Calibration of geodetic-type receivers

FINAL REPORT OF REAL INSTITUTO Y OBSERVATORIO DE LA ARMADA

A report to BIPM

	NAME	SIGNATURE	DATE
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HISTORY OF DOCUMENT CHANGES		
Edition	**Date**	**Information**
01	December 2008	Initial version

REAL INSTITUTO Y OBSERVATORIO DE LA ARMADA
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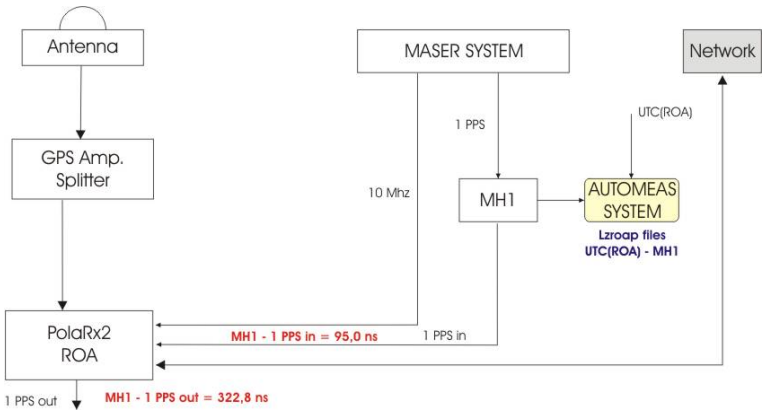
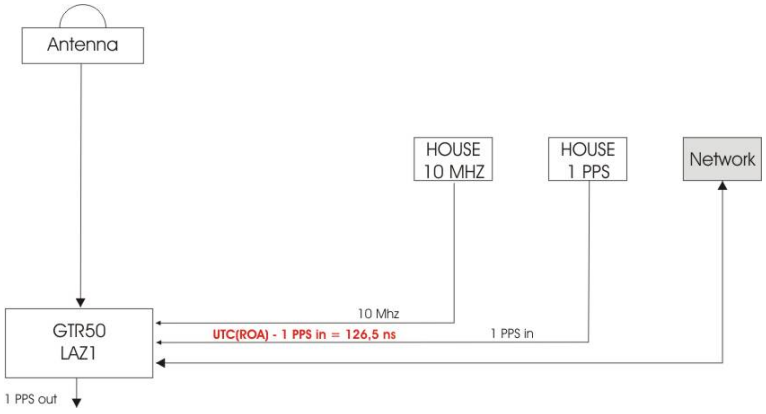
i) Actual set-up

