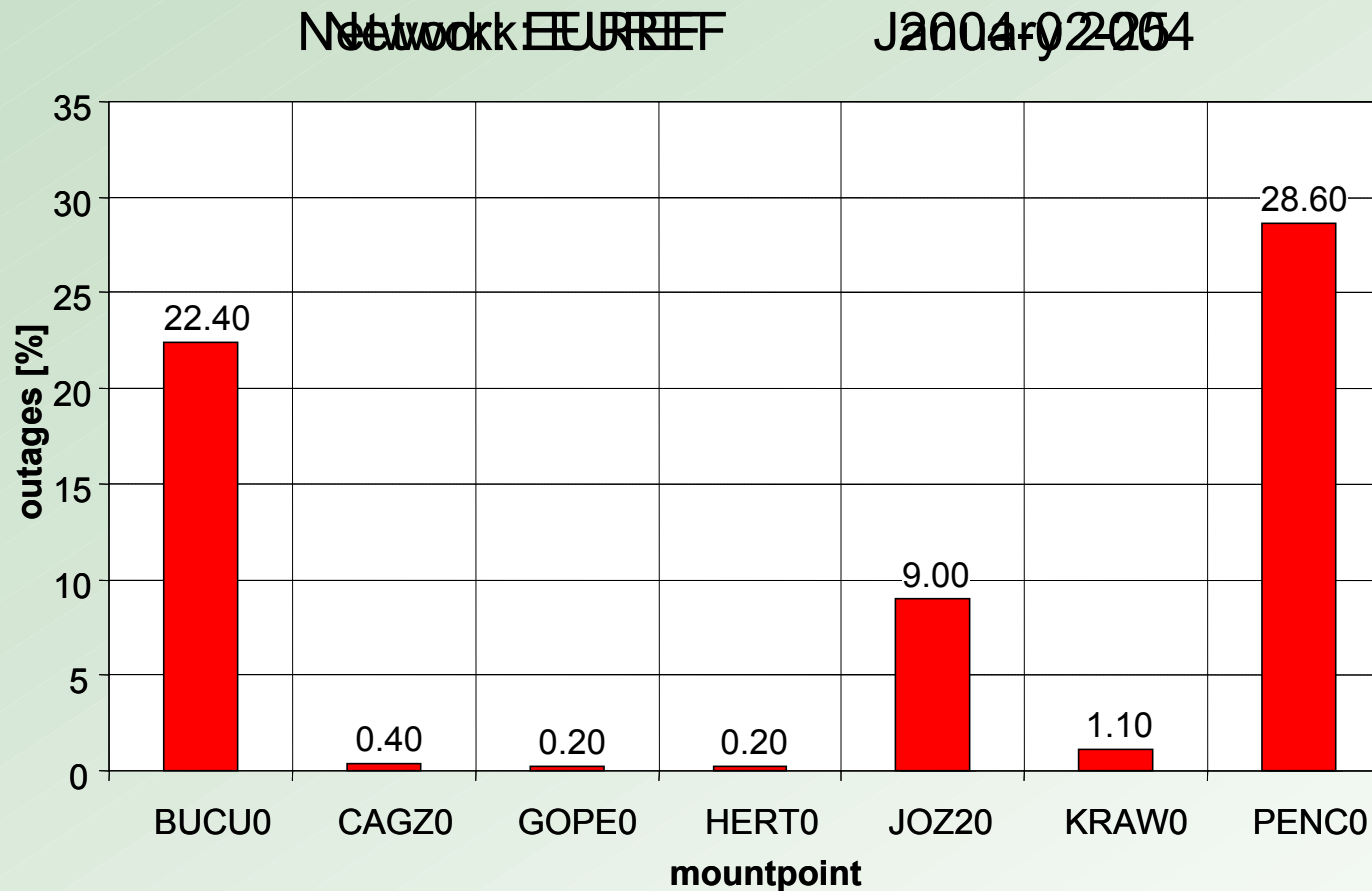
Available data streams (02/2004):

- \approx 145 real time data streams
- 13 networks (EUREF, IGS, CORS,...)
- GPS, GLONASS, EGNOS,...
- different formats:
 - RTCM corrections (DGPS, RTK)
 - raw measurement data
 - RTCA
- most streams from Europe
 - 21 from USA
 - 1 from Chile
 - 1 from Australia

