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Notations

As presented in [Petit et al., 2001] for the Z12-T, the calibration of a geodetic system is divided in (up to) 6 different parts (Figure 1)

- X_P = Delay of the 1PPS-in with respect to the laboratory reference
- X_O = Delay of the "internal reference" with respect to the 1PPS-in

(X_P + X_o) = REFDLY.

- X_C = antenna cable delay
- [X_D = short cable + splitter delay]

(X_C + X_D) = CABDLY. In practice, X_D is generally not used.

- X_R = receiver internal delay, measured from the "internal reference"
- X_S = antenna delay

(X_R + X_S) = INTDLY.

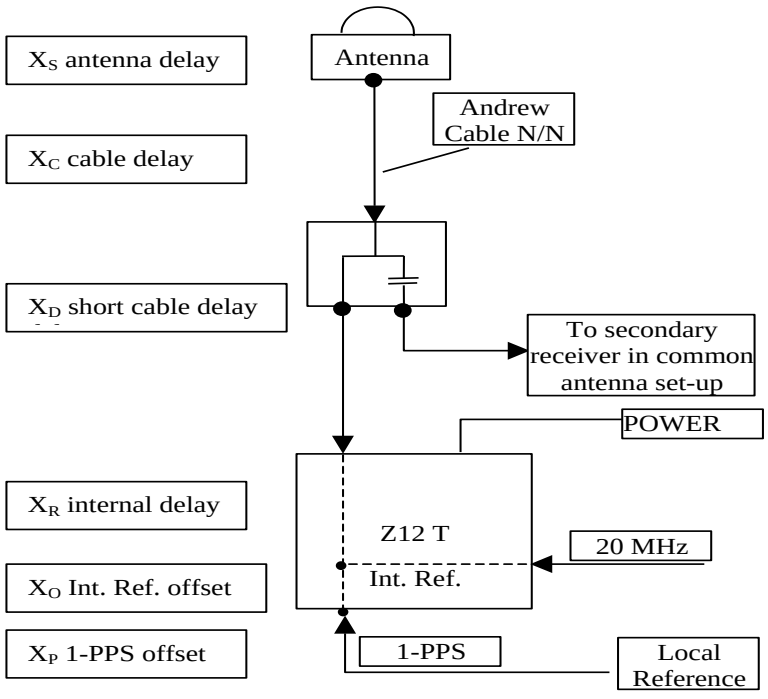


Figure 1: Definition of the different delays used in the most general set-up of a geodetic system (here shown for a Z12-T) from [Petit et al, 2001].

2/ phase 2

Laboratories: BIPM, ROA, PTB, OP

2.1/ BIPM (21047)

Period

MJD 59261 to 59267

Delays

BP1J: (cf page 4)

X_O = 142.03 ns (210.55-68.52)

X_P = 53.52 ns (68.52-15.0)

REFDLY = 195.55 ns

CABDLY = 176.38 ns (C211)

BP25: (cf page 5)

REFDLY = 53.42 ns (68.42-15.0)

CABDLY = 176.24 ns (C208)

BP21: (cf page 4)

REFDLY = 43.25 ns (58.25-15.0)

CABDLY = 140.80 ns (C201)

Setup at the BIPM

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory:	BIPM
Date and hour of the beginning of measurements:	MJD 59261
Date and hour of the end of measurements:	MJD 59267

Information on the system

	Local:	**Travelling:**
4-character BIPM code	BP21	BP1J
• Receiver maker and type: Receiver serial number:	Septentrio PolaRx5TR 4701229	Septentrio PolaRx4proTR 27
1 PPS trigger level /V:		
• Antenna cable maker and type: Phase stabilised cable (Y/N):	LMR-195	HYLM195
Length outside the building /m:	~ 15 m	~ 15 m
• Antenna maker and type: Antenna serial number:	Septentrio SEPCHOKE B3E6 5253	Septentrio SEPCHOKE MC 5131
Temperature (if stabilised) /°C		

Measured delays /ns

(if needed fill box "Additional Information" below)

	Local:	**Travelling:**
• Delay from local UTC to receiver 1 PPS-in:	43.25 ns	53.52 ns
Delay from 1 PPS-in to internal Reference (if different): (see section 2 for details)	PPSin compensation enable	142.03 ns
• Antenna cable delay:	140.80 ns	176.38 ns
Splitter delay (if any):		(1)
Additional cable delay (if any):		(1)

Data used for the generation of CGGTTS files

• INT DLY (GPS) /ns:	
• INT DLY (Galileo) /ns:	
• INT DLY (GLONASS) /ns:	
• CAB DLY /ns:	
• REF DLY /ns:	
• Coordinates reference frame:	
Latitude or X /m:	
Longitude or Y /m:	
Height or Z /m:	

General information

• Rise time of the local UTC pulse:	
• Is the laboratory air conditioned:	
Set temperature value and uncertainty:	22 ± 1°C
Set humidity value and uncertainty:	

(1) For a trip with closure, not needed if the traveling equipment is used in the same set-up throughout.

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory:	BIPM
Date and hour of the beginning of measurements:	MJD 59261
Date and hour of the end of measurements:	MJD 59267

Information on the system

	Local:	Travelling:
4-character BIPM code	BP21	BP25
• Receiver maker and type: Receiver serial number:	Septentrio PolaRx5TR 4701229	Mesit GTR55 1808001
1 PPS trigger level /V:		
• Antenna cable maker and type: Phase stabilised cable (Y/N):	LMR-195	HYLM195
Length outside the building /m:	~ 15 m	~ 15 m
• Antenna maker and type: Antenna serial number:	Septentrio SEPCHOKE B3E6 5253	Novatel GNSS-850 NMLK18070096N
Temperature (if stabilised) /°C		

Measured delays /ns

(if needed fill box "Additional Information" below)

	Local:	Travelling:
• Delay from local UTC to receiver 1 PPS-in:	43.25 ns	53.42 ns
Delay from 1 PPS-in to internal Reference (if different): (see section 2 for details)	PPSin compensation enable	
• Antenna cable delay:	140.80 ns	176.24 ns
Splitter delay (if any):		(1)
Additional cable delay (if any):		(1)

Data used for the generation of CGGTTS files

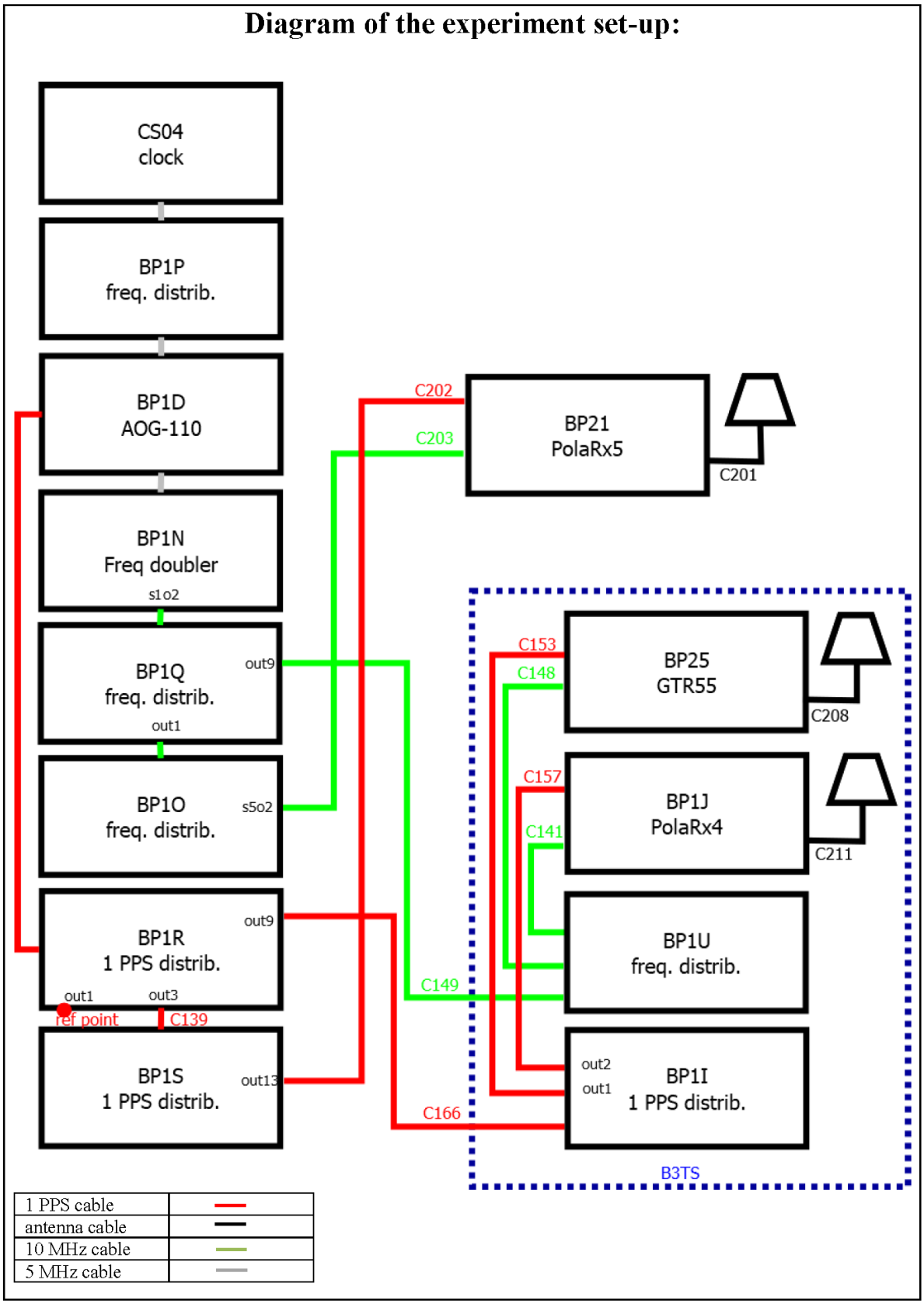
• INT DLY (GPS) /ns:	
• INT DLY (Galileo) /ns:	
• INT DLY (GLONASS) /ns:	
• CAB DLY /ns:	
• REF DLY /ns:	
• Coordinates reference frame:	
Latitude or X /m:	
Longitude or Y /m:	
Height or Z /m:	

General information

• Rise time of the local UTC pulse:	
• Is the laboratory air conditioned:	
Set temperature value and uncertainty:	22 ± 1°C
Set humidity value and uncertainty:	

(1) For a trip with closure, not needed if the traveling equipment is used in the same set-up throughout.

Diagram of the experiment set-up:



Log of Events / Additional Information :

All measurements at BIPM carried out by L. Tisserand.

Equipment used to measure delays is a Time Interval Counter (TIC), model 53230A, maker Keysight, S/N MY58390132, with measurement uncertainty typically less than 0.5 ns (using external reference frequency as timebase).

BP1J-BP21

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 144454
Apriori codes biases from 27247 high elev obs : -27.387 -27.088
Iteration 0: Obs used = 222876; Huge residuals = 2649; Large residuals = 13576
Iteration 1: Obs used = 226824; Huge residuals = 0; Large residuals = 6978
Computed code bias (P1/P2)/m = -27.478 -27.211
Computed baseline (X,Y,Z)/m = -3.717 -0.604 3.215
RMS of residuals /m = 0.670

Number of phase differences to fit baseline
L1/L2 = 140173
L5 = 70406
A priori baseline (X,Y,Z)/m = -3.717 -0.604 3.215
20156 clock jitters computed out of 20156 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 3.7

Iter 1 Large residuals L1= 3
Iter 1 Large residuals L2= 4
Iter 1 Large residuals L5= 2
Computed baseline L1 (X,Y,Z)/m = 0.124 0.025 0.147
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.141 0.034 0.169
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.123 0.030 0.157
RMS of residuals L5 /m = 0.003

Iter 2 Large residuals L1= 3
Iter 2 Large residuals L2= 4
Iter 2 Large residuals L5= 2
Computed baseline L1 (X,Y,Z)/m = 0.124 0.025 0.147
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.141 0.034 0.169
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.123 0.030 0.157
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -3.585 -0.574 3.374
20156 clock jitters computed out of 20156 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 0.4

Iter 3 Large residuals L1= 3
Iter 3 Large residuals L2= 4
Iter 3 Large residuals L5= 2
Computed baseline L1 (X,Y,Z)/m = 0.003 -0.010 -0.003
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.020 -0.001 0.018
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.002 -0.011 0.008
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m =	-3.582	-0.584	3.370
Final baseline L2 (X,Y,Z)/m =	-3.565	-0.575	3.392
Final baseline L5 (X,Y,Z)/m =	-3.583	-0.585	3.382

COMPUTATION OF CODE DIFFERENCES

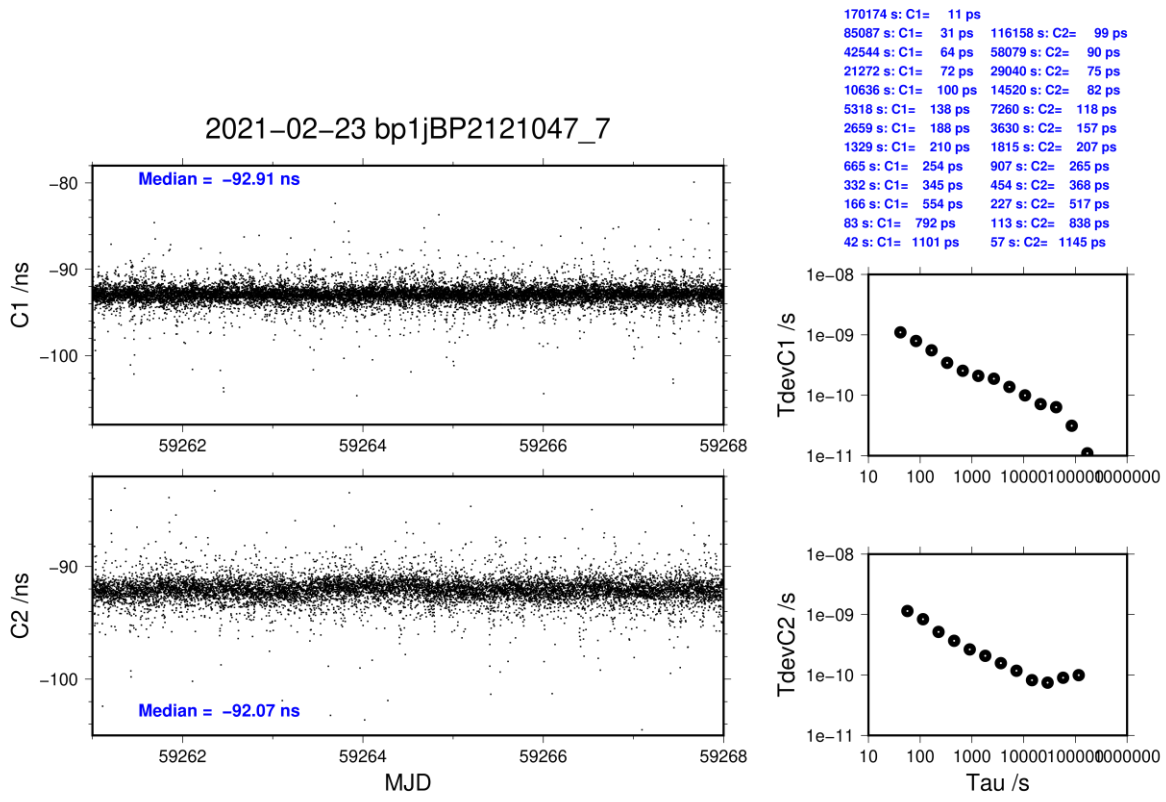
Total number of code differences = 377514

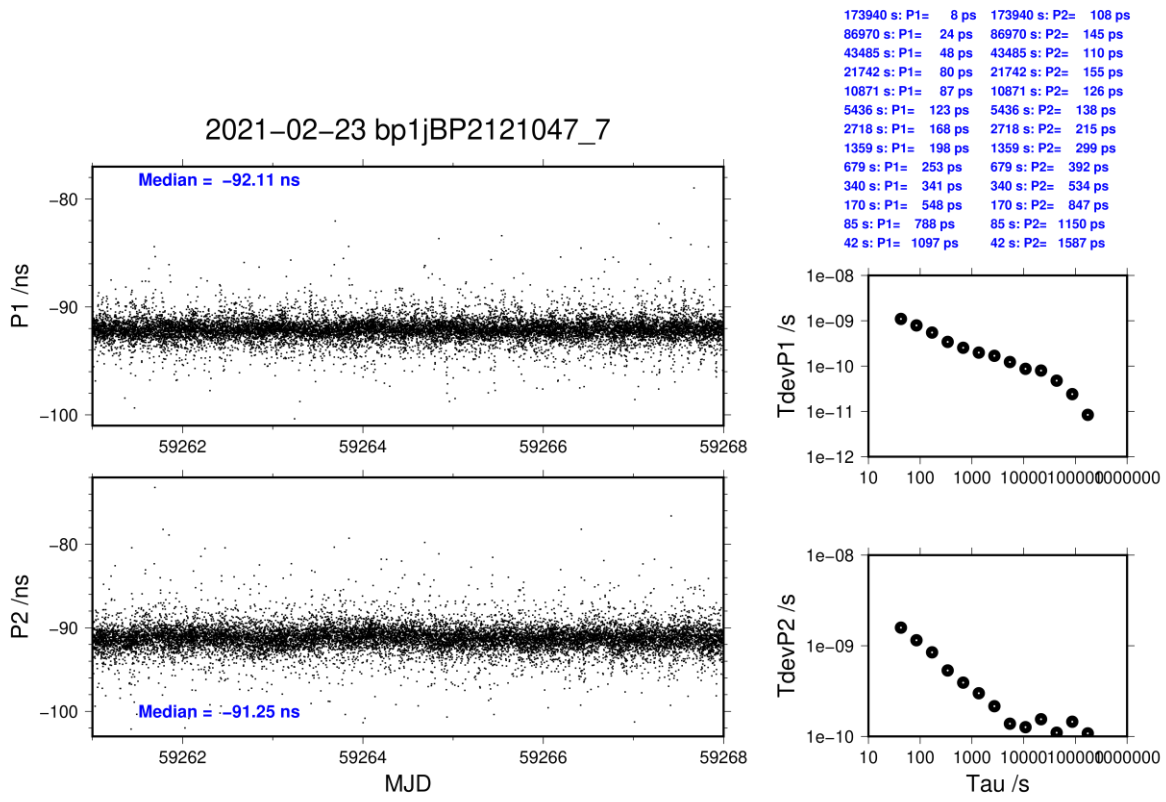
Global average of individual differences

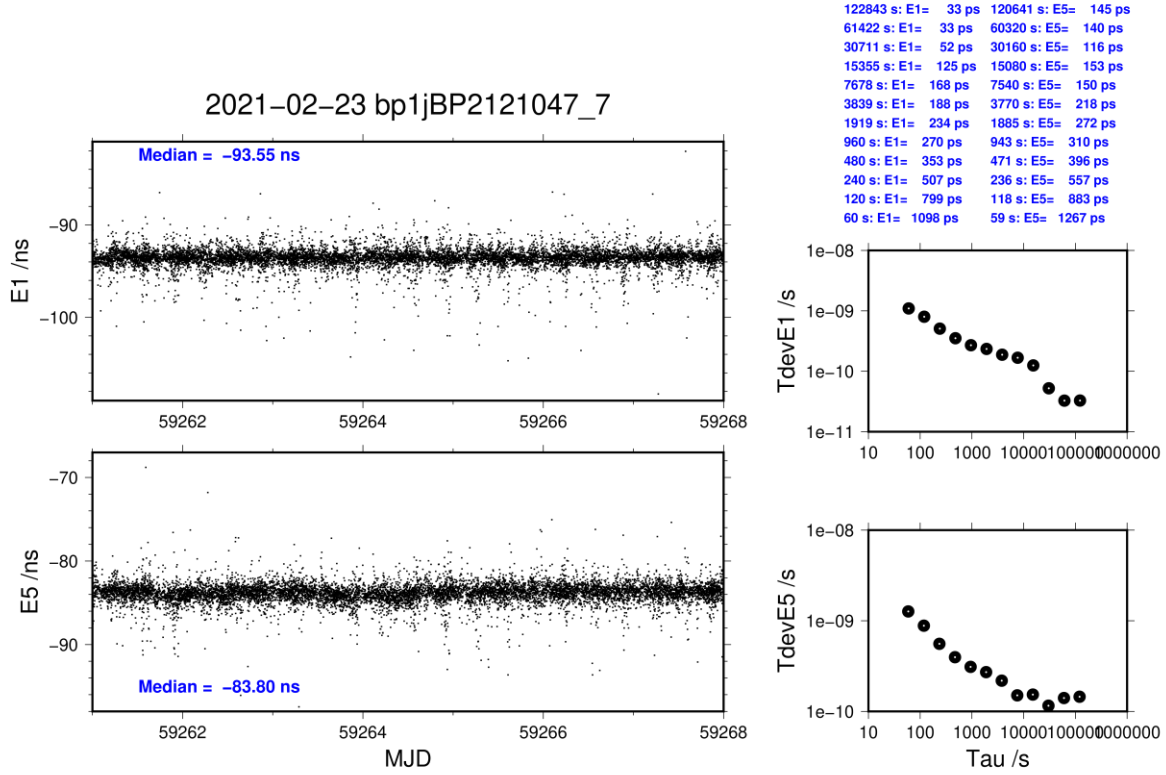
Code	#pts	ave/ns	rms/ns
C1	146145	-92.900	2.216
C2	106923	-92.070	2.125
P1	143045	-92.099	2.035
P2	142993	-91.247	2.884
E1	100915	-93.561	2.003
E5	102727	-83.827	1.963

Number of 300s epochs in out file = 2016

Code	#pts	median/ns	ave/ns	rms/ns
C1	14551	-92.914	-92.907	1.108
C2	10659	-92.073	-92.090	1.139
P1	14236	-92.111	-92.097	1.096
P2	14236	-91.252	-91.252	1.622
E1	10079	-93.546	-93.596	1.106
E5	10263	-83.802	-83.854	1.261




173940 s: P1= 8 ps 173940 s: P2= 108 ps
86970 s: P1= 24 ps 86970 s: P2= 145 ps
43485 s: P1= 48 ps 43485 s: P2= 110 ps
21742 s: P1= 80 ps 21742 s: P2= 155 ps
10871 s: P1= 87 ps 10871 s: P2= 126 ps
5436 s: P1= 123 ps 5436 s: P2= 138 ps
2718 s: P1= 168 ps 2718 s: P2= 215 ps
1359 s: P1= 198 ps 1359 s: P2= 299 ps
679 s: P1= 253 ps 679 s: P2= 392 ps
340 s: P1= 341 ps 340 s: P2= 534 ps
170 s: P1= 548 ps 170 s: P2= 847 ps
85 s: P1= 788 ps 85 s: P2= 1150 ps
42 s: P1= 1097 ps 42 s: P2= 1587 ps
2021−02−23 bp1jBP2121047_7
Median = −92.11 ns
P1 /ns
Median = −91.25 ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s


122843 s: E1= 33 ps 120641 s: E5= 145 ps
61422 s: E1= 33 ps 60320 s: E5= 140 ps
30711 s: E1= 52 ps 30160 s: E5= 116 ps
15355 s: E1= 125 ps 15080 s: E5= 153 ps
7678 s: E1= 168 ps 7540 s: E5= 150 ps
3839 s: E1= 188 ps 3770 s: E5= 218 ps
1919 s: E1= 234 ps 1885 s: E5= 272 ps
960 s: E1= 270 ps 943 s: E5= 310 ps
480 s: E1= 353 ps 471 s: E5= 396 ps
240 s: E1= 507 ps 236 s: E5= 557 ps
120 s: E1= 799 ps 118 s: E5= 883 ps
60 s: E1= 1098 ps 59 s: E5= 1267 ps
2021−02−23 bp1jBP2121047_7
Median = −93.55 ns
E1 /ns
Median = −83.80 ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s

BP25-BP21

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 141296
Apriori codes biases from 27247 high elev obs : 3.866 5.538
Iteration 0: Obs used = 224517; Huge residuals = 2; Large residuals = 5619
Iteration 1: Obs used = 224516; Huge residuals = 0; Large residuals = 5618
Computed code bias (P1/P2)/m = 3.612 5.216
Computed baseline (X,Y,Z)/m = -5.037 -0.662 4.518
RMS of residuals /m = 0.629

Number of phase differences to fit baseline
L1/L2 = 136849
L5 = 69336
A priori baseline (X,Y,Z)/m = -5.037 -0.662 4.518
20156 clock jitters computed out of 20156 intervals
AVE jitter /ps = -0.4 RMS jitter /ps = 4.8

Iter 1 Large residuals L1= 3
Iter 1 Large residuals L2= 3
Iter 1 Large residuals L5= 4
Computed baseline L1 (X,Y,Z)/m = 0.002 -0.073 0.157
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.025 -0.072 0.175
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = 0.008 -0.070 0.165
RMS of residuals L5 /m = 0.004

Iter 2 Large residuals L1= 3
Iter 2 Large residuals L2= 3
Iter 2 Large residuals L5= 4
Computed baseline L1 (X,Y,Z)/m = 0.002 -0.073 0.157
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.025 -0.072 0.175
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = 0.008 -0.070 0.165
RMS of residuals L5 /m = 0.004

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -5.023 -0.734 4.684
20156 clock jitters computed out of 20156 intervals
AVE jitter /ps = 0.3 RMS jitter /ps = 0.3

Iter 3 Large residuals L1= 3
Iter 3 Large residuals L2= 3
Iter 3 Large residuals L5= 4
Computed baseline L1 (X,Y,Z)/m = 0.003 -0.029 -0.002
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.026 -0.028 0.016
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = 0.012 -0.033 0.008
RMS of residuals L5 /m = 0.004

Final baseline L1 (X,Y,Z)/m = -5.020 -0.763 4.682
Final baseline L2 (X,Y,Z)/m = -4.997 -0.762 4.700
Final baseline L5 (X,Y,Z)/m = -5.011 -0.767 4.692

COMPUTATION OF CODE DIFFERENCES

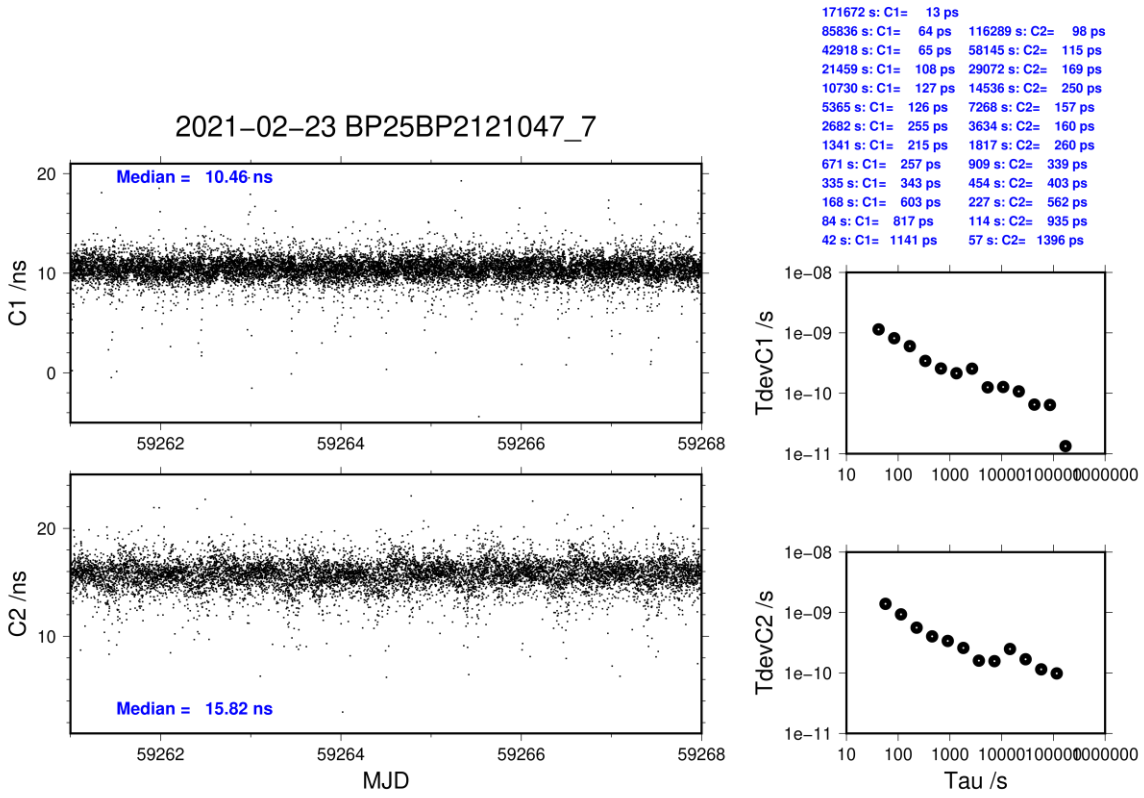
Total number of code differences = 500806

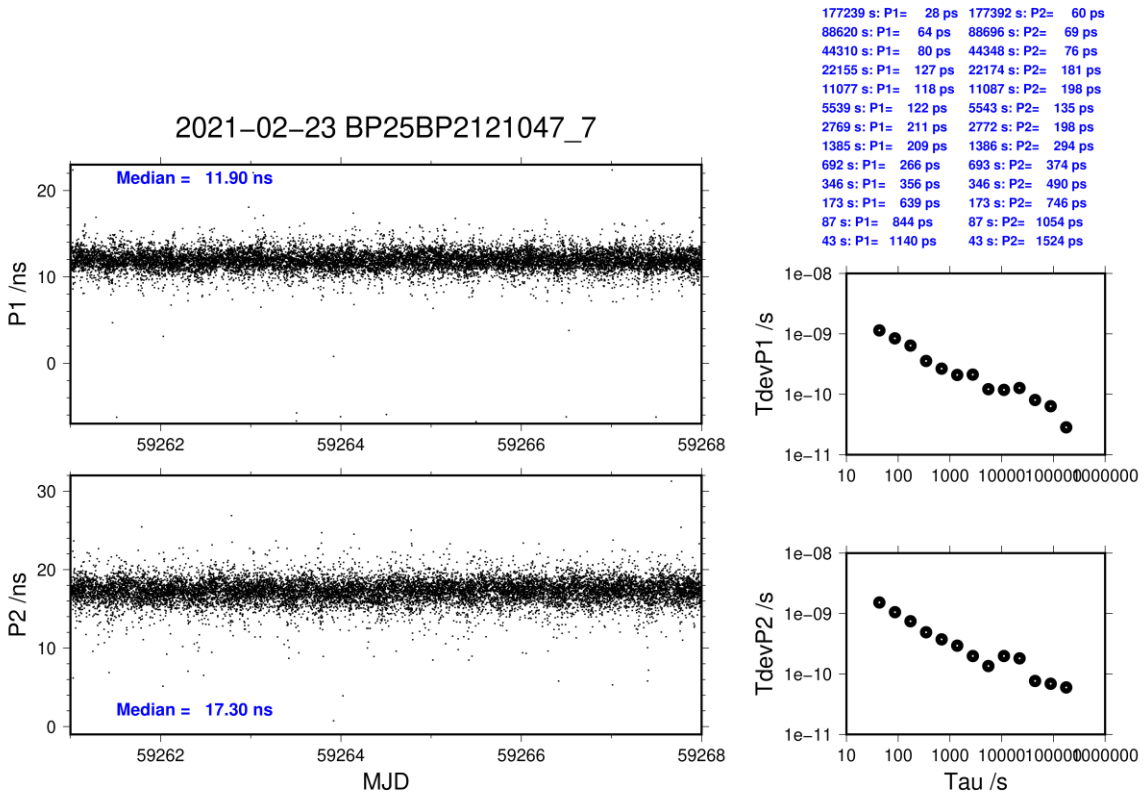
Global average of individual differences

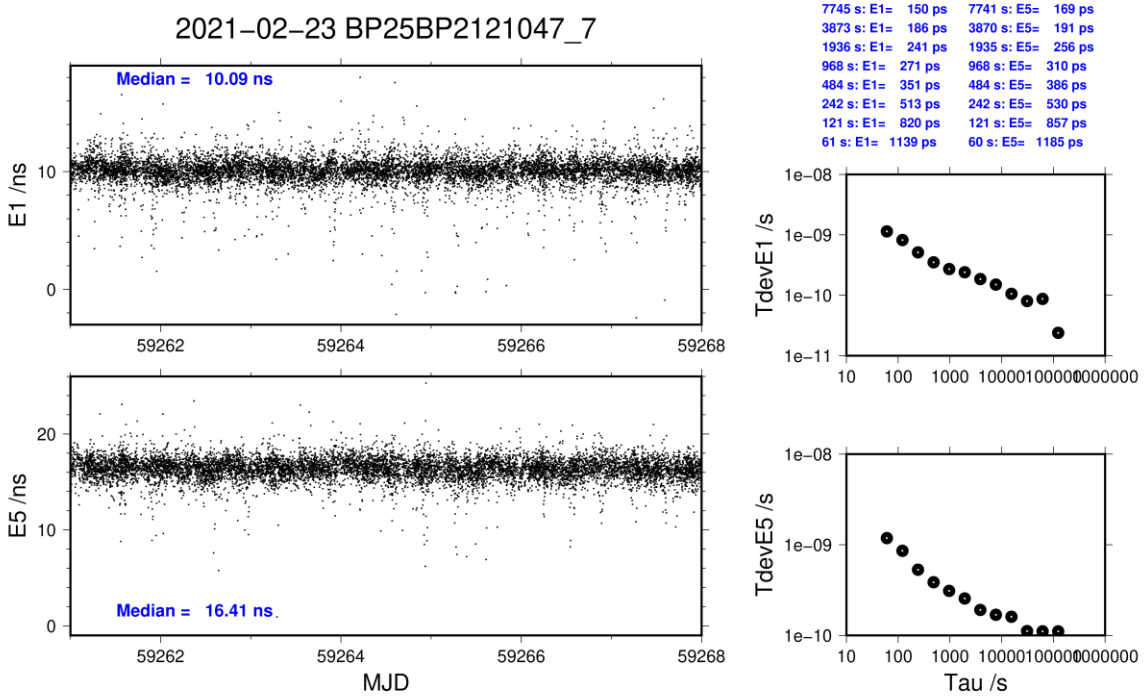
Code	#pts	ave/ns	rms/ns
C1	144514	10.446	2.038
C2	106647	15.745	2.139
P1	140918	11.866	1.991
P2	140629	17.239	2.597
E1	99872	10.051	1.873
E5	100205	16.371	1.772

Number of 300s epochs in out file = 2016

Code	#pts	median/ns	ave/ns	rms/ns
C1	14424	10.462	10.451	1.162
C2	10647	15.822	15.746	1.341
P1	13971	11.900	11.905	1.182
P2	13959	17.302	17.249	1.515
E1	9991	10.094	10.046	1.133
E5	9997	16.412	16.359	1.197




2021−02−23 BP25BP2121047_7
Median = 11.90 ns
Median = 17.30 ns
P1 /ns
P2 /ns
MJD
177239 s: P1= 28 ps 177392 s: P2= 60 ps
88620 s: P1= 64 ps 88696 s: P2= 69 ps
44310 s: P1= 80 ps 44348 s: P2= 76 ps
22155 s: P1= 127 ps 22174 s: P2= 181 ps
11077 s: P1= 118 ps 11087 s: P2= 198 ps
5539 s: P1= 122 ps 5543 s: P2= 135 ps
2769 s: P1= 211 ps 2772 s: P2= 198 ps
1385 s: P1= 209 ps 1386 s: P2= 294 ps
692 s: P1= 266 ps 693 s: P2= 374 ps
346 s: P1= 356 ps 346 s: P2= 490 ps
173 s: P1= 639 ps 173 s: P2= 746 ps
87 s: P1= 844 ps 87 s: P2= 1054 ps
43 s: P1= 1140 ps 43 s: P2= 1524 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−02−23 BP25BP2121047_7
Median = 10.09 ns
Median = 16.41 ns
E1 /ns
E5 /ns
MJD
123926 s: E1= 24 ps 123851 s: E5= 111 ps
61963 s: E1= 87 ps 61926 s: E5= 111 ps
30981 s: E1= 80 ps 30963 s: E5= 112 ps
15491 s: E1= 106 ps 15481 s: E5= 161 ps
7745 s: E1= 150 ps 7741 s: E5= 169 ps
3873 s: E1= 186 ps 3870 s: E5= 191 ps
1936 s: E1= 241 ps 1935 s: E5= 256 ps
968 s: E1= 271 ps 968 s: E5= 310 ps
484 s: E1= 351 ps 484 s: E5= 386 ps
242 s: E1= 513 ps 242 s: E5= 530 ps
121 s: E1= 820 ps 121 s: E5= 857 ps
61 s: E1= 1139 ps 60 s: E5= 1185 ps
TdevE1 /s
TdevE5 /s
Tau /s

2.2/ ROA (21067)

Period

MJD 59281 to 59287

Delays

BP1J: (cf page 3 & 22)
- X_O = 133.48 ns (148.93-15.45)
- X_P = 331.02 ns (277.5+53.52)
- REFDLY = 464.50 ns
- CABDLY = 176.38 ns (C211)

BP25: (cf page 3 & 22)
- REFDLY = 330.92 ns (277.5+53.42)
- CABDLY = 176.24 ns (C208)

RO_5: (cf page 15)
- REFDLY = 306.8 ns
- CABDLY = 91.5 ns (70+7+14.5)
- INT DLY: 8.0 (GPS C1), 8.0 (GPS P1), 26.0 (GPS P2)

RO_6: (cf page 16)
- REFDLY = 485.1 ns (292.6+192.5)
- CABDLY = 82.0 ns (70+7+5)

ROAP (RO_7): (cf page 17)
- REFDLY = 452.4 ns (305.6+146.8)
- CABDLY = 89.9 ns (70+14+5.9)

RO_8: (cf page 18)
- REFDLY = 20.4 ns
- CABDLY = 197.1 ns

RO_9: (cf page 19)
- REFDLY = 451.8 ns (305.6+146.2)
- CABDLY = 59.7 ns

ROAG (RO10): (cf page 20)
- REFDLY = 5.1 ns
- CABDLY = 199.0 ns (174.7+13+11.3)