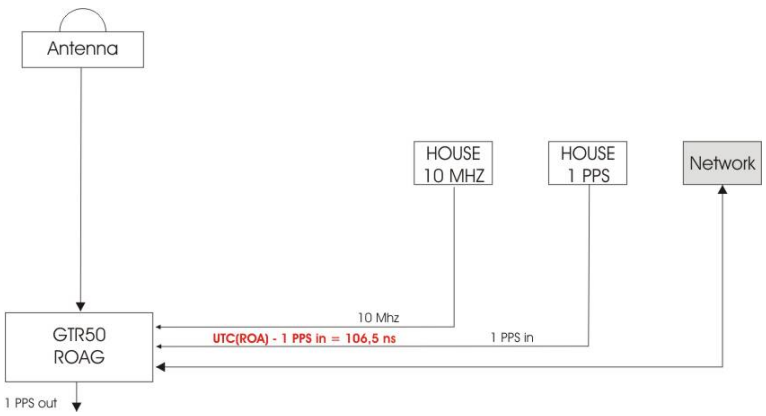
Septentrio PolaRx2 s/n 1225



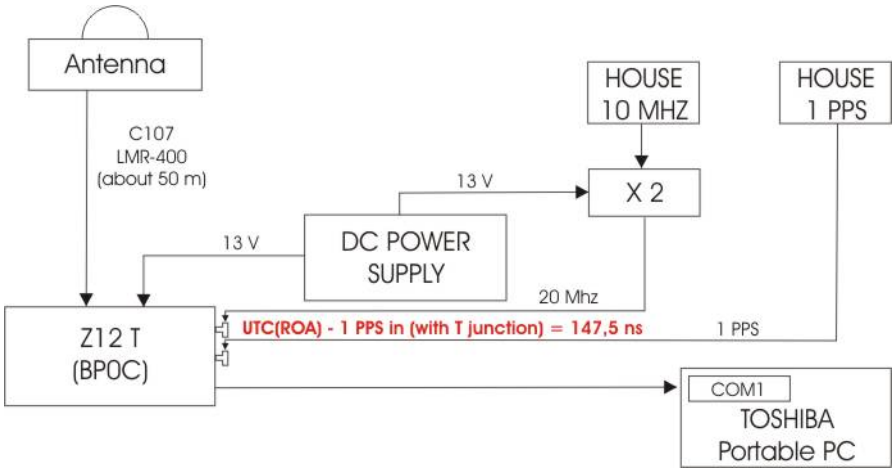
GTR50 s/n 0802017 (LAZ1)



GTR50 s/n 0601012 (ROAG)



BIPM Z12-T



ii) Result of the check realized the MJD 54822 (DOY 358), from 12:25 UTC to 13:50 UTC (k = 2).

1. Measurement 3.1-1)

   $(+15.9 \pm 0.6)\,\text{ns} \quad (k = 2)$

2. Measurement 3.1-2)

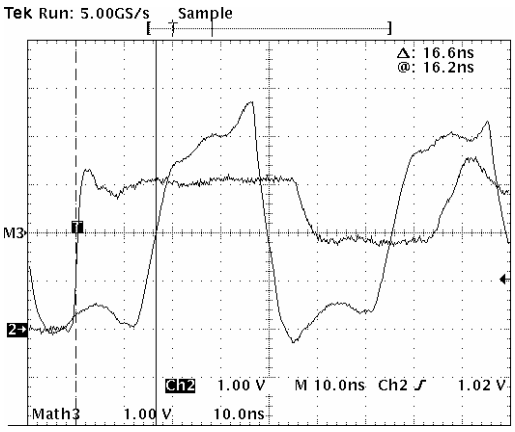
   $(+37.1 \pm 0.3)\,\text{ns} \quad (k = 2)$

3. Measurement 3.1-3)

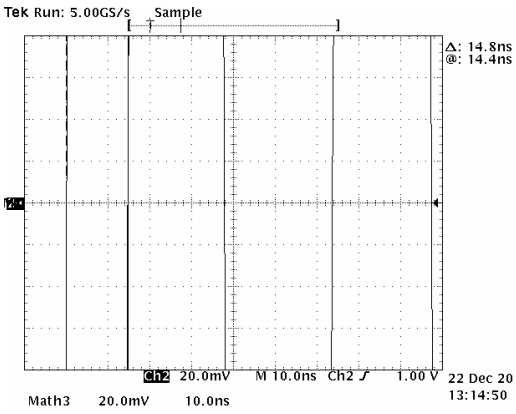
   $(+15.2 \pm 0.3)\,\text{ns} \quad (k = 2)$

4. Plots (3.1-4)

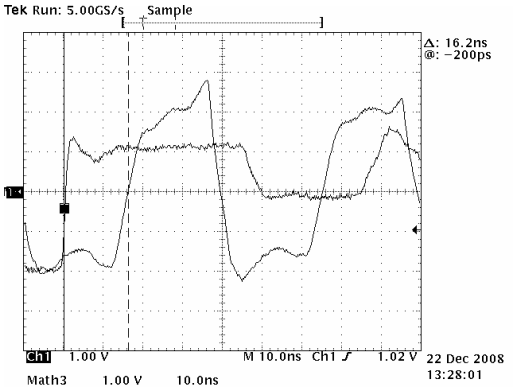
   Plot of measurement 3.1-1.1)