Available Data Streams



Temporal Availability

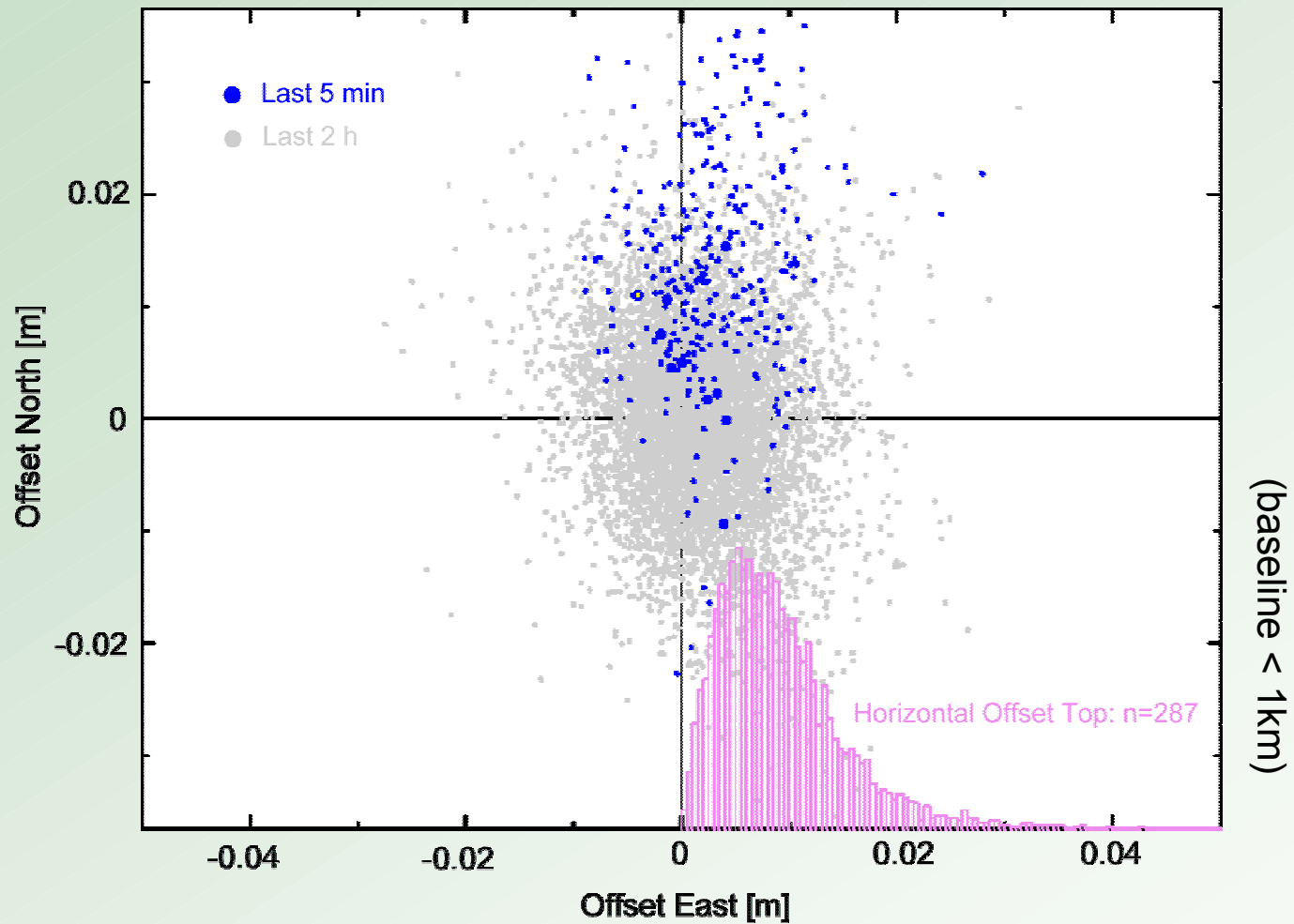


All data streams: (14 networks)

- more than 50% show an availability higher than 95%
- 32% of the data streams are available more than 98%