Setup at the ROA

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory	ROA	
Date and hour beginning of measurements	08-03-2021, 12:00 UTC	
Date and hour end of measurements		
Information on the system		
	Local	**Traveling**
4-character BIPM code	RO_5	BP25/BP1J
Receiver maker and type Receiver serial number	DICOM GTR50 0601012 V1.6.1	Mesit GTR55 S/N 1808001 Septentrio PolaRx4TR PRO S/N 3001388
1 PPS trigger level /V	1 V	1V
Antenna cable maker and type Phase stabilized cable (Y/N)	LDF1RK-50	C208/C211
Cable length outside building /m	Approximately 18 m	Approximately 10 m
Antenna maker and type Antenna serial number	LEICA AR25 S/N 725233	Novatel GNSS-850 S/N NMLK18070096N Septentrio Choke Ring S/N 5131
Temperature if stabilized /°C	N/A	N/A
Measured delays / ns		
	Local	**Traveling**
Delay from local UTC(k) to receiver 1 PPS_IN	306.8	N/A
Delay from 1 PPS_IN to internal reference (see Annex 1)	N/A	N/A
Antenna cable delay	70.0	N/A
Splitter delay	7.0	N/A
Additional cable delay	14.5	N/A
Data used for the generation of CGGTTS files		
	Local	
INT DLY (GPS) /ns	8.0 (C1), 8.0 (P1), 26.0 (GPS P2)	
INT DLY (Galileo) /ns	N/A	
CAB DLY /ns	91.5	
REF DLY /ns	306.8	
Coordinate reference frame	ITRF14	
Latitude or X /m	5105581.87	
Longitude or Y /m	-555193.41	
Height or Z /m	3769704.66	
General information		
Rise time of local UTC pulse	< 1 ns	
Air conditioning (Y/N)	Y	
Set temperature value and uncertainty	(22 ± 2) °C	
Set humidity value and uncertainty	< 70 %	

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory	ROA
Date and hour beginning of measurements	08-03-2021, 12:00 UTC
Date and hour end of measurements	

Information on the system		
	Local	**Traveling**
4-character BIPM code	RO_6	BP25/BP1J
Receiver maker and type Receiver serial number	Septentrio PolaRx3eTR 200805 v2.1	Mesit GTR55 S/N 1808001 Septentrio PolaRx4TR PRO S/N 3001388
1 PPS trigger level /V	1 V	1V
Antenna cable maker and type Phase stabilized cable (Y/N)	LDF1RK-50	C208/C211
Cable length outside building /m	Approximately 18 m	Approximately 10 m
Antenna maker and type Antenna serial number	LEICA AR25 S/N 725233	Novatel GNSS-850 S/N NMLK18070096N Septentrio Choke Ring S/N 5131
Temperature if stabilized /°C	N/A	N/A

Measured delays / ns		
	Local	**Traveling**
Delay from local UTC(k) to receiver 1 PPS_IN	292.6	N/A
Delay from 1 PPS_IN to internal reference (see Annex 1)	192.5	N/A
Antenna cable delay	70.0	N/A
Splitter delay	7.0	N/A
Additional cable delay	5.0	N/A

Data used for the generation of CGGTTS files	
	Local
INT DLY (GPS) /ns	56.3 (C1), 54.7 (P1), 53.5 (P2)
INT DLY (Galileo) /ns	N/A
CAB DLY /ns	82.0
REF DLY /ns	485.1
Coordinate reference frame	ITRF14
Latitude or X /m	5105581.87
Longitude or Y /m	-555193.41
Height or Z /m	3769704.66

General information	
Rise time of local UTC pulse	< 1 ns
Air conditioning (Y/N)	Y
Set temperature value and uncertainty	(22 ± 2) °C
Set humidity value and uncertainty	< 70 %

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory	ROA	
Date and hour beginning of measurements	08-03-2021, 12:00 UTC	
Date and hour end of measurements		
Information on the system		
	Local	**Traveling**
4-character BIPM code	RO_7	BP25/BP1J
Receiver maker and type Receiver serial number	Septentrio PolaRx4TR PRO 3007633 v2.9.6	Mesit GTR55 S/N 1808001 Septentrio PolaRx4TR PRO S/N 3001388
1 PPS trigger level /V	1 V	1V
Antenna cable maker and type Phase stabilized cable (Y/N)	LDF1RK-50	C208/C211
Cable length outside building /m	Approximately 18 m	Approximately 10 m
Antenna maker and type Antenna serial number	LEICA AR25 S/N 725233	Novatel GNSS-850 S/N NMLK18070096N Septentrio Choke Ring S/N 5131
Temperature if stabilized /°C	N/A	N/A
Measured delays / ns		
	Local	**Traveling**
Delay from local UTC(k) to receiver 1 PPS_IN	305.6	N/A
Delay from 1 PPS_IN to internal reference (see Annex 1)	146.8	N/A
Antenna cable delay	70.0	N/A
Splitter delay	14.0	N/A
Additional cable delay	5.9	N/A
Data used for the generation of CGGTTS files		
	Local	
INT DLY (GPS) /ns	56.3 (C1), 55.0 (P1), 53.9 (P2)	
INT DLY (Galileo) /ns	55.6 (E1), 64.2 (E5a)	
CAB DLY /ns	89.9	
REF DLY /ns	452.4	
Coordinate reference frame	ITRF14	
Latitude or X /m	5105581.87	
Longitude or Y /m	-555193.41	
Height or Z /m	3769704.66	
General information		
Rise time of local UTC pulse	< 1 ns	
Air conditioning (Y/N)	Y	
Set temperature value and uncertainty	(22 ± 2) °C	
Set humidity value and uncertainty	< 70 %	

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory	ROA	
Date and hour beginning of measurements	08-03-2021, 12:00 UTC	
Date and hour end of measurements		
Information on the system		
	Local	**Traveling**
4-character BIPM code	RO_8	BP25/BP1J
Receiver maker and type Receiver serial number	MESIT GTR51 1509257 v1.9.4	Mesit GTR55 S/N 1808001 Septentrio PolaRx4TR PRO S/N 3001388
1 PPS trigger level /V	1 V	1V
Antenna cable maker and type Phase stabilized cable (Y/N)	LDF1RK-50	C208/C211
Cable length outside building /m	Approximately 20 m	Approximately 10 m
Antenna maker and type Antenna serial number	ANTCOM G5Ant-72CA4T1 S/N 448359	Novatel GNSS-850 S/N NMLK18070096N Septentrio Choke Ring S/N 5131
Temperature if stabilized /°C	N/A	N/A
Measured delays / ns		
	Local	**Traveling**
Delay from local UTC(k) to receiver 1 PPS_IN	20.4	N/A
Delay from 1 PPS_IN to internal reference (see Annex 1)	N/A	N/A
Antenna cable delay	197.1	N/A
Splitter delay		N/A
Additional cable delay		N/A
Data used for the generation of CGGTTS files		
	Local	
INT DLY (GPS) /ns	31.3 (C1), 29.6 (P1), 27.9 (P2)	
INT DLY (Galileo) /ns	32.6 (E1), 24.6 (E5a)	
CAB DLY /ns	197.1	
REF DLY /ns	20.4	
Coordinate reference frame	ITRF14	
Latitude or X /m	5105576.85	
Longitude or Y /m	-555197.14	
Height or Z /m	3769710.69	
General information		
Rise time of local UTC pulse	< 1 ns	
Air conditioning (Y/N)	Y	
Set temperature value and uncertainty	(22 ± 2) °C	
Set humidity value and uncertainty	< 70 %	

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory	ROA	
Date and hour beginning of measurements	08-03-2021, 12:00 UTC	
Date and hour end of measurements		
Information on the system		
	Local	**Traveling**
4-character BIPM code	RO_9	BP25/BP1J
Receiver maker and type Receiver serial number	Septentrio PolaRx4TR PRO 3008013 v2.9.6	Mesit GTR55 S/N 1808001 Septentrio PolaRx4TR PRO S/N 3001388
1 PPS trigger level /V	1 V	1V
Antenna cable maker and type Phase stabilized cable (Y/N)	LDF1RK-50	C208/C211
Cable length outside building /m	Approximately 20 m	Approximately 10 m
Antenna maker and type Antenna serial number	LEICA AR25 S/N 726362	Novatel GNSS-850 S/N NMLK18070096N Septentrio Choke Ring S/N 5131
Temperature if stabilized /°C	N/A	N/A
Measured delays / ns		
	Local	**Traveling**
Delay from local UTC(k) to receiver 1 PPS_IN	305.6	N/A
Delay from 1 PPS_IN to internal reference (see Annex 1)	146.2	N/A
Antenna cable delay	59.7	N/A
Splitter delay	0.0	N/A
Additional cable delay	0.0	N/A
Data used for the generation of CGGTTS files		
	Local	
INT DLY (GPS) /ns	56.9 (C1), 55.5 (P1), 54.4 (P2)	
INT DLY (Galileo) /ns	56.2 (E1), 65.3 (E5a)	
CAB DLY /ns	59.7	
REF DLY /ns	451.8	
Coordinate reference frame	ITRF14	
Latitude or X /m	5105582.84	
Longitude or Y /m	-555191.16	
Height or Z /m	3769703.68	
General information		
Rise time of local UTC pulse	< 1 ns	
Air conditioning (Y/N)	Y	
Set temperature value and uncertainty	(22 ± 2) °C	
Set humidity value and uncertainty	< 70 %	

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory	ROA	
Date and hour beginning of measurements	08-03-2021, 12:00 UTC	
Date and hour end of measurements		
Information on the system		
	Local	**Traveling**
4-character BIPM code	RO_10	BP25/BP1J
Receiver maker and type Receiver serial number	PolaRx5TR 4701187 V5.2.0	Mesit GTR55 S/N 1808001 Septentrio PolaRx4TR PRO S/N 3001388
1 PPS trigger level /V	1 V	1V
Antenna cable maker and type Phase stabilized cable (Y/N)	LDF1RK-50	C208/C211
Cable length outside building /m	Approximately 37 m	Approximately 10 m
Antenna maker and type Antenna serial number	LEICA AR25 S/N 726362	Novatel GNSS-850 S/N NMLK18070096N Septentrio Choke Ring S/N 5131
Temperature if stabilized /°C	N/A	N/A
Measured delays / ns		
	Local	**Traveling**
Delay from local UTC(k) to receiver 1 PPS_IN	5.1	N/A
Delay from 1 PPS_IN to internal reference (see Annex 1)	0.0	N/A
Antenna cable delay	174.7	N/A
Splitter delay	13.0	N/A
Additional cable delay	11.3	N/A
Data used for the generation of CGGTTS files		
	Local	
INT DLY (GPS) /ns	30.7 (C1), 29.0 (P1), 26.3 (P2)	
INT DLY (Galileo) /ns	30.6 (E1), 30.5 (E5a)	
CAB DLY /ns	199.0	
REF DLY /ns	5.1	
Coordinate reference frame	ITRF14	
Latitude or X /m	5105577.43	
Longitude or Y /m	-555208.88	
Height or Z /m	3769714.22	
General information		
Rise time of local UTC pulse	< 1 ns	
Air conditioning (Y/N)	Y	
Set temperature value and uncertainty	(22 ± 2) °C	
Set humidity value and uncertainty	< 70 %	

Diagram of the experiment set-up:

Setup of BIPM GNSS calibration system at ROA

Monday 8 March 2021

Setup

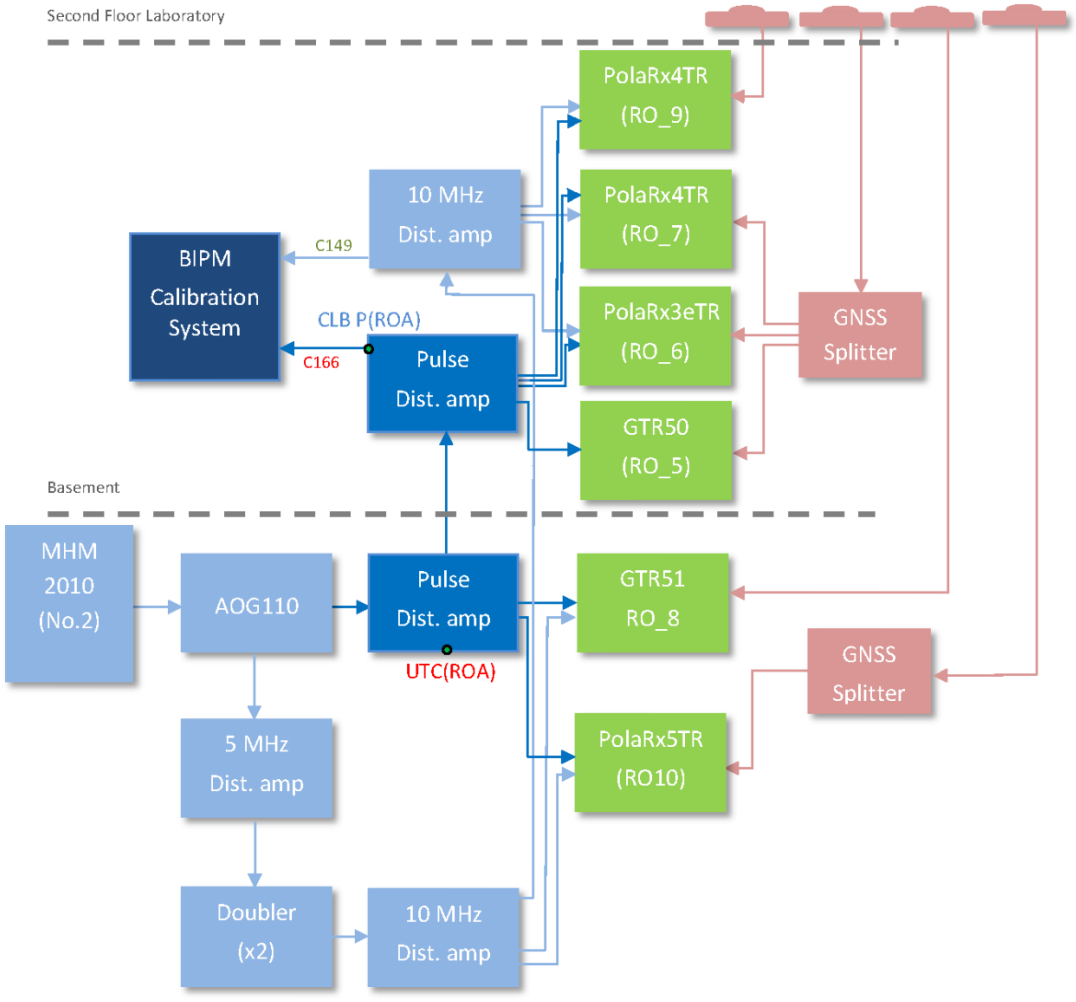


Figure 1: Hookup diagram of GNSS receivers.

Log of Events / Additional Information :

Monday 8 March 2021

Start data logging at 11:30 UTC.

Delay Measurement, 11:30 UTC:

UTC(ROA) – CLB P(ROA) = (277.50± 0.01) ns

Delay Measurement at each receiver:

BP1J (PolaRx4eTR):

Channel A [C183], channel B [C157 (PPS IN)+(Female BNC-BNC)+C155] = (15.48 ± 0.01) ns

Channel A [C183], channel B [PPS OUT+C155] = (148.87 ± 0.09) ns

BP25 (GTR55):

Channel A [C183], channel B [C153 (PPS IN)]= (5 ± 4) ps

Friday 15 Mach 2021

Delay Measurement, 07:00 UTC:

UTC(ROA) – CLB P(ROA) = (277.50± 0.01) ns

Delay Measurement at each receiver:

BP1C (PolaRx4eTR):

Channel A [C183], channel B [C157 (PPS IN)+(Female BNC-BNC)+C155] = (15.41 ± 0.01) ns

Channel A [C183], channel B [PPS OUT+C155] = (148.98 ± 0.09) ns

BP1X (GTR50):

Channel A [C183], channel B [C153 (PPS IN)]= (4 ± 5) ps

RO_5-BP1J

COMPUTATION OF BASELINE

Number of phase differences to fit baseline
L1/L2 = 141881
L5 = 0
A priori baseline (X,Y,Z)/m = -1.575 4.058 2.620
18081 clock jitters computed out of 18129 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 37.6

Iter 1 Large residuals L1= 8
Iter 1 Large residuals L2= 8
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.002 0.003 0.001
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = -0.003 0.003 0.004
RMS of residuals L2 /m = 0.002
No computed baseline L5, will use L1/L2

Iter 2 Large residuals L1= 8
Iter 2 Large residuals L2= 8
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.002 0.003 0.001
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = -0.003 0.003 0.004
RMS of residuals L2 /m = 0.002
No computed baseline L5, will use L1/L2

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -1.576 4.061 2.622
18081 clock jitters computed out of 18129 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 0.1

Iter 3 Large residuals L1= 8
Iter 3 Large residuals L2= 8
Iter 3 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.001 0.002 -0.002
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = -0.003 0.002 0.001
RMS of residuals L2 /m = 0.002
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -1.574 4.063 2.620
Final baseline L2 (X,Y,Z)/m = -1.579 4.063 2.623
Final baseline L5 (X,Y,Z)/m = -1.576 4.063 2.622

COMPUTATION OF CODE DIFFERENCES

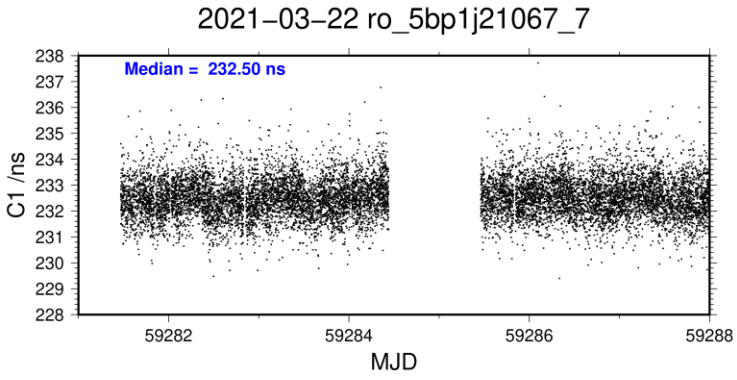
Total number of code differences = 149824

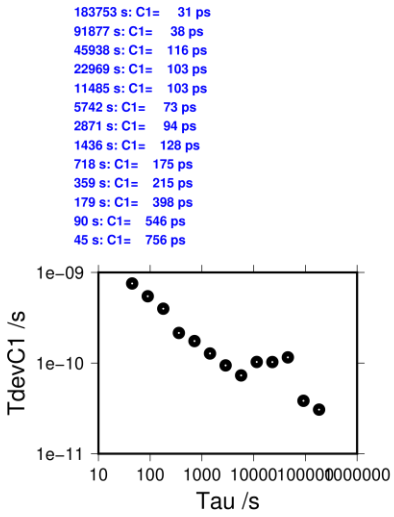
Global average of individual differences

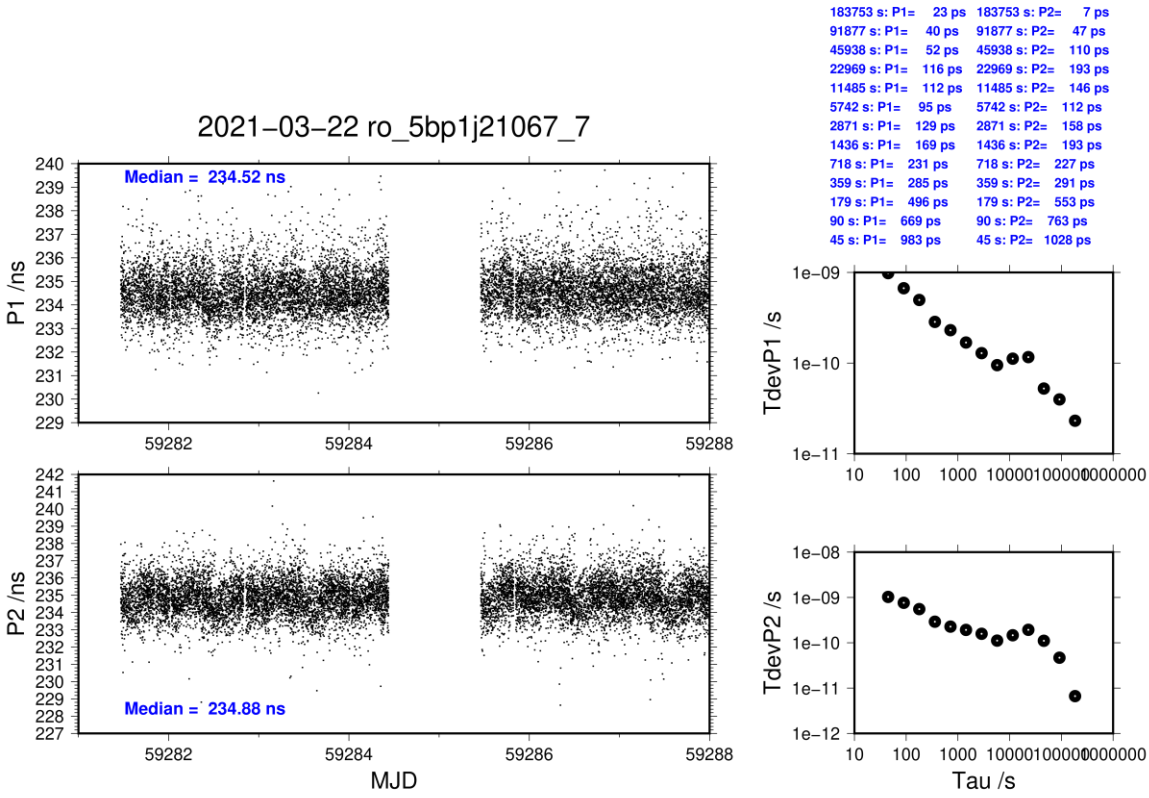
Code	#pts	ave/ns	rms/ns
C1	126363	232.526	1.117
P1	126335	234.582	1.529
P2	126334	234.889	1.599

Number of 300s epochs in out file = 1854

Code	#pts	median/ns	ave/ns	rms/ns
C1	12573	232.502	232.528	0.767
P1	12573	234.522	234.586	0.966
P2	12573	234.882	234.898	1.060






2021−03−22 ro_5bp1j21067_7
Median = 234.52 ns
Median = 234.88 ns
P1 /ns
P2 /ns
MJD
183753 s: P1= 23 ps 183753 s: P2= 7 ps
91877 s: P1= 40 ps 91877 s: P2= 47 ps
45938 s: P1= 52 ps 45938 s: P2= 110 ps
22969 s: P1= 116 ps 22969 s: P2= 193 ps
11485 s: P1= 112 ps 11485 s: P2= 146 ps
5742 s: P1= 95 ps 5742 s: P2= 112 ps
2871 s: P1= 129 ps 2871 s: P2= 158 ps
1436 s: P1= 169 ps 1436 s: P2= 193 ps
718 s: P1= 231 ps 718 s: P2= 227 ps
359 s: P1= 285 ps 359 s: P2= 291 ps
179 s: P1= 496 ps 179 s: P2= 553 ps
90 s: P1= 669 ps 90 s: P2= 763 ps
45 s: P1= 983 ps 45 s: P2= 1028 ps
TdevP1 /s
TdevP2 /s
Tau /s

RO_5-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 147676
Apriori codes biases from 22507 high elev obs : 42.020 40.813
Iteration 0: Obs used = 253055; Huge residuals = 0; Large residuals = 583
Iteration 1: Obs used = 253055; Huge residuals = 0; Large residuals = 583
Computed code bias (P1/P2)/m = 41.880 40.618
Computed baseline (X,Y,Z)/m = -2.243 3.276 2.796
RMS of residuals /m = 0.477

Number of phase differences to fit baseline
L1/L2 = 140296
L5 = 0
A priori baseline (X,Y,Z)/m = -2.243 3.276 2.796
18063 clock jitters computed out of 18116 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 37.6

Iter 1 Large residuals L1= 5
Iter 1 Large residuals L2= 5
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.273 -0.018 0.149
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.258 -0.019 0.144
RMS of residuals L2 /m = 0.003
No computed baseline L5, will use L1/L2

Iter 2 Large residuals L1= 5
Iter 2 Large residuals L2= 5
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.273 -0.018 0.149
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.258 -0.019 0.144
RMS of residuals L2 /m = 0.003
No computed baseline L5, will use L1/L2

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -1.978 3.258 2.942
18063 clock jitters computed out of 18116 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 0.4

Iter 3 Large residuals L1= 5
Iter 3 Large residuals L2= 5
Iter 3 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.018 0.006 0.008
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.002 0.005 0.003
RMS of residuals L2 /m = 0.003
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -1.960 3.264 2.950
Final baseline L2 (X,Y,Z)/m = -1.975 3.263 2.945
Final baseline L5 (X,Y,Z)/m = -1.968 3.263 2.948

COMPUTATION OF CODE DIFFERENCES

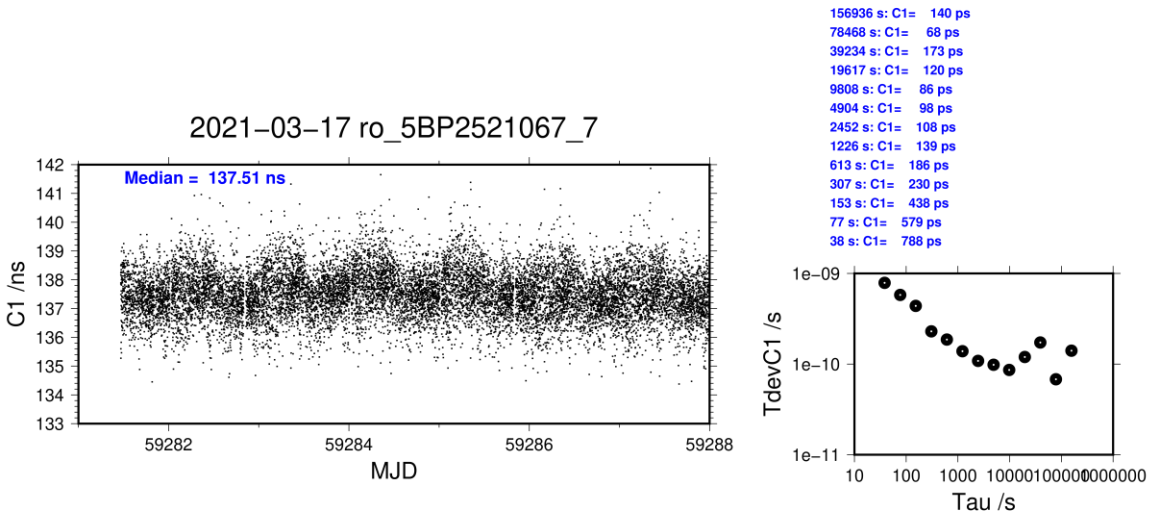
Total number of code differences = 147907

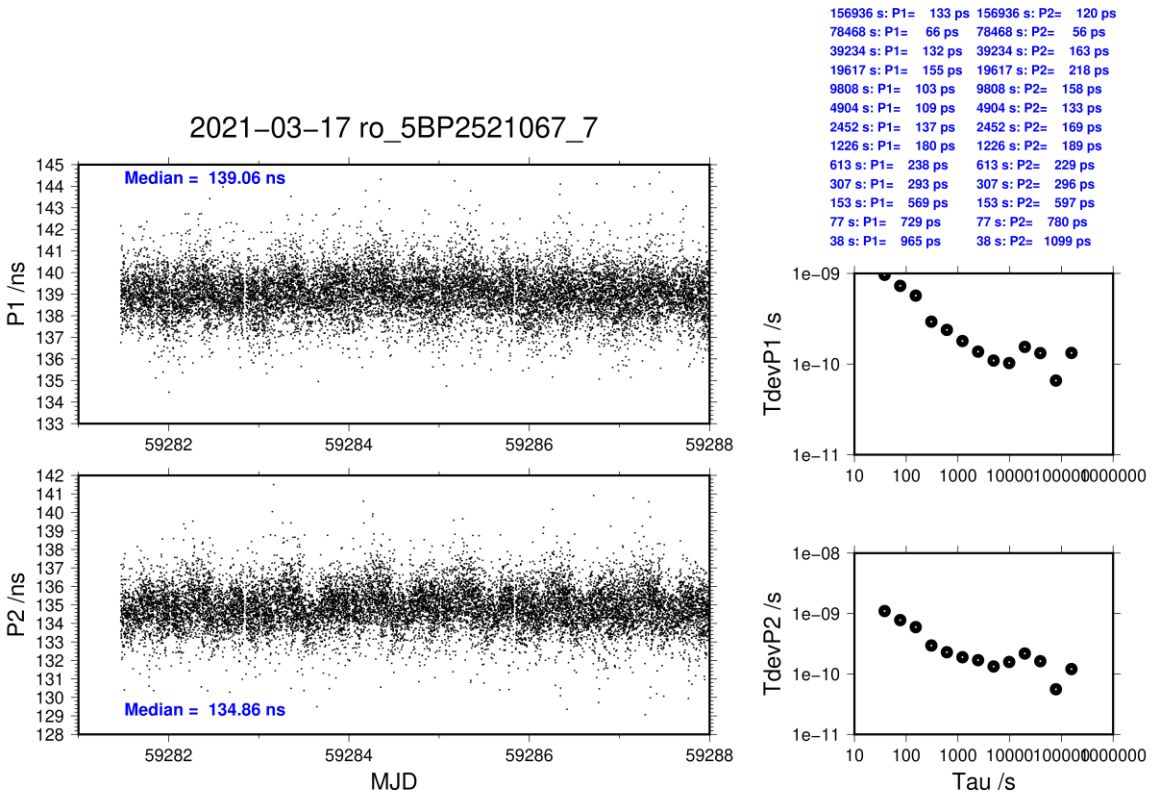
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	147603	137.518	1.097
P1	147602	139.049	1.509
P2	147602	134.865	1.597

Number of 300s epochs in out file = 1856

Code	#pts	median/ns	ave/ns	rms/ns
C1	14737	137.509	137.523	0.825
P1	14737	139.057	139.055	1.020
P2	14737	134.858	134.876	1.119




2021−03−17 ro_5BP2521067_7
Median = 139.06 ns
Median = 134.86 ns
P1 /ns
P2 /ns
MJD
156936 s: P1= 133 ps 156936 s: P2= 120 ps
78468 s: P1= 66 ps 78468 s: P2= 56 ps
39234 s: P1= 132 ps 39234 s: P2= 163 ps
19617 s: P1= 155 ps 19617 s: P2= 218 ps
9808 s: P1= 103 ps 9808 s: P2= 158 ps
4904 s: P1= 109 ps 4904 s: P2= 133 ps
2452 s: P1= 137 ps 2452 s: P2= 169 ps
1226 s: P1= 180 ps 1226 s: P2= 189 ps
613 s: P1= 238 ps 613 s: P2= 229 ps
307 s: P1= 293 ps 307 s: P2= 296 ps
153 s: P1= 569 ps 153 s: P2= 597 ps
77 s: P1= 729 ps 77 s: P2= 780 ps
38 s: P1= 965 ps 38 s: P2= 1099 ps
TdevP1 /s
TdevP2 /s
Tau /s

RO_6-BP1J

COMPUTATION OF BASELINE

Number of phase differences to fit baseline
L1/L2 = 181088
L5 = 0
A priori baseline (X,Y,Z)/m = -1.579 4.061 2.618
18797 clock jitters computed out of 18797 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 4.0

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.000 0.002 -0.001
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = 0.003 0.003 0.002
RMS of residuals L2 /m = 0.003
No computed baseline L5, will use L1/L2

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -1.577 4.064 2.619
18797 clock jitters computed out of 18797 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 0.0

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.001 0.000 -0.001
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = 0.001 0.001 0.001
RMS of residuals L2 /m = 0.003
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -1.579 4.064 2.618
Final baseline L2 (X,Y,Z)/m = -1.576 4.065 2.620
Final baseline L5 (X,Y,Z)/m = -1.577 4.065 2.619

COMPUTATION OF CODE DIFFERENCES

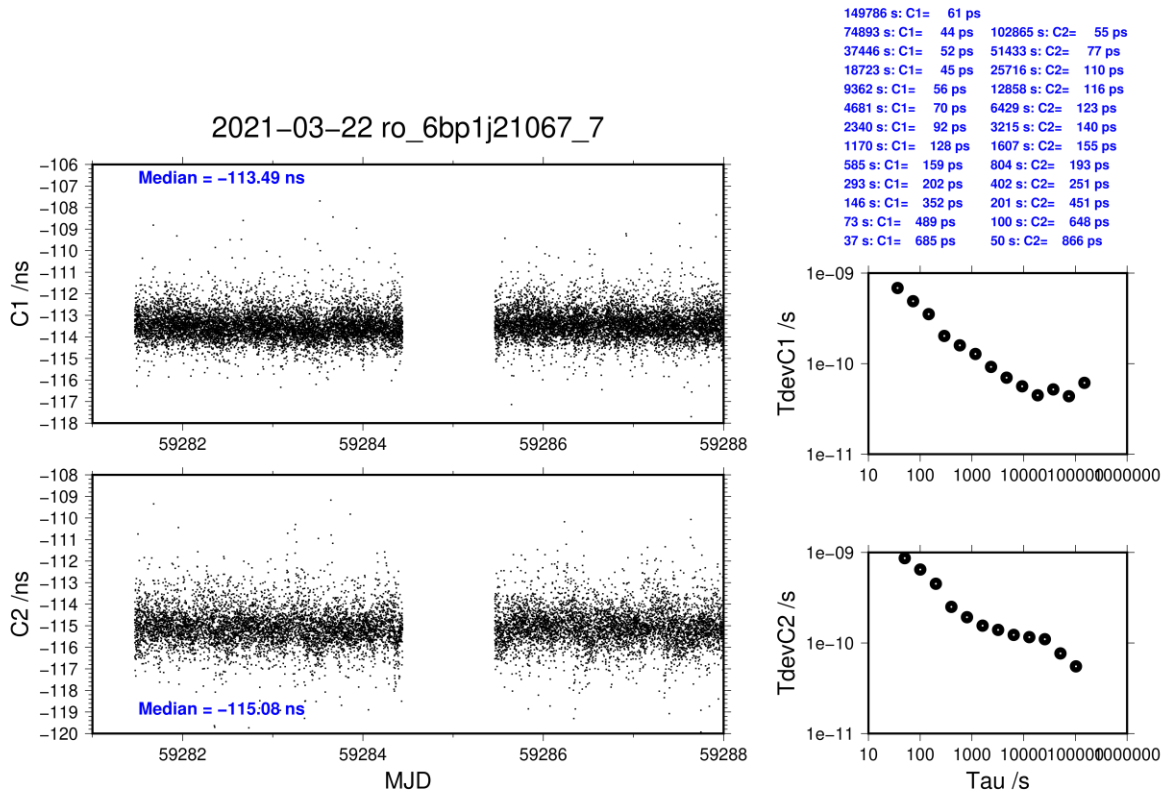
Total number of code differences = 317158

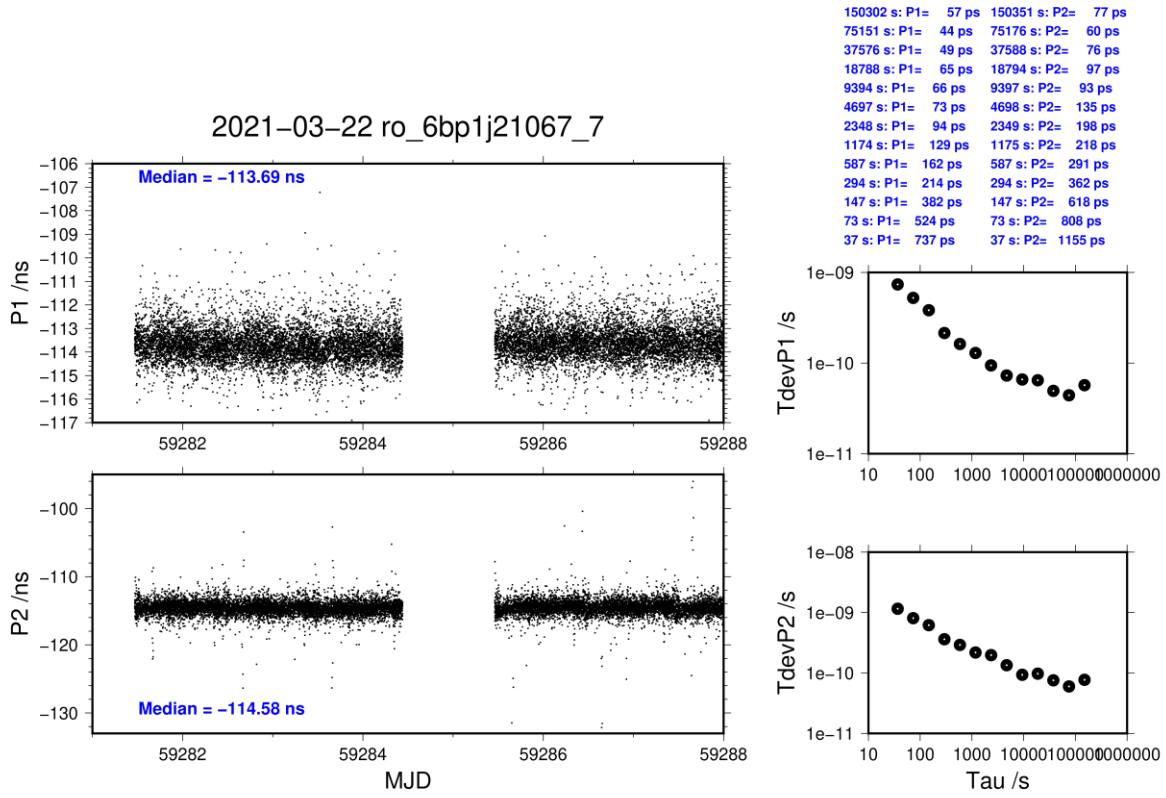
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	154409	-113.451	1.157
C2	112412	-115.051	1.624
P1	153901	-113.651	1.189
P2	153862	-114.574	1.512

Number of 300s epochs in out file = 1881

Code	#pts	median/ns	ave/ns	rms/ns
C1	15424	-113.492	-113.445	0.688
C2	11230	-115.084	-115.047	0.888
P1	15371	-113.692	-113.644	0.737
P2	15366	-114.579	-114.575	1.168




