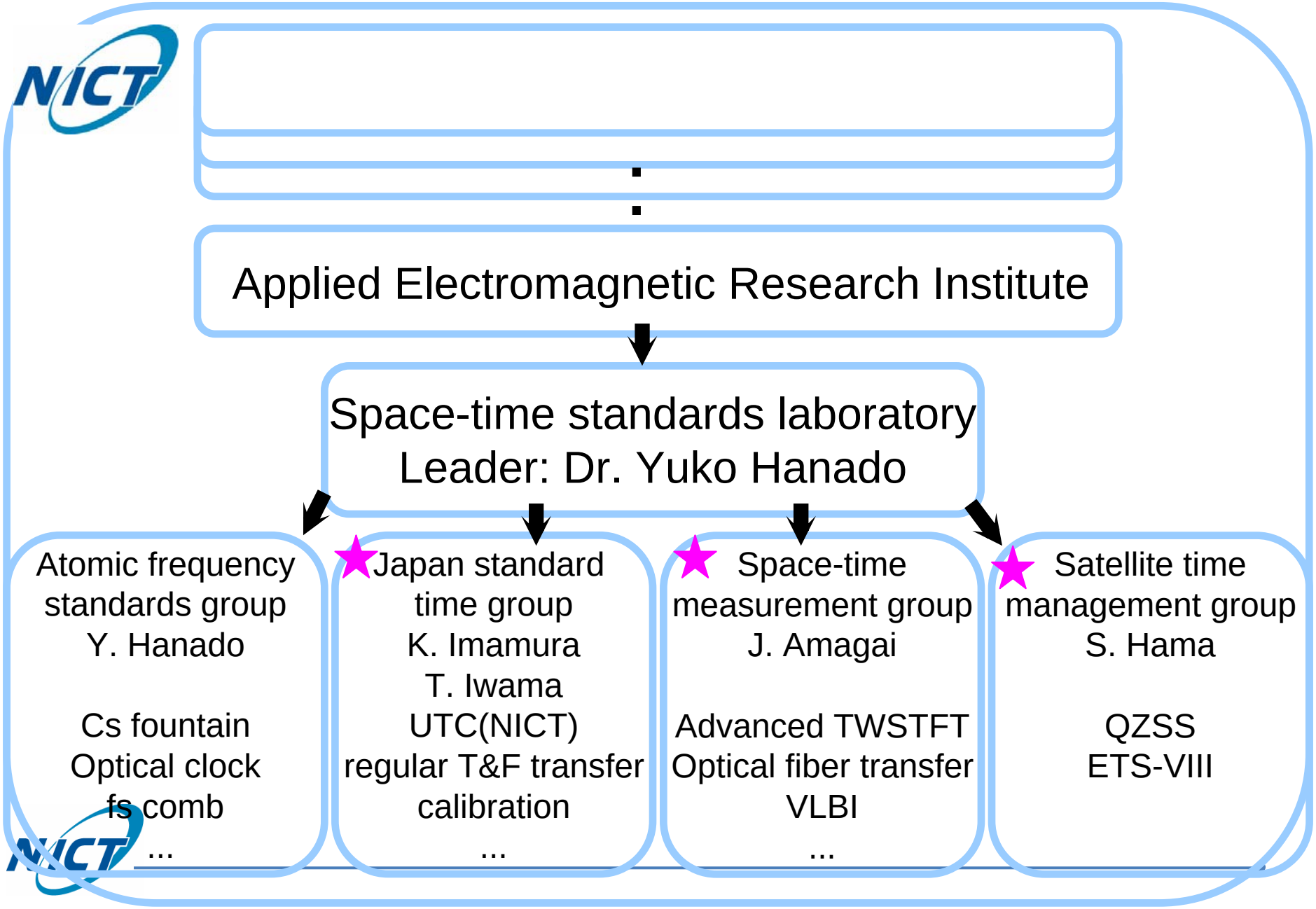
NICT station report

NICT

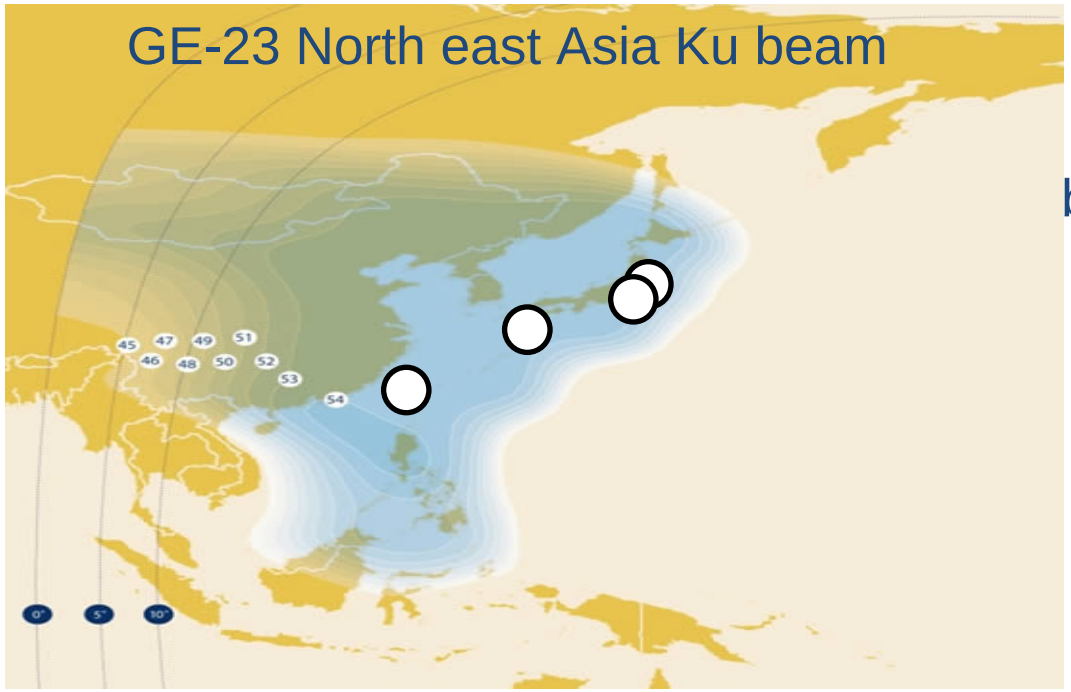
- New organization
- Regular TWSTFT links
    1. Asia link
    2. NICT-Hawaii-USNO link
       Eu-Asia link
- R&D for advanced TWSTFT