Accuracy

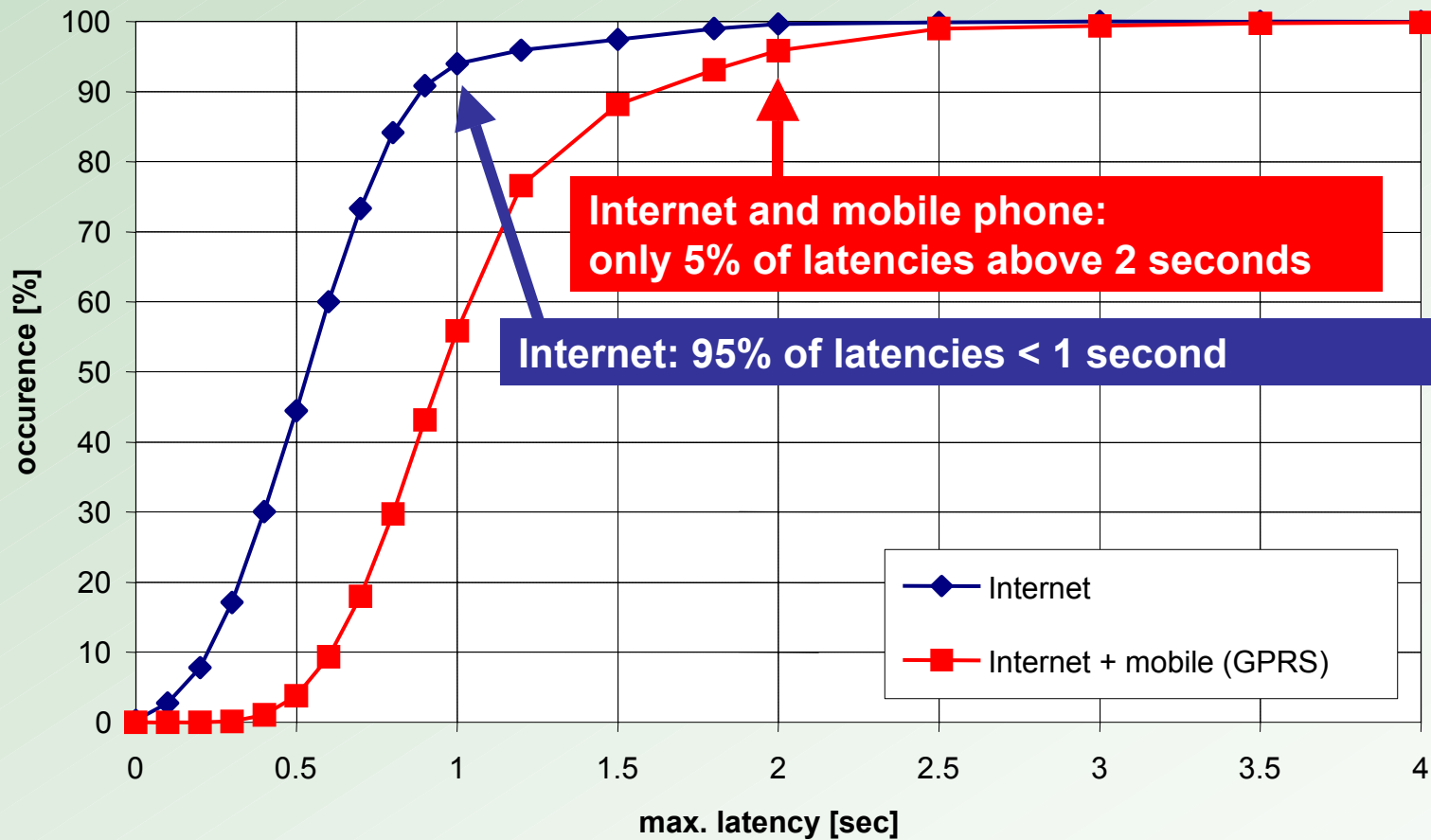
RTK Positioning - Internet and GPRS



=> No significant degradation of performance compared to usage of other transportation media