2021−03−22 ro_6bp1j21067_7
Median = −113.69 ns
Median = −114.58 ns
P1 /ns
P2 /ns
MJD
150302 s: P1= 57 ps 150351 s: P2= 77 ps
75151 s: P1= 44 ps 75176 s: P2= 60 ps
37576 s: P1= 49 ps 37588 s: P2= 76 ps
18788 s: P1= 65 ps 18794 s: P2= 97 ps
9394 s: P1= 66 ps 9397 s: P2= 93 ps
4697 s: P1= 73 ps 4698 s: P2= 135 ps
2348 s: P1= 94 ps 2349 s: P2= 198 ps
1174 s: P1= 129 ps 1175 s: P2= 218 ps
587 s: P1= 162 ps 587 s: P2= 291 ps
294 s: P1= 214 ps 294 s: P2= 362 ps
147 s: P1= 382 ps 147 s: P2= 618 ps
73 s: P1= 524 ps 73 s: P2= 808 ps
37 s: P1= 737 ps 37 s: P2= 1155 ps
TdevP1 /s
TdevP2 /s
Tau /s

RO_6-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 168373
Apriori codes biases from 24211 high elev obs : -62.276 -63.877
Iteration 0: Obs used = 291845; Huge residuals = 0; Large residuals = 29
Iteration 1: Obs used = 291845; Huge residuals = 0; Large residuals = 29
Computed code bias (P1/P2)/m = -62.524 -64.164
Computed baseline (X,Y,Z)/m = -2.234 3.310 2.784
RMS of residuals /m = 0.386

Number of phase differences to fit baseline
L1/L2 = 167655
L5 = 0
A priori baseline (X,Y,Z)/m = -2.234 3.310 2.784
18779 clock jitters computed out of 18779 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 3.9

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.262 -0.044 0.158
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.258 -0.042 0.154
RMS of residuals L2 /m = 0.003
No computed baseline L5, will use L1/L2

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -1.974 3.266 2.940
18779 clock jitters computed out of 18779 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 0.4

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.008 -0.003 0.009
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.004 -0.001 0.005
RMS of residuals L2 /m = 0.003
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -1.966 3.264 2.949
Final baseline L2 (X,Y,Z)/m = -1.970 3.266 2.945
Final baseline L5 (X,Y,Z)/m = -1.968 3.265 2.947

COMPUTATION OF CODE DIFFERENCES

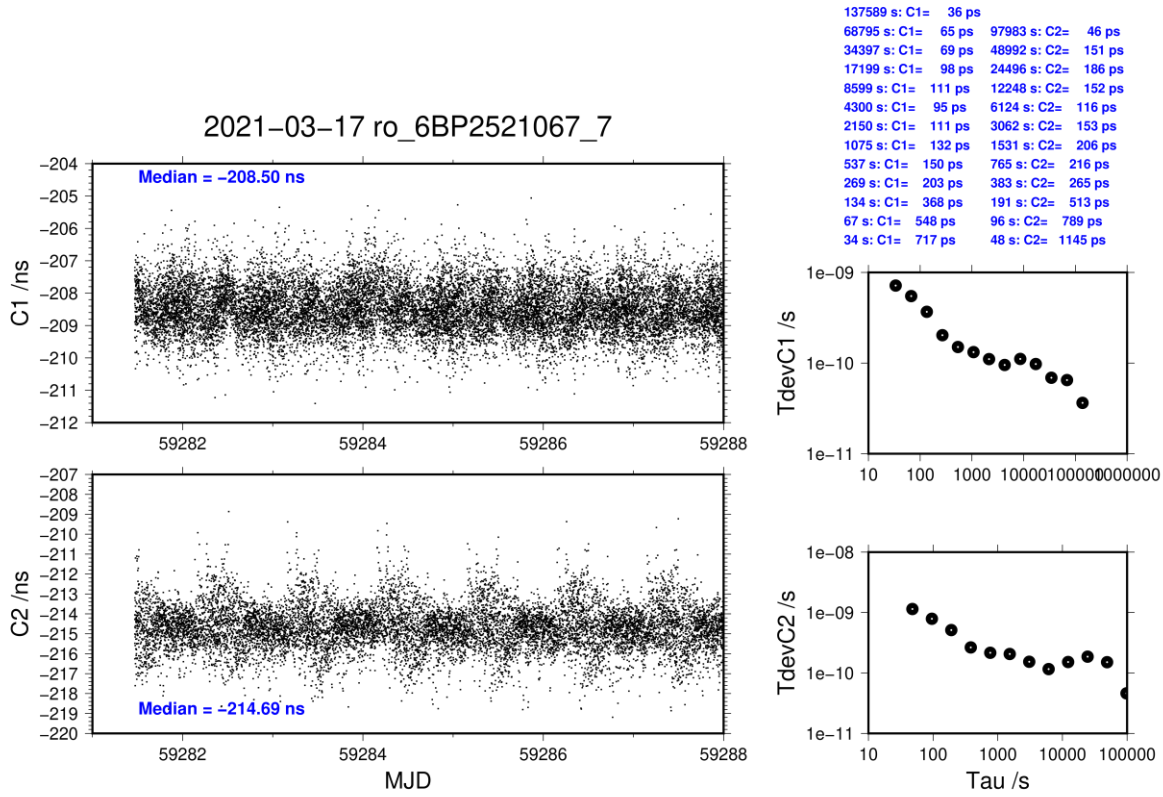
Total number of code differences = 295031

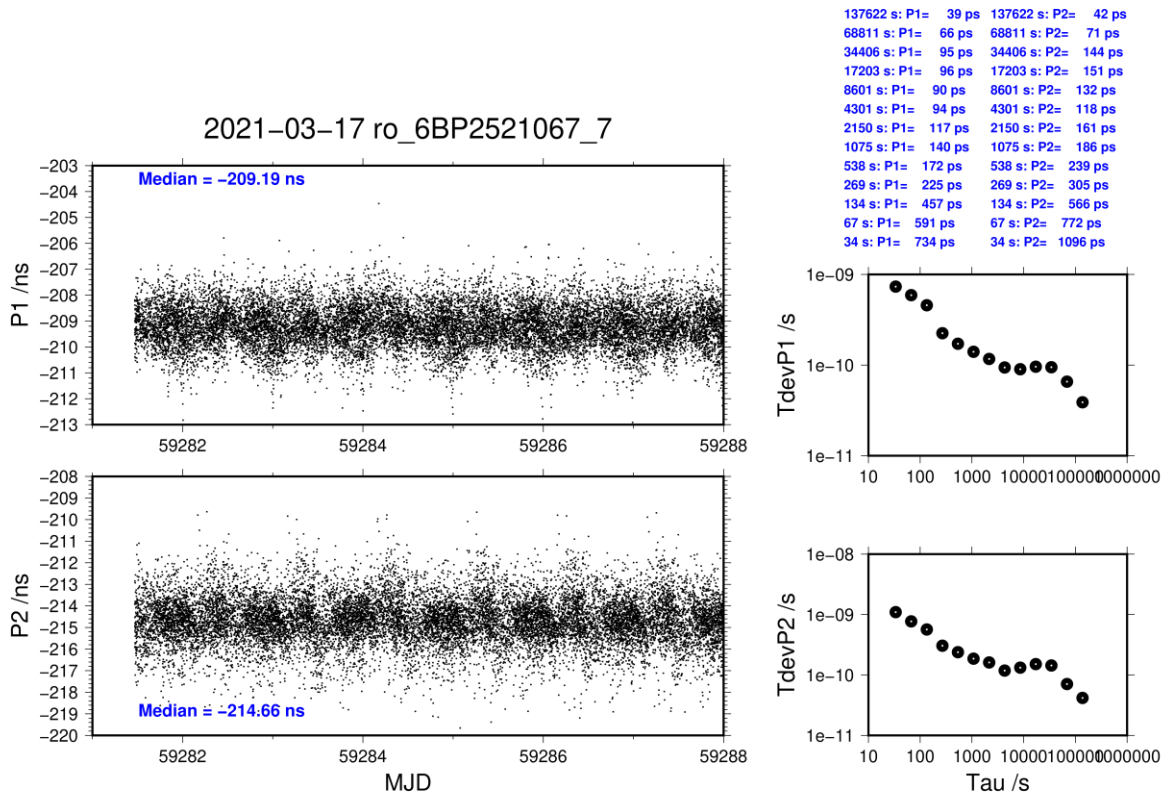
Global average of individual differences

Code	#pts	ave/ns	rms/ns
C1	168306	-208.474	1.015
C2	118174	-214.693	1.455
P1	168292	-209.194	1.068
P2	168292	-214.662	1.362

Number of 300s epochs in out file = 1883

Code	#pts	median/ns	ave/ns	rms/ns
C1	16809	-208.505	-208.468	0.740
C2	11802	-214.690	-214.689	1.109
P1	16805	-209.195	-209.190	0.801
P2	16805	-214.661	-214.657	1.097




2021−03−17 ro_6BP2521067_7
Median = −209.19 ns
Median = −214.66 ns
P1 /ns
P2 /ns
MJD
59282
59284
59286
59288
137622 s: P1= 39 ps 137622 s: P2= 42 ps
68811 s: P1= 66 ps 68811 s: P2= 71 ps
34406 s: P1= 95 ps 34406 s: P2= 144 ps
17203 s: P1= 96 ps 17203 s: P2= 151 ps
8601 s: P1= 90 ps 8601 s: P2= 132 ps
4301 s: P1= 94 ps 4301 s: P2= 118 ps
2150 s: P1= 117 ps 2150 s: P2= 161 ps
1075 s: P1= 140 ps 1075 s: P2= 186 ps
538 s: P1= 172 ps 538 s: P2= 239 ps
269 s: P1= 225 ps 269 s: P2= 305 ps
134 s: P1= 457 ps 134 s: P2= 566 ps
67 s: P1= 591 ps 67 s: P2= 772 ps
34 s: P1= 734 ps 34 s: P2= 1096 ps
TdevP1 /s
TdevP2 /s
Tau /s

ROAP-BP1J

COMPUTATION OF BASELINE

Number of phase differences to fit baseline
L1/L2 = 181765
L5 = 92116
A priori baseline (X,Y,Z)/m = -1.580 4.063 2.632
18797 clock jitters computed out of 18797 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 3.0

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.001 -0.001 -0.014
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = 0.002 0.003 -0.011
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.007 0.001 -0.007
RMS of residuals L5 /m = 0.002

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -1.579 4.064 2.619
18797 clock jitters computed out of 18797 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 0.0

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.001 -0.002 -0.002
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = 0.001 0.002 0.001
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.005 0.000 0.005
RMS of residuals L5 /m = 0.002

Final baseline L1 (X,Y,Z)/m = -1.579 4.063 2.617
Final baseline L2 (X,Y,Z)/m = -1.578 4.066 2.620
Final baseline L5 (X,Y,Z)/m = -1.573 4.064 2.624

COMPUTATION OF CODE DIFFERENCES

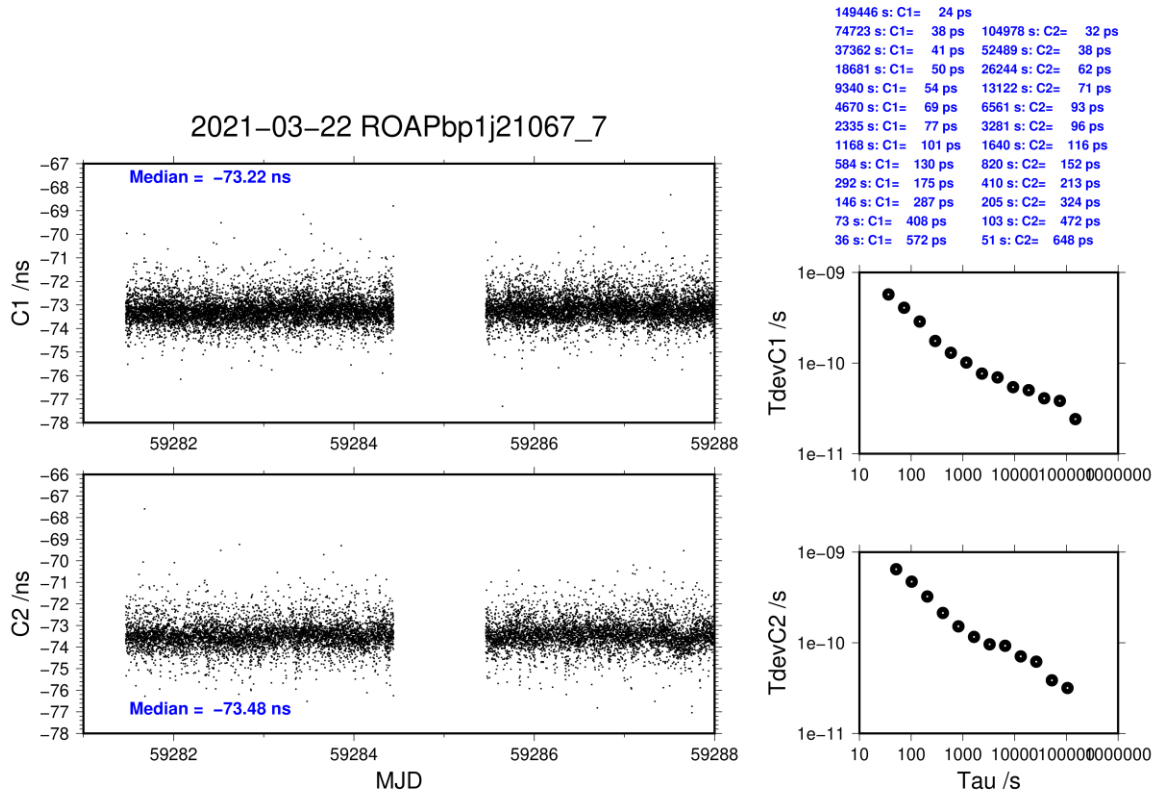
Total number of code differences = 439623

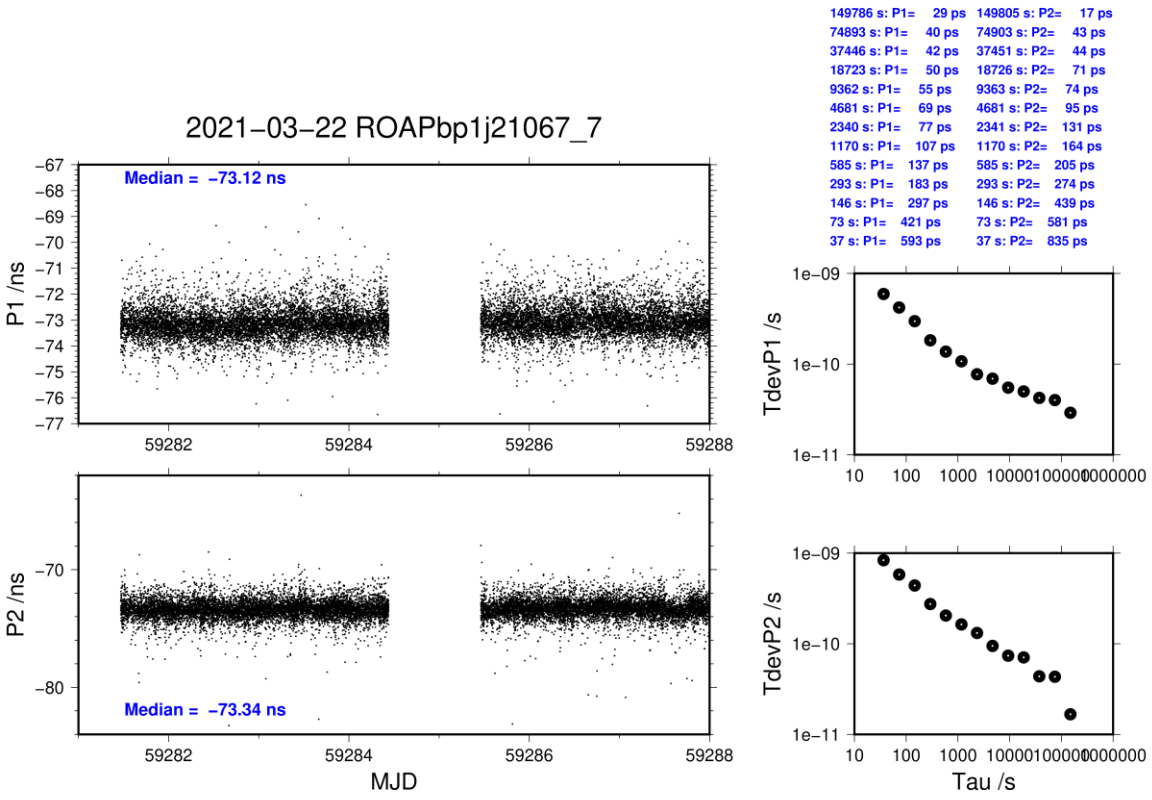
Global average of individual differences

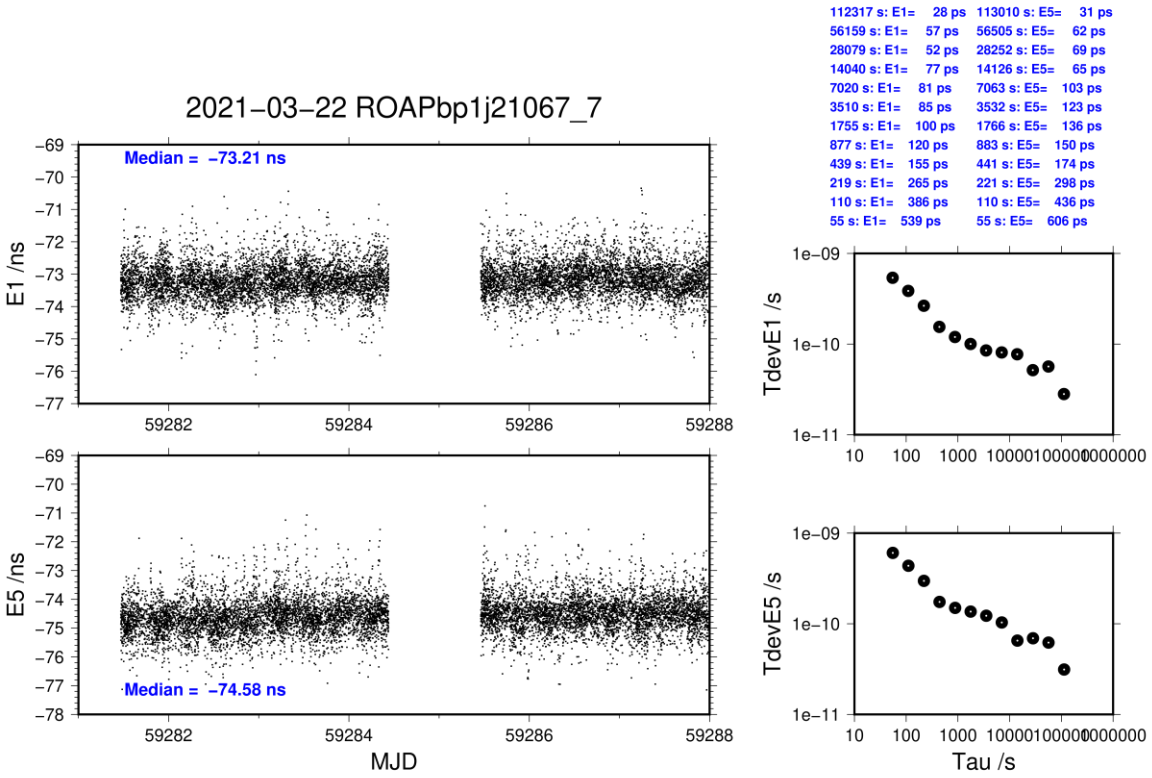
Code	#pts	ave/ns	rms/ns
C1	154735	-73.184	1.039
C2	110120	-73.444	1.375
P1	154381	-73.077	1.053
P2	154364	-73.347	1.150
E1	102988	-73.180	0.823
E5	102370	-74.565	0.785

Number of 300s epochs in out file = 1881

Code	#pts	median/ns	ave/ns	rms/ns
C1	15459	-73.221	-73.185	0.574
C2	11004	-73.476	-73.443	0.658
P1	15424	-73.123	-73.076	0.595
P2	15422	-73.343	-73.347	0.843
E1	10285	-73.209	-73.182	0.544
E5	10222	-74.584	-74.564	0.624




2021−03−22 ROAPbp1j21067_7
Median = −73.12 ns
Median = −73.34 ns
P1 /ns
P2 /ns
MJD
149786 s: P1= 29 ps 149805 s: P2= 17 ps
74893 s: P1= 40 ps 74903 s: P2= 43 ps
37446 s: P1= 42 ps 37451 s: P2= 44 ps
18723 s: P1= 50 ps 18726 s: P2= 71 ps
9362 s: P1= 55 ps 9363 s: P2= 74 ps
4681 s: P1= 69 ps 4681 s: P2= 95 ps
2340 s: P1= 77 ps 2341 s: P2= 131 ps
1170 s: P1= 107 ps 1170 s: P2= 164 ps
585 s: P1= 137 ps 585 s: P2= 205 ps
293 s: P1= 183 ps 293 s: P2= 274 ps
146 s: P1= 297 ps 146 s: P2= 439 ps
73 s: P1= 421 ps 73 s: P2= 581 ps
37 s: P1= 593 ps 37 s: P2= 835 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−03−22 ROAPbp1j21067_7
Median = −73.21 ns
Median = −74.58 ns
E1 /ns
E5 /ns
MJD
112317 s: E1= 28 ps 113010 s: E5= 31 ps
56159 s: E1= 57 ps 56505 s: E5= 62 ps
28079 s: E1= 52 ps 28252 s: E5= 69 ps
14040 s: E1= 77 ps 14126 s: E5= 65 ps
7020 s: E1= 81 ps 7063 s: E5= 103 ps
3510 s: E1= 85 ps 3532 s: E5= 123 ps
1755 s: E1= 100 ps 1766 s: E5= 136 ps
877 s: E1= 120 ps 883 s: E5= 150 ps
439 s: E1= 155 ps 441 s: E5= 174 ps
219 s: E1= 265 ps 221 s: E5= 298 ps
110 s: E1= 386 ps 110 s: E5= 436 ps
55 s: E1= 539 ps 55 s: E5= 606 ps
TdevE1 /s
TdevE5 /s
Tau /s

ROAP-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 162164
Apriori codes biases from 22804 high elev obs : -50.176 -51.590
Iteration 0: Obs used = 282162; Huge residuals = 0; Large residuals = 4
Iteration 1: Obs used = 282162; Huge residuals = 0; Large residuals = 4
Computed code bias (P1/P2)/m = -50.400 -51.841
Computed baseline (X,Y,Z)/m = -2.177 3.291 2.814
RMS of residuals /m = 0.323

Number of phase differences to fit baseline
L1/L2 = 161507
L5 = 82904
A priori baseline (X,Y,Z)/m = -2.177 3.291 2.814
18779 clock jitters computed out of 18779 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 3.8

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.206 -0.029 0.130
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.201 -0.025 0.127
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.205 -0.022 0.128
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -1.973 3.264 2.942
18779 clock jitters computed out of 18779 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 0.3

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.008 -0.002 0.006
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.003 0.001 0.003
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.008 0.001 0.006
RMS of residuals L5 /m = 0.002

Final baseline L1 (X,Y,Z)/m = -1.966 3.262 2.949
Final baseline L2 (X,Y,Z)/m = -1.970 3.265 2.945
Final baseline L5 (X,Y,Z)/m = -1.966 3.265 2.948

COMPUTATION OF CODE DIFFERENCES

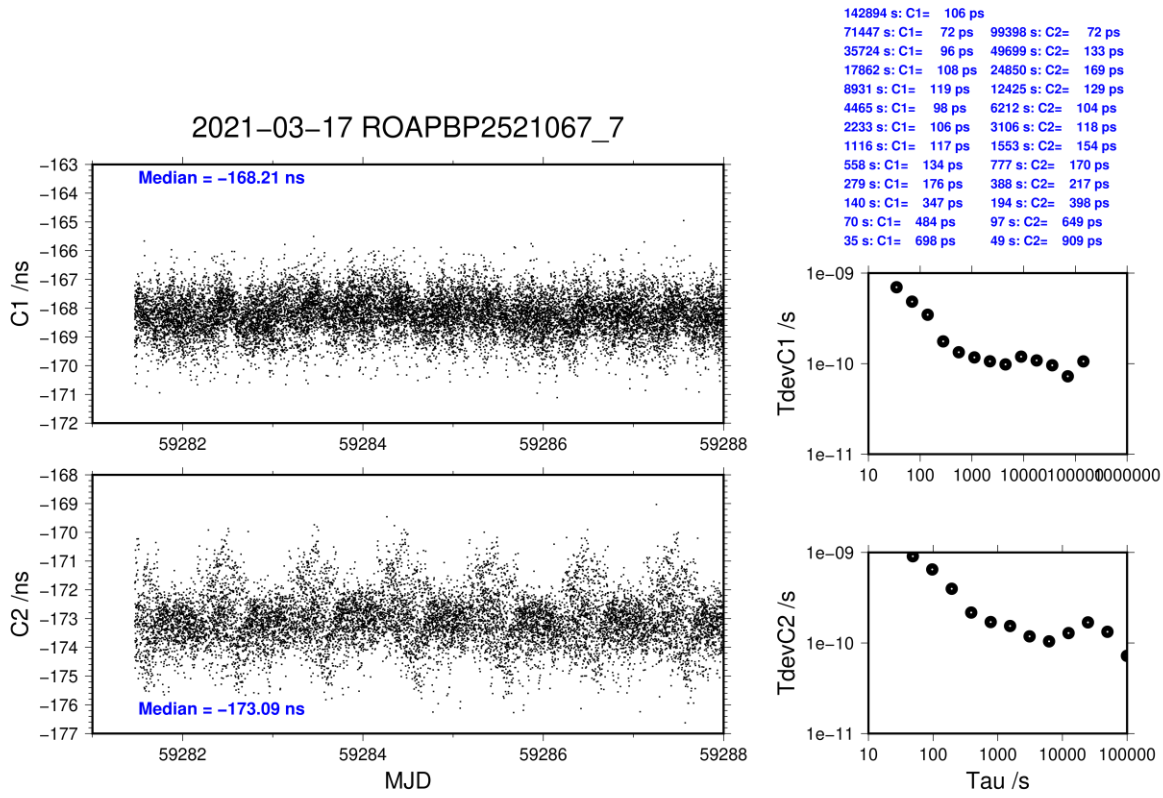
Total number of code differences = 499694

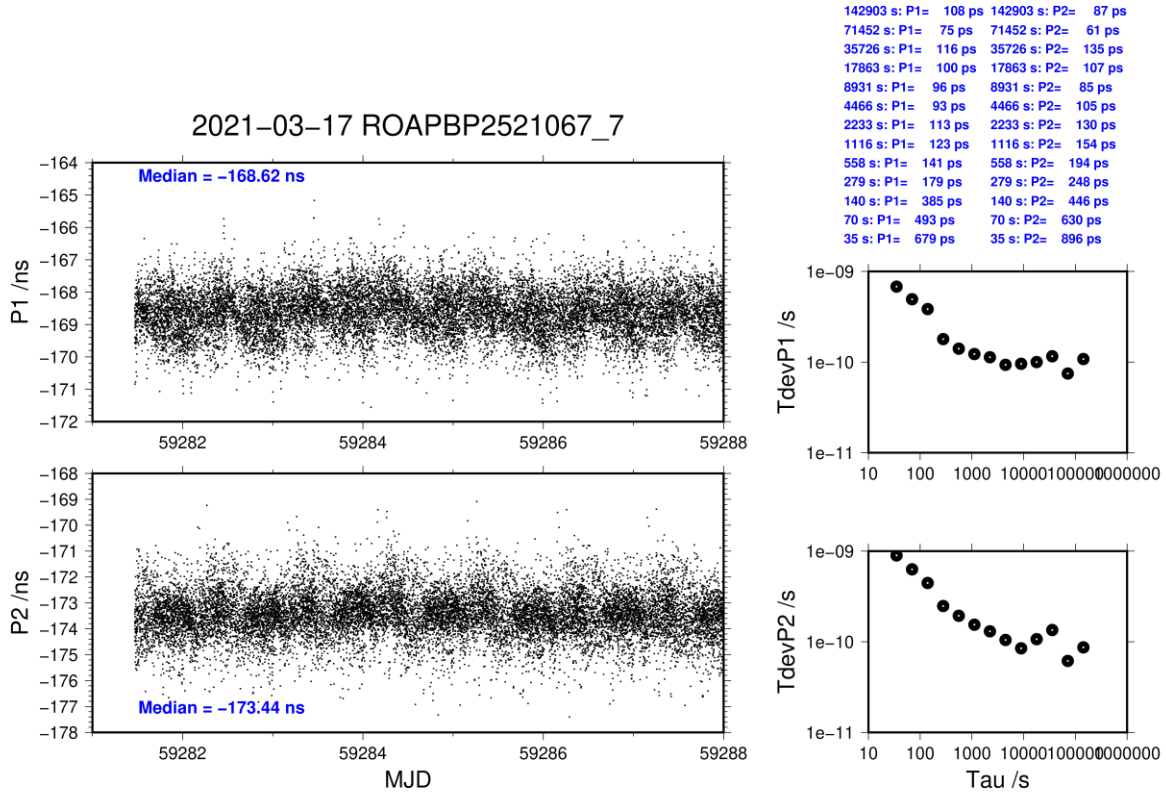
Global average of individual differences

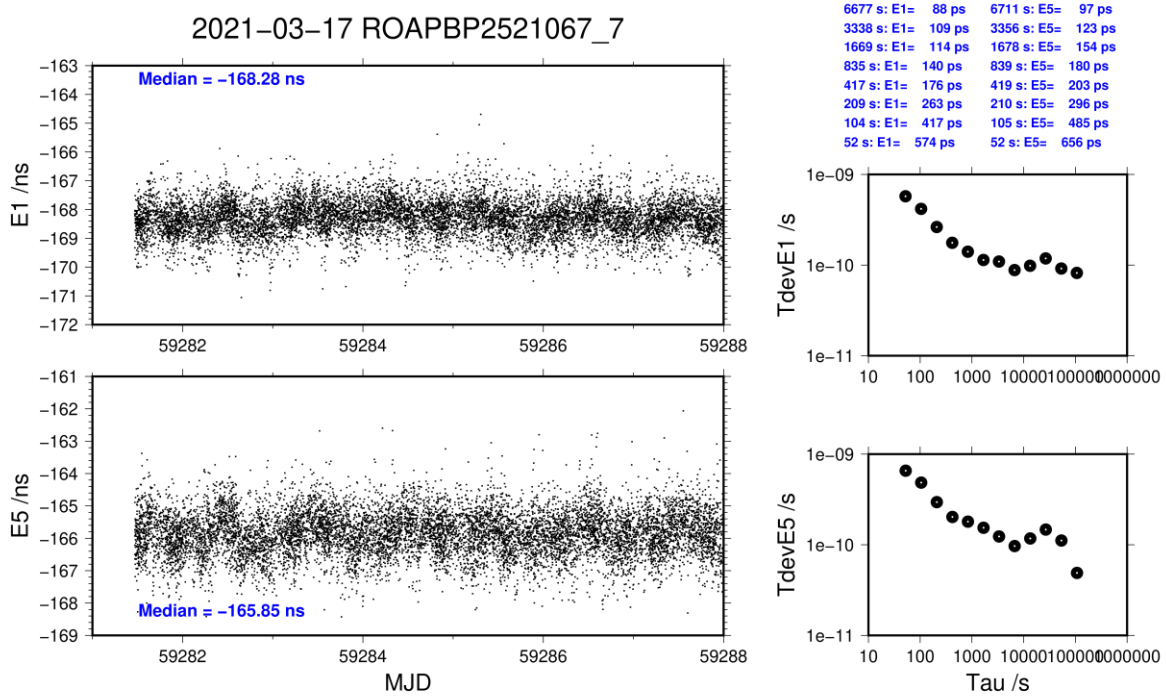
Code	#pts	ave/ns	rms/ns
C1	162085	-168.220	0.933
C2	116491	-173.063	1.180
P1	162083	-168.622	0.945
P2	162083	-173.420	1.097
E1	108376	-168.285	0.780
E5	107793	-165.852	0.789

Number of 300s epochs in out file = 1883

Code	#pts	median/ns	ave/ns	rms/ns
C1	16185	-168.213	-168.222	0.697
C2	11634	-173.090	-173.063	0.895
P1	16184	-168.618	-168.626	0.706
P2	16184	-173.436	-173.419	0.894
E1	10825	-168.285	-168.288	0.595
E5	10769	-165.848	-165.852	0.685




2021−03−17 ROAPBP2521067_7
Median = −168.62 ns
Median = −173.44 ns
P1 /ns
P2 /ns
MJD
142903 s: P1= 108 ps 142903 s: P2= 87 ps
71452 s: P1= 75 ps 71452 s: P2= 61 ps
35726 s: P1= 116 ps 35726 s: P2= 135 ps
17863 s: P1= 100 ps 17863 s: P2= 107 ps
8931 s: P1= 96 ps 8931 s: P2= 85 ps
4466 s: P1= 93 ps 4466 s: P2= 105 ps
2233 s: P1= 113 ps 2233 s: P2= 130 ps
1116 s: P1= 123 ps 1116 s: P2= 154 ps
558 s: P1= 141 ps 558 s: P2= 194 ps
279 s: P1= 179 ps 279 s: P2= 248 ps
140 s: P1= 385 ps 140 s: P2= 446 ps
70 s: P1= 493 ps 70 s: P2= 630 ps
35 s: P1= 679 ps 35 s: P2= 896 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−03−17 ROAPBP2521067_7
Median = −168.28 ns
Median = −165.85 ns
E1 /ns
E5 /ns
MJD
106827 s: E1= 82 ps 107383 s: E5= 49 ps
53414 s: E1= 92 ps 53692 s: E5= 111 ps
26707 s: E1= 118 ps 26846 s: E5= 147 ps
13353 s: E1= 98 ps 13423 s: E5= 117 ps
6677 s: E1= 88 ps 6711 s: E5= 97 ps
3338 s: E1= 109 ps 3356 s: E5= 123 ps
1669 s: E1= 114 ps 1678 s: E5= 154 ps
835 s: E1= 140 ps 839 s: E5= 180 ps
417 s: E1= 176 ps 419 s: E5= 203 ps
209 s: E1= 263 ps 210 s: E5= 296 ps
104 s: E1= 417 ps 105 s: E5= 485 ps
52 s: E1= 574 ps 52 s: E5= 656 ps
TdevE1 /s
TdevE5 /s
Tau /s

RO_8-BP1J

COMPUTATION OF BASELINE

Number of phase differences to fit baseline
L1/L2 = 157978
L5 = 82570
A priori baseline (X,Y,Z)/m = 3.377 7.796 -3.475
18797 clock jitters computed out of 18797 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 3.3

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 1
Computed baseline L1 (X,Y,Z)/m = 0.000 0.003 -0.001
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.004 0.005 -0.007
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = -0.008 0.009 -0.019
RMS of residuals L5 /m = 0.003

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 1
Computed baseline L1 (X,Y,Z)/m = 0.000 0.003 -0.001
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.004 0.005 -0.007
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = -0.008 0.009 -0.019
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 3.379 7.800 -3.479
18797 clock jitters computed out of 18797 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 0.0

Iter 3 Large residuals L1= 0
Iter 3 Large residuals L2= 0
Iter 3 Large residuals L5= 1
Computed baseline L1 (X,Y,Z)/m = -0.002 0.001 0.003
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.002 0.002 -0.004
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = -0.010 0.007 -0.015
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m = 3.377 7.801 -3.476

Final baseline L2 (X,Y,Z)/m = 3.382 7.803 -3.483
Final baseline L5 (X,Y,Z)/m = 3.369 7.807 -3.494

COMPUTATION OF CODE DIFFERENCES

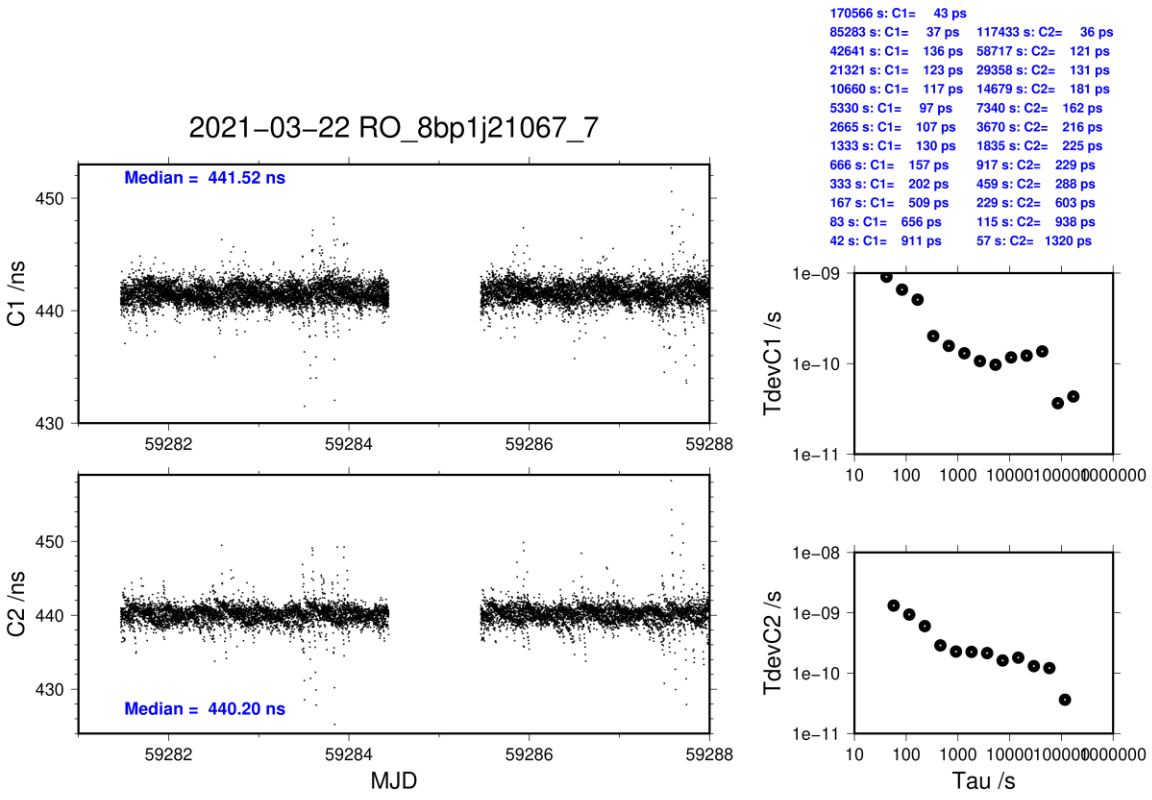
Total number of code differences = 385445