New organization from 2011/4



Regular TWSTFT link
1. Asia link

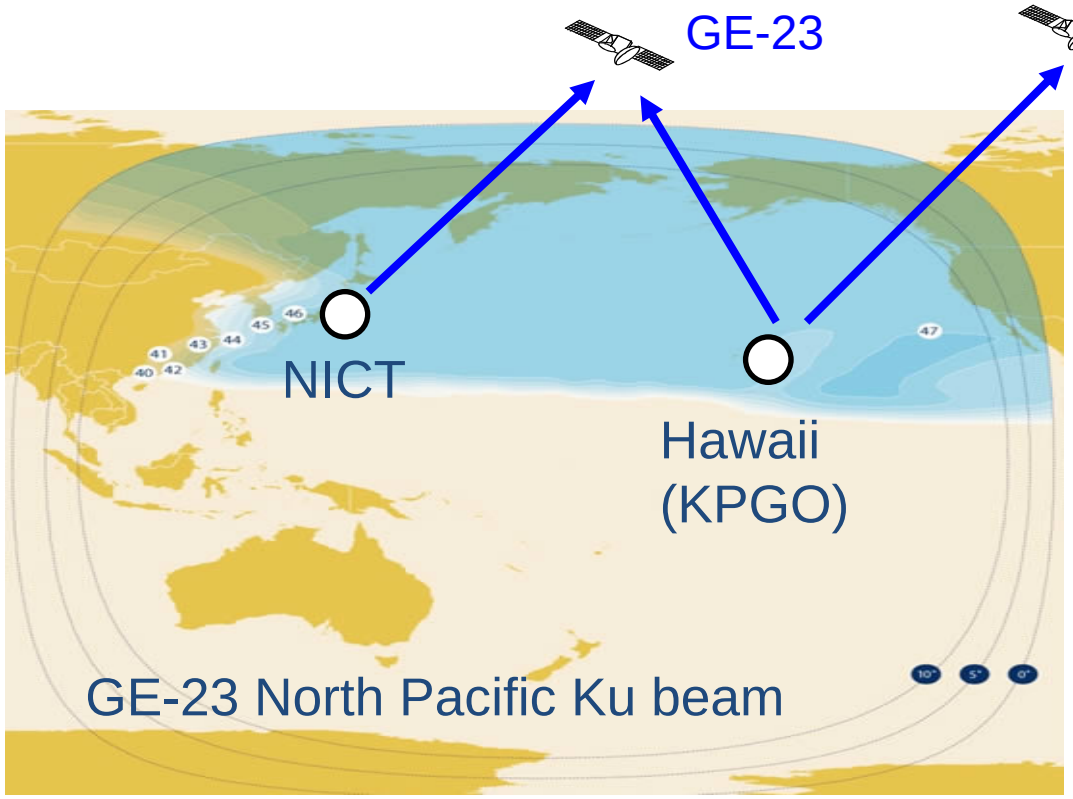
- Satellite changed from IS-8(166°) to GE-23(172°) in April 2011.



by NICT modems

NICT, TL and 2 domestic stations perform time transfer once per hour.