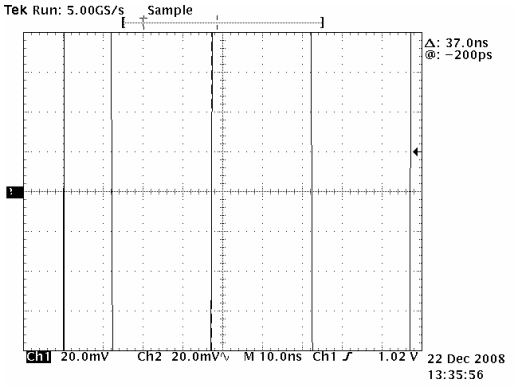
   Plot of measurement 3.1-1.2)



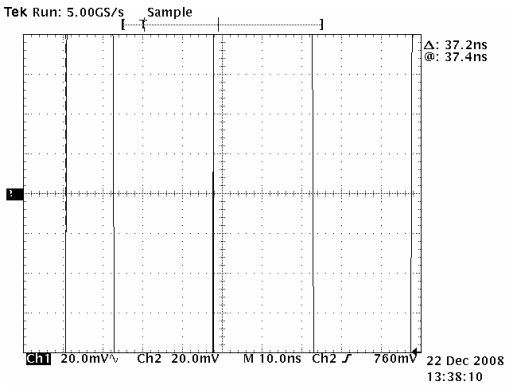
Plot of measurement 3.1-1.3)



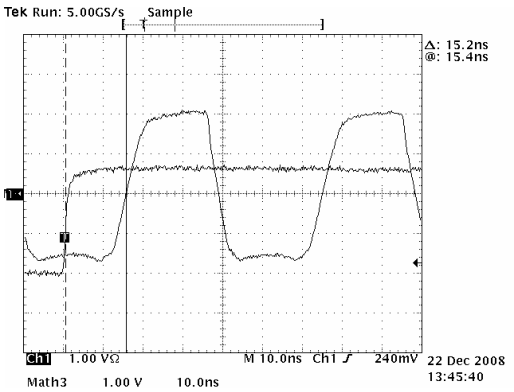
Plot of measurement 3.1-2.1)



Plot of measurement 3.1-2.2)



Plot of measurement 3.1-3)



iii) Result of the check realized the MJD 54829 (DOY 364), from 08:25 UTC to 09:10 UTC (k = 2).

5. Measurement 3.1-1)

   $(+15.8 \pm 0.3)$ ns $(k = 2)$
   By means of TIC SR620: $(+16.5 \pm 0.8)$ ns $(k = 2)$

6. Measurement 3.1-2)

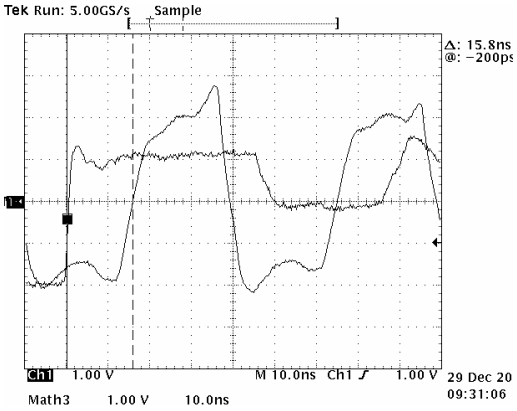
   $(+34.4 \pm 0.3)$ ns $(k = 2)$
   By means of TIC SR620: $(+37.6 \pm 0.8)$ ns $(k = 2)$

7. Measurement 3.1-3)

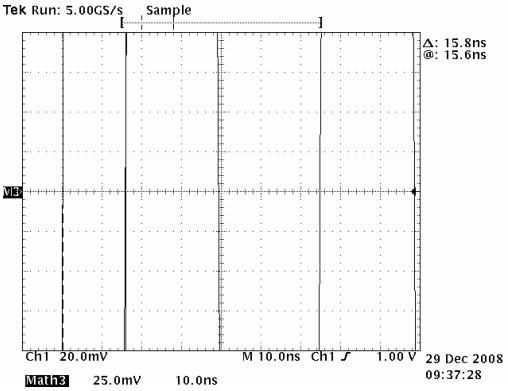
   $(+15.0 \pm 0.3)$ ns $(k = 2)$
   By means of TIC SR620: $(+15.3 \pm 0.8)$ ns $(k = 2)$