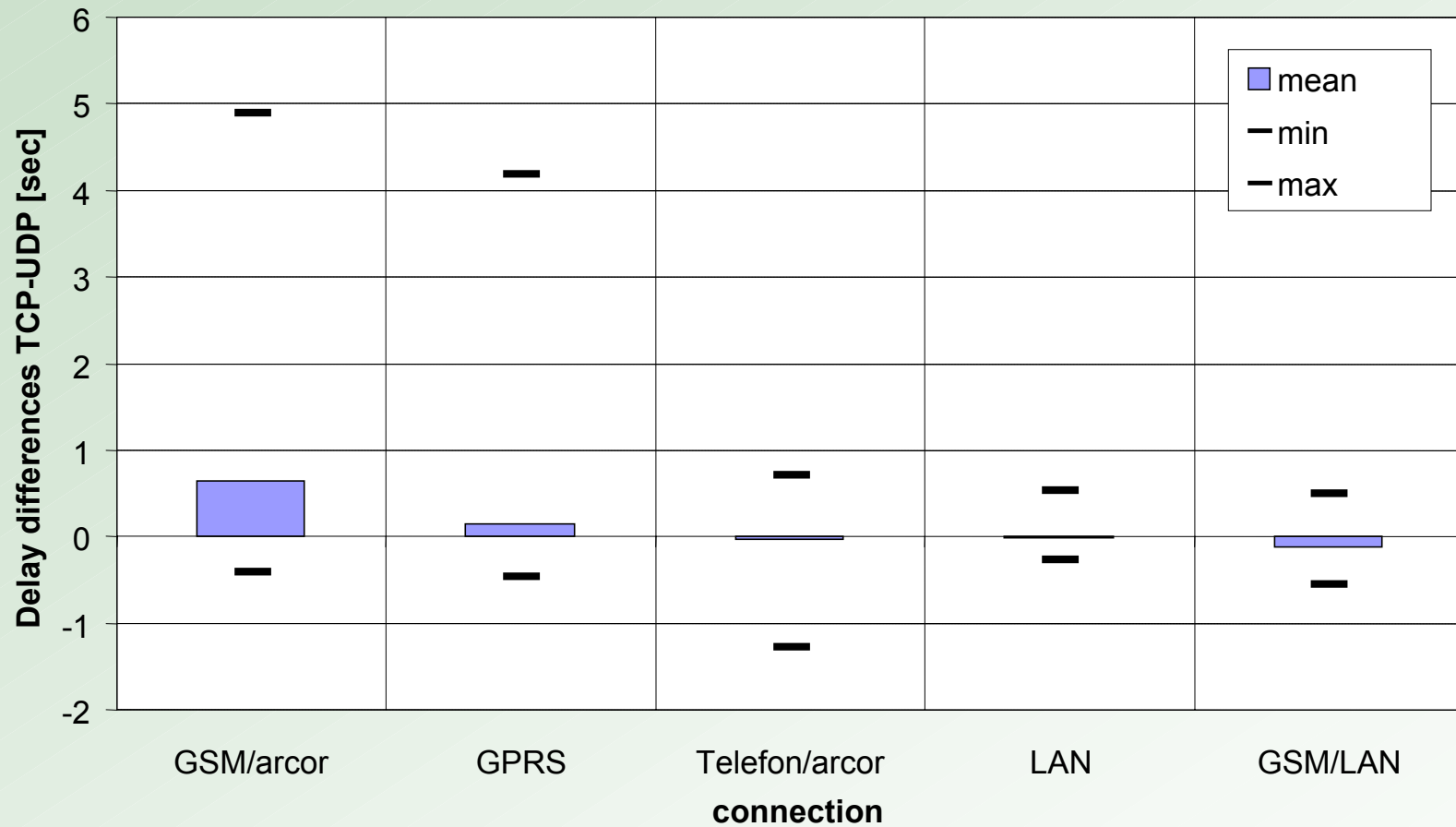
Latencies - RTCM corrections

DGPS data stream (without carrier phase information)
Brussels => Ntrip Caster => Frankfurt



TCP – UDP

- Runtime differences between TCP and UDP strongly depend on connection type and time (resp. bandwidth and traffic)
- Only with mobile phone connections significant differences



NTRIP Client: „GNSS Internet Radio“

available for Windows, Windows CE, Palm, LINUX

The screenshot displays the 'GNSS Internet Radio' application interface. The main window features a 'Broadcaster' section with 'START' and 'STOP' buttons, a progress indicator, and fields for 'Select Network' (containing 'GREF') and 'Select Stream or Update' (containing 'Frankfurt/DGPS/GREF'). A status bar at the bottom indicates 'Writing data to 141.74.242.142:21'. Overlaid on this is the 'Source Table' dialog, which lists details for the selected broadcaster: 'EUREF operated by BKG in DEU'. It provides a URL for more information and lists stream details for 'Frankfurt, Entry No: 1 of 141', including mountpoint, authentication, format, carrier, and system information. A 'Settings' dialog is also open, showing options for output (COM-Port, TCP/IP, File, None), autostart, and HTTP proxy server settings. The proxy server is currently set to 'gate-f.ifag.de:8001'.