Regular TWSTFT link
2. NICT-Hawaii-USNO link

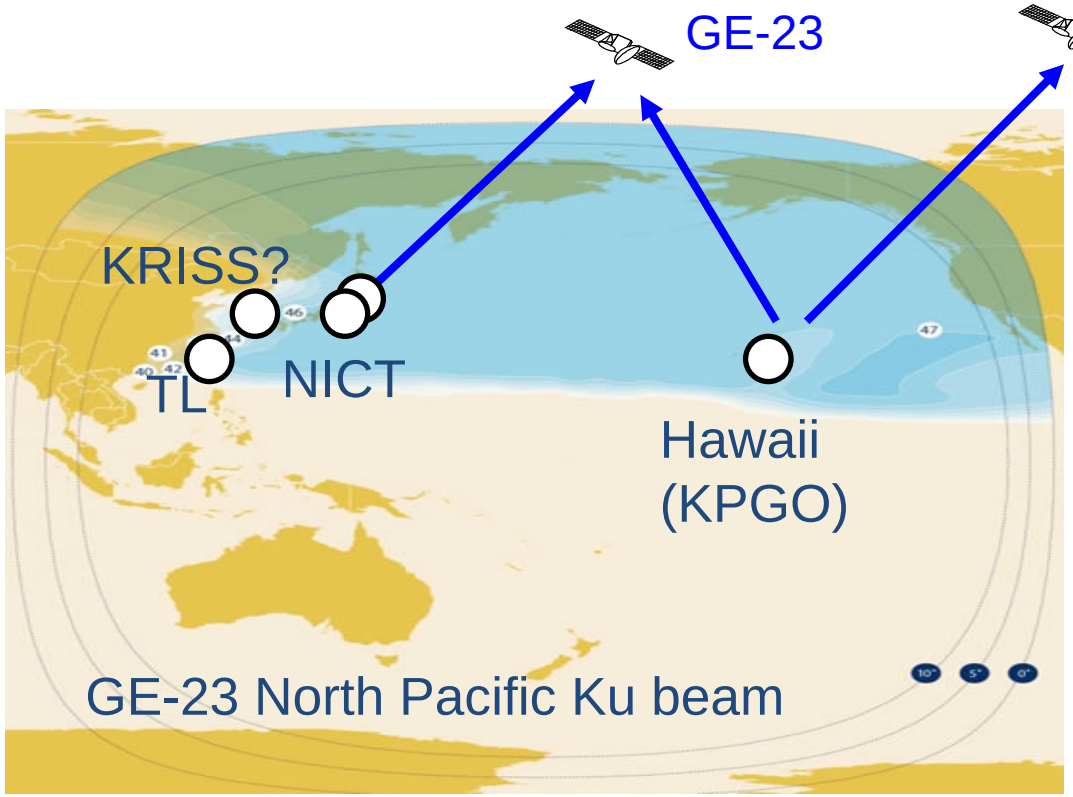


by SATRE modems

NICT connects USNO via Hawaii every 2 hours.

Regular TWSTFT link

1+2.Combine 2 links of Asia and Asia-Hawaii in 2012

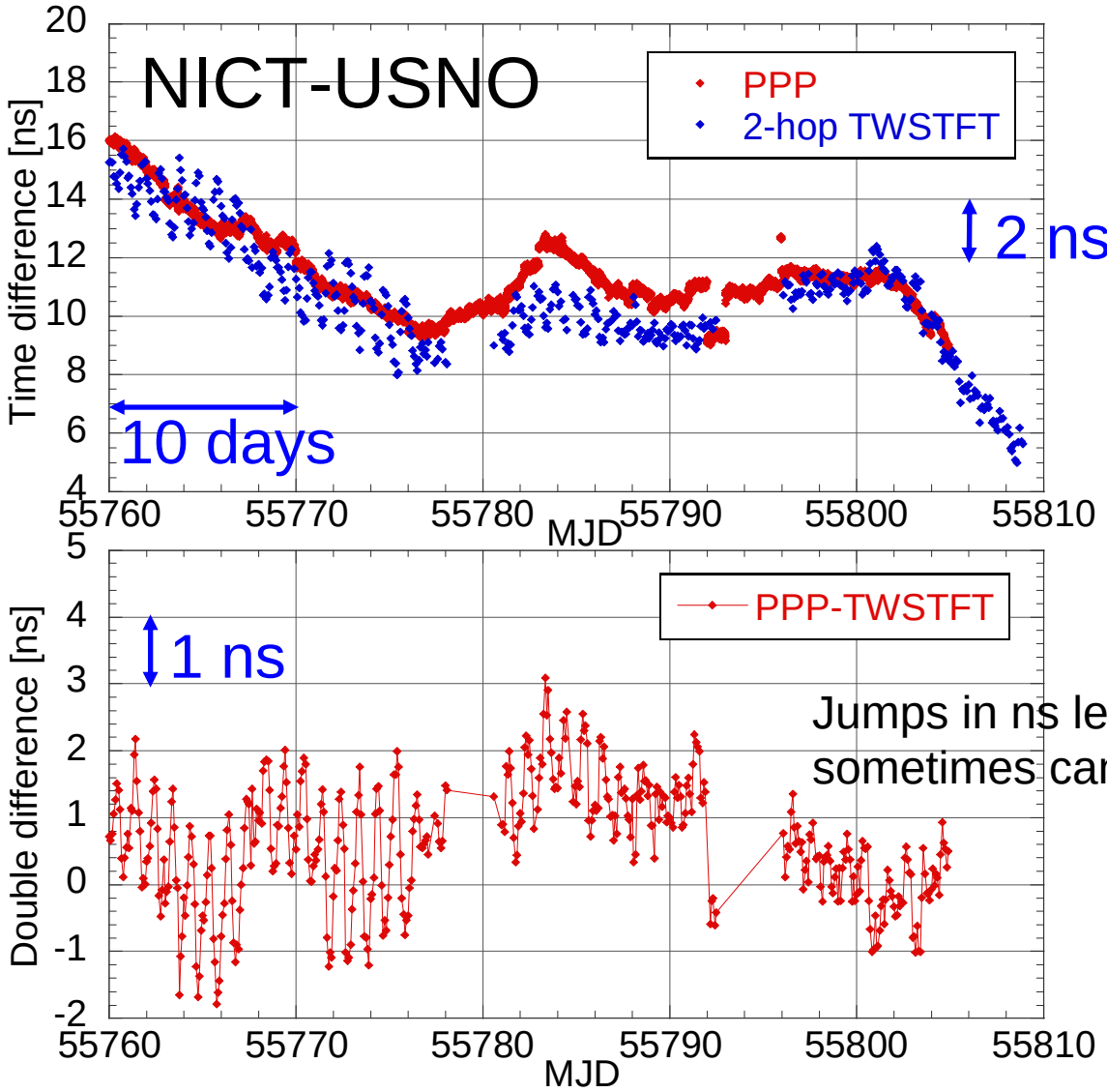


by SATRE modems

We will stop time transfer by NICT modem and employ operations using SATRE modem.