8. Plots (3.1-4)

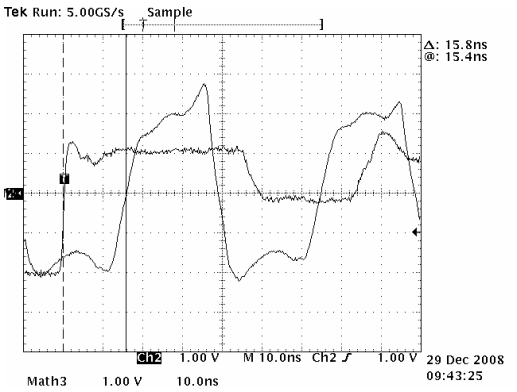
Plot of measurement 3.1-1.1)



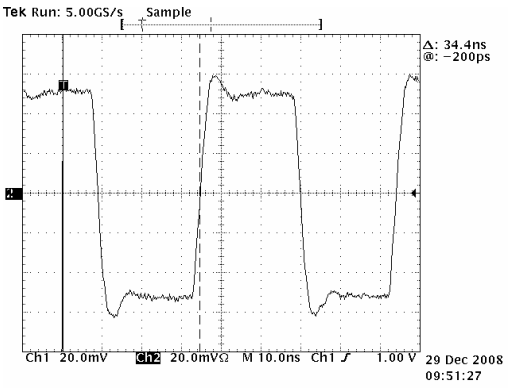
Plot of measurement 3.1-1.2)



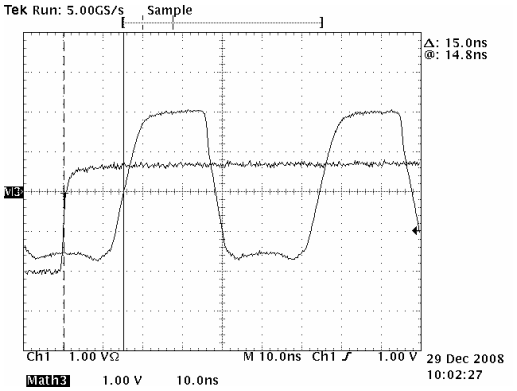
Plot of measurement 3.1-1.3)



Plot of measurement 3.1-2)



Plot of measurement 3.1-3)



9. Measurement 3.2-1)

$(+227.8 \pm 0.5)\,\text{ns} \quad (k = 2)$

10. Measurement UTC(ROA) - 1 PPS in (Septentrio PolaRx2 ROA)

    By electronic data file (LZroap54.8xx).
    This data file include two columns with time labels (DJM.ddddd) and time interval measures of UTC(ROA) - MH1.
    MH1 - 1 PPS in (Septentrio PolaRx2 ROA) = $(+95.0 \pm 1.2)\,\text{ns} \quad (k = 2)$

11. Measurement UTC(ROA) - 1 PPS in (DICOM GTR50 LAZ1)

    By oscilloscope: $(+126.6 \pm 0.3)\,\text{ns} \quad (k = 2)$
    By means of SR620: $(+126.5 \pm 0.7)\,\text{ns} \quad (k = 2)$

12. Measurement UTC(ROA) - 1 PPS in (DICOM GTR50 ROAG)

    By means of SR620: $(+106.5 \pm 0.7)\,\text{ns} \quad (k = 2)$

13. Measurement UTC(ROA) - 1 PPS in (Ashtech Z12-T BIPM)

    By oscilloscope: $(+147.2 \pm 0.3)\,\text{ns} \quad (k = 2)$
    By means of SR620: $(+147.5 \pm 0.7)\,\text{ns} \quad (k = 2)$

iv) Coordinates of the phase center of the antennas.