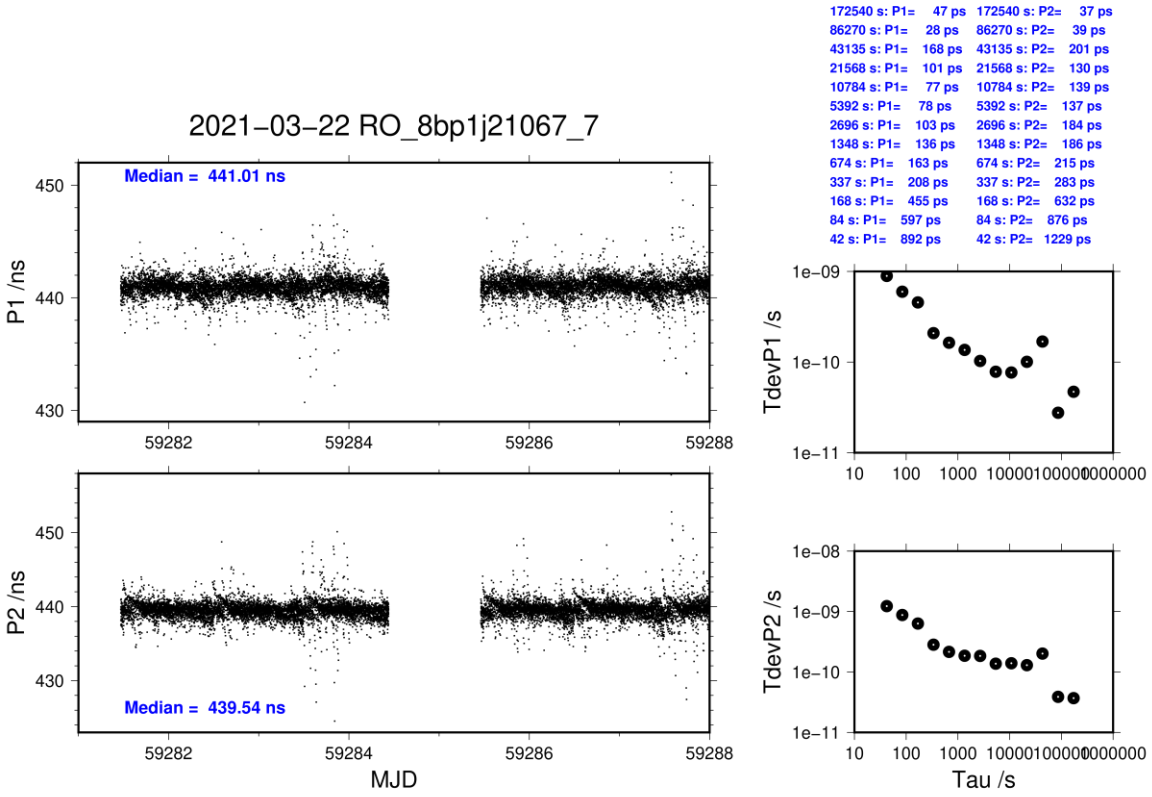
Global average of individual differences

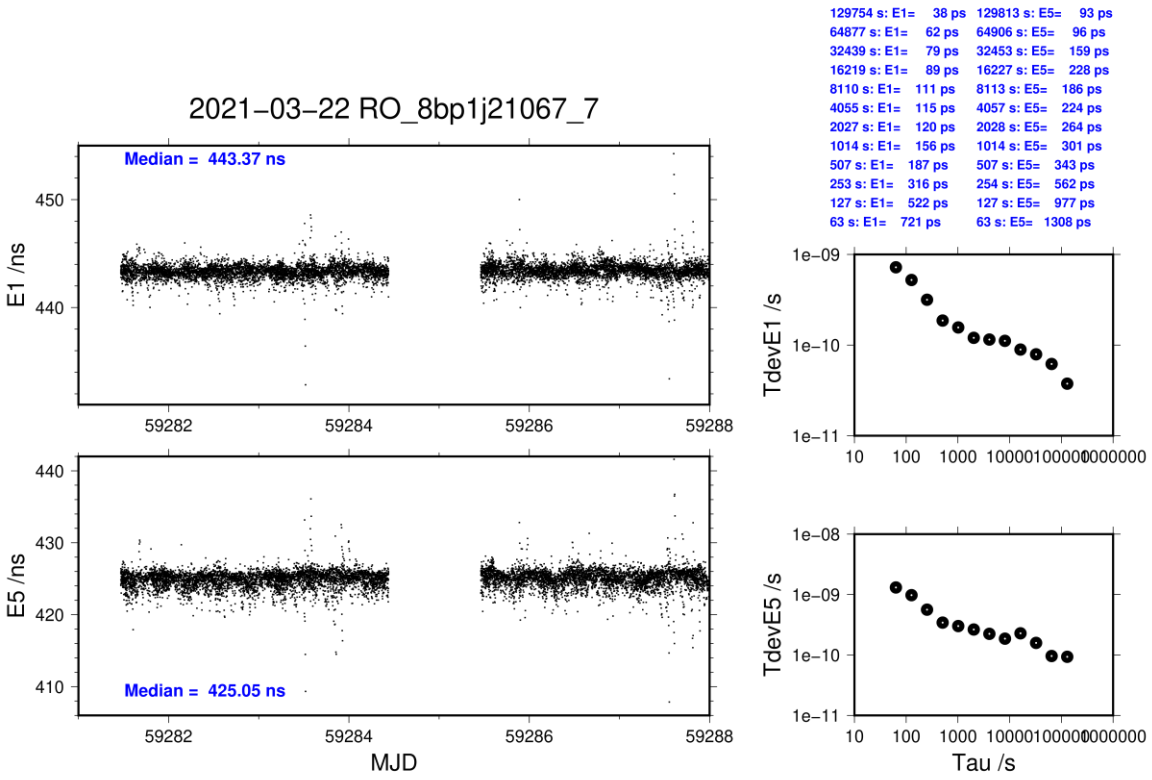
Code	#pts	ave/ns	rms/ns
C1	135665	441.554	1.061
C2	98498	440.126	1.508
P1	134188	440.988	1.055
P2	134178	439.509	1.346
E1	89161	443.360	0.815
E5	89121	424.890	1.402

Number of 300s epochs in out file = 1881

Code	#pts	median/ns	ave/ns	rms/ns
C1	13545	441.522	441.553	0.913
C2	9837	440.204	440.125	1.286
P1	13390	441.007	440.988	0.864
P2	13390	439.543	439.509	1.214
E1	8903	443.367	443.363	0.713
E5	8899	425.048	424.894	1.321




2021−03−22 RO_8bp1j21067_7
Median = 441.01 ns
Median = 439.54 ns
P1 /ns
P2 /ns
MJD
172540 s: P1= 47 ps 172540 s: P2= 37 ps
86270 s: P1= 28 ps 86270 s: P2= 39 ps
43135 s: P1= 168 ps 43135 s: P2= 201 ps
21568 s: P1= 101 ps 21568 s: P2= 130 ps
10784 s: P1= 77 ps 10784 s: P2= 139 ps
5392 s: P1= 78 ps 5392 s: P2= 137 ps
2696 s: P1= 103 ps 2696 s: P2= 184 ps
1348 s: P1= 136 ps 1348 s: P2= 186 ps
674 s: P1= 163 ps 674 s: P2= 215 ps
337 s: P1= 208 ps 337 s: P2= 283 ps
168 s: P1= 455 ps 168 s: P2= 632 ps
84 s: P1= 597 ps 84 s: P2= 876 ps
42 s: P1= 892 ps 42 s: P2= 1229 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−03−22 RO_8bp1j21067_7
Median = 443.37 ns
Median = 425.05 ns
E1 /ns
E5 /ns
MJD
129754 s: E1= 38 ps 129813 s: E5= 93 ps
64877 s: E1= 62 ps 64906 s: E5= 96 ps
32439 s: E1= 79 ps 32453 s: E5= 159 ps
16219 s: E1= 89 ps 16227 s: E5= 228 ps
8110 s: E1= 111 ps 8113 s: E5= 186 ps
4055 s: E1= 115 ps 4057 s: E5= 224 ps
2027 s: E1= 120 ps 2028 s: E5= 264 ps
1014 s: E1= 156 ps 1014 s: E5= 301 ps
507 s: E1= 187 ps 507 s: E5= 343 ps
253 s: E1= 316 ps 254 s: E5= 562 ps
127 s: E1= 522 ps 127 s: E5= 977 ps
63 s: E1= 721 ps 63 s: E5= 1308 ps
TdevE1 /s
TdevE5 /s
Tau /s

RO_8-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 164658
Apriori codes biases from 24211 high elev obs : 103.114 101.253
Iteration 0: Obs used = 283723; Huge residuals = 2; Large residuals = 721
Iteration 1: Obs used = 283726; Huge residuals = 0; Large residuals = 716
Computed code bias (P1/P2)/m = 103.298 101.477
Computed baseline (X,Y,Z)/m = 3.315 6.932 -2.874
RMS of residuals /m = 0.351

Number of phase differences to fit baseline
L1/L2 = 163733
L5 = 82651
A priori baseline (X,Y,Z)/m = 3.315 6.932 -2.874
18779 clock jitters computed out of 18779 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 4.1

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 1
Computed baseline L1 (X,Y,Z)/m = -0.315 0.058 -0.260
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = -0.325 0.060 -0.275
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = -0.339 0.056 -0.287
RMS of residuals L5 /m = 0.003

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 1
Computed baseline L1 (X,Y,Z)/m = -0.315 0.058 -0.260
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = -0.325 0.060 -0.275
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = -0.339 0.056 -0.287
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 2.995 6.991 -3.141
18779 clock jitters computed out of 18779 intervals
AVE jitter /ps = -0.1 RMS jitter /ps = 0.6

Iter 3 Large residuals L1= 0
Iter 3 Large residuals L2= 0
Iter 3 Large residuals L5= 1
Computed baseline L1 (X,Y,Z)/m = -0.002 0.007 -0.004
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = -0.012 0.009 -0.019
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = -0.025 0.015 -0.032
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m =	2.993	6.998	-3.145
Final baseline L2 (X,Y,Z)/m =	2.983	6.999	-3.160
Final baseline L5 (X,Y,Z)/m =	2.970	7.005	-3.173

COMPUTATION OF CODE DIFFERENCES

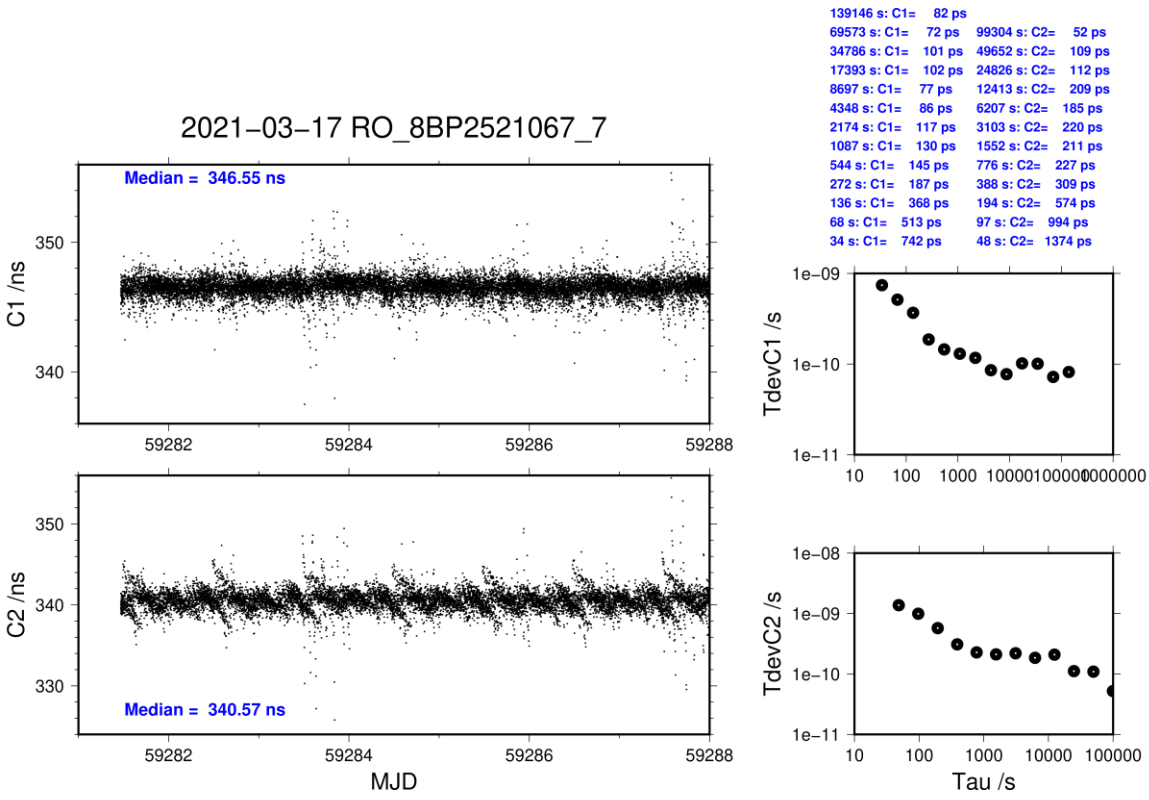
Total number of code differences = 401922

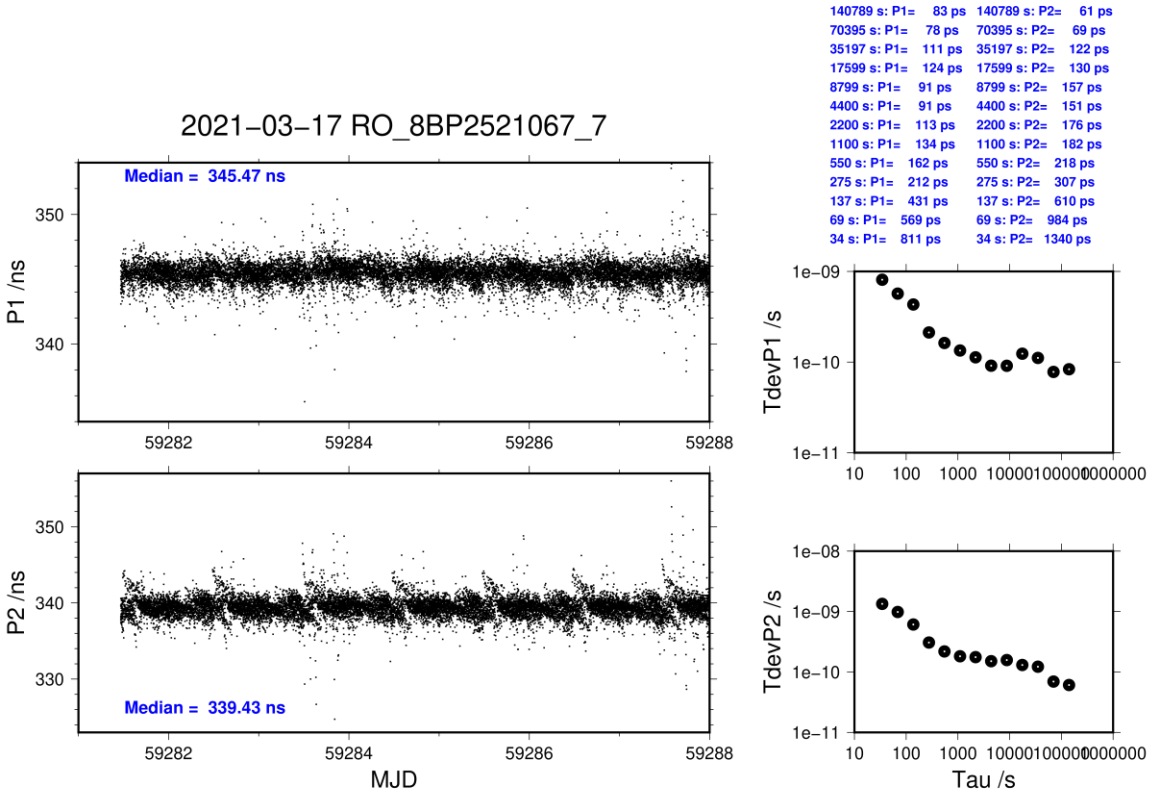
Global average of individual differences

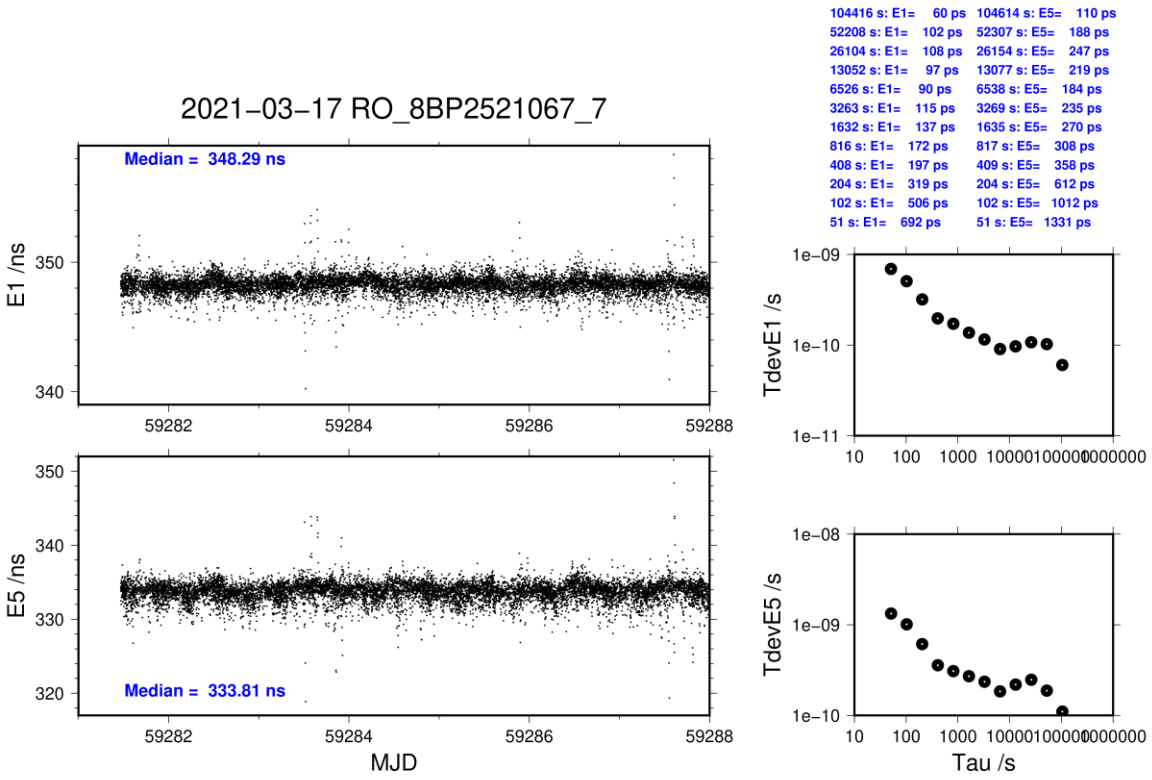
Code	#pts	ave/ns	rms/ns
C1	166419	346.526	0.840
C2	116595	340.539	1.402
P1	164574	345.439	0.955
P2	164567	339.405	1.415
E1	110927	348.253	0.791
E5	110697	333.656	1.440

Number of 300s epochs in out file = 1883

Code	#pts	median/ns	ave/ns	rms/ns
C1	16621	346.546	346.523	0.733
C2	11645	340.569	340.539	1.330
P1	16427	345.466	345.436	0.814
P2	16427	339.426	339.405	1.304
E1	11075	348.288	348.251	0.702
E5	11054	333.806	333.659	1.370




2021−03−17 RO_8BP2521067_7
Median = 345.47 ns
Median = 339.43 ns
P1 /ns
P2 /ns
MJD
140789 s: P1= 83 ps 140789 s: P2= 61 ps
70395 s: P1= 78 ps 70395 s: P2= 69 ps
35197 s: P1= 111 ps 35197 s: P2= 122 ps
17599 s: P1= 124 ps 17599 s: P2= 130 ps
8799 s: P1= 91 ps 8799 s: P2= 157 ps
4400 s: P1= 91 ps 4400 s: P2= 151 ps
2200 s: P1= 113 ps 2200 s: P2= 176 ps
1100 s: P1= 134 ps 1100 s: P2= 182 ps
550 s: P1= 162 ps 550 s: P2= 218 ps
275 s: P1= 212 ps 275 s: P2= 307 ps
137 s: P1= 431 ps 137 s: P2= 610 ps
69 s: P1= 569 ps 69 s: P2= 984 ps
34 s: P1= 811 ps 34 s: P2= 1340 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−03−17 RO_8BP2521067_7
Median = 348.29 ns
Median = 333.81 ns
E1 /ns
E5 /ns
MJD
104416 s: E1= 60 ps 104614 s: E5= 110 ps
52208 s: E1= 102 ps 52307 s: E5= 188 ps
26104 s: E1= 108 ps 26154 s: E5= 247 ps
13052 s: E1= 97 ps 13077 s: E5= 219 ps
6526 s: E1= 90 ps 6538 s: E5= 184 ps
3263 s: E1= 115 ps 3269 s: E5= 235 ps
1632 s: E1= 137 ps 1635 s: E5= 270 ps
816 s: E1= 172 ps 817 s: E5= 308 ps
408 s: E1= 197 ps 409 s: E5= 358 ps
204 s: E1= 319 ps 204 s: E5= 612 ps
102 s: E1= 506 ps 102 s: E5= 1012 ps
51 s: E1= 692 ps 51 s: E5= 1331 ps
TdevE1 /s
TdevE5 /s
Tau /s

RO_9-BP1J

COMPUTATION OF BASELINE

Number of phase differences to fit baseline
L1/L2 = 182055
L5 = 92266
A priori baseline (X,Y,Z)/m = -2.547 1.965 3.607
18797 clock jitters computed out of 18797 intervals
AVE jitter /ps = -0.4 RMS jitter /ps = 3.0

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.005 -0.105 -0.012
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = -0.001 -0.102 -0.010
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = -0.003 -0.104 -0.006
RMS of residuals L5 /m = 0.002

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -2.550 1.861 3.596
18797 clock jitters computed out of 18797 intervals
AVE jitter /ps = 0.3 RMS jitter /ps = 0.1

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.004 -0.034 -0.002
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = -0.001 -0.030 0.001
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.002 -0.033 0.004
RMS of residuals L5 /m = 0.002

Final baseline L1 (X,Y,Z)/m = -2.555 1.827 3.594
Final baseline L2 (X,Y,Z)/m = -2.551 1.831 3.596
Final baseline L5 (X,Y,Z)/m = -2.548 1.829 3.600

COMPUTATION OF CODE DIFFERENCES

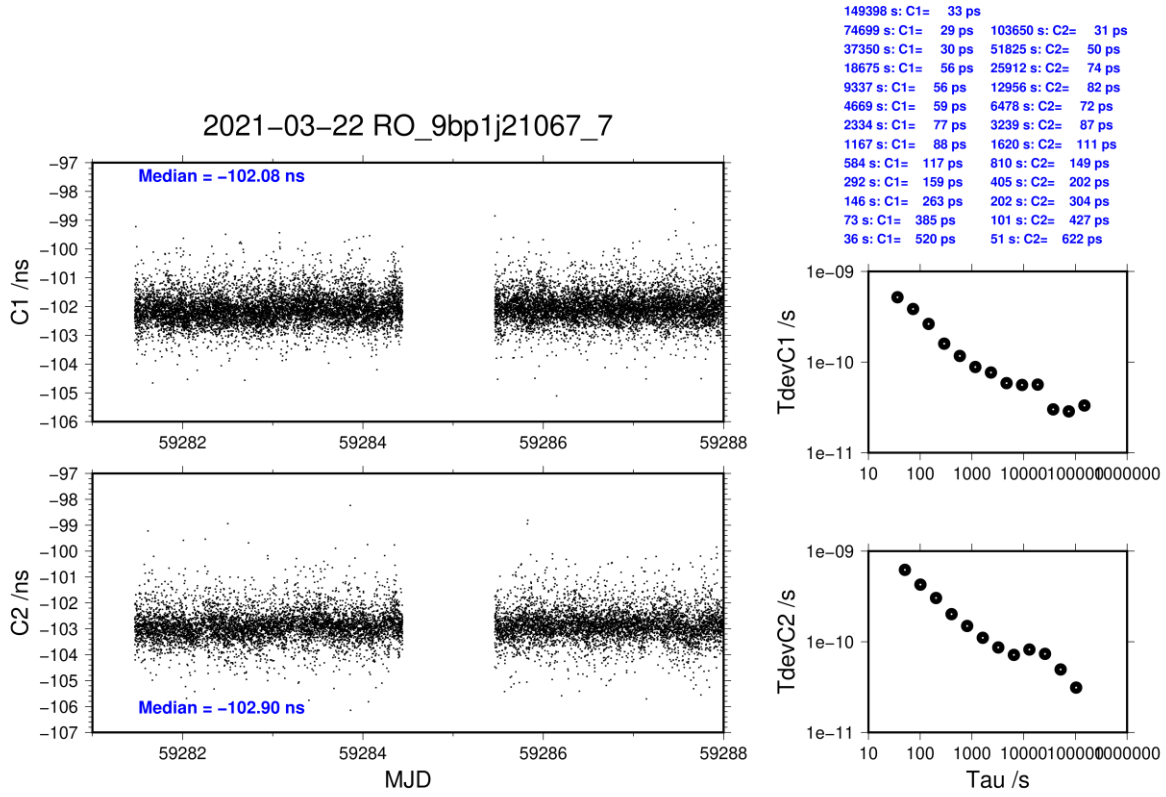
Total number of code differences = 439893

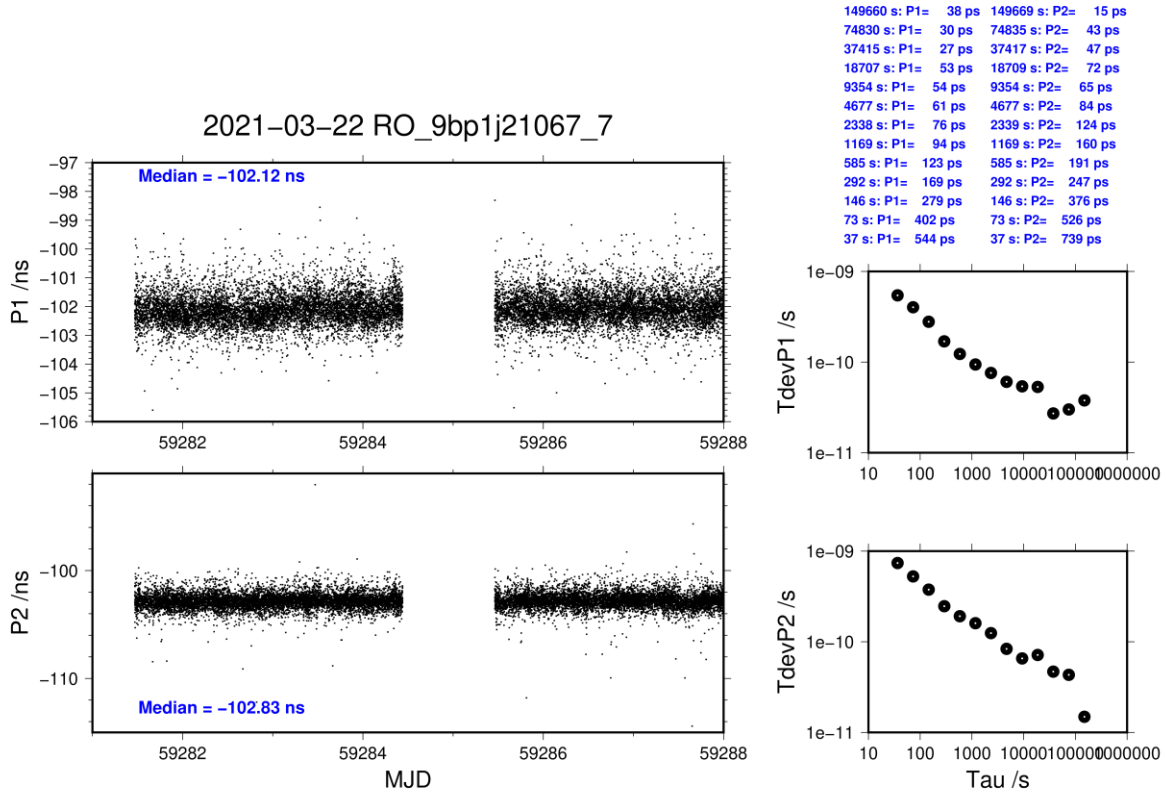
Global average of individual differences

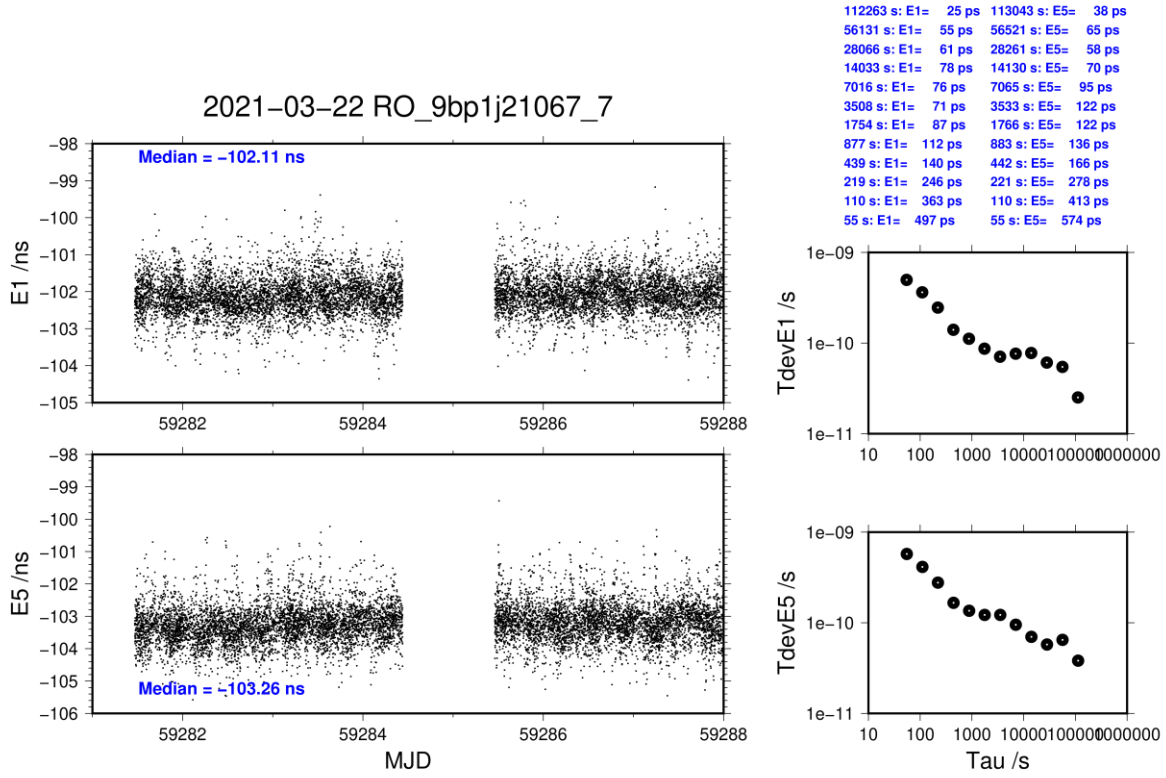
Code	#pts	ave/ns	rms/ns
C1	154820	-102.050	0.971
C2	111607	-102.868	1.350
P1	154561	-102.080	0.993
P2	154545	-102.817	1.058
E1	103021	-102.086	0.775
E5	102329	-103.240	0.752

Number of 300s epochs in out file = 1881

Code	#pts	median/ns	ave/ns	rms/ns
C1	15464	-102.085	-102.051	0.528
C2	11145	-102.902	-102.873	0.619
P1	15437	-102.117	-102.081	0.553
P2	15436	-102.833	-102.817	0.754
E1	10290	-102.110	-102.088	0.505
E5	10219	-103.257	-103.240	0.589




2021−03−22 RO_9bp1j21067_7
Median = −102.12 ns
Median = −102.83 ns
P1 /ns
P2 /ns
MJD
149660 s: P1= 38 ps 149669 s: P2= 15 ps
74830 s: P1= 30 ps 74835 s: P2= 43 ps
37415 s: P1= 27 ps 37417 s: P2= 47 ps
18707 s: P1= 53 ps 18709 s: P2= 72 ps
9354 s: P1= 54 ps 9354 s: P2= 65 ps
4677 s: P1= 61 ps 4677 s: P2= 84 ps
2338 s: P1= 76 ps 2339 s: P2= 124 ps
1169 s: P1= 94 ps 1169 s: P2= 160 ps
585 s: P1= 123 ps 585 s: P2= 191 ps
292 s: P1= 169 ps 292 s: P2= 247 ps
146 s: P1= 279 ps 146 s: P2= 376 ps
73 s: P1= 402 ps 73 s: P2= 526 ps
37 s: P1= 544 ps 37 s: P2= 739 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−03−22 RO_9bp1j21067_7
Median = −102.11 ns
Median = −103.26 ns
E1 /ns
E5 /ns
MJD
112263 s: E1= 25 ps 113043 s: E5= 38 ps
56131 s: E1= 55 ps 56521 s: E5= 65 ps
28066 s: E1= 61 ps 28261 s: E5= 58 ps
14033 s: E1= 78 ps 14130 s: E5= 70 ps
7016 s: E1= 76 ps 7065 s: E5= 95 ps
3508 s: E1= 71 ps 3533 s: E5= 122 ps
1754 s: E1= 87 ps 1766 s: E5= 122 ps
877 s: E1= 112 ps 883 s: E5= 136 ps
439 s: E1= 140 ps 442 s: E5= 166 ps
219 s: E1= 246 ps 221 s: E5= 278 ps
110 s: E1= 363 ps 110 s: E5= 413 ps
55 s: E1= 497 ps 55 s: E5= 574 ps
TdevE1 /s
TdevE5 /s
Tau /s

RO_9-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 162164
Apriori codes biases from 22804 high elev obs : -58.701 -60.317
Iteration 0: Obs used = 282162; Huge residuals = 0; Large residuals = 4
Iteration 1: Obs used = 282162; Huge residuals = 0; Large residuals = 4
Computed code bias (P1/P2)/m = -59.036 -60.621
Computed baseline (X,Y,Z)/m = -3.222 1.040 3.730
RMS of residuals /m = 0.311

Number of phase differences to fit baseline
L1/L2 = 161514
L5 = 82835
A priori baseline (X,Y,Z)/m = -3.222 1.040 3.730
18779 clock jitters computed out of 18779 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 3.8

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.274 -0.031 0.189
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.265 -0.028 0.182
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.270 -0.023 0.182
RMS of residuals L5 /m = 0.002

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -2.953 1.010 3.915
18779 clock jitters computed out of 18779 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 0.4

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.011 0.000 0.010
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.003 0.003 0.004
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.008 0.003 0.005
RMS of residuals L5 /m = 0.002

Final baseline L1 (X,Y,Z)/m = -2.942 1.010 3.925
Final baseline L2 (X,Y,Z)/m = -2.950 1.013 3.919
Final baseline L5 (X,Y,Z)/m = -2.945 1.013 3.921

COMPUTATION OF CODE DIFFERENCES

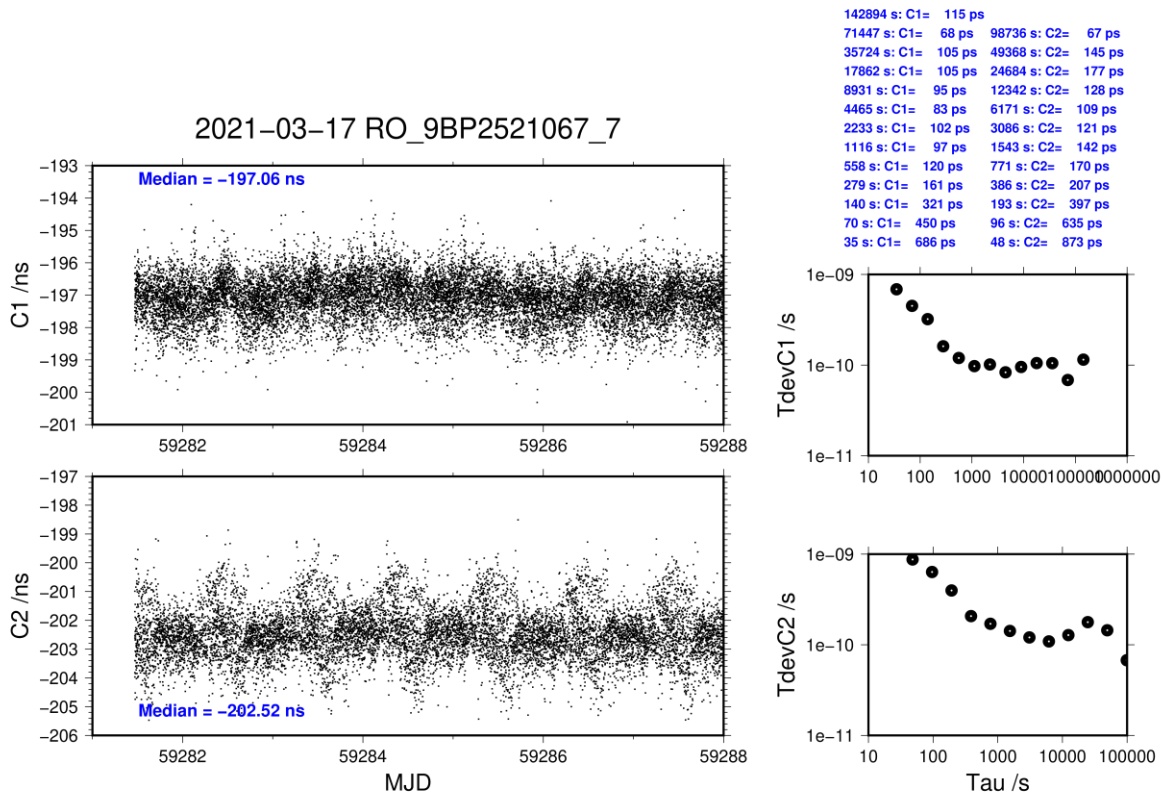
Total number of code differences = 498341