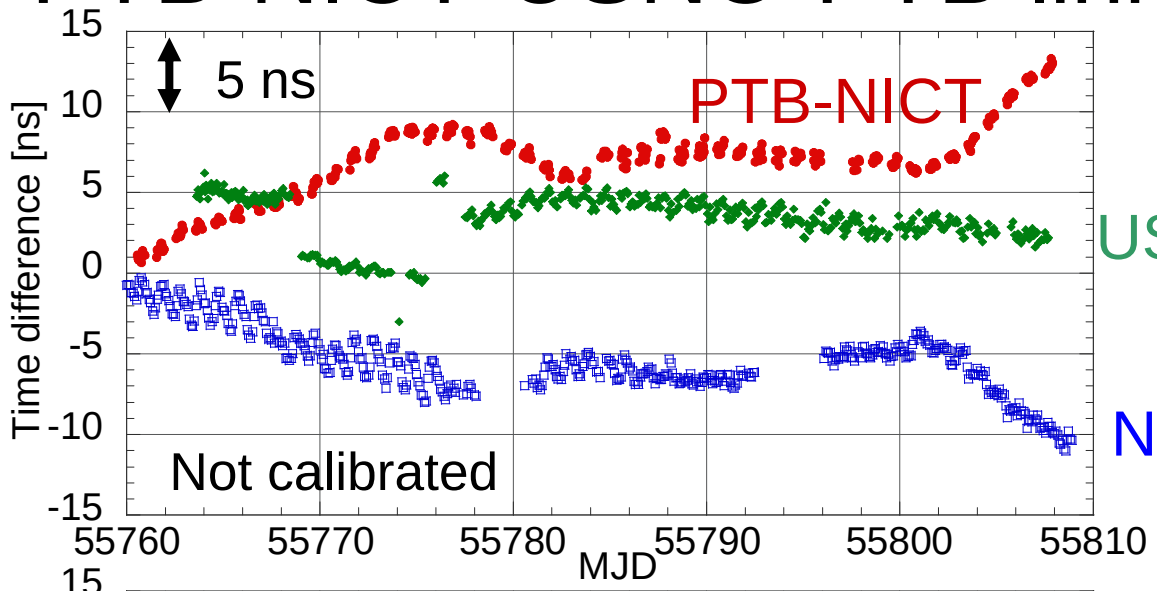
Please contact us if you want to join this link.

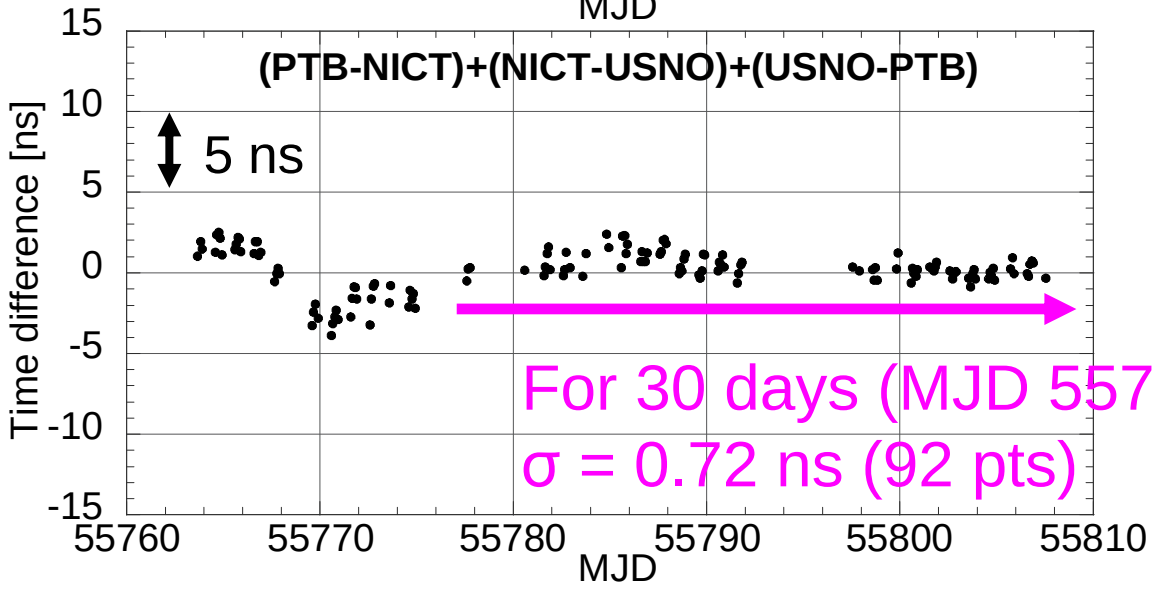
Regular TWSTFT link
2. NICT-Hawaii-USNO link



Jumps in ns level
sometimes can be seen...

Regular TWSTFT link
PTB-NICT-USNO-PTB link





For 30 days (MJD 55777~55807)