Septentrio PolaRx2 s/n 1225

X = +5105510.59 m
Y = -555201.10 m
Z = +3769790.88 m

Lat = 36º 27’ 51.36406’’
Long = -6º 12’ 22.56612’’
h = 74.815

GTR50 s/n 0802017 (LAZ1)

X = +5105511.70 m
Y = -555187.02 m
Z = +3769791.71 m

Lat = 36º 27’ 51.39379’’
Long = -6º 12’ 21.99912’’
h = 74.972

GTR50 s/n 0601012 (ROAG)

X = +5105510.92 m
Y = -555191.42 m
Z = +3769793.84 m

Lat = 36º 27' 51.45514''
Longt = -6º 12' 22.17819''
h = 75.997

BIPM Z12-T

X = +5105511.2210 m
Y = -555201.1481 m
Z = +3769790.1527 m

Lat = 36º 27' 51,3328''
Long = -6º 12' 22,5653''
h = 74.8918

v) Delay configuration of own GPS receivers.

Septentrio PolaRx2 s/n 1225

INT DLY = 0.0 ns (GPS P1), 0.0 ns (GPS P2)
CAB DLY = 0.0 ns
REF DLY = 0.0 ns

GTR50 s/n 0802017 (LAZ1)

Software version 1.5.4

/opt/GTR50/data/config_lck
Rec_type=GTR50
Rec_num=0802017
Rec_fw=1.5.4
Rec_p=C
Ant_type=Novatel GPS-702
Ant_num=NAE 08050053
Ant_dh=0
Ant_de=0
Ant_dn=0
Int_dly0=-98.2 (it is used for purposes of calculation)
Int_dly=0
AMR_cor=-3.2
Cab_dly=127.8 (it only modifies the header cable delay data. No used for purposes of calculation)
Dif_dly=19.3
Cor_imu2=0
Cor_imu3=0
Temp0=45
Trig0=100

Input time reference:

Cable delay: 46.8 ns. (it modifies the header ref delay data. Used for purposes of calculation)

Note1: Delay programmed on the GTR50 receiver are considered to elaborate the rinex data files.
Note2: The only variables that the receiver keeps in mind are: Cable delay (Input Time Reference) and Int_dly0.

GTR50 s/n 0601012 (ROAG)

Software version 1.6.0

/opt/GTR50/data/config_lck
Rec_type=GTR50
Rec_num=0601012
Rec_p=Y
Ant_type=Novatel GPS-702
Ant_num=NVH05510034
Ant_dh=0
Ant_de=0
Ant_dn=0
Int_dly=0 (it is used for purposes of calculation)
P1C1_dif=0
P1P2_dif=0
Temp0=45
Trig0=100

/opt/GTR50/data/config_site
Site=ROAG
Lab=ROA
Observer=GTR50
Marker=POSTE_HORA
Mark_num=3
Pos_X=+5105510.9205
Pos_Y=-555191.419
Pos_Z=+3769793.8392
Frame=ITRF-2000
El_mask=10,10,10,10,10,10,10,10,10,10,10,10
Ref=UTC(ROA)
Ref_dly=106.1 (it modifies the header ref delay data. Used for purposes of calculation)
Cab_dly=127.5 (it only modifies the header cable delay data. No used for purposes of calculation)
R_comment=GTR50 RECEIVER
C_comment=GTR50 RECEIVER
R_name=ROAG
C_name=ROAG

Note1: Delays programmed on the GTR50 receiver are considered to elaborate the Rinex data files.

Note2: The only variables that the receiver keeps in mind are: Int_dly and Ref_dly.

vi) Log of events

19th December, 10:00 UTC:	Reception of the BIPM travelling system.
19th December, 12:00 UTC:	Start up of the BIPM Z12T, the first tracking takes place.
20th December	GTR50 s/n 0601012 (ROAG) is fixed and begins to be available
22nd December, 12:05 UTC:	It is suspended the collection of data by BIPM Z12-T temporarily. The measures from 3.1-1 to 3.1-3 of the guide are made. Saving of data is launched.
29th December, 08:20 UTC:	The measures from 3.1-1 to 3.1-2 of the guide are made. It is stopped the collection of data by BIPM Z12-T. Shutdown of the BIPM Z12T. The measure 3.1-3 of the guide is made.
29th December, 12:00 UTC:	Departure of the BIPM travelling system toward VSL via Sli. The equipment arrives to its destination the 5th January.