GNSS Internet Radio

Broadcaster

START STOP

Select Network
GREF

Select Stream or Update
Frankfurt/DGPS/GREF

Writing data to 141.74.242.142:21

Source Table

Previous Next Select Cancel

Broadcaster: EUREF operated by BKG in DEU
Won't handle incoming NMEA-GGA
http://igs.ifag.de/index_ntrip_cast.htm

Stream: Frankfurt, Entry No: 1 of 141
Mountpoint: FFMJ2
Authentication: None
Format: RTCM 2.1 / 1(1),3(19),16(59)
Carrier: No
Client must send NMEA: No
System: GPS
Country: DEU
Latitude: 50.12 deg North
Longitude: 8.68 deg East
Generator: GPSNet V2.10
Solution: Network
Compression: none
Bitrate: 560 bits per sec
Miscellaneous: Demo

Network: GREF
Operator: BKG
Details: http://igs.ifag.de/qref_realtime.htm
Registration: http://igs.ifag.de/root_ftp/software/NtripRegister.doc
Charges: No

Settings

Select Output

COM-Port **COM-Port Settings**

TCP/IP **TCP/IP Settings**

File **File Settings**

None

OK Cancel About

Autostart

Use Autostart

HTTP Proxy Server

Use Proxy Server

Server:Port

Mobile Data Access



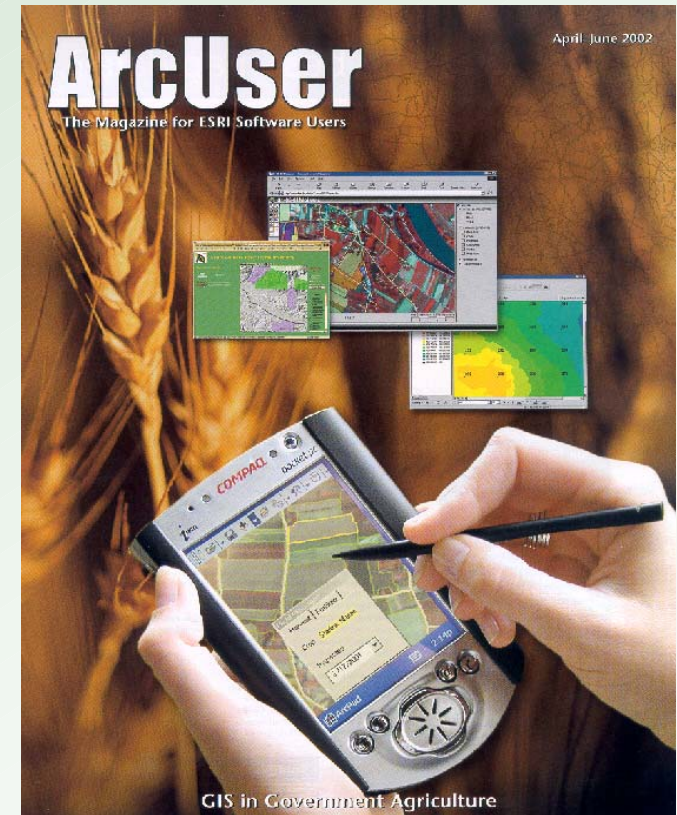
Compaq iPAQ Pocket PC
with „GNSS Internet Radio“



Nokia D211 GPRS modem

DGPS: 0.7 cent/min

GIS & DGPS:
Simultaneous Real-Time
Access to Distributed Data



Other Broadcaster Implementations

- Broadcasting Network
- Regional Broadcasters
 - Distributing the Workload



NtripCaster:

EUREF: 129.217.182.51:80

BKG: 213.20.169.236:80

Trimble-iGate:

IGNE: 80.38.104.84:2101

Terrasat: 62.159.109.248:8080

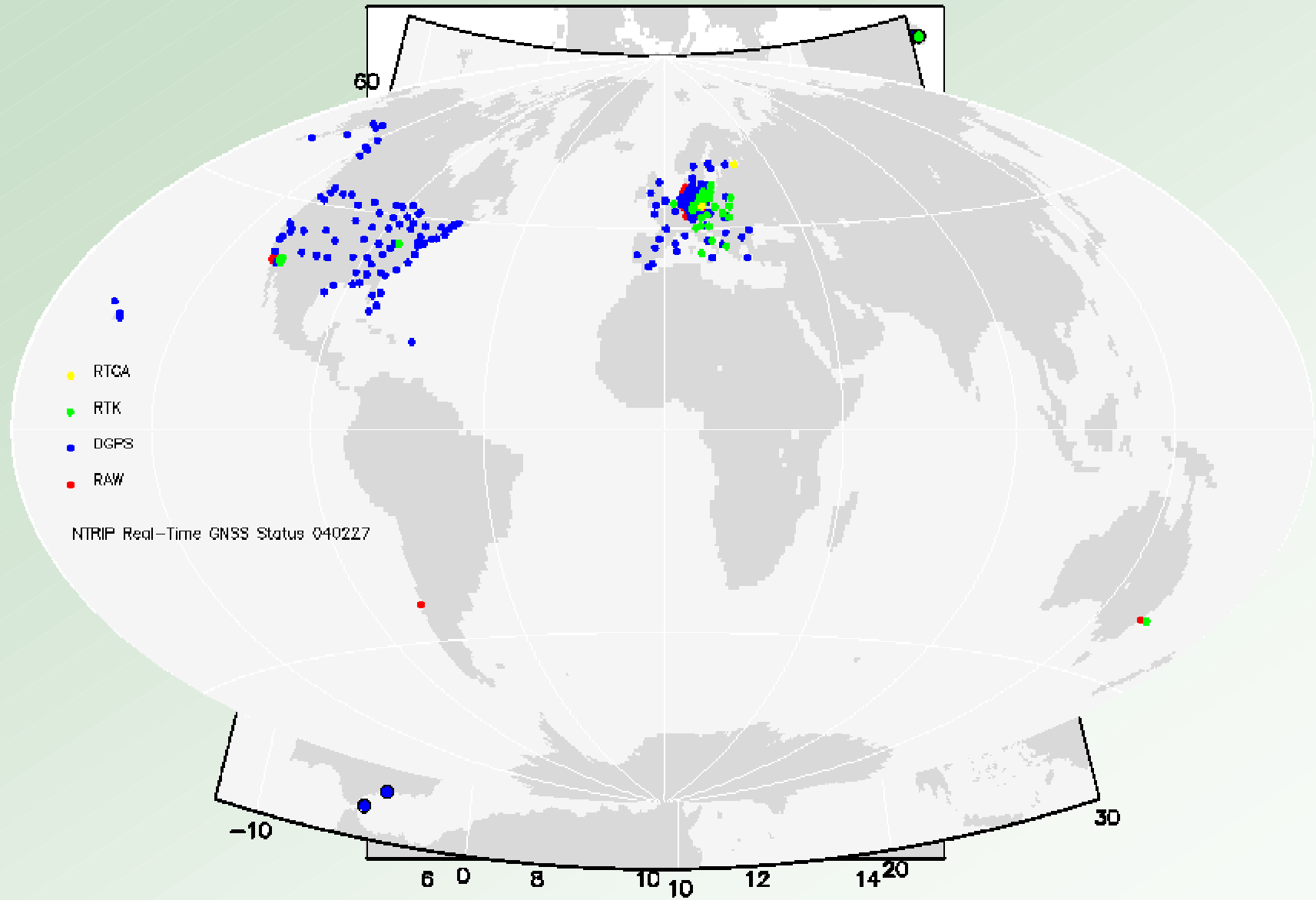
Thüringen: 195.145.245.203:8040

Hessen: 141.90.2.81:8080

Swisstopo: www3.swisstopo.ch:8080

Trimble DK: Makalu.GPSnet.dk:9000

Available NTRIP Data Streams



NTRIP - Standardization

- co-operation with receiver manufacturers
- Standardization process within RTCM SC-104
- Working Group on „Internet Protocol“
Chair: Robert Snow, Thales
WG Members from Leica, Trimble, Ashtech, Topcon,
U.S. Coast Guard
- RTCM Paper 167-203/SC104-315
- new RTCM standard within the next few month

Conclusion

- Streaming GNSS real-time data over Internet and cellular phone networks is feasible
- EUREF-IP Ntrip Broadcaster providing data for several month
- NtripCaster could handle about 300 data streams und up to 1500 user
- Today: more than 140 real-time data streams from 16 countries
- Latencies less than 1 second (2 seconds for mobile phone connections) sufficient for most applications
like: real-time positioning, navigation, orbit determination
- No significant degradation of performance compared to usage of other transportation media



Information on the Web

EUREF Ntrip Broadcaster:

Ntrip Format:

Download:

http://igs.ifag.de/ntrip_caster.htm

http://igs.ifag.de/index_ntrip.htm

http://igs.ifag.de/ntrip_down.htm