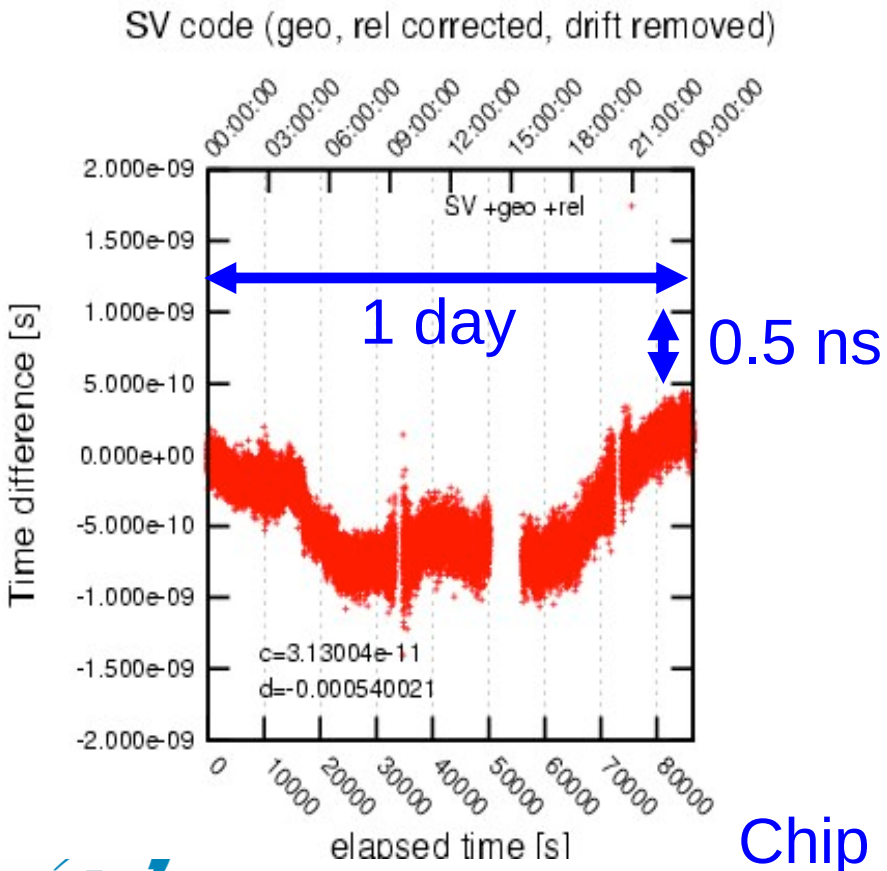
σ = 0.72 ns (92 pts)

R&D for advanced TWSTFT

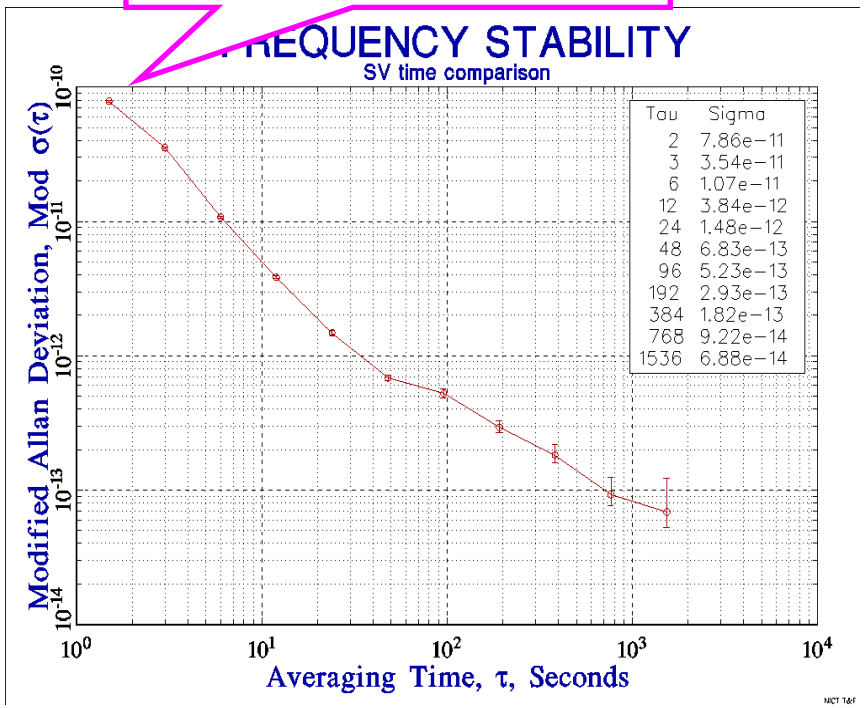
- QZSS
- DPN
- Carrier phase

QZSS

- Two-way time transfer experiment between onboard Rb clock and ground started in Dec 2010.