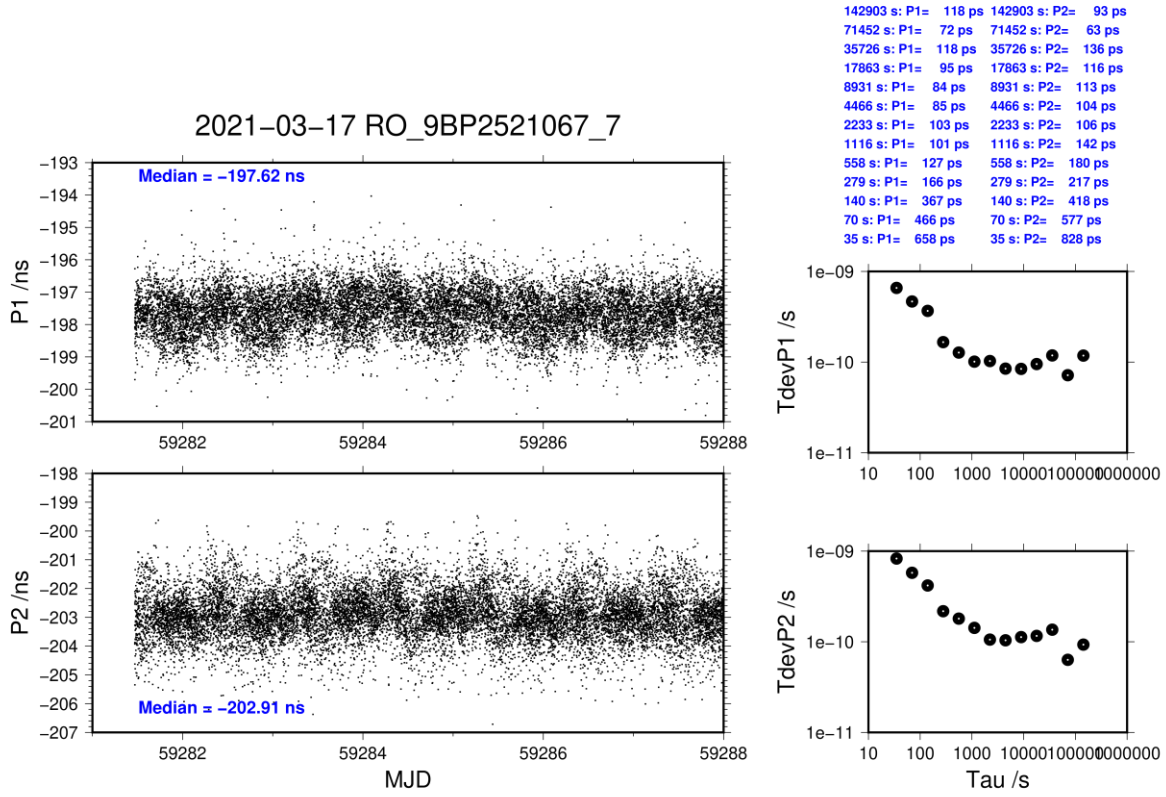
Global average of individual differences

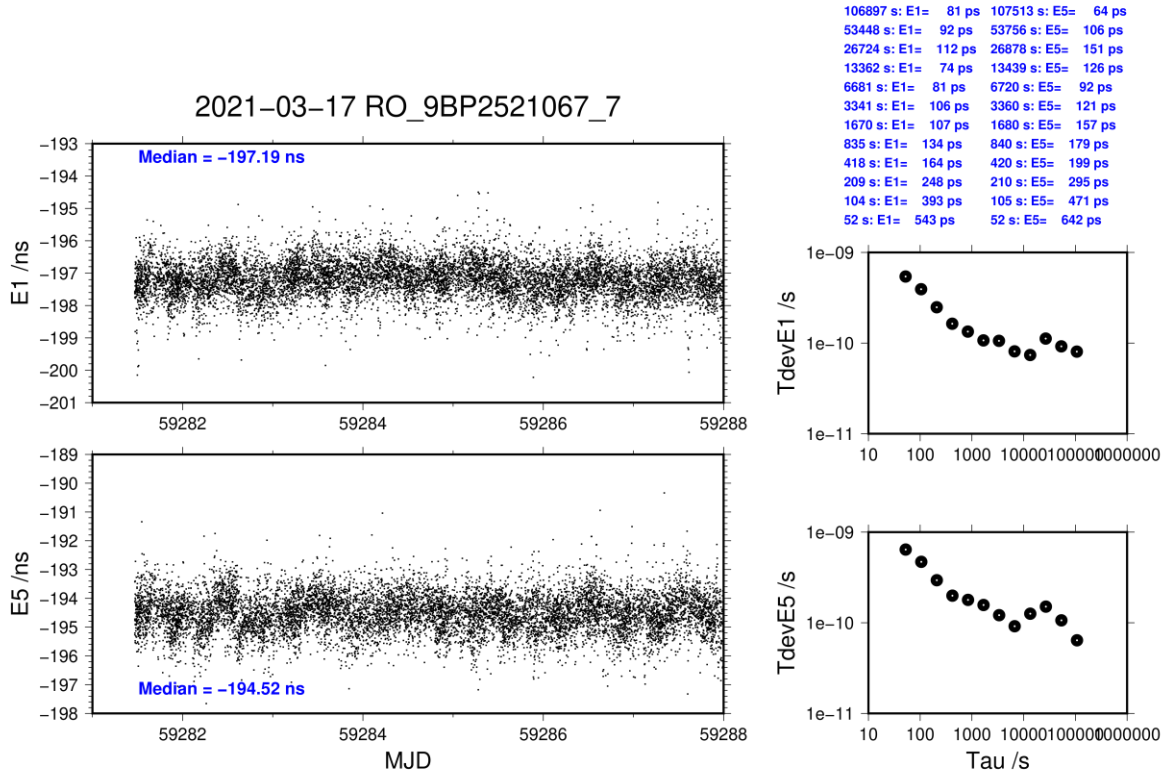
Code	#pts	ave/ns	rms/ns
C1	162085	-197.088	0.886
C2	117288	-202.478	1.164
P1	162083	-197.629	0.899
P2	162083	-202.893	1.030
E1	108299	-197.189	0.742
E5	107675	-194.519	0.776

Number of 300s epochs in out file = 1883

Code	#pts	median/ns	ave/ns	rms/ns
C1	16185	-197.059	-197.091	0.663
C2	11712	-202.517	-202.479	0.874
P1	16184	-197.615	-197.630	0.674
P2	16184	-202.915	-202.891	0.829
E1	10818	-197.189	-197.194	0.563
E5	10756	-194.518	-194.520	0.676




142903 s: P1= 118 ps 142903 s: P2= 93 ps
71452 s: P1= 72 ps 71452 s: P2= 63 ps
35726 s: P1= 118 ps 35726 s: P2= 136 ps
17863 s: P1= 95 ps 17863 s: P2= 116 ps
8931 s: P1= 84 ps 8931 s: P2= 113 ps
4466 s: P1= 85 ps 4466 s: P2= 104 ps
2233 s: P1= 103 ps 2233 s: P2= 106 ps
1116 s: P1= 101 ps 1116 s: P2= 142 ps
558 s: P1= 127 ps 558 s: P2= 180 ps
279 s: P1= 166 ps 279 s: P2= 217 ps
140 s: P1= 367 ps 140 s: P2= 418 ps
70 s: P1= 466 ps 70 s: P2= 577 ps
35 s: P1= 658 ps 35 s: P2= 828 ps
2021−03−17 RO_9BP2521067_7
Median = −197.62 ns
P1 /ns
Median = −202.91 ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s


106897 s: E1= 81 ps 107513 s: E5= 64 ps
53448 s: E1= 92 ps 53756 s: E5= 106 ps
26724 s: E1= 112 ps 26878 s: E5= 151 ps
13362 s: E1= 74 ps 13439 s: E5= 126 ps
6681 s: E1= 81 ps 6720 s: E5= 92 ps
3341 s: E1= 106 ps 3360 s: E5= 121 ps
1670 s: E1= 107 ps 1680 s: E5= 157 ps
835 s: E1= 134 ps 840 s: E5= 179 ps
418 s: E1= 164 ps 420 s: E5= 199 ps
209 s: E1= 248 ps 210 s: E5= 295 ps
104 s: E1= 393 ps 105 s: E5= 471 ps
52 s: E1= 543 ps 52 s: E5= 642 ps
2021−03−17 RO_9BP2521067_7
Median = −197.19 ns
E1 /ns
Median = −194.52 ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s

ROAG-BP1J

COMPUTATION OF BASELINE

Number of phase differences to fit baseline
L1/L2 = 182051
L5 = 94446
A priori baseline (X,Y,Z)/m = 2.899 19.537 -6.930
18797 clock jitters computed out of 18797 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 2.9

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.001 -0.002 -0.001
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = 0.007 -0.002 0.003
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.008 -0.005 0.008
RMS of residuals L5 /m = 0.002

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 2.902 19.535 -6.929
18797 clock jitters computed out of 18797 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 0.0

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.004 -0.000 -0.002
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = 0.004 -0.001 0.002
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.005 -0.003 0.007
RMS of residuals L5 /m = 0.002

Final baseline L1 (X,Y,Z)/m = 2.898 19.535 -6.931
Final baseline L2 (X,Y,Z)/m = 2.906 19.534 -6.927
Final baseline L5 (X,Y,Z)/m = 2.907 19.532 -6.922

COMPUTATION OF CODE DIFFERENCES

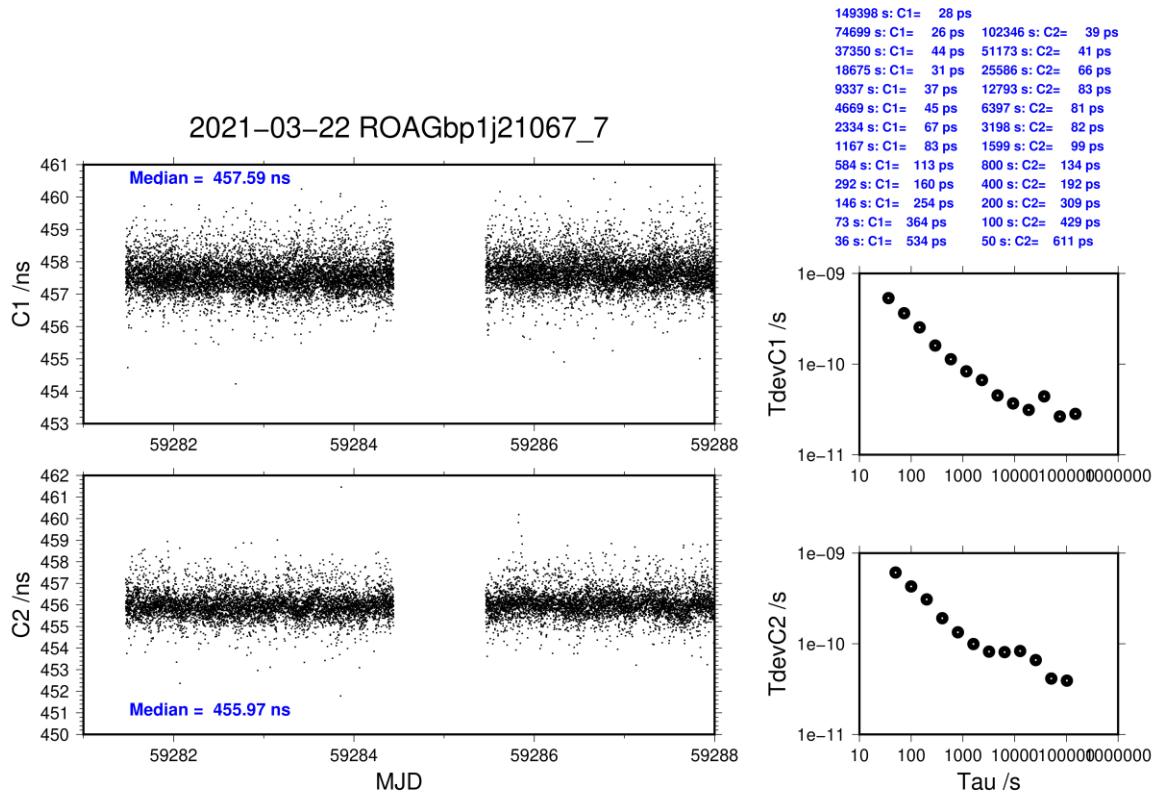
Total number of code differences = 440016

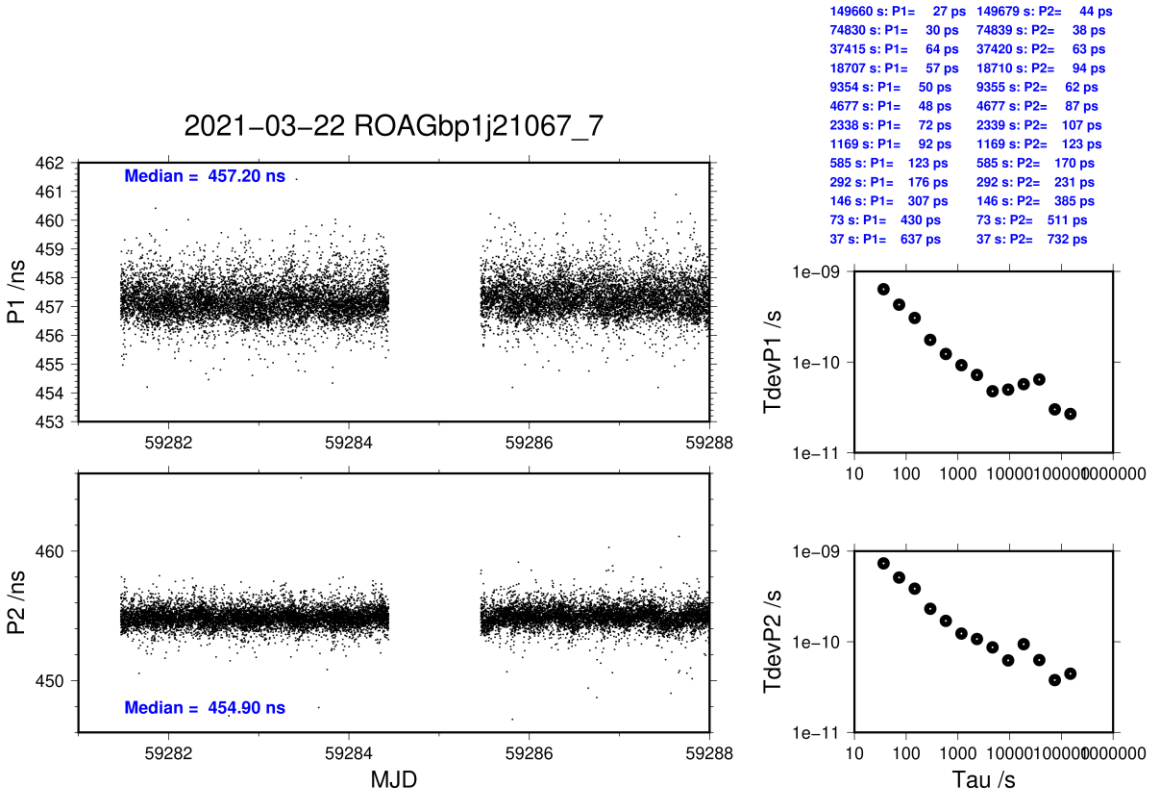
Global average of individual differences

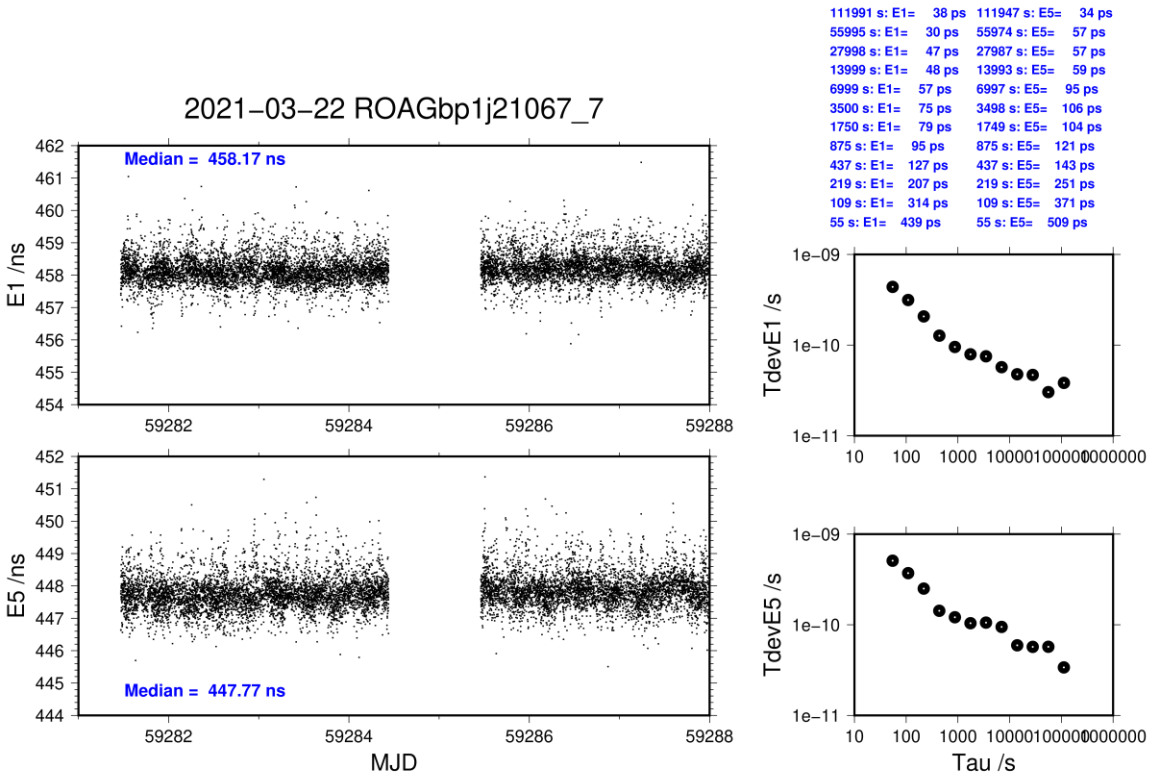
Code	#pts	ave/ns	rms/ns
C1	154821	457.627	1.015
C2	112983	456.017	1.307
P1	154567	457.256	1.071
P2	154551	454.919	1.117
E1	103267	458.201	0.763
E5	103336	447.805	0.702

Number of 300s epochs in out file = 1881

Code	#pts	median/ns	ave/ns	rms/ns
C1	15464	457.588	457.627	0.520
C2	11287	455.974	456.011	0.612
P1	15437	457.200	457.257	0.614
P2	15435	454.905	454.921	0.737
E1	10315	458.168	458.200	0.440
E5	10319	447.771	447.806	0.526




2021−03−22 ROAGbp1j21067_7
Median = 457.20 ns
Median = 454.90 ns
P1 /ns
P2 /ns
MJD
149660 s: P1= 27 ps 149679 s: P2= 44 ps
74830 s: P1= 30 ps 74839 s: P2= 38 ps
37415 s: P1= 64 ps 37420 s: P2= 63 ps
18707 s: P1= 57 ps 18710 s: P2= 94 ps
9354 s: P1= 50 ps 9355 s: P2= 62 ps
4677 s: P1= 48 ps 4677 s: P2= 87 ps
2338 s: P1= 72 ps 2339 s: P2= 107 ps
1169 s: P1= 92 ps 1169 s: P2= 123 ps
585 s: P1= 123 ps 585 s: P2= 170 ps
292 s: P1= 176 ps 292 s: P2= 231 ps
146 s: P1= 307 ps 146 s: P2= 385 ps
73 s: P1= 430 ps 73 s: P2= 511 ps
37 s: P1= 637 ps 37 s: P2= 732 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−03−22 ROAGbp1j21067_7
Median = 458.17 ns
Median = 447.77 ns
E1 /ns
E5 /ns
MJD
111991 s: E1= 38 ps 111947 s: E5= 34 ps
55995 s: E1= 30 ps 55974 s: E5= 57 ps
27998 s: E1= 47 ps 27987 s: E5= 57 ps
13999 s: E1= 48 ps 13993 s: E5= 59 ps
6999 s: E1= 57 ps 6997 s: E5= 95 ps
3500 s: E1= 75 ps 3498 s: E5= 106 ps
1750 s: E1= 79 ps 1749 s: E5= 104 ps
875 s: E1= 95 ps 875 s: E5= 121 ps
437 s: E1= 127 ps 437 s: E5= 143 ps
219 s: E1= 207 ps 219 s: E5= 251 ps
109 s: E1= 314 ps 109 s: E5= 371 ps
55 s: E1= 439 ps 55 s: E5= 509 ps
TdevE1 /s
TdevE5 /s
Tau /s

ROAG-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 162164
Apriori codes biases from 22804 high elev obs : 104.640 102.537
Iteration 0: Obs used = 281634; Huge residuals = 0; Large residuals = 532
Iteration 1: Obs used = 281634; Huge residuals = 0; Large residuals = 532
Computed code bias (P1/P2)/m = 106.811 104.750
Computed baseline (X,Y,Z)/m = 4.650 18.514 -5.141
RMS of residuals /m = 0.671

Number of phase differences to fit baseline
L1/L2 = 161498
L5 = 84146
A priori baseline (X,Y,Z)/m = 4.650 18.514 -5.141
18779 clock jitters computed out of 18779 intervals
AVE jitter /ps = -0.1 RMS jitter /ps = 5.0

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -2.085 0.250 -1.409
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = -2.094 0.253 -1.415
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = -2.086 0.209 -1.396
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 2.561 18.766 -6.553
18779 clock jitters computed out of 18779 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 3.3

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.052 -0.013 -0.049
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = -0.061 -0.010 -0.055
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = -0.058 -0.011 -0.050
RMS of residuals L5 /m = 0.002

Final baseline L1 (X,Y,Z)/m = 2.508 18.753 -6.603
Final baseline L2 (X,Y,Z)/m = 2.500 18.756 -6.608
Final baseline L5 (X,Y,Z)/m = 2.503 18.755 -6.603

COMPUTATION OF CODE DIFFERENCES

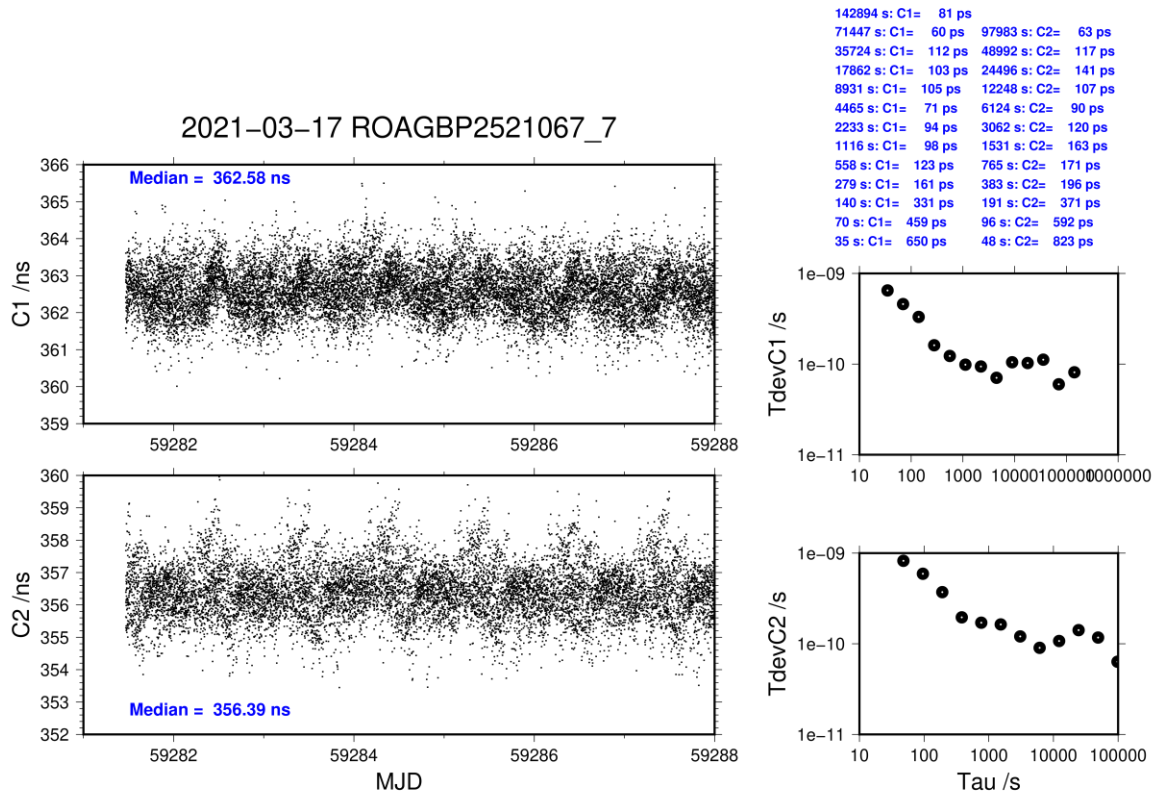
Total number of code differences = 519918

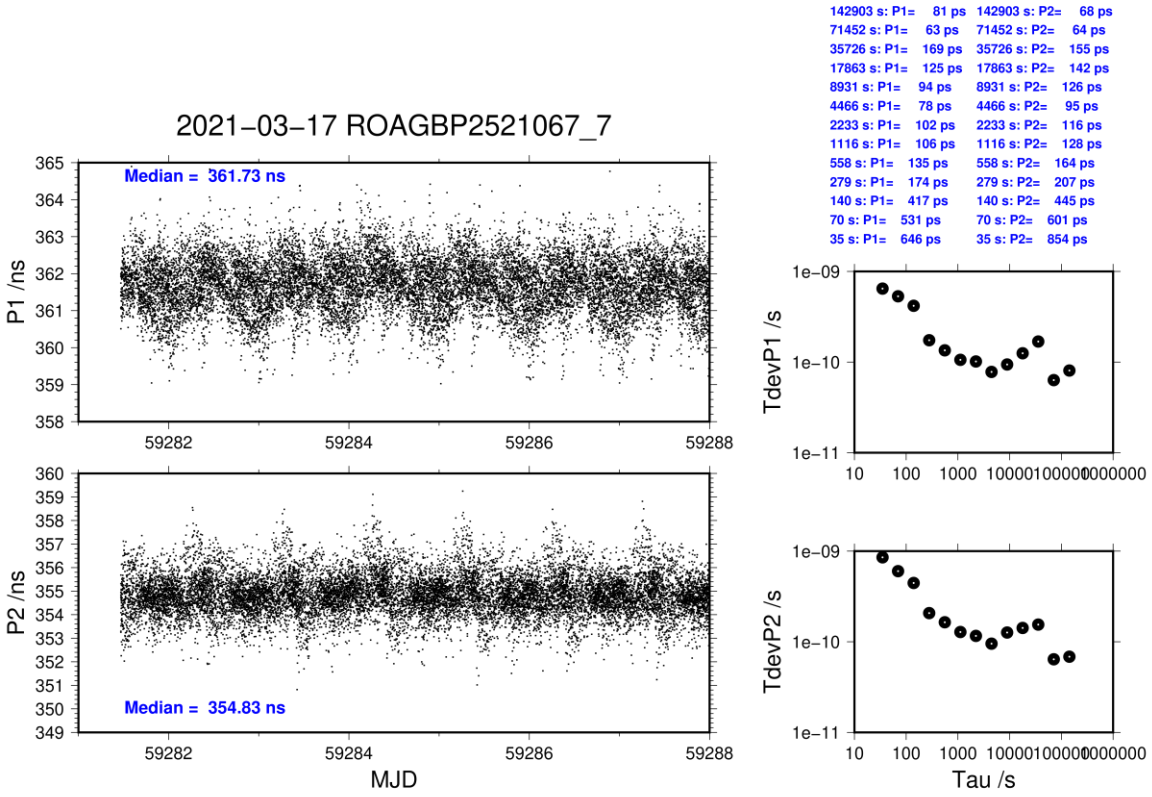
Global average of individual differences

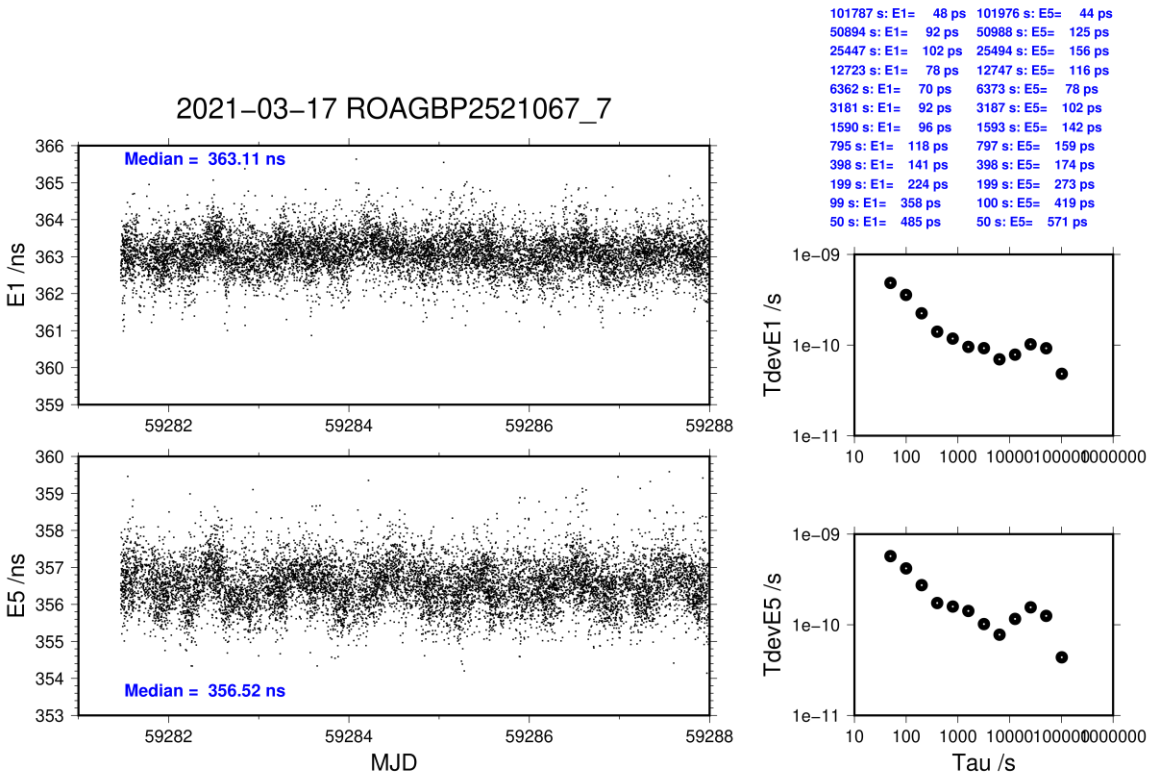
Code	#pts	ave/ns	rms/ns
C1	162085	362.595	0.933
C2	118174	356.415	1.085
P1	162083	361.706	0.985
P2	162083	354.857	1.100
E1	113747	363.106	0.720
E5	113527	356.527	0.710

Number of 300s epochs in out file = 1883

Code	#pts	median/ns	ave/ns	rms/ns
C1	16185	362.578	362.595	0.651
C2	11802	356.394	356.415	0.818
P1	16184	361.733	361.704	0.720
P2	16184	354.832	354.859	0.856
E1	11361	363.109	363.104	0.504
E5	11340	356.520	356.527	0.609




142903 s: P1= 81 ps 142903 s: P2= 68 ps
71452 s: P1= 63 ps 71452 s: P2= 64 ps
35726 s: P1= 169 ps 35726 s: P2= 155 ps
17863 s: P1= 125 ps 17863 s: P2= 142 ps
8931 s: P1= 94 ps 8931 s: P2= 126 ps
4466 s: P1= 78 ps 4466 s: P2= 95 ps
2233 s: P1= 102 ps 2233 s: P2= 116 ps
1116 s: P1= 106 ps 1116 s: P2= 128 ps
558 s: P1= 135 ps 558 s: P2= 164 ps
279 s: P1= 174 ps 279 s: P2= 207 ps
140 s: P1= 417 ps 140 s: P2= 445 ps
70 s: P1= 531 ps 70 s: P2= 601 ps
35 s: P1= 646 ps 35 s: P2= 854 ps
2021–03–17 ROAGBP2521067_7
Median = 361.73 ns
Median = 354.83 ns
P1 /ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s


101787 s: E1= 48 ps 101976 s: E5= 44 ps
50894 s: E1= 92 ps 50988 s: E5= 125 ps
25447 s: E1= 102 ps 25494 s: E5= 156 ps
12723 s: E1= 78 ps 12747 s: E5= 116 ps
6362 s: E1= 70 ps 6373 s: E5= 78 ps
3181 s: E1= 92 ps 3187 s: E5= 102 ps
1590 s: E1= 96 ps 1593 s: E5= 142 ps
795 s: E1= 118 ps 797 s: E5= 159 ps
398 s: E1= 141 ps 398 s: E5= 174 ps
199 s: E1= 224 ps 199 s: E5= 273 ps
99 s: E1= 358 ps 100 s: E5= 419 ps
50 s: E1= 485 ps 50 s: E5= 571 ps
2021–03–17 ROAGBP2521067_7
Median = 363.11 ns
Median = 356.52 ns
E1 /ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s

2.3/ PTB (21089)

Period

MJD 59303 to 59311

Delays

BP1J: (cf page 3 & PTB report page 10-12)

X_O = 140.33 ns

X_P = 68.58 ns (53.52+15.06)

REFDLY = 208.91 ns

CABDLY = 176.38 ns (C211)

BP25: (cf page 3 & PTB report page 10)

REFDLY = 68.48 ns (53.42+15.06)

CABDLY = 176.24 ns (C208)

PT07:

REFDLY = 43.36 ns (PTB report page 13)

CABDLY = 245.80 ns (cf page 62)

INT DLY = -35.5 ns (GPS C1), -36.9 ns (GPS P1), -24.6 ns (GPS P2)

PT09:

REFDLY = 182.88 ns (PTB report page 13)

CABDLY = 198.70 ns (cf page 61)

PT10:

REFDLY = 36.56 ns (PTB report page 13)

CABDLY = 250.00 ns (cf page 61)

PTBB (PT13):

REFDLY = 56.22 ns (PTB report page 12)

CABDLY = 205.70 ns (cf page 60)

Setup at the PTB

Laboratory:	PTB
Date and hour of the beginning of measurements:	2021-03-30 (approx. 14:00 UTC) 59303 DOY 89(§)
Date and hour of the end of measurements:	2021-04-08 (24:00 UTC) 59312 DOY 98

Information on the system

	Local: PTBB	**Travelling:** (1) BP25, (2) BP1C
• Receiver maker:	Septentrio	(1) Mesit, (2) Septentrio
Receiver type:	PolaRx5 TR	(1) GTR55, (2) PolaRx4 TR
Receiver serial number:	470 1292	(1) 1306001, (2) S9000169176
1 PPS trigger level /V:	1 V	1 V
• Antenna cable maker:	SSB electronics GmbH	
Antenna cable type :	ECOFLEX15	(1) C208 (2) C211
Phase stabilised cable (Y/N):		
Length outside the building /m:	approx. 25 m	approx. 25 m
• Antenna maker:	LEICA	(1) Novatel, (2) Ashtech
Antenna type:	AR 25	(1) GPS-703 GG (2) ?
Antenna serial number:	726333	CR6200323008
Temperature (if stabilised) /°C	no	no

Measured delays /ns

	Local:	**Travelling:**
• Delay from local UTC to receiver 1 PPS-in (X_P)	See Report for details	See Report for details
Delay from 1 PPS-in to internal Reference (if different): (X_O)		
• Antenna cable delay: (X_C)		??
Splitter delay (if any):	N/A	N/A
Additional cable delay (if any):	N/A	N/A

Data used for the generation of CGGTTS files

	LOCAL: P1 / P2 E1 / E5a	Travelling (§§)
• INT DLY (or X_R+X_S) (GPS) /ns:	29.7 / 27.2	0
• INT DLY (or X_R+X_S) (GALILEO) /ns:	32.0 / 31.7	0
• CAB DLY (or X_C) /ns:	205.7 (§§§)	0
• REF DLY (or X_P+X_O) /ns:	54.3 (§§§§)	0
• Coordinates reference frame:	ITRF	ITRF
Latitude or X /m:	3844059.86 (***)	
Longitude or Y /m:	709661.56 (***)	
Height or Z /m:	5023129.87 (***)	

General information

Rise time of the local UTC pulse:	< 3 ns
• Is the laboratory air conditioned:	yes
Set temperature value and uncertainty:	22.8 °C ± 0.5 °C
Set humidity value and uncertainty:	

Notes:
§ initial operation was with interchanged antenna cables. Corrected 2021-03-30 ca. 13:16 UTC.
§§ no CGGTTS files produced, coordinates (APC) not determined
§§§ measurement not repeated
§§§§ see details on installation below
(***) values provided by BIPM via Mail 2019-08-07

Laboratory:	PTB
Date and hour of the beginning of measurements:	2021-03-30 (approx. 14:00 UTC) 59303 DOY 89(§)
Date and hour of the end of measurements:	2021-04-08 (24:00 UTC) 59312 DOY 98

Information on the system

	Local: (2) PT09 (3) PT10	
• Receiver maker:	(2) Septentrio (3) Dicom (mesit)	
Receiver type:	(2) PolaRx4TR PRO (3) GTR51	
Receiver serial number:	(2) 3001148, (3) 1309042	
1 PPS trigger level /V:	1 V	
• Antenna cable maker:	(2) SSB-electronics GmbH, (3) Belden	
Antenna cable type :	(2) Ecoflex 15plus, (3) 8214 RG-8/U	
Phase stabilised cable (Y/N):	Y	
Length outside the building /m:	approx. 25 m	
• Antenna maker:	(3) Novatel, (4) NavExperience	
Antenna type:	(3) NOV750.R4 NOVS (4) 3G+C	
Antenna serial number:	(3) n/a (4) NA 0121	
Temperature (if stabilised) /°C		

Measured delays /ns

	Local:	**Travelling:**
• Delay from local UTC to receiver 1 PPS-in (X_P)	See Report for details	
Delay from 1 PPS-in to internal Reference (if different): (X_O)		
• Antenna cable delay: (X_C)		
Splitter delay (if any):	N/A	
Additional cable delay (if any):	N/A	

Data used for the generation of CGGTTS files

	LOCAL: P1 / P2 & E1 / E5a	Travelling
• INT DLY (or X_R+X_S) (GPS) /ns:	(2) 56.7 / 55.7 (3) 34.0 / 31.9	
• INT DLY (or X_R+X_S) (GLONASS) /ns:		
INT DLY (GALILEO)	(2) 57.6 / 66.3 (3) 35.1 / 23.8	
• CAB DLY (or X_C) /ns:	(2) 198.7* (3) 250.0*	
• REF DLY (or X_P+X_O) /ns:	(2) 183.2 (3) 36.8	
• Coordinates reference frame:	ITRF	
Latitude or X /m:	(2) 3844057.34 (3) 3844056.64	
Longitude or Y /m:	(2) 709663.82 (3) 709664.25	
Height or Z /m:	(2) 5023131.76 (3) 5023131.88	

General information

Rise time of the local UTC pulse:	< 5 ns
• Is the laboratory air conditioned:	yes
Set temperature value and uncertainty:	22.8 °C ± 0.5 °C
Set humidity value and uncertainty:	

Note: * not measured in 2021, all antenna coordinates (APC) determined in 2018 using PPP.

