Report of the CGGTTS

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1. Change in data format

Necessary to include data
from other satellite systems

Remain compatible with
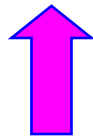existing data files

Current Reporting Format

```
PRN_CL__MJD__STTIME  …
_____hhmmss
_XX_XX_XXXXX_XXXXXX  …
```

Proposed New Reporting Format

PRN_CL__MJD__STTIME …

_____hhmmss

nxx**T**xx_xxxxx_xxxxxx …

3rd digit
(if needed)

Single letter:
   G or blank = GPS
   R   = GLONASS
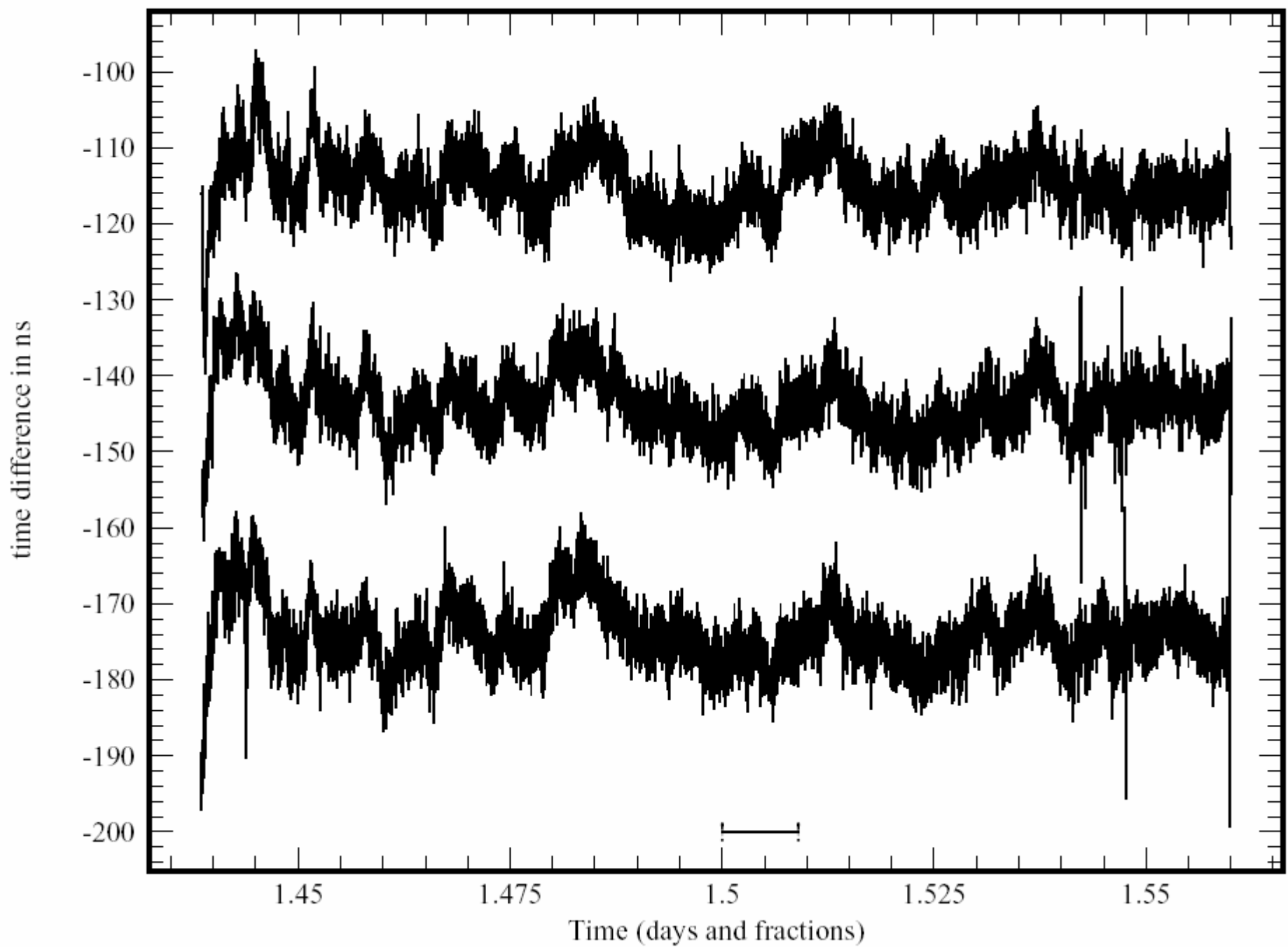   E   = Galileo
   S   = Geostationary
Follow IGS conventions
when possible

2. Focus on improving type-b uncertainties

Improvements in type-a uncertainties less important, since they are already smaller

Stacked data, SV 19 short-baseline cv

Receiver calibrations

- Short-baseline common view affected by multi-path
  - Changes receiver "calibration"
  - Track length and 4 minute advance make problem hard to see
- Distribution not white phase noise
  - "average" value has varying bias