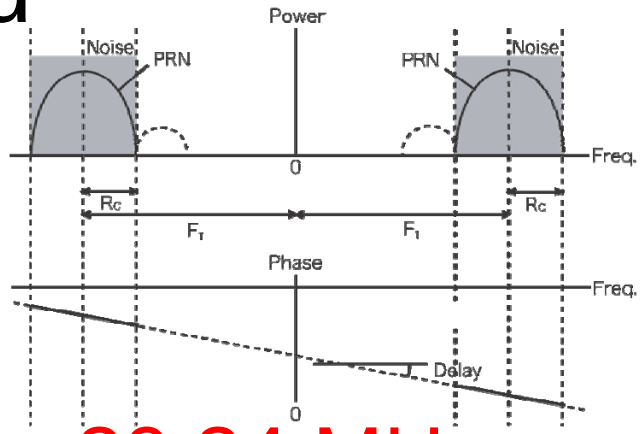


8e-11 @ 1.5 sec



Chip rate : 10 Mcps

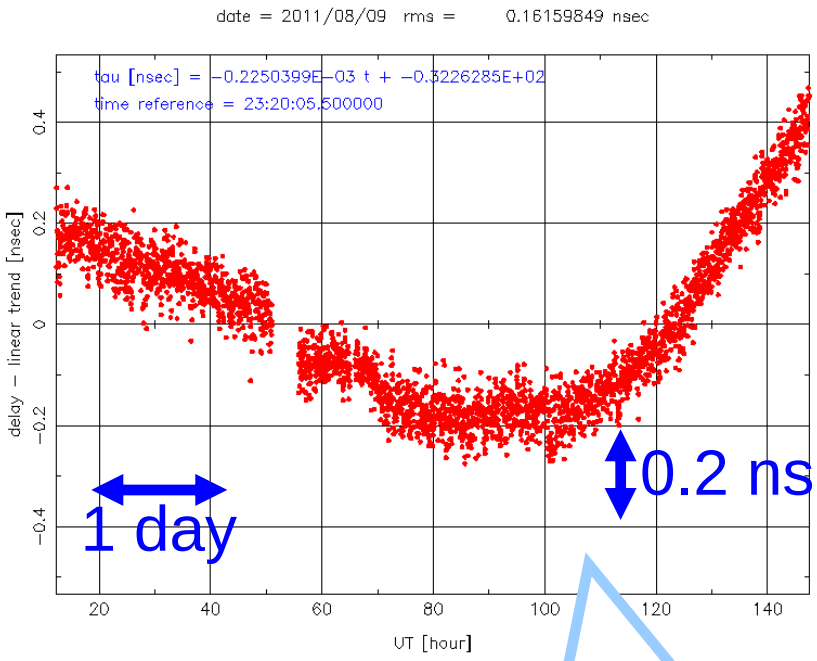
Current status of DPN TWSTFT
Satellite changed



- Previous (～ March 2011)
  IS-8
  DPN Frequency separation : 20.24 MHz
  Sampling : 64 Msps × 1ch
- New (April 2011 ～)
  GE-23 (Wide cover area : low EIRP & G/T)
  DPN Frequency separation : 31.7 MHz
  Sampling : 8 Msps × 2ch

DPN result after satellite change

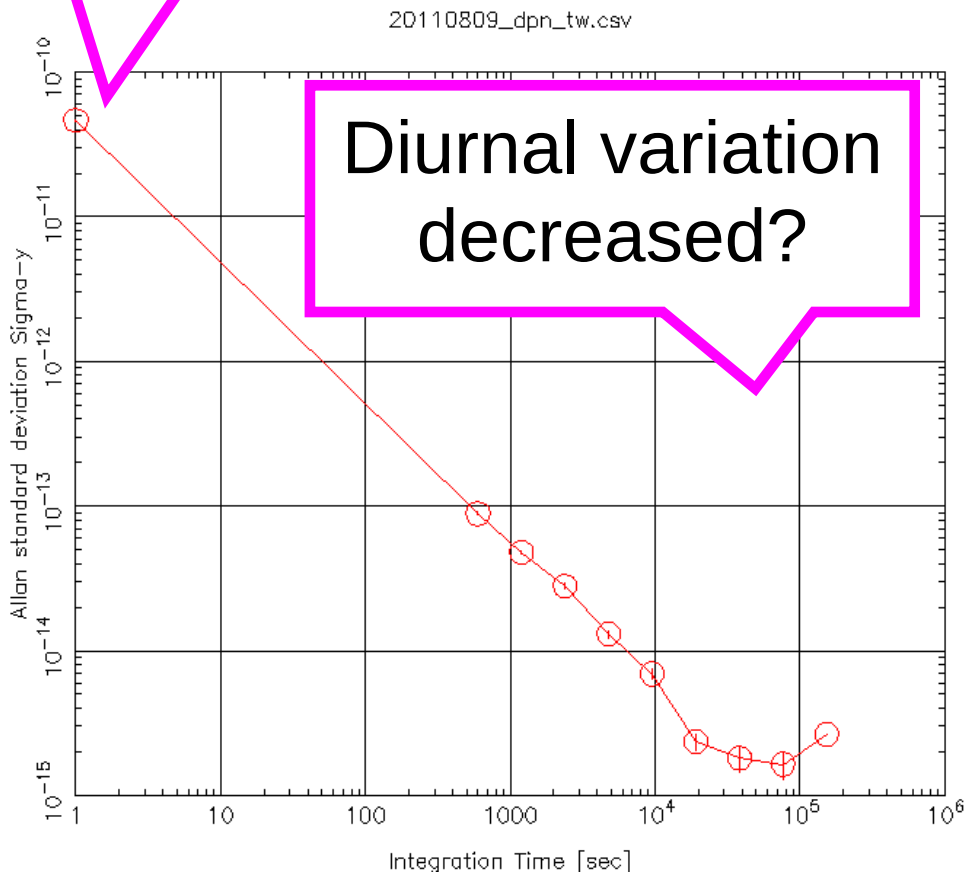
Domestic test: UTC(NICT)-HM(Kashima)