Laboratory:	PTB
Date and hour of the beginning of measurements:	2021-03-30 (approx. 14:00 UTC) 59303 DOY 89(§)
Date and hour of the end of measurements:	2021-04-08 (24:00 UTC) 59312 DOY 98

Information on the system

	Local: (4) PT07	
• Receiver maker:	(4) Dicom (mesit)	
Receiver type:	(4) GTR50	
Receiver serial number:	(4) 806091,	
1 PPS trigger level /V:	1 V	
• Antenna cable maker:	(4) Andrews	
Antenna cable type :	(4) FSJ-1	
Phase stabilised cable (Y/N):	Y	
Length outside the building /m:	approx. 25 m	
• Antenna maker:	(4) Novatel	
Antenna type:	(4) GPS-702-PP	
Antenna serial number:	(4) SN 01017577	
Temperature (if stabilised) /°C		

Measured delays /ns

	Local:	
• Delay from local UTC to receiver 1 PPS-in (X_P)	See Report for details	
Delay from 1 PPS-in to internal Reference (if different): (X_O)		
• Antenna cable delay: (X_C)		
Splitter delay (if any):	N/A	
Additional cable delay (if any):	N/A	

Data used for the generation of CGGTTS files

	LOCAL: P1 / P2	
• INT DLY (or X_R+X_S) (GPS) /ns:	-36.9 / -24.6	
• INT DLY (or X_R+X_S) (GLONASS) /ns:		
• CAB DLY (or X_C) /ns:	245.8*	
• REF DLY (or X_P+X_O) /ns:	43.4	
• Coordinates reference frame:	ITRF	
Latitude or X /m:	3844062.43	
Longitude or Y /m:	709659.03	
Height or Z /m:	5023128.06	

General information

Rise time of the local UTC pulse:	< 5 ns
• Is the laboratory air conditioned:	yes
Set temperature value and uncertainty:	22-8 °C ± 0.5 °C
Set humidity value and uncertainty:	

Notes:

* not measured in 2021

Diagram of the experiment set-up:

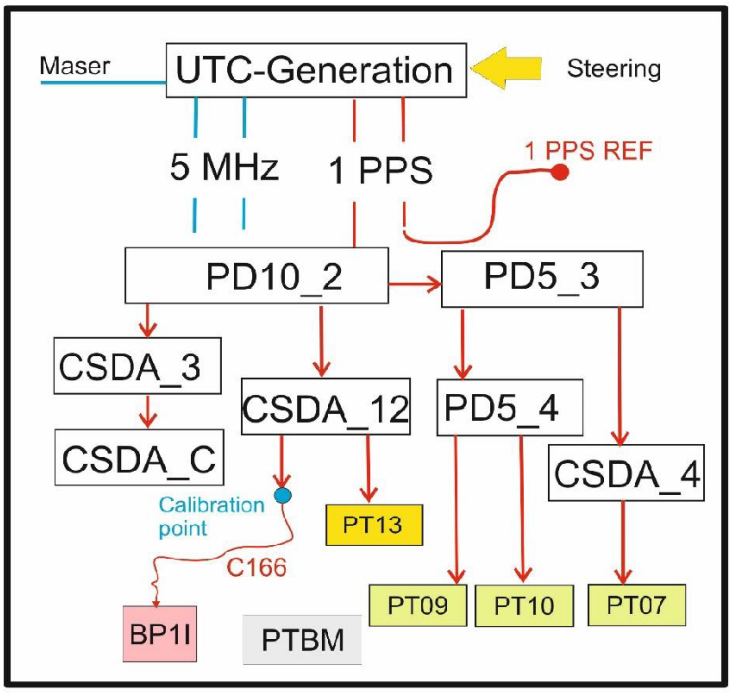


Figure 1: Signal distribution (1pps) to local receivers and B3TS

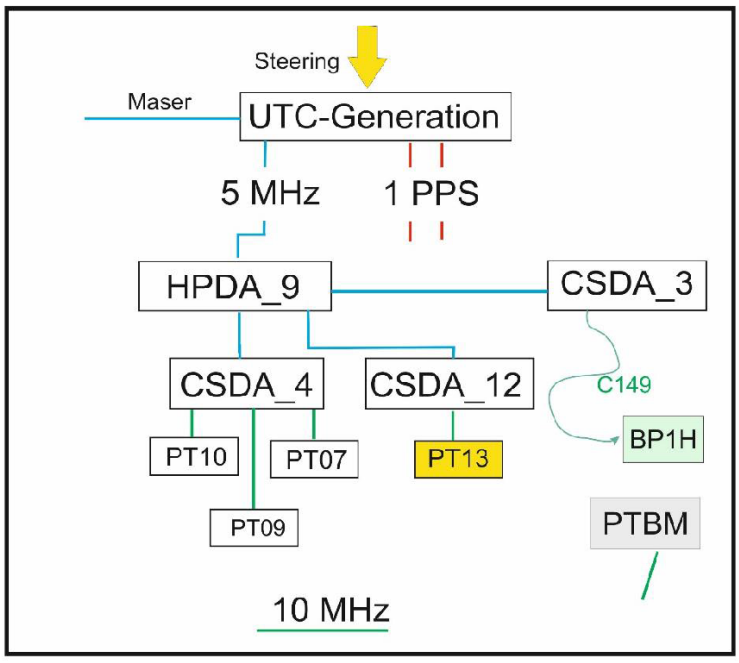


Figure 2: Signal distribution (5 MHz, 10 MHz, 20 MHz) to local receivers and B3

Log of Events / Additional Information :

PTB report: “Relative calibration of internal delays of PTB GNSS receivers by means of B3TS – Campaign 1001-2020 v. 0, 2021-04-09, A. Bauch, D. Piester, T. Polewka” received by email on April 12th 2021, filename: “PTB_GNSS_Calibration_Report_2021-03-25.docx”.

PT07-BP1J

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 208530
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 30566 high elev obs : -6.200 -6.197
Iteration 0: Obs used = 357868; Huge residuals = 0; Large residuals = 88
Iteration 1: Obs used = 357868; Huge residuals = 0; Large residuals = 88
Computed code bias (P1/P2)/m = -6.155 -6.113
Computed baseline (X,Y,Z)/m = 0.135 0.415 -0.251
RMS of residuals /m = 0.377

Number of phase differences to fit baseline
L1/L2 = 205076
L5 = 0
A priori baseline (X,Y,Z)/m = 0.135 0.415 -0.251
24125 clock jitters computed out of 24134 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 28.3

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.054 -0.006 0.035
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.063 -0.003 0.047
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 0.193 0.410 -0.210
24125 clock jitters computed out of 24134 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 0.1

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.001 -0.004 -0.004
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.007 -0.000 0.008
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = 0.192 0.406 -0.214
Final baseline L2 (X,Y,Z)/m = 0.200 0.410 -0.202
Final baseline L5 (X,Y,Z)/m = 0.196 0.408 -0.208

COMPUTATION OF CODE DIFFERENCES

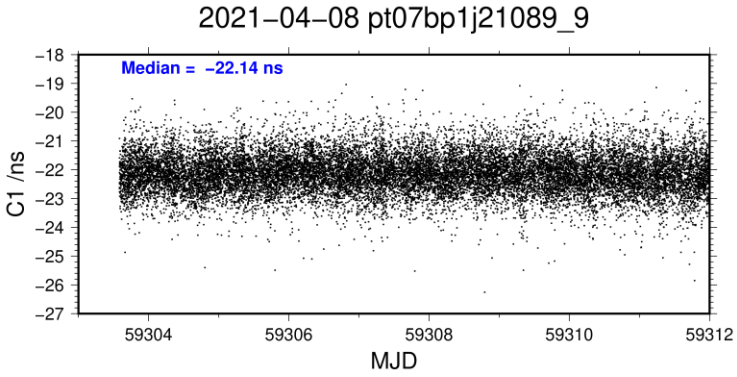
Total number of code differences = 209912

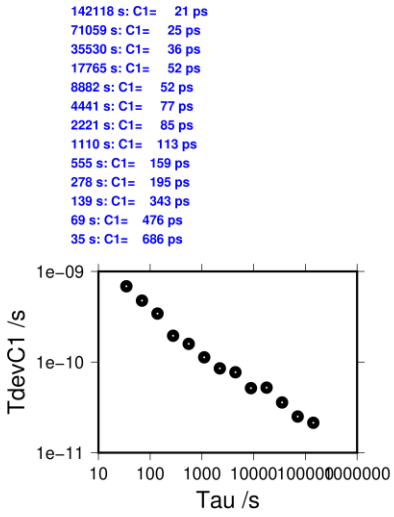
Global average of individual differences

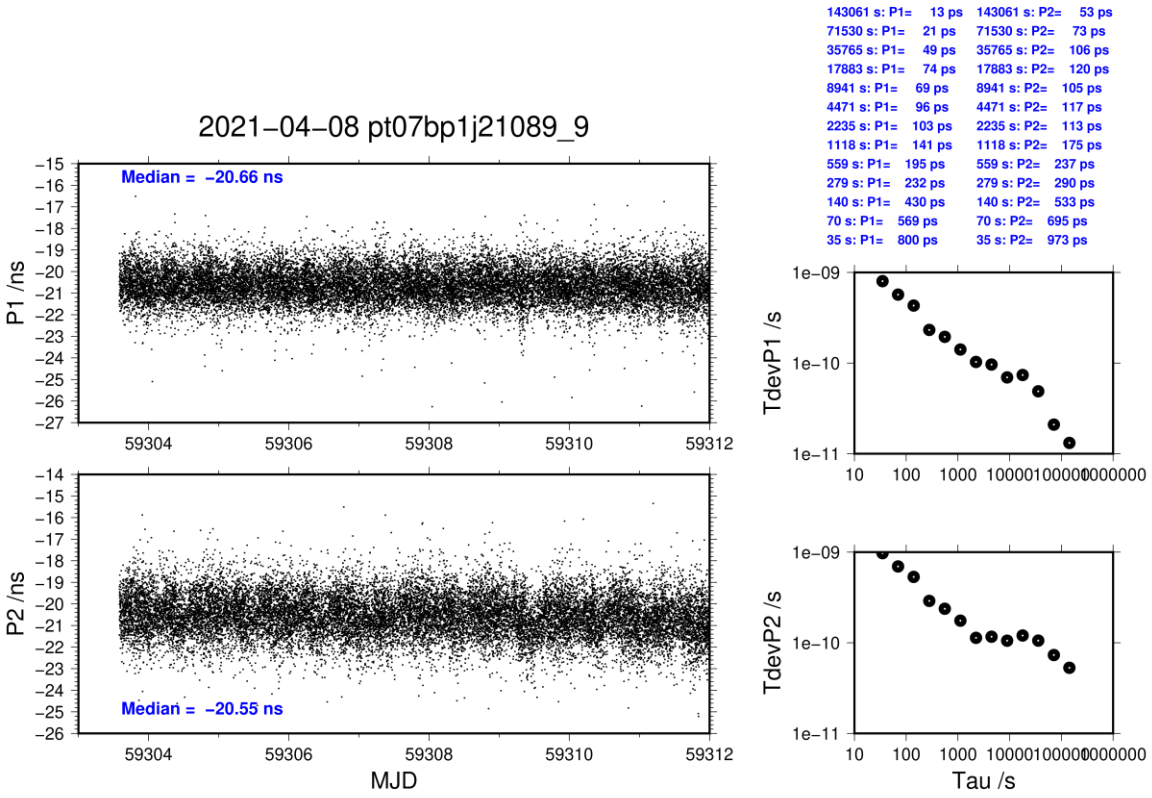
Code	#pts	ave/ns	rms/ns
C1	209835	-22.123	0.981
P1	208453	-20.643	1.108
P2	208453	-20.537	1.308

Number of 300s epochs in out file = 2424

Code	#pts	median/ns	ave/ns	rms/ns
C1	20951	-22.138	-22.119	0.673
P1	20813	-20.656	-20.641	0.805
P2	20813	-20.548	-20.542	0.997






2021−04−08 pt07bp1j21089_9
Median = −20.66 ns
Median = −20.55 ns
P1 /ns
P2 /ns
MJD
59304
59306
59308
59310
59312
143061 s: P1= 13 ps
71530 s: P1= 21 ps
35765 s: P1= 49 ps
17883 s: P1= 74 ps
8941 s: P1= 69 ps
4471 s: P1= 96 ps
2235 s: P1= 103 ps
1118 s: P1= 141 ps
559 s: P1= 195 ps
279 s: P1= 232 ps
140 s: P1= 430 ps
70 s: P1= 569 ps
35 s: P1= 800 ps
143061 s: P2= 53 ps
71530 s: P2= 73 ps
35765 s: P2= 106 ps
17883 s: P2= 120 ps
8941 s: P2= 105 ps
4471 s: P2= 117 ps
2235 s: P2= 113 ps
1118 s: P2= 175 ps
559 s: P2= 237 ps
279 s: P2= 290 ps
140 s: P2= 533 ps
70 s: P2= 695 ps
35 s: P2= 973 ps
TdevP1 /s
TdevP2 /s
Tau /s

PT07-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 208232
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 30566 high elev obs : -36.880 -38.250
Iteration 0: Obs used = 357181; Huge residuals = 116; Large residuals = 181
Iteration 1: Obs used = 357177; Huge residuals = 0; Large residuals = 69
Computed code bias (P1/P2)/m = -36.890 -38.186
Computed baseline (X,Y,Z)/m = -0.190 -0.387 0.187
RMS of residuals /m = 0.384

Number of phase differences to fit baseline
L1/L2 = 204471
L5 = 0
A priori baseline (X,Y,Z)/m = -0.190 -0.387 0.187
24125 clock jitters computed out of 24135 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 28.3

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.038 -0.025 -0.018
RMS of residuals L1 /m = 0.005
Computed baseline L2 (X,Y,Z)/m = -0.039 -0.023 -0.017
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -0.229 -0.411 0.170
24125 clock jitters computed out of 24135 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 0.1

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.001 -0.006 -0.002
RMS of residuals L1 /m = 0.005
Computed baseline L2 (X,Y,Z)/m = -0.002 -0.004 -0.001
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = -0.230 -0.417 0.168
Final baseline L2 (X,Y,Z)/m = -0.231 -0.414 0.169
Final baseline L5 (X,Y,Z)/m = -0.231 -0.416 0.168

COMPUTATION OF CODE DIFFERENCES

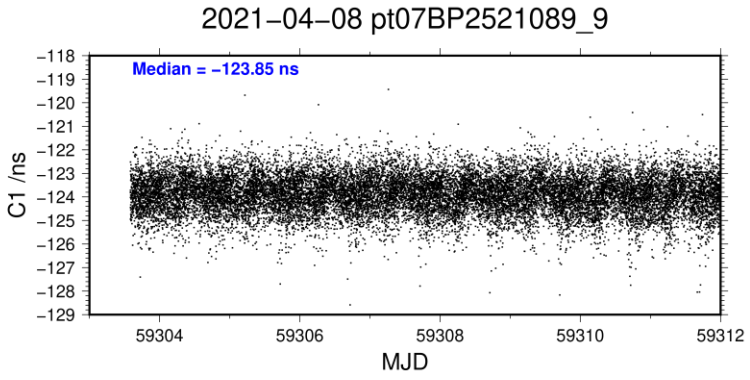
Total number of code differences = 209516

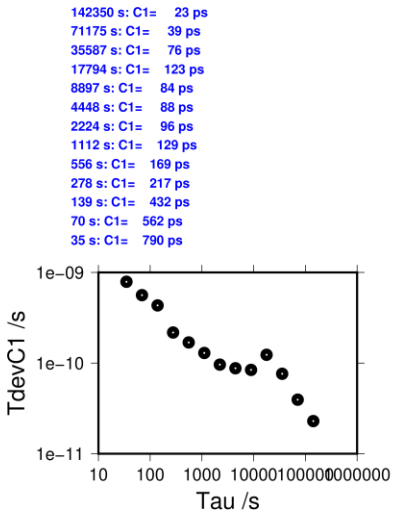
Global average of individual differences

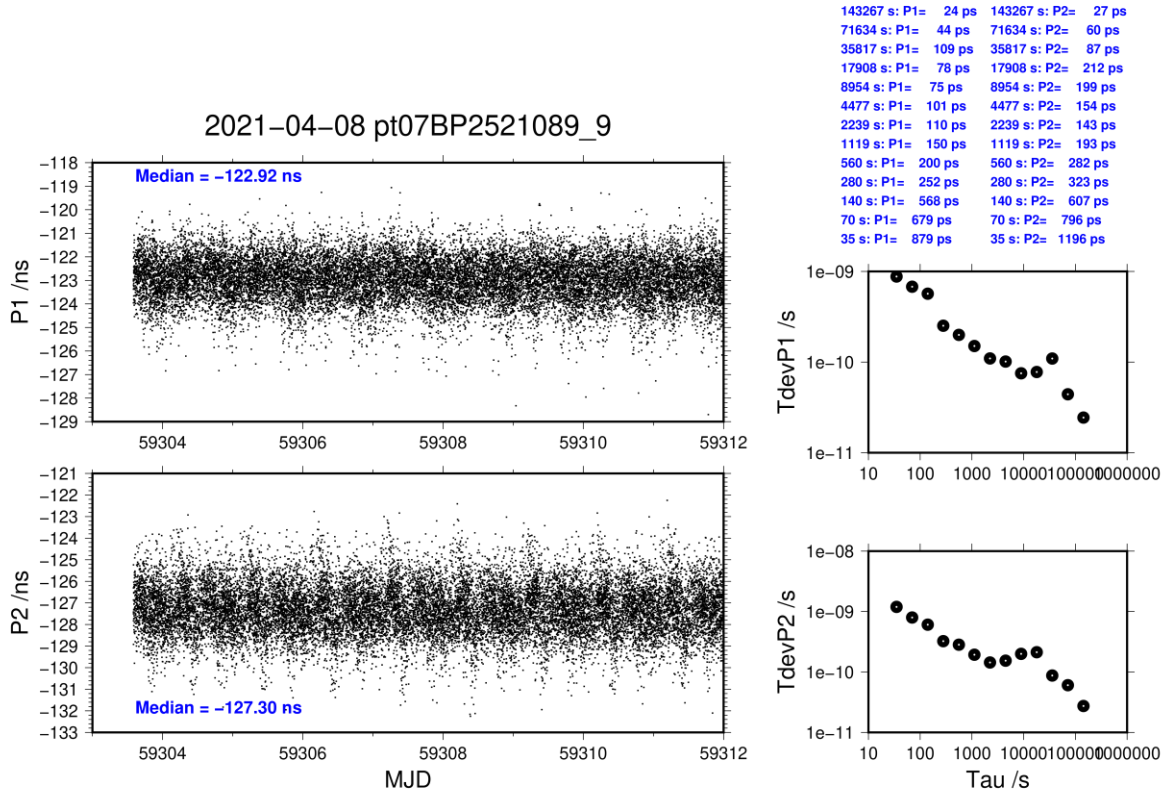
Code	#pts	ave/ns	rms/ns
C1	209444	-123.876	0.946
P1	208102	-122.952	1.098
P2	208101	-127.285	1.374

Number of 300s epochs in out file = 2424

Code	#pts	median/ns	ave/ns	rms/ns
C1	20917	-123.853	-123.879	0.795
P1	20783	-122.915	-122.955	0.938
P2	20783	-127.302	-127.285	1.178






2021−04−08 pt07BP2521089_9
Median = −122.92 ns
Median = −127.30 ns
P1 /ns
P2 /ns
MJD
143267 s: P1= 24 ps 143267 s: P2= 27 ps
71634 s: P1= 44 ps 71634 s: P2= 60 ps
35817 s: P1= 109 ps 35817 s: P2= 87 ps
17908 s: P1= 78 ps 17908 s: P2= 212 ps
8954 s: P1= 75 ps 8954 s: P2= 199 ps
4477 s: P1= 101 ps 4477 s: P2= 154 ps
2239 s: P1= 110 ps 2239 s: P2= 143 ps
1119 s: P1= 150 ps 1119 s: P2= 193 ps
560 s: P1= 200 ps 560 s: P2= 282 ps
280 s: P1= 252 ps 280 s: P2= 323 ps
140 s: P1= 568 ps 140 s: P2= 607 ps
70 s: P1= 679 ps 70 s: P2= 796 ps
35 s: P1= 879 ps 35 s: P2= 1196 ps
TdevP1 /s
TdevP2 /s
Tau /s

PT09-BP1J

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 188949
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 26974 high elev obs : 15.595 15.374
Iteration 0: Obs used = 325418; Huge residuals = 0; Large residuals = 322
Iteration 1: Obs used = 325418; Huge residuals = 0; Large residuals = 322
Computed code bias (P1/P2)/m = 15.480 15.287
Computed baseline (X,Y,Z)/m = 5.185 -4.368 -3.967
RMS of residuals /m = 0.400

Number of phase differences to fit baseline
L1/L2 = 187820
L5 = 93870
A priori baseline (X,Y,Z)/m = 5.185 -4.368 -3.967
21356 clock jitters computed out of 21356 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 3.5

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.121 0.031 0.142
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = 0.124 0.034 0.147
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.127 0.041 0.143
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 5.308 -4.335 -3.823
21356 clock jitters computed out of 21356 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 0.3

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.004 0.004 0.004
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = 0.006 0.006 0.009
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.009 0.008 0.008
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m = 5.312 -4.332 -3.819
Final baseline L2 (X,Y,Z)/m = 5.314 -4.329 -3.813
Final baseline L5 (X,Y,Z)/m = 5.317 -4.327 -3.815

COMPUTATION OF CODE DIFFERENCES

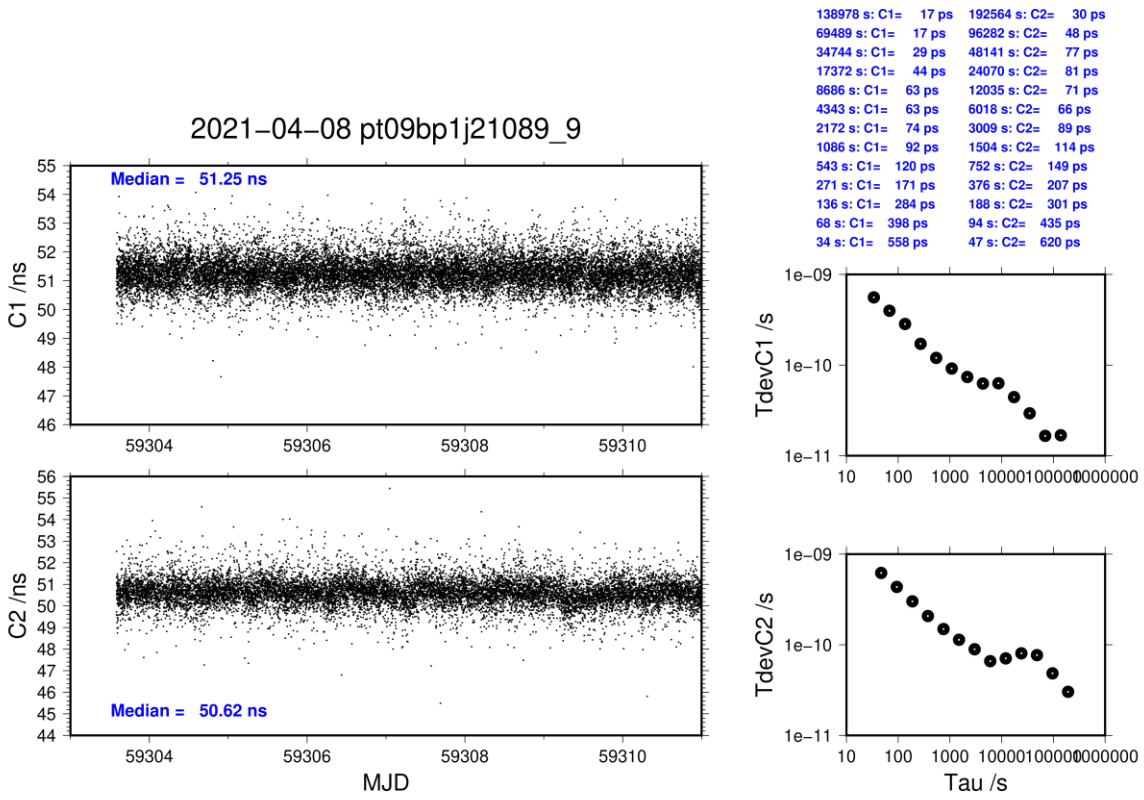
Total number of code differences = 470116

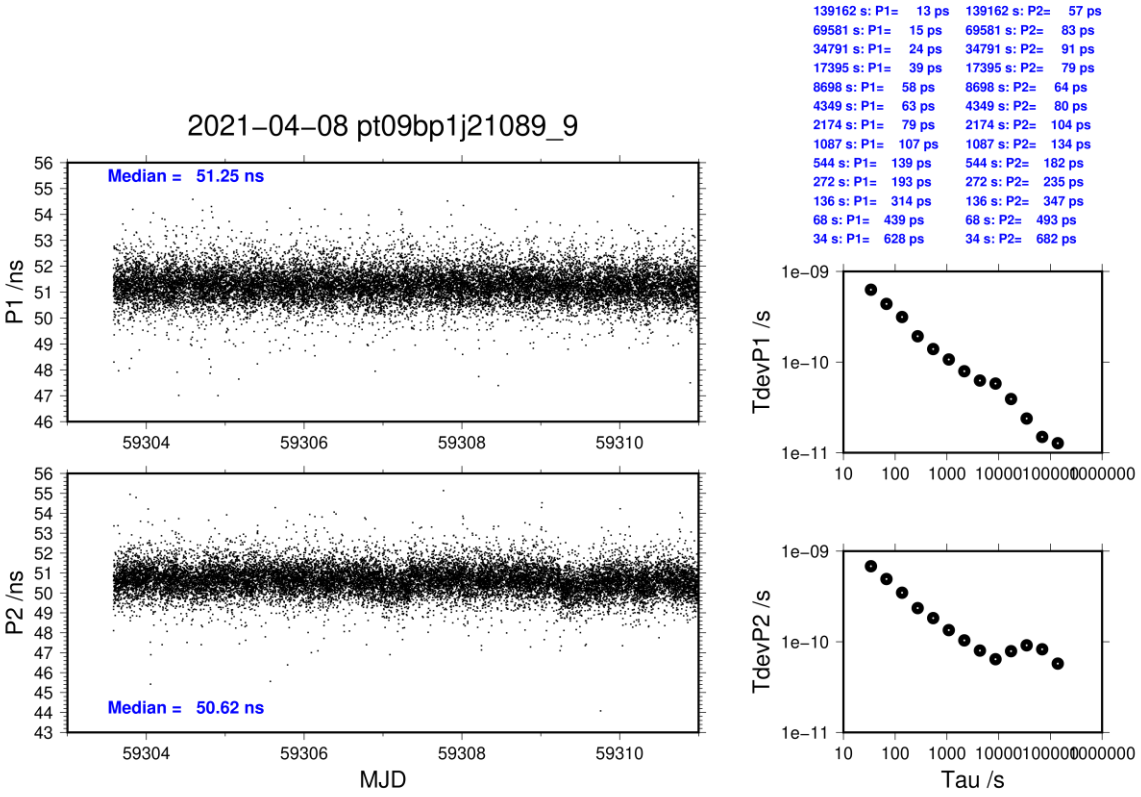
Global average of individual differences

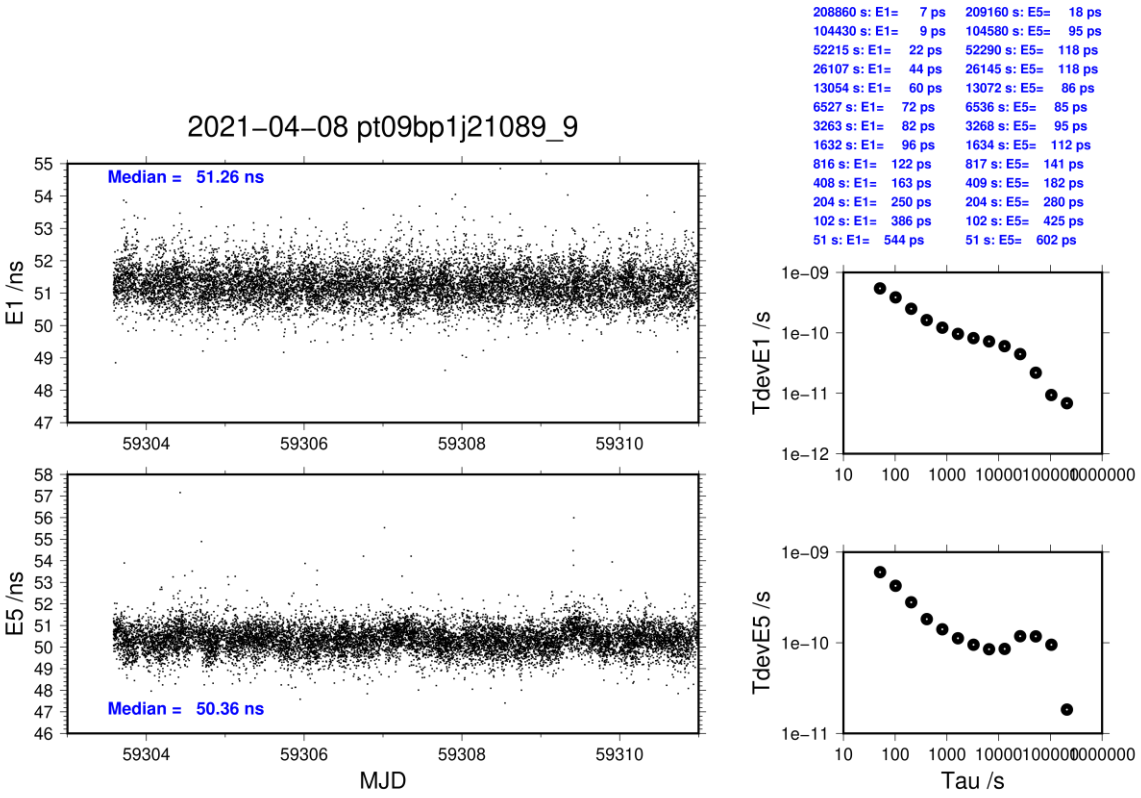
Code	#pts	ave/ns	rms/ns
C1	189147	51.272	1.160
C2	136368	50.622	1.411
P1	188868	51.273	1.223
P2	188868	50.634	1.332
E1	125828	51.282	1.027
E5	125642	50.364	0.979

Number of 300s epochs in out file = 2136

Code	#pts	median/ns	ave/ns	rms/ns
C1	18878	51.249	51.270	0.555
C2	13625	50.618	50.620	0.625
P1	18853	51.253	51.271	0.618
P2	18853	50.621	50.632	0.706
E1	12562	51.256	51.275	0.538
E5	12544	50.364	50.363	0.613




2021−04−08 pt09bp1j21089_9
Median = 51.25 ns
Median = 50.62 ns
P1 /ns
P2 /ns
MJD
139162 s: P1= 13 ps
69581 s: P1= 15 ps
34791 s: P1= 24 ps
17395 s: P1= 39 ps
8698 s: P1= 58 ps
4349 s: P1= 63 ps
2174 s: P1= 79 ps
1087 s: P1= 107 ps
544 s: P1= 139 ps
272 s: P1= 193 ps
136 s: P1= 314 ps
68 s: P1= 439 ps
34 s: P1= 628 ps
139162 s: P2= 57 ps
69581 s: P2= 83 ps
34791 s: P2= 91 ps
17395 s: P2= 79 ps
8698 s: P2= 64 ps
4349 s: P2= 80 ps
2174 s: P2= 104 ps
1087 s: P2= 134 ps
544 s: P2= 182 ps
272 s: P2= 235 ps
136 s: P2= 347 ps
68 s: P2= 493 ps
34 s: P2= 682 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−04−08 pt09bp1j21089_9
Median = 51.26 ns
Median = 50.36 ns
E1 /ns
E5 /ns
MJD
208860 s: E1= 7 ps
104430 s: E1= 9 ps
52215 s: E1= 22 ps
26107 s: E1= 44 ps
13054 s: E1= 60 ps
6527 s: E1= 72 ps
3263 s: E1= 82 ps
1632 s: E1= 96 ps
816 s: E1= 122 ps
408 s: E1= 163 ps
204 s: E1= 250 ps
102 s: E1= 386 ps
51 s: E1= 544 ps
209160 s: E5= 18 ps
104580 s: E5= 95 ps
52290 s: E5= 118 ps
26145 s: E5= 118 ps
13072 s: E5= 86 ps
6536 s: E5= 85 ps
3268 s: E5= 95 ps
1634 s: E5= 112 ps
817 s: E5= 141 ps
409 s: E5= 182 ps
204 s: E5= 280 ps
102 s: E5= 425 ps
51 s: E5= 602 ps
TdevE1 /s
TdevE5 /s
Tau /s

PT09-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 191953
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 28313 high elev obs : -14.969 -16.569
Iteration 0: Obs used = 328988; Huge residuals = 4; Large residuals = 176
Iteration 1: Obs used = 328988; Huge residuals = 0; Large residuals = 172
Computed code bias (P1/P2)/m = -15.197 -16.741
Computed baseline (X,Y,Z)/m = 4.804 -5.180 -3.600
RMS of residuals /m = 0.389

Number of phase differences to fit baseline
L1/L2 = 190826
L5 = 92663
A priori baseline (X,Y,Z)/m = 4.804 -5.180 -3.600
21356 clock jitters computed out of 21356 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 4.0

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.084 0.020 0.156
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.075 0.024 0.151
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.073 0.032 0.144
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 4.884 -5.158 -3.446
21356 clock jitters computed out of 21356 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 0.3

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.008 0.003 0.009
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = -0.001 0.006 0.004
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = -0.004 0.010 -0.001
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m = 4.891 -5.155 -3.437
Final baseline L2 (X,Y,Z)/m = 4.883 -5.151 -3.442
Final baseline L5 (X,Y,Z)/m = 4.880 -5.148 -3.448

COMPUTATION OF CODE DIFFERENCES

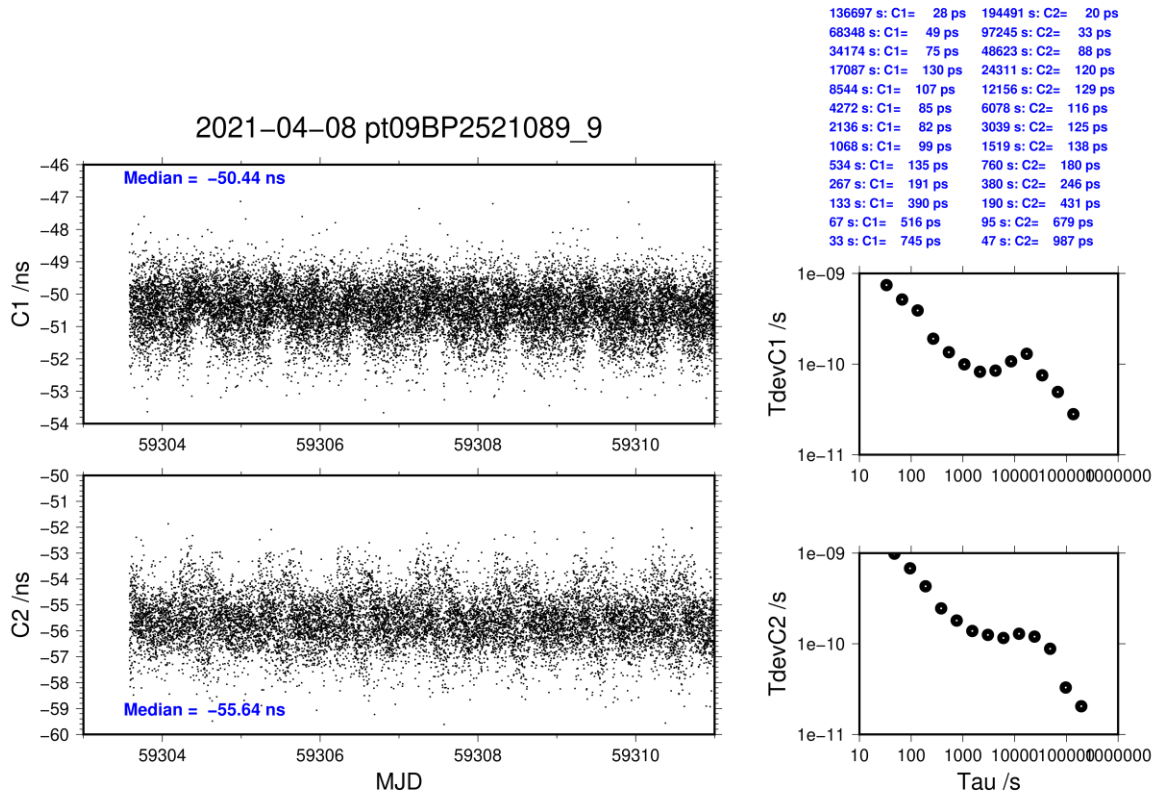
Total number of code differences = 641250

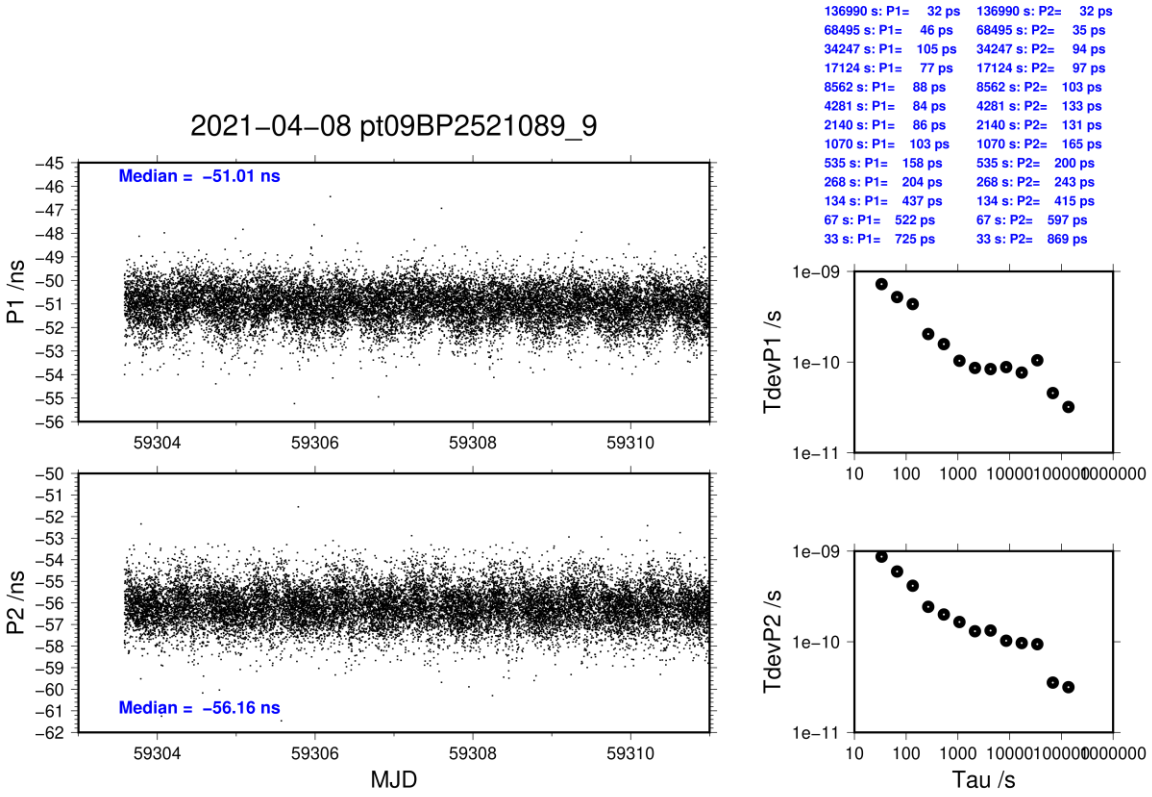
Global average of individual differences

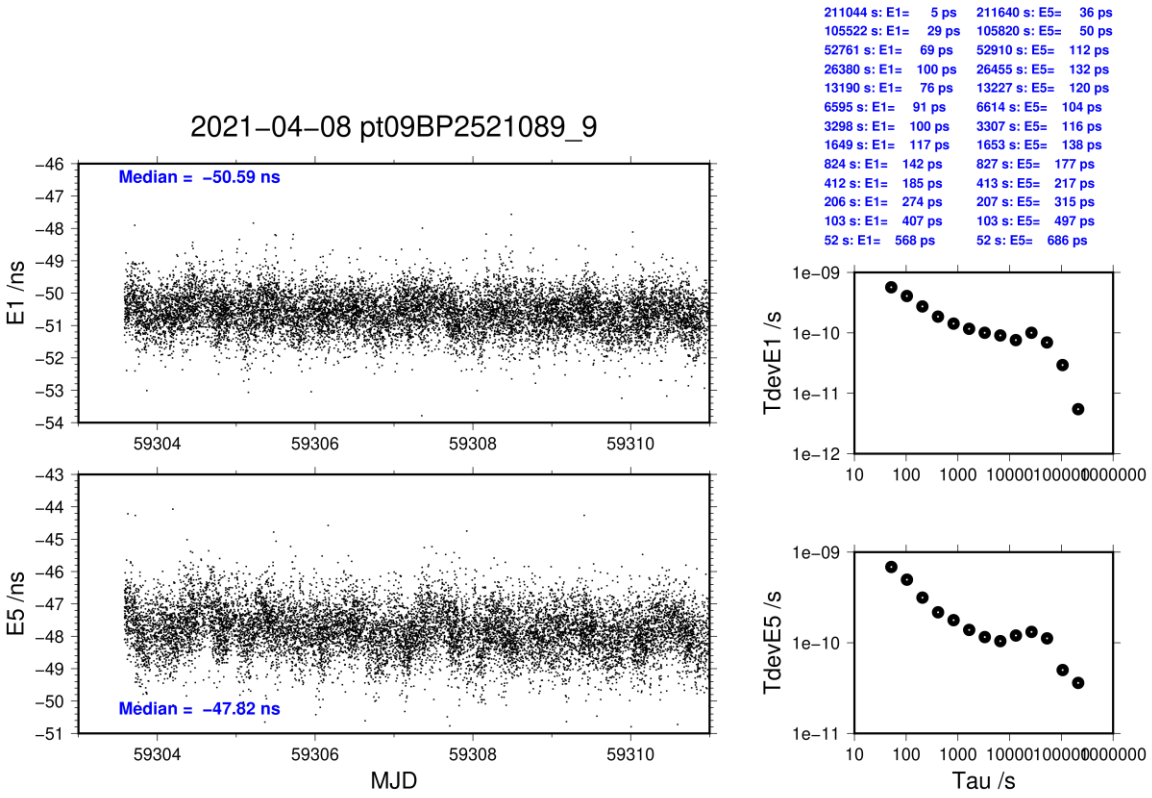
Code	#pts	ave/ns	rms/ns
C1	192214	-50.468	1.137
C2	135027	-55.611	1.434
P1	191885	-51.029	1.175
P2	191883	-56.158	1.310
E1	124458	-50.586	0.983
E5	124109	-47.818	0.995

Number of 300s epochs in out file = 2136

Code	#pts	median/ns	ave/ns	rms/ns
C1	19193	-50.443	-50.476	0.735
C2	13490	-55.639	-55.613	0.946
P1	19152	-51.010	-51.037	0.747
P2	19152	-56.162	-56.157	0.857
E1	12432	-50.588	-50.593	0.586
E5	12397	-47.819	-47.816	0.718




136990 s: P1= 32 ps
68495 s: P1= 46 ps
34247 s: P1= 105 ps
17124 s: P1= 77 ps
8562 s: P1= 88 ps
4281 s: P1= 84 ps
2140 s: P1= 86 ps
1070 s: P1= 103 ps
535 s: P1= 158 ps
268 s: P1= 204 ps
134 s: P1= 437 ps
67 s: P1= 522 ps
33 s: P1= 725 ps
136990 s: P2= 32 ps
68495 s: P2= 35 ps
34247 s: P2= 94 ps
17124 s: P2= 97 ps
8562 s: P2= 103 ps
4281 s: P2= 133 ps
2140 s: P2= 131 ps
1070 s: P2= 165 ps
535 s: P2= 200 ps
268 s: P2= 243 ps
134 s: P2= 415 ps
67 s: P2= 597 ps
33 s: P2= 869 ps
2021−04−08 pt09BP2521089_9
Median = −51.01 ns
Median = −56.16 ns
P1 /ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s


211044 s: E1= 5 ps
105522 s: E1= 29 ps
52761 s: E1= 69 ps
26380 s: E1= 100 ps
13190 s: E1= 76 ps
6595 s: E1= 91 ps
3298 s: E1= 100 ps
1649 s: E1= 117 ps
824 s: E1= 142 ps
412 s: E1= 185 ps
206 s: E1= 274 ps
103 s: E1= 407 ps
52 s: E1= 568 ps
211640 s: E5= 36 ps
105820 s: E5= 50 ps
52910 s: E5= 112 ps
26455 s: E5= 132 ps
13227 s: E5= 120 ps
6614 s: E5= 104 ps
3307 s: E5= 116 ps
1653 s: E5= 138 ps
827 s: E5= 177 ps
413 s: E5= 217 ps
207 s: E5= 315 ps
103 s: E5= 497 ps
52 s: E5= 686 ps
2021−04−08 pt09BP2521089_9
Median = −50.59 ns
Median = −47.82 ns
E1 /ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s

PT10-BP1J

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 209716
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 30574 high elev obs : 67.550 65.622
Iteration 0: Obs used = 359217; Huge residuals = 4; Large residuals = 1095
Iteration 1: Obs used = 359213; Huge residuals = 0; Large residuals = 1095
Computed code bias (P1/P2)/m = 67.362 65.450
Computed baseline (X,Y,Z)/m = 5.821 -4.796 -4.211
RMS of residuals /m = 0.435

Number of phase differences to fit baseline
L1/L2 = 207859
L5 = 104992
A priori baseline (X,Y,Z)/m = 5.821 -4.796 -4.211
24210 clock jitters computed out of 24210 intervals
AVE jitter /ps = -0.1 RMS jitter /ps = 3.9

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.130 -0.004 0.150
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.141 -0.000 0.160
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.145 0.011 0.156
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 5.957 -4.798 -4.056
24210 clock jitters computed out of 24210 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 0.3

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.001 -0.004 0.002
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.012 -0.000 0.012
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.016 0.005 0.010
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m = 5.958 -4.803 -4.054
Final baseline L2 (X,Y,Z)/m = 5.969 -4.798 -4.044
Final baseline L5 (X,Y,Z)/m = 5.972 -4.794 -4.046

COMPUTATION OF CODE DIFFERENCES

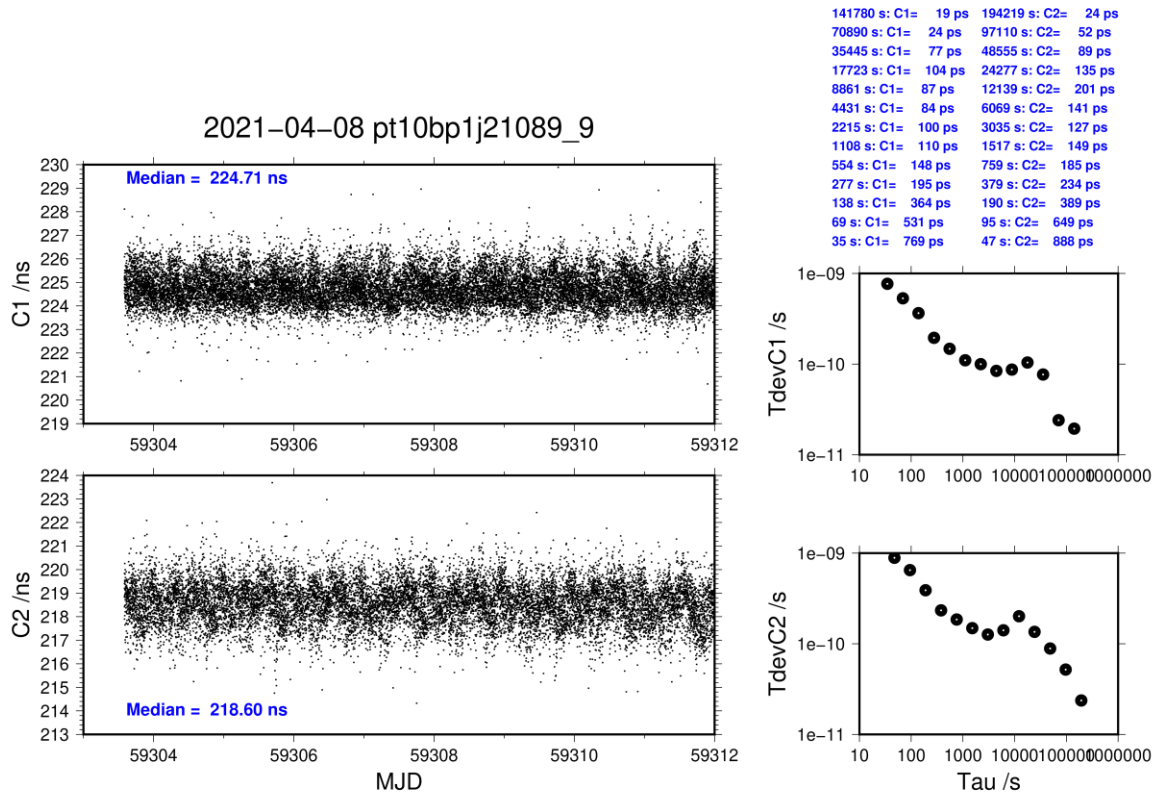
Total number of code differences = 508114

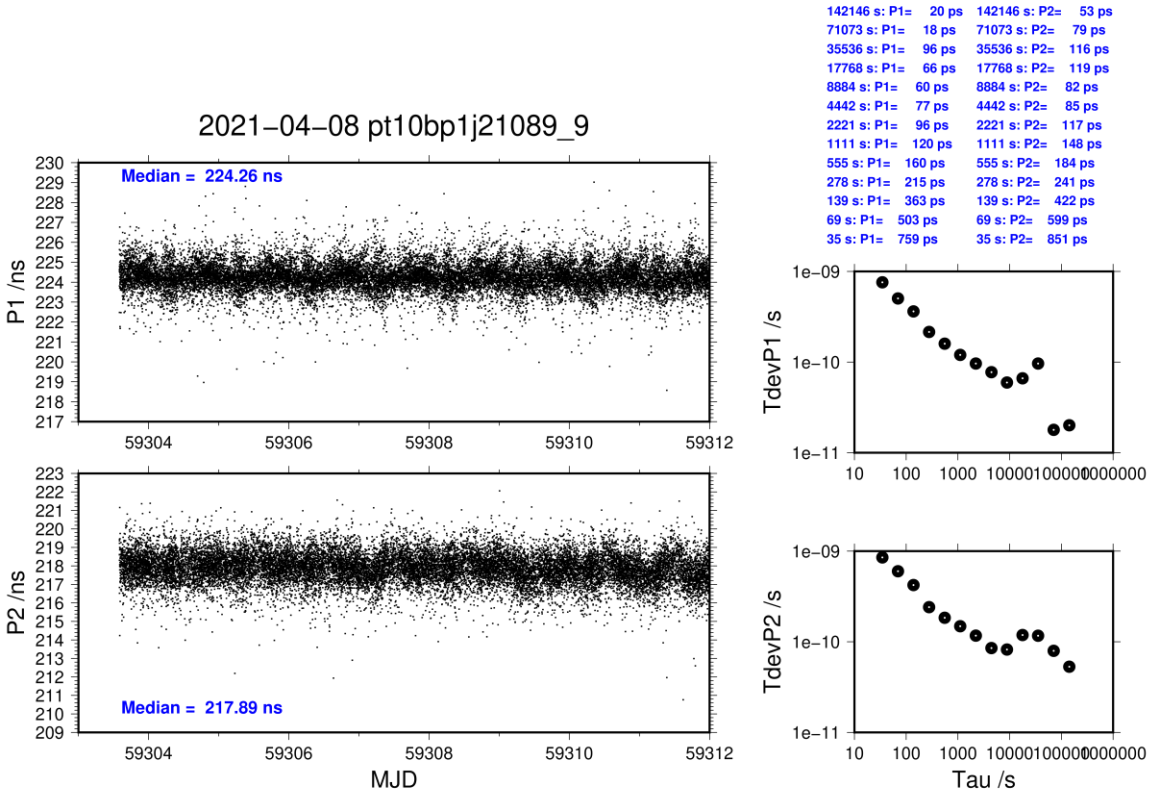
Global average of individual differences

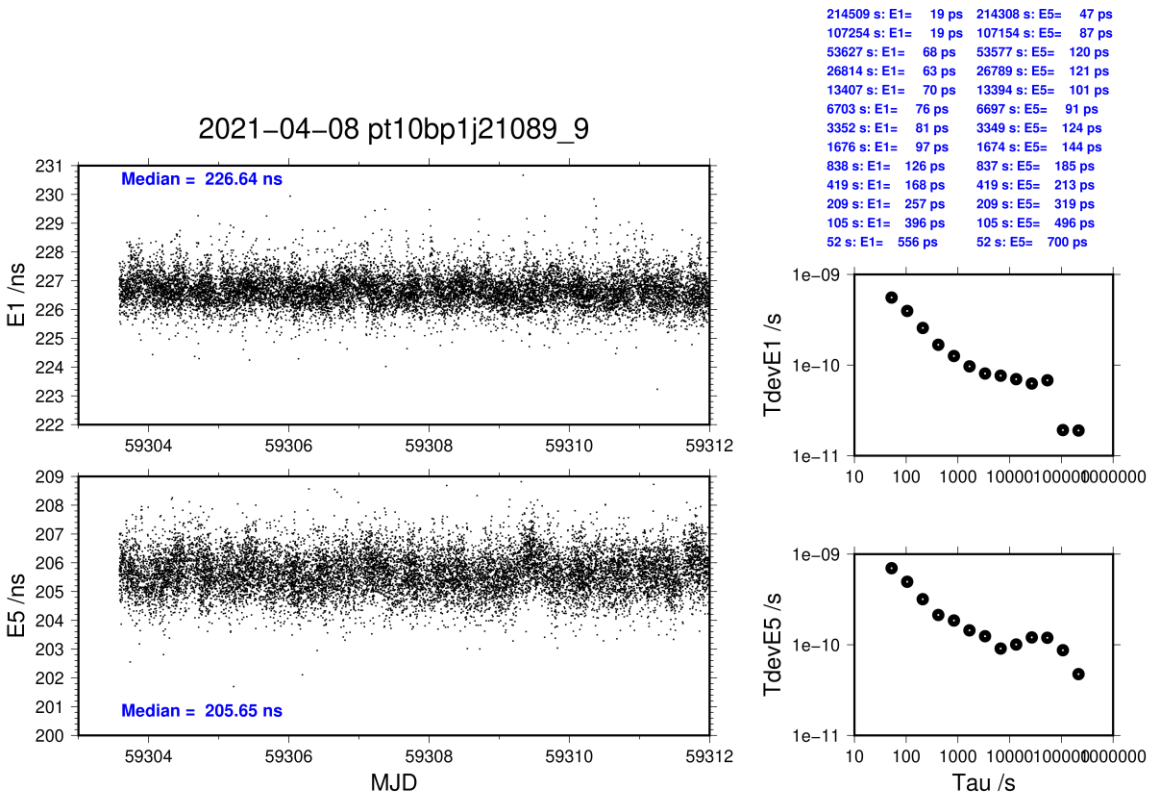
Code	#pts	ave/ns	rms/ns
C1	210123	224.746	1.219
C2	153422	218.559	1.455
P1	209652	224.272	1.371
P2	209651	217.868	1.483
E1	138920	226.667	0.951
E5	139001	205.656	1.008

Number of 300s epochs in out file = 2423

Code	#pts	median/ns	ave/ns	rms/ns
C1	21001	224.708	224.757	0.742
C2	15331	218.601	218.565	0.895
P1	20947	224.261	224.285	0.730
P2	20947	217.888	217.877	0.855
E1	13881	226.640	226.674	0.553
E5	13894	205.646	205.656	0.713




142146 s: P1= 20 ps 142146 s: P2= 53 ps
71073 s: P1= 18 ps 71073 s: P2= 79 ps
35536 s: P1= 96 ps 35536 s: P2= 116 ps
17768 s: P1= 66 ps 17768 s: P2= 119 ps
8884 s: P1= 60 ps 8884 s: P2= 82 ps
4442 s: P1= 77 ps 4442 s: P2= 85 ps
2221 s: P1= 96 ps 2221 s: P2= 117 ps
1111 s: P1= 120 ps 1111 s: P2= 148 ps
555 s: P1= 160 ps 555 s: P2= 184 ps
278 s: P1= 215 ps 278 s: P2= 241 ps
139 s: P1= 363 ps 139 s: P2= 422 ps
69 s: P1= 503 ps 69 s: P2= 599 ps
35 s: P1= 759 ps 35 s: P2= 851 ps
2021−04−08 pt10bp1j21089_9
Median = 224.26 ns
Median = 217.89 ns
P1 /ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s


214509 s: E1= 19 ps 214308 s: E5= 47 ps
107254 s: E1= 19 ps 107154 s: E5= 87 ps
53627 s: E1= 68 ps 53577 s: E5= 120 ps
26814 s: E1= 63 ps 26789 s: E5= 121 ps
13407 s: E1= 70 ps 13394 s: E5= 101 ps
6703 s: E1= 76 ps 6697 s: E5= 91 ps
3352 s: E1= 81 ps 3349 s: E5= 124 ps
1676 s: E1= 97 ps 1674 s: E5= 144 ps
838 s: E1= 126 ps 837 s: E5= 185 ps
419 s: E1= 168 ps 419 s: E5= 213 ps
209 s: E1= 257 ps 209 s: E5= 319 ps
105 s: E1= 396 ps 105 s: E5= 496 ps
52 s: E1= 556 ps 52 s: E5= 700 ps
2021−04−08 pt10bp1j21089_9
Median = 226.64 ns
Median = 205.65 ns
E1 /ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s

PT10-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 215540
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 32079 high elev obs : 37.007 33.658
Iteration 0: Obs used = 367972; Huge residuals = 46; Large residuals = 1084
Iteration 1: Obs used = 367963; Huge residuals = 0; Large residuals = 1047
Computed code bias (P1/P2)/m = 36.680 33.420
Computed baseline (X,Y,Z)/m = 5.441 -5.606 -3.838
RMS of residuals /m = 0.431

Number of phase differences to fit baseline
L1/L2 = 213562
L5 = 104882
A priori baseline (X,Y,Z)/m = 5.441 -5.606 -3.838
24210 clock jitters computed out of 24210 intervals
AVE jitter /ps = -0.1 RMS jitter /ps = 4.2

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.091 -0.015 0.159
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.091 -0.011 0.159
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.089 -0.000 0.152
RMS of residuals L5 /m = 0.004

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 5.533 -5.620 -3.679
24210 clock jitters computed out of 24210 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 0.3

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.005 -0.006 0.007
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.005 -0.002 0.007
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.003 0.003 0.001
RMS of residuals L5 /m = 0.004

Final baseline L1 (X,Y,Z)/m = 5.537 -5.625 -3.672
Final baseline L2 (X,Y,Z)/m = 5.538 -5.622 -3.672
Final baseline L5 (X,Y,Z)/m = 5.536 -5.616 -3.678

COMPUTATION OF CODE DIFFERENCES

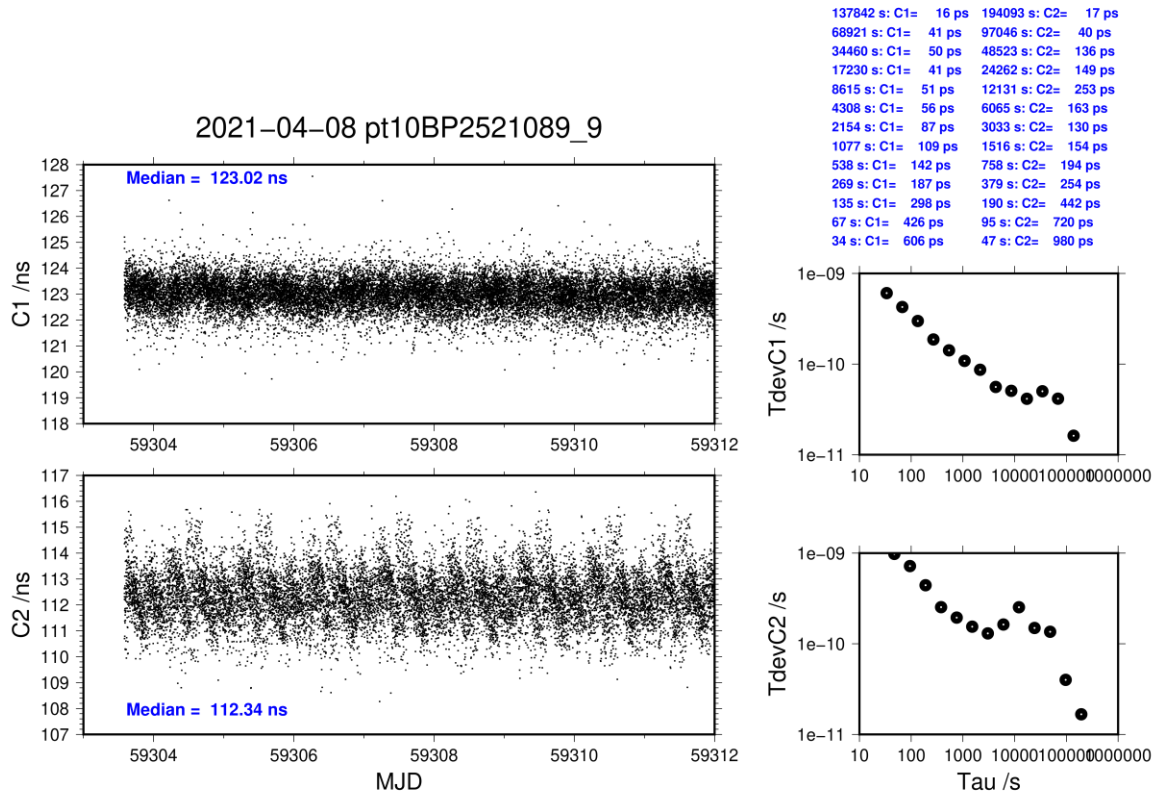
Total number of code differences = 535666

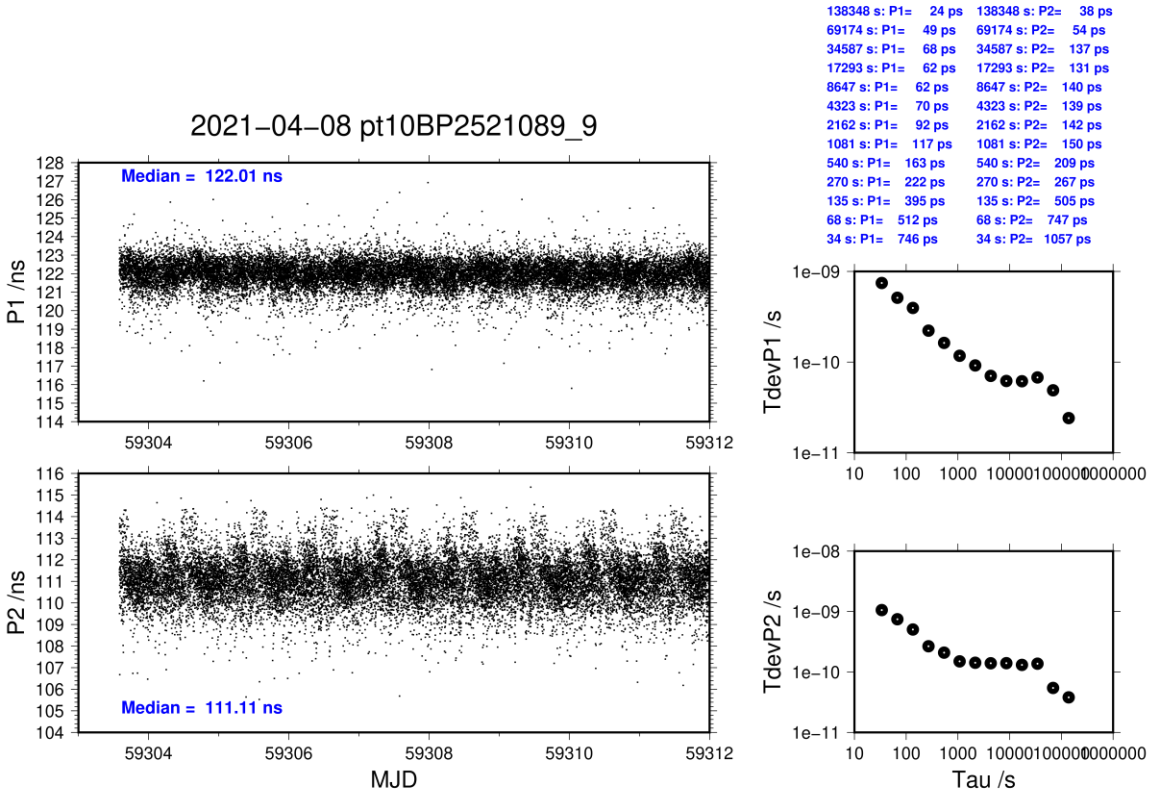
Global average of individual differences

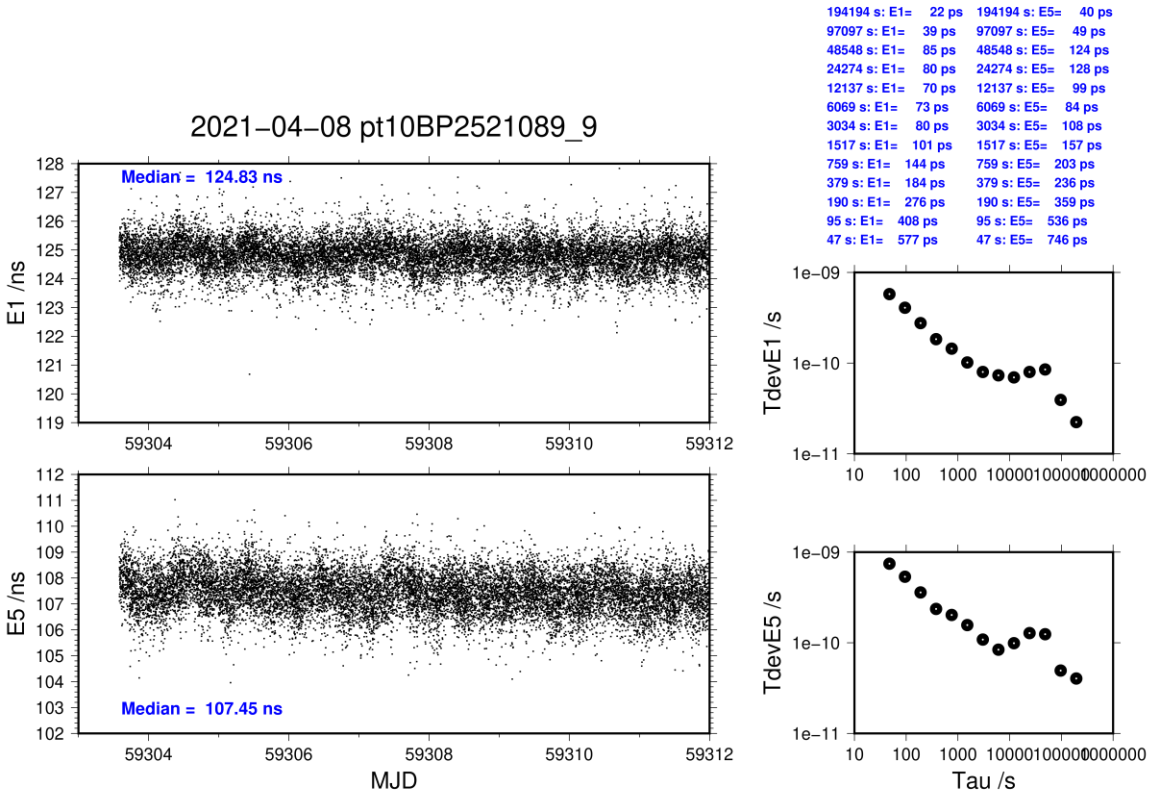
Code	#pts	ave/ns	rms/ns
C1	216155	122.992	1.034
C2	153543	112.347	1.385
P1	215455	121.958	1.291
P2	215454	111.091	1.529
E1	153466	124.808	0.912
E5	153466	107.444	1.023

Number of 300s epochs in out file = 2423

Code	#pts	median/ns	ave/ns	rms/ns
C1	21601	123.018	123.003	0.603
C2	15341	112.336	112.352	0.996
P1	21522	122.008	121.973	0.739
P2	21522	111.110	111.100	1.035
E1	15333	124.827	124.813	0.582
E5	15333	107.449	107.443	0.777




2021−04−08 pt10BP2521089_9
Median = 122.01 ns
Median = 111.11 ns
P1 /ns
P2 /ns
MJD
138348 s: P1= 24 ps 138348 s: P2= 38 ps
69174 s: P1= 49 ps 69174 s: P2= 54 ps
34587 s: P1= 68 ps 34587 s: P2= 137 ps
17293 s: P1= 62 ps 17293 s: P2= 131 ps
8647 s: P1= 62 ps 8647 s: P2= 140 ps
4323 s: P1= 70 ps 4323 s: P2= 139 ps
2162 s: P1= 92 ps 2162 s: P2= 142 ps
1081 s: P1= 117 ps 1081 s: P2= 150 ps
540 s: P1= 163 ps 540 s: P2= 209 ps
270 s: P1= 222 ps 270 s: P2= 267 ps
135 s: P1= 395 ps 135 s: P2= 505 ps
68 s: P1= 512 ps 68 s: P2= 747 ps
34 s: P1= 746 ps 34 s: P2= 1057 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−04−08 pt10BP2521089_9
Median = 124.83 ns
Median = 107.45 ns
E1 /ns
E5 /ns
MJD
194194 s: E1= 22 ps 194194 s: E5= 40 ps
97097 s: E1= 39 ps 97097 s: E5= 49 ps
48548 s: E1= 85 ps 48548 s: E5= 124 ps
24274 s: E1= 80 ps 24274 s: E5= 128 ps
12137 s: E1= 70 ps 12137 s: E5= 99 ps
6069 s: E1= 73 ps 6069 s: E5= 84 ps
3034 s: E1= 80 ps 3034 s: E5= 108 ps
1517 s: E1= 101 ps 1517 s: E5= 157 ps
759 s: E1= 144 ps 759 s: E5= 203 ps
379 s: E1= 184 ps 379 s: E5= 236 ps
190 s: E1= 276 ps 190 s: E5= 359 ps
95 s: E1= 408 ps 95 s: E5= 536 ps
47 s: E1= 577 ps 47 s: E5= 746 ps
TdevE1 /s
TdevE5 /s
Tau /s

PTBB-BP1J

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 233565
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 30575 high elev obs : 48.267 47.537
Iteration 0: Obs used = 405723; Huge residuals = 908; Large residuals = 2285
Iteration 1: Obs used = 405887; Huge residuals = 0; Large residuals = 1213
Computed code bias (P1/P2)/m = 48.219 47.534
Computed baseline (X,Y,Z)/m = 2.589 -2.114 -2.070
RMS of residuals /m = 0.484

Number of phase differences to fit baseline
L1/L2 = 176138
L5 = 89698
A priori baseline (X,Y,Z)/m = 2.589 -2.114 -2.070
18474 clock jitters computed out of 18474 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 3.4

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.108 0.055 0.091
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.114 0.054 0.094
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.117 0.061 0.096
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 2.700 -2.059 -1.977
18474 clock jitters computed out of 18474 intervals
AVE jitter /ps = -0.1 RMS jitter /ps = 0.2

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.001 0.008 0.002
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.006 0.006 0.005
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.009 0.010 0.010
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m = 2.701 -2.052 -1.975
Final baseline L2 (X,Y,Z)/m = 2.706 -2.053 -1.972
Final baseline L5 (X,Y,Z)/m = 2.709 -2.049 -1.967

COMPUTATION OF CODE DIFFERENCES

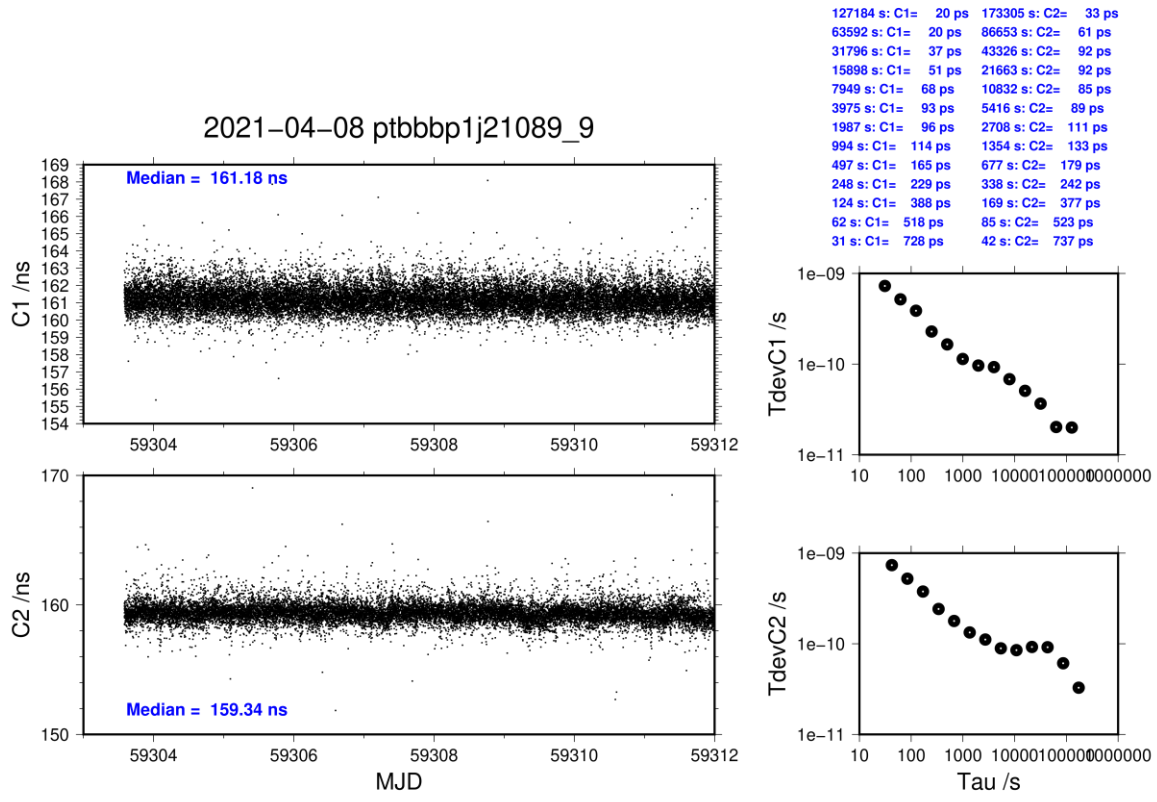
Total number of code differences = 588764

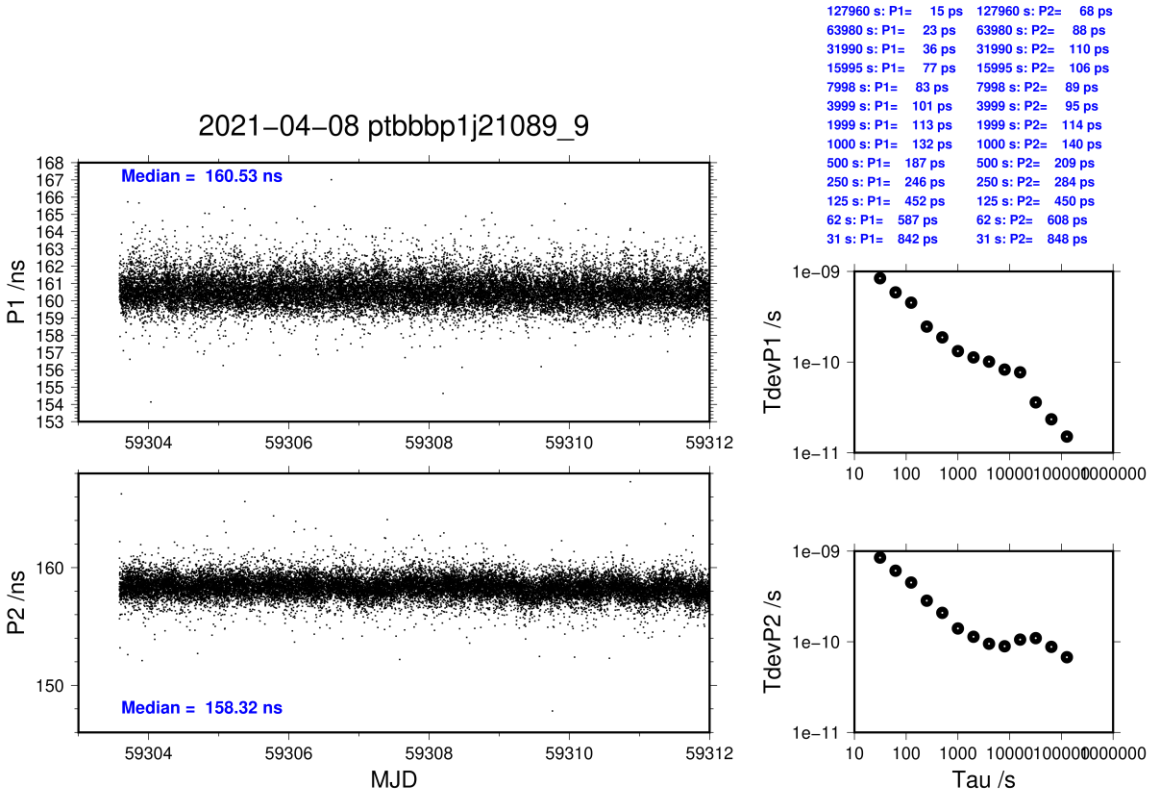
Global average of individual differences

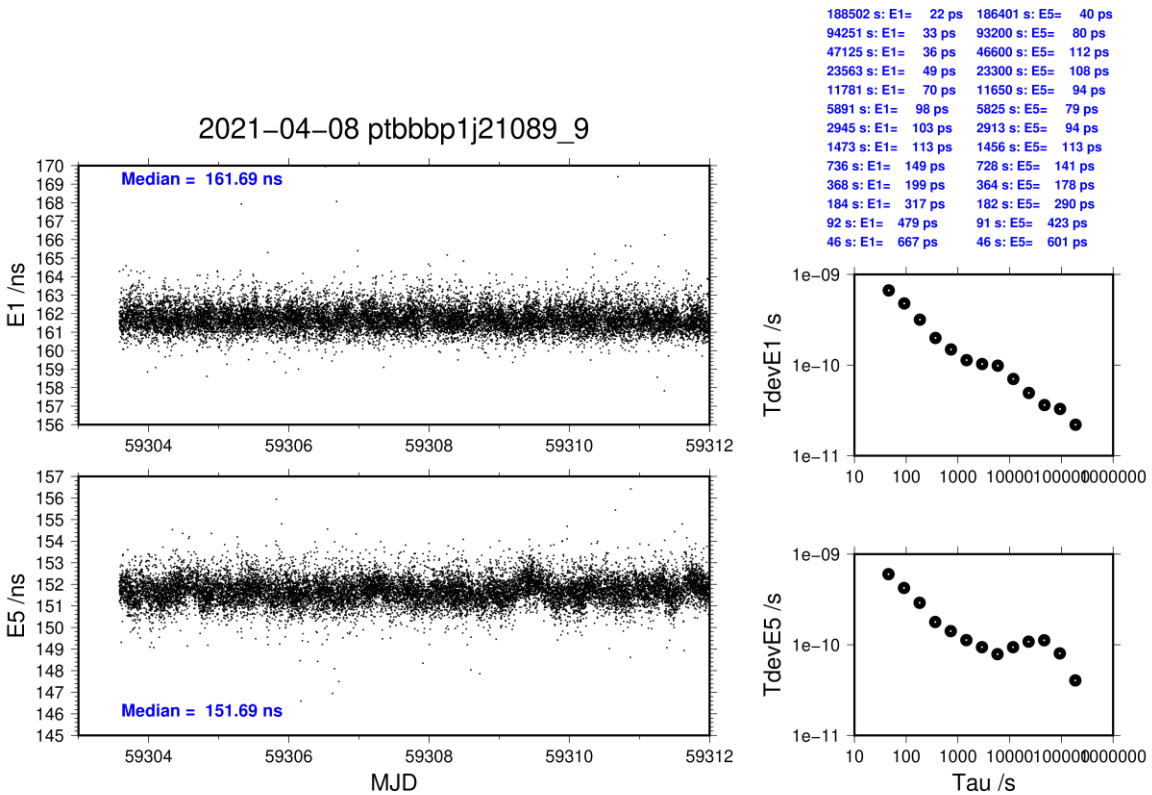
Code	#pts	ave/ns	rms/ns
C1	234320	161.220	1.526
C2	171826	159.368	1.656
P1	233041	160.587	1.564
P2	233033	158.312	1.636
E1	158270	161.732	1.282
E5	160028	151.699	1.049

Number of 300s epochs in out file = 2424

Code	#pts	median/ns	ave/ns	rms/ns
C1	23411	161.177	161.221	0.732
C2	17181	159.343	159.377	0.754
P1	23269	160.529	160.585	0.839
P2	23269	158.317	158.317	0.878
E1	15796	161.693	161.737	0.664
E5	15974	151.692	151.698	0.614




2021−04−08 ptbbbp1j21089_9
Median = 160.53 ns
Median = 158.32 ns
P1 /ns
P2 /ns
MJD
127960 s: P1= 15 ps
63980 s: P1= 23 ps
31990 s: P1= 36 ps
15995 s: P1= 77 ps
7998 s: P1= 83 ps
3999 s: P1= 101 ps
1999 s: P1= 113 ps
1000 s: P1= 132 ps
500 s: P1= 187 ps
250 s: P1= 246 ps
125 s: P1= 452 ps
62 s: P1= 587 ps
31 s: P1= 842 ps
127960 s: P2= 68 ps
63980 s: P2= 88 ps
31990 s: P2= 110 ps
15995 s: P2= 106 ps
7998 s: P2= 89 ps
3999 s: P2= 95 ps
1999 s: P2= 114 ps
1000 s: P2= 140 ps
500 s: P2= 209 ps
250 s: P2= 284 ps
125 s: P2= 450 ps
62 s: P2= 608 ps
31 s: P2= 848 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−04−08 ptbbbp1j21089_9
Median = 161.69 ns
Median = 151.69 ns
E1 /ns
E5 /ns
MJD
188502 s: E1= 22 ps
94251 s: E1= 33 ps
47125 s: E1= 36 ps
23563 s: E1= 49 ps
11781 s: E1= 70 ps
5891 s: E1= 98 ps
2945 s: E1= 103 ps
1473 s: E1= 113 ps
736 s: E1= 149 ps
368 s: E1= 199 ps
184 s: E1= 317 ps
92 s: E1= 479 ps
46 s: E1= 667 ps
186401 s: E5= 40 ps
93200 s: E5= 80 ps
46600 s: E5= 112 ps
23300 s: E5= 108 ps
11650 s: E5= 94 ps
5825 s: E5= 79 ps
2913 s: E5= 94 ps
1456 s: E5= 113 ps
728 s: E5= 141 ps
364 s: E5= 178 ps
182 s: E5= 290 ps
91 s: E5= 423 ps
46 s: E5= 601 ps
TdevE1 /s
TdevE5 /s
Tau /s

PTBB-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 212012
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 30575 high elev obs : 17.642 15.513
Iteration 0: Obs used = 364527; Huge residuals = 0; Large residuals = 377
Iteration 1: Obs used = 364527; Huge residuals = 0; Large residuals = 377
Computed code bias (P1/P2)/m = 17.487 15.476
Computed baseline (X,Y,Z)/m = 2.257 -2.915 -1.647
RMS of residuals /m = 0.448

Number of phase differences to fit baseline
L1/L2 = 160854
L5 = 81361
A priori baseline (X,Y,Z)/m = 2.257 -2.915 -1.647
18474 clock jitters computed out of 18474 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 3.7

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.024 0.029 0.051
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.012 0.034 0.042
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.012 0.034 0.038
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 2.275 -2.884 -1.600
18474 clock jitters computed out of 18474 intervals
AVE jitter /ps = -0.1 RMS jitter /ps = 0.1

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.006 0.005 0.006
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = -0.006 0.010 -0.002
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = -0.006 0.010 -0.006
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m = 2.281 -2.879 -1.594
Final baseline L2 (X,Y,Z)/m = 2.269 -2.874 -1.603
Final baseline L5 (X,Y,Z)/m = 2.269 -2.874 -1.606

COMPUTATION OF CODE DIFFERENCES

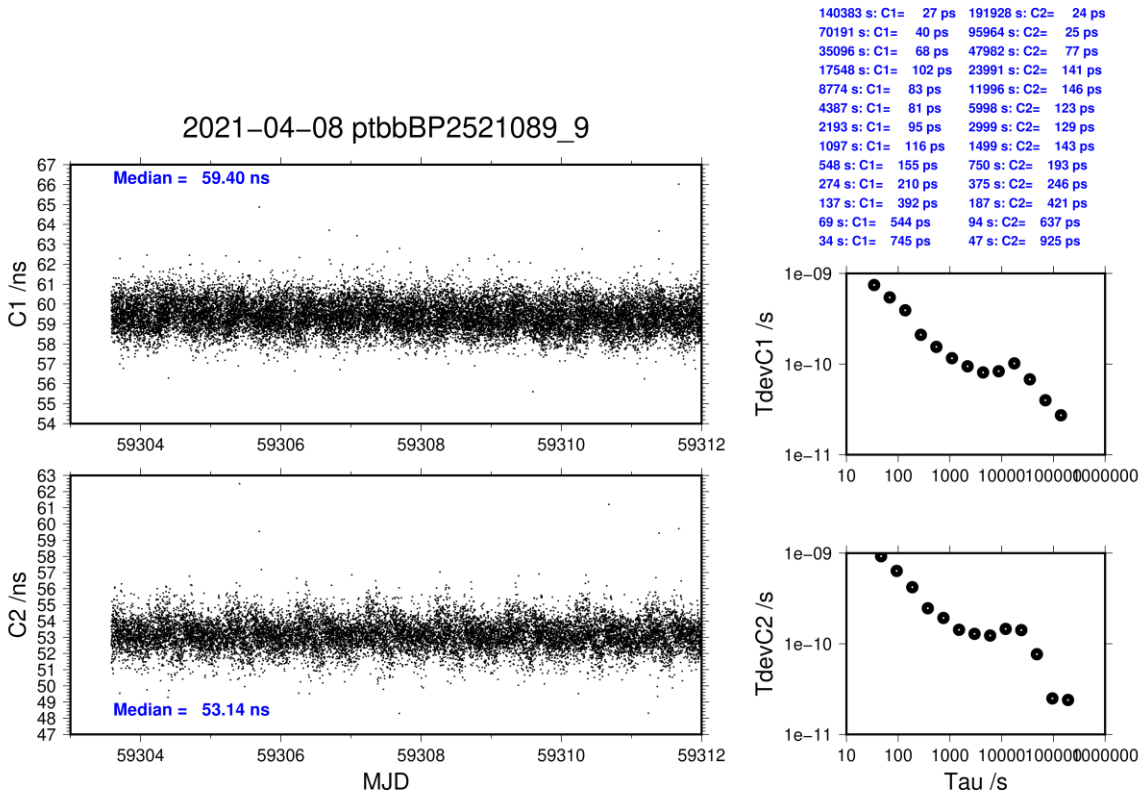
Total number of code differences = 690671

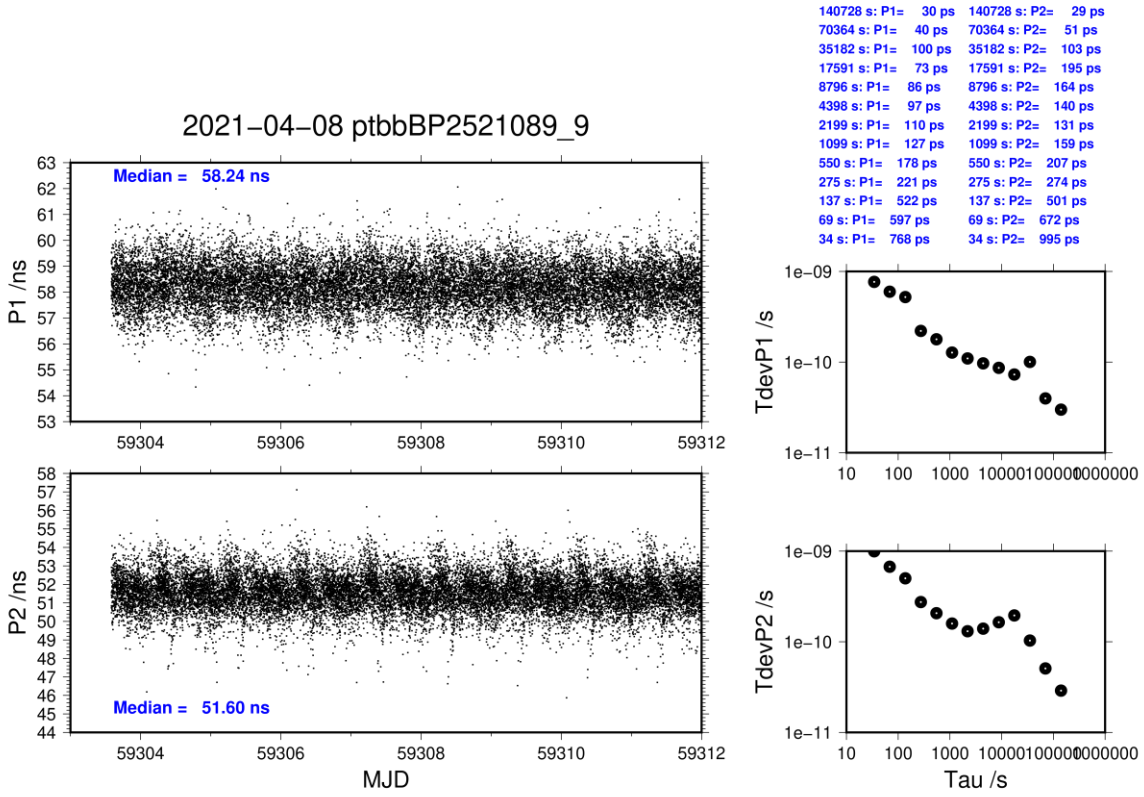
Global average of individual differences

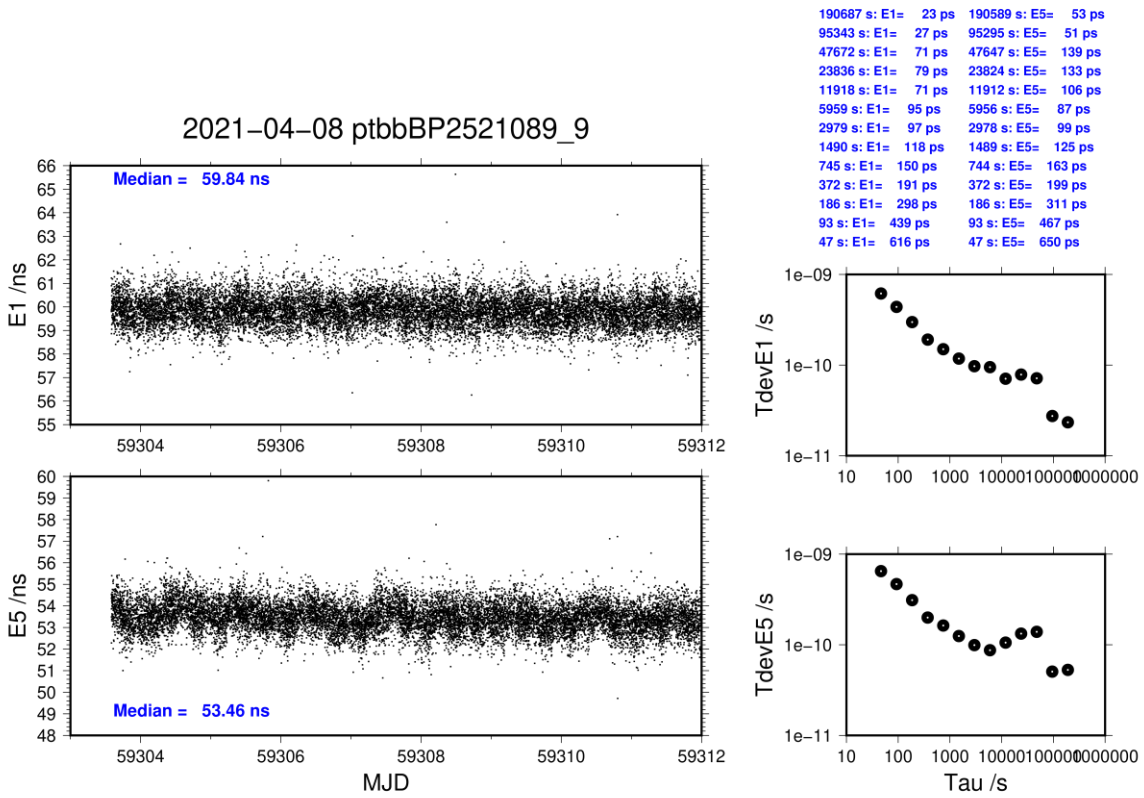
Code	#pts	ave/ns	rms/ns
C1	212357	59.434	1.297
C2	155340	53.143	1.387
P1	211911	58.238	1.344
P2	211906	51.570	1.549
E1	156336	59.826	1.090
E5	156386	53.468	0.926

Number of 300s epochs in out file = 2424

Code	#pts	median/ns	ave/ns	rms/ns
C1	21210	59.404	59.427	0.751
C2	15514	53.137	53.149	0.903
P1	21158	58.238	58.228	0.834
P2	21158	51.602	51.586	0.986
E1	15615	59.835	59.836	0.623
E5	15623	53.459	53.465	0.680




140728 s: P1= 30 ps
70364 s: P1= 40 ps
35182 s: P1= 100 ps
17591 s: P1= 73 ps
8796 s: P1= 86 ps
4398 s: P1= 97 ps
2199 s: P1= 110 ps
1099 s: P1= 127 ps
550 s: P1= 178 ps
275 s: P1= 221 ps
137 s: P1= 522 ps
69 s: P1= 597 ps
34 s: P1= 768 ps
140728 s: P2= 29 ps
70364 s: P2= 51 ps
35182 s: P2= 103 ps
17591 s: P2= 195 ps
8796 s: P2= 164 ps
4398 s: P2= 140 ps
2199 s: P2= 131 ps
1099 s: P2= 159 ps
550 s: P2= 207 ps
275 s: P2= 274 ps
137 s: P2= 501 ps
69 s: P2= 672 ps
34 s: P2= 995 ps
2021−04−08 ptbbBP2521089_9
Median = 58.24 ns
P1 /ns
Median = 51.60 ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s


190687 s: E1= 23 ps
95343 s: E1= 27 ps
47672 s: E1= 71 ps
23836 s: E1= 79 ps
11918 s: E1= 71 ps
5959 s: E1= 95 ps
2979 s: E1= 97 ps
1490 s: E1= 118 ps
745 s: E1= 150 ps
372 s: E1= 191 ps
186 s: E1= 298 ps
93 s: E1= 439 ps
47 s: E1= 616 ps
190589 s: E5= 53 ps
95295 s: E5= 51 ps
47647 s: E5= 139 ps
23824 s: E5= 133 ps
11912 s: E5= 106 ps
5956 s: E5= 87 ps
2978 s: E5= 99 ps
1489 s: E5= 125 ps
744 s: E5= 163 ps
372 s: E5= 199 ps
186 s: E5= 311 ps
93 s: E5= 467 ps
47 s: E5= 650 ps
2021−04−08 ptbbBP2521089_9
Median = 59.84 ns
E1 /ns
Median = 53.46 ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s

2.4/ OP (21112)

Period

MJD 59326 to 59336

Delays

BP1J: (cf page 4)
- X_O = 145.71 ns (cf page 94)
- X_P = 105.47 ns (53.52+51.95)
- REFDLY = 251.18 ns
- CABDLY = 176.38 ns (C211)

BP25: (cf page 4 & 94)
- REFDLY = 105.37 ns (53.42+51.95)
- CABDLY = 176.24 ns (C208)

OP71: (cf page 90)
- REFDLY = 192.10 ns
- CABDLY = 128.70 ns

OP73: (cf page 91)
- REFDLY = 85.22 ns
- CABDLY = 129.60 ns

OPMT (OP02): (cf page 92)
- REFDLY = 137.20 ns
- CABDLY = 156.50 ns

Setup at the OP

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory:	OP
Date and hour of the beginning of measurements:	22-04-2021 14:00 UTC
Date and hour of the end of measurements:	3-05-2021 12:00 UTC

Information on the system

	Local:	Travelling:
4-character BIPM code	OP71	
• Receiver maker and type: Receiver serial number:	SEPT POLARX4TR 3009606	
1 PPS trigger level /V:	1V	
• Antenna cable maker and type: Phase stabilised cable (Y/N):		
Length outside the building /m:		
• Antenna maker and type: Antenna serial number:	LEIAR25.R4 725 498	
Temperature (if stabilised) /°C		

Measured delays /ns

(if needed fill box "Additional Information" below)

	Local:	Travelling:
• Delay from local UTC to receiver 1 ~~PPS-in~~ PPS-OUT	192,1 ns.	
Delay from 1 PPS-in to internal Reference (if different): (see section 2 for details)		
• Antenna cable delay:	128,7 ns.	(1)
Splitter delay (if any):		(1)
Additional cable delay (if any):		(1)

Data used for the generation of CGGTTS files

• INT DLY (GPS) /ns:	P1 = 55,2 ns P2 = 53,8 ns
• INT DLY (Galileo) /ns:	E1 = 55,7 ns E5a = 64,2 ns
• INT DLY (GLONASS) /ns:	
• CAB DLY /ns:	128,7 ns
• REF DLY /ns:	192,1 ns
• Coordinates reference frame:	
Latitude or X /m:	4 202 779,90
Longitude or Y /m:	171 370,77
Height or Z /m:	4 778 660,82

General information

• Rise time of the local UTC pulse:	
• Is the laboratory air conditioned:	YES
Set temperature value and uncertainty:	22 ± 1°C
Set humidity value and uncertainty:	

(1) For a trip with closure, not needed if the traveling equipment is used in the same set-up throughout.

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory:	OP
Date and hour of the beginning of measurements:	22-04-2021 14:00 UTC
Date and hour of the end of measurements:	03-05-2021 12:00 UTC

Information on the system

	Local:	Travelling:
4-character BIPM code	OP73	
• Receiver maker and type: Receiver serial number:	SEPT POLARX5TR 3069470	
1 PPS trigger level /V:	1V	
• Antenna cable maker and type: Phase stabilised cable (Y/N):		
Length outside the building /m:		
• Antenna maker and type: Antenna serial number:	SEPCHOKE_B3E6 710071	
Temperature (if stabilised) /°C		

Measured delays /ns

(if needed fill box "Additional Information" below)

	Local:	Travelling:
• Delay from local UTC to receiver 1 PPS-in:	55,783 ns	
Delay from 1 PPS-in to internal Reference (if different): (see section 2 for details)	29,435 ns.	
• Antenna cable delay:	129,6 ns.	(1)
Splitter delay (if any):		(1)
Additional cable delay (if any):		(1)

Data used for the generation of CGGTTS files

• INT DLY (GPS) /ns:	P1=29,8 ns P2=26,2 ns
• INT DLY (Galileo) /ns:	
• INT DLY (GLONASS) /ns:	
• CAB DLY /ns:	129,6 ns
• REF DLY /ns:	85,2 ns
• Coordinates reference frame:	
Latitude or X /m:	4 202 777,07
Longitude or Y /m:	171 367,03
Height or Z /m:	4 778 661,39

General information

• Rise time of the local UTC pulse:	
• Is the laboratory air conditioned:	YES
Set temperature value and uncertainty:	22±1°C.
Set humidity value and uncertainty:	

(1) For a trip with closure, not needed if the traveling equipment is used in the same set-up throughout.

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory:	OP
Date and hour of the beginning of measurements:	22-04-2021 14:00 UTC
Date and hour of the end of measurements:	03-05-2021 12:00 UTC

Information on the system

	Local:	Travelling:
4-character BIPM code	OPMT	
• Receiver maker and type: Receiver serial number:	ASHTECH Z-XII3T 02962	
1 PPS trigger level /V:	1V	
• Antenna cable maker and type: Phase stabilised cable (Y/N):		
Length outside the building /m:		
• Antenna maker and type: Antenna serial number:	35-02-TSADM 00019	
Temperature (if stabilised) /°C		

Measured delays /ns

(if needed fill box "Additional Information" below)

	Local:	Travelling:
• Delay from local UTC to receiver 1 PPS-in:	137,2 ns	
Delay from 1 PPS-in to internal Reference (if different): (see section 2 for details)		
• Antenna cable delay:	156,5 ns.	(1)
Splitter delay (if any):		(1)
Additional cable delay (if any):		(1)

Data used for the generation of CGGTTS files

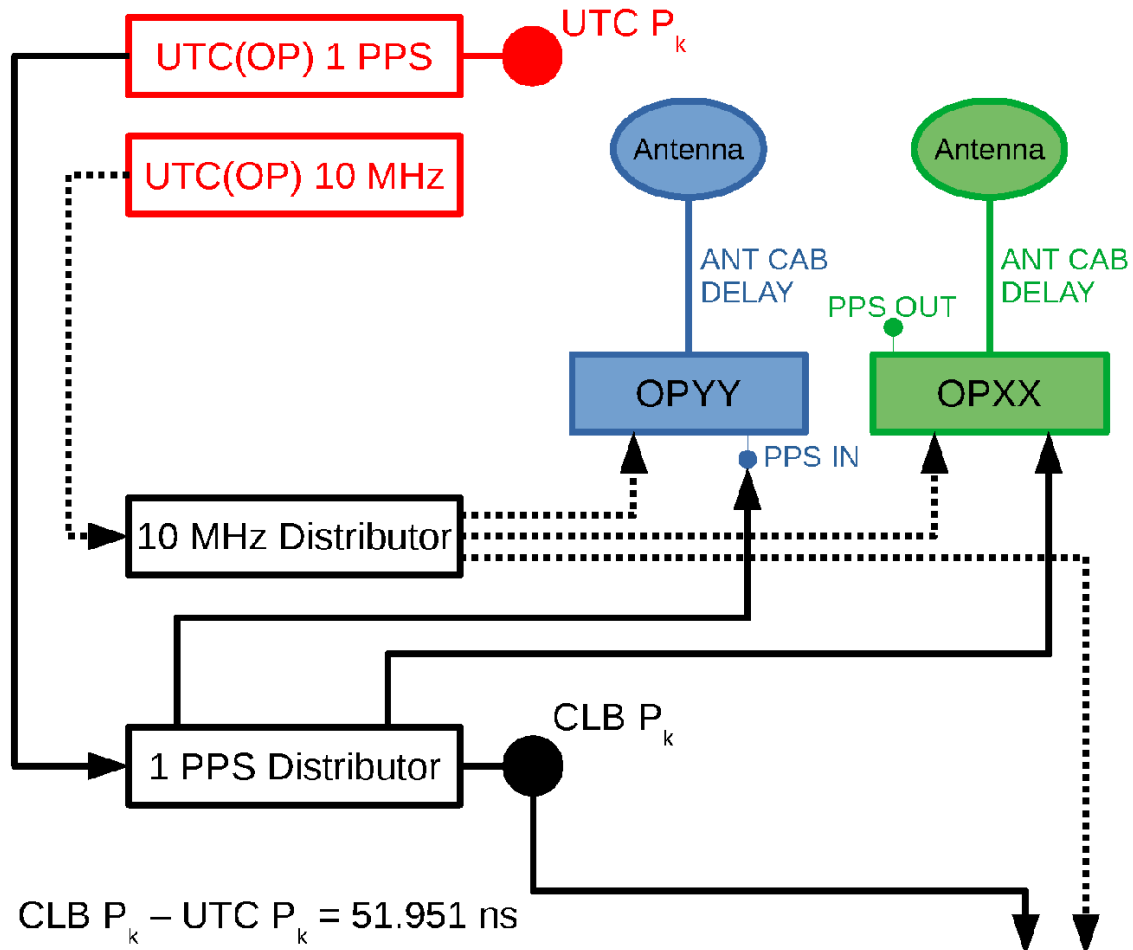
• INT DLY (GPS) /ns:	P1 = 308,4 ns P2 = 320,2 ns
• INT DLY (Galileo) /ns:	
• INT DLY (GLONASS) /ns:	
• CAB DLY /ns:	156,5 ns
• REF DLY /ns:	137,2 ns
• Coordinates reference frame:	
Latitude or X /m:	4 202 777,33
Longitude or Y /m:	171 368,26
Height or Z /m:	4 778 660,50

General information

• Rise time of the local UTC pulse:	
• Is the laboratory air conditioned:	YES
Set temperature value and uncertainty:	22 ± 1°C
Set humidity value and uncertainty:	

(1) For a trip with closure, not needed if the traveling equipment is used in the same set-up throughout.

Diagram of the experiment set-up:



OPXX	PPS OUT – UTC P_k	ANT CAB DELAY
OP71	192.1 ns	128.7 ns
OP73	85.2 ns	129.6 ns
OPYY	PPS IN – UTC P_k	ANT CAB DELAY
OPMT	137.2 ns	156.5 ns

Log of Events / Additional Information :

BP1J : We used a 10 dBm attenuator for the 10 MHz signal input.

We didn't use the BiPM's antenna support. See joined picture.

OP71 : We measured only the PPS OUT, please use it like the REF DELAY : 192,1 ns

BSTS delays values :

start :

CLB P_k - UTC(OP)P_k = 51,951 ns.

1PPS In BP25 - UTC(OP)P_k = 105,632 ns.

1PPS OUT BP1J - UTC(OP)P_k = 251,423 ns.

1PPS In BP1J - UTC(OP)P_k = 105,717 ns.

1PPS OUT BP1J - 1PPS In BP1J = 145,706.

stop :

CLB P_k - UTC(OP)P_k = 51,965 ns.

1PPS In BP25 - UTC(OP)P_k = 105,622 ns

1PPS OUT BP1J - UTC(OP)P_k = 251,391 ns

1PPS IN BP1J - UTC(OP)P_k = 105,723 ns.

1PPS OUT BP 15 - 1PPS IN BP1J = 145,668 ns

OP71-BP1J

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 280359
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 40348 high elev obs : 3.865 3.595
Iteration 0: Obs used = 482289; Huge residuals = 0; Large residuals = 1065
Iteration 1: Obs used = 482289; Huge residuals = 0; Large residuals = 1065
Computed code bias (P1/P2)/m = 3.984 3.702
Computed baseline (X,Y,Z)/m = 3.501 -2.753 -3.036
RMS of residuals /m = 0.391

Number of phase differences to fit baseline
L1/L2 = 278571
L5 = 139973
A priori baseline (X,Y,Z)/m = 3.501 -2.753 -3.036
30009 clock jitters computed out of 30009 intervals
AVE jitter /ps = -0.1 RMS jitter /ps = 3.1

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.007 -0.013 -0.029
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = 0.010 -0.010 -0.023
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.010 -0.011 -0.024
RMS of residuals L5 /m = 0.002

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 3.510 -2.765 -3.062
30009 clock jitters computed out of 30009 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 0.1

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.001 -0.005 -0.004
RMS of residuals L1 /m = 0.002
Computed baseline L2 (X,Y,Z)/m = 0.001 -0.001 0.002
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.002 -0.002 0.000
RMS of residuals L5 /m = 0.002

Final baseline L1 (X,Y,Z)/m = 3.509 -2.770 -3.066
Final baseline L2 (X,Y,Z)/m = 3.511 -2.766 -3.060

Final baseline L5 (X,Y,Z)/m = 3.512 -2.767 -3.062

COMPUTATION OF CODE DIFFERENCES

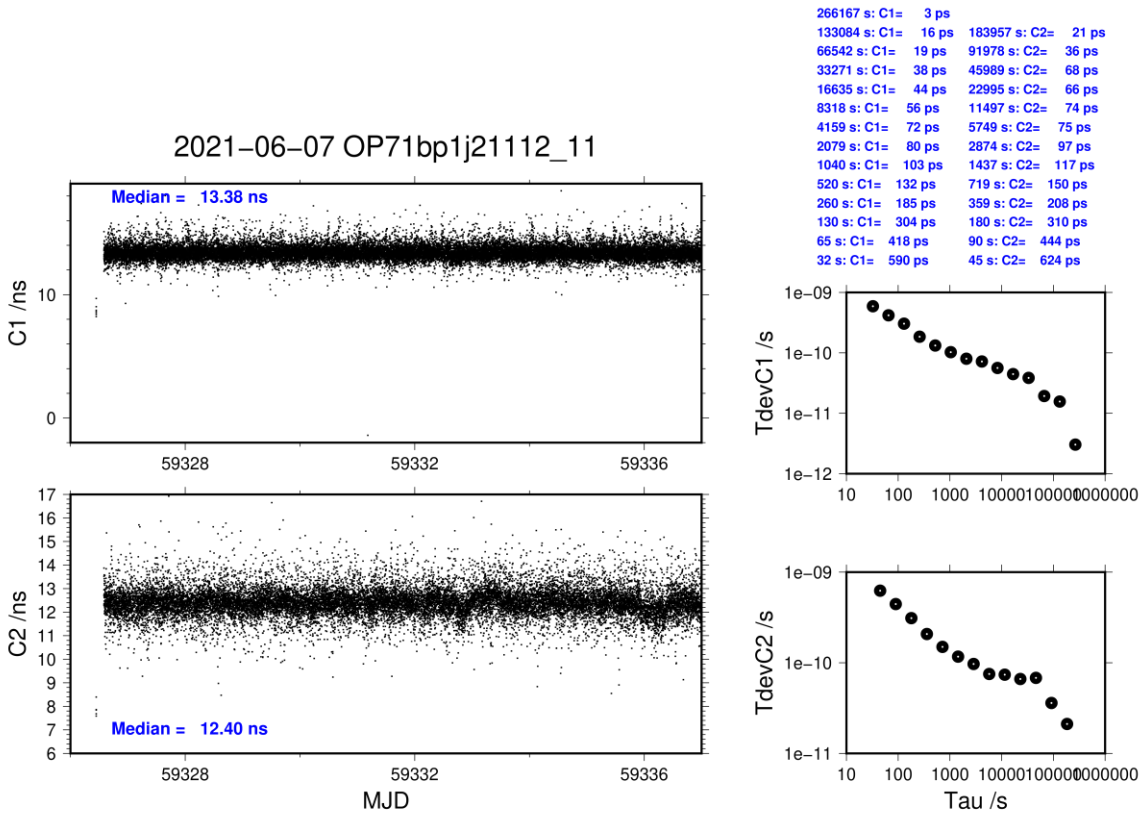
Total number of code differences = 694859

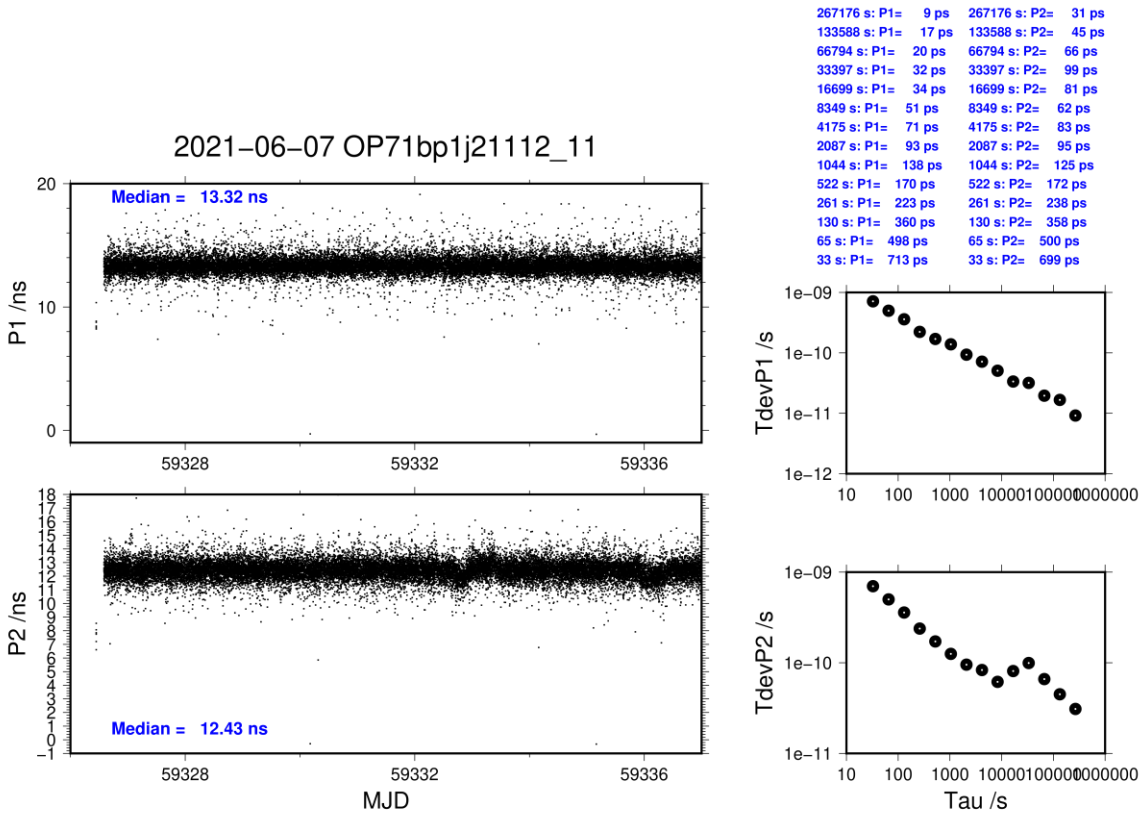
Global average of individual differences