Stacked data, SV 19 short-baseline cv
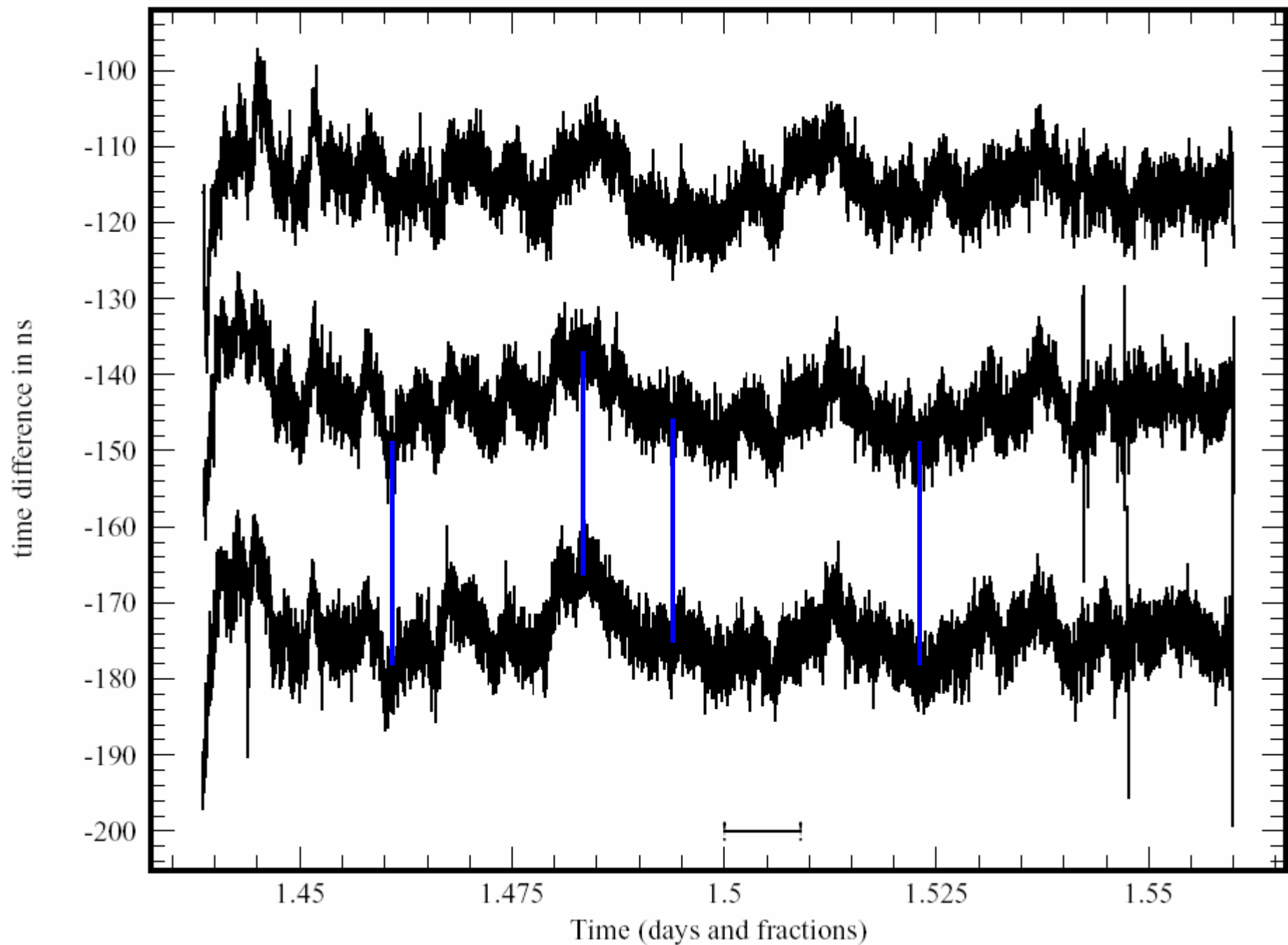
Multipath attenuation

- Compute frequency over sidereal day interval
    - Actual interval varies with satellite
- Integrate sidereal frequency values to get time
- Type-b uncertainty on Fort Collins Boulder link is about 1.5 ns
    - Agreement between two parallel links

3. Re-evaluate 13-minute track length and averaging method

Reasons for 13 minute track and technical directives no longer important

Shorter track length could make error evaluation easier

Data from geodetic receivers cannot be exactly compatible

New Tracking method

- Reduce track length to 15 s or 30 s
  - 15 s compatible with existing method
  - Compatible with geodetic receivers
- Simplify averaging method
  - Complicated averaging no longer needed

How much data?

- Receiver outputs 60,000 bytes/day
  - About 1 minute even at 9600 baud
- Output of 50 receivers: 3MB/day
  - 30 GB disk holds 10,000 days of data

4. Encourage stability in definitions of Galileo signals

Changes in signals are difficult for receiver designers

5. Encourage studies of statistics of Galileo signals

Technical directives for averaging methods
Should be based on this work.

Reporting format same as for other systems

6. Use latest ionosphere model in single-frequency receivers

Different models may be transmitted simultaneously from different satellites

Future Work

- Replace standing CGGTTS committee with short-term working groups to study specific questions
  - Working groups should have specific members and terms of reference

Current recommendation

- Modify technical directives for Reporting Time transfer data
  - Include 3rd digit for PRN if needed
  - Include single letter to identify source
    - Use IGS definitions if possible
    - Consult with other groups for new systems

Proposed Study

- Review (and revise) averaging methods in the technical directives
  - Study track length, averaging methods for GPS and Galileo and …
  - Study statistics of Galileo data
    - Same as GPS?

Other recommendations

- Encourage studies to improve type-b uncertainties at each laboratory

- Encourage stability in definition of Galileo signals

- Encourage studies of Galileo signal statistics by receiver manufacturers

- Use latest ionosphere model in single frequency receivers