Frequency change in Kashima

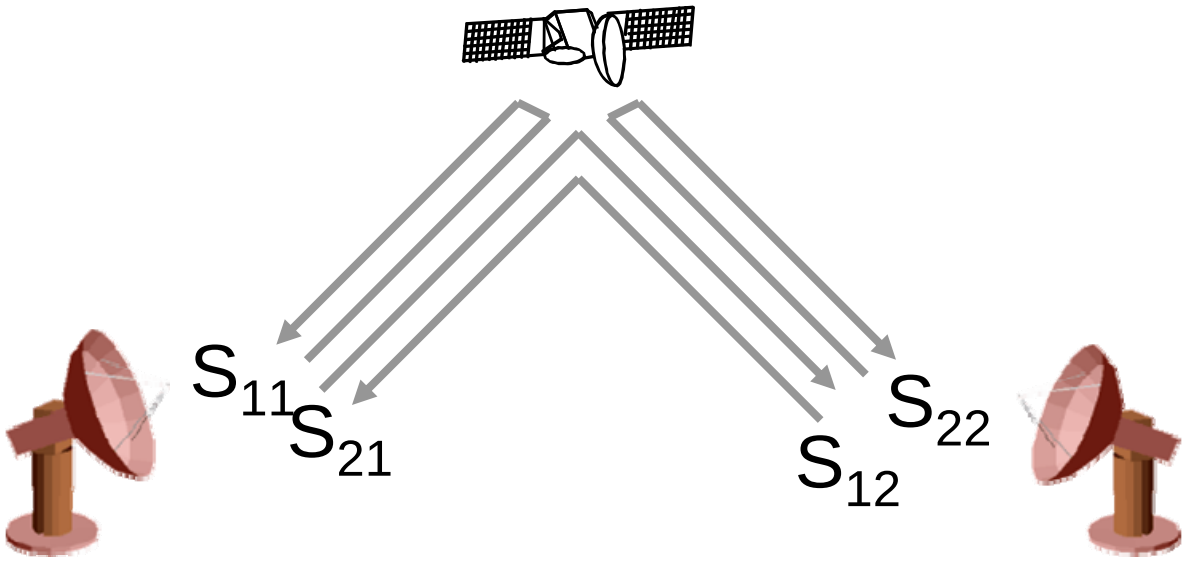
5e-11 @ 1 s

5 sec/10 min
1sec integration



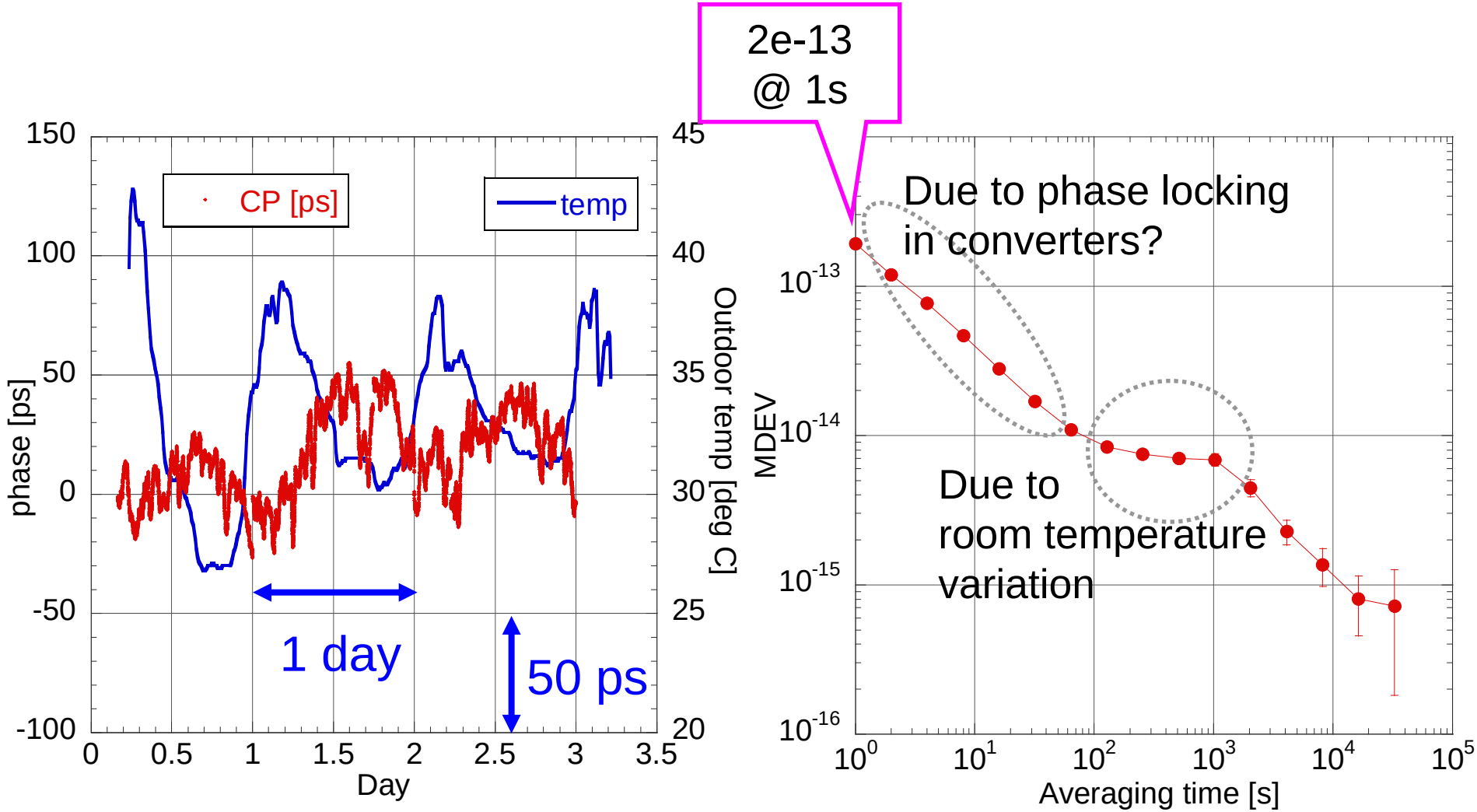
Diurnal variation decreased?

Carrier phase



- Cancellation of onboard clock using ranging and counterpart signals
- Phase detection by A/D sampler
- Ambiguity solution using code

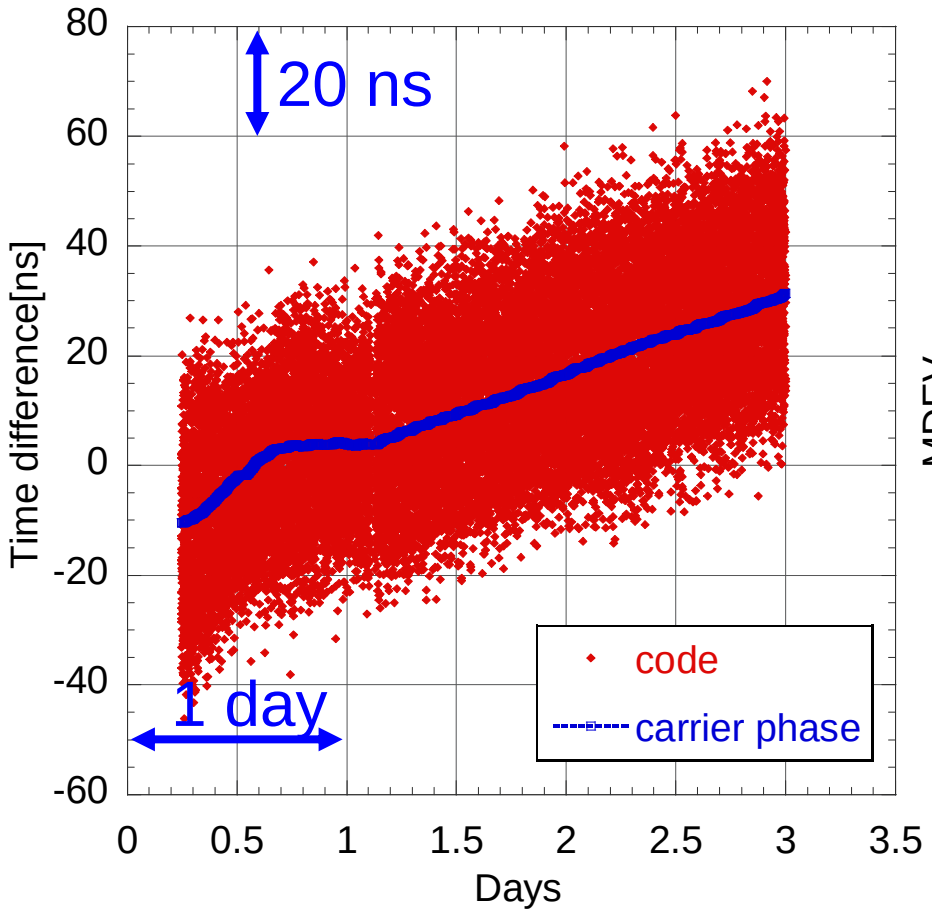
Common clock in zero baseline via GE-23

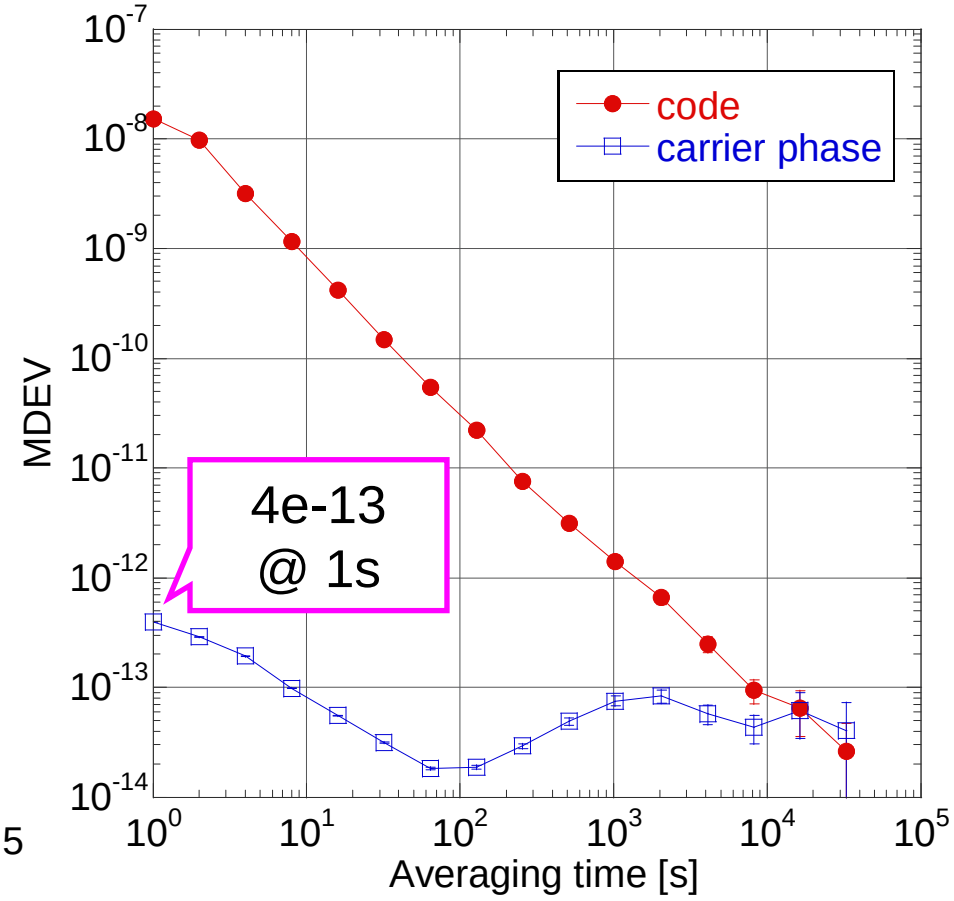


128kbps coded signal was generated by AWG.

Short baseline (~140 km) via GE-23

UTC(NICT)-HM(Kashima)





128kbps coded signal was generated by AWG.

Future plan

DPN

- Study about diurnals and long-term stability in domestic and NICT-TL links

Carrier phase

- Proof test with GPS or faster coded signal
- Estimation of error sources
- Evaluation of availability of current equipment
  ex. NICT/SATRE modems, U/C, D/C...

Thank you for your kind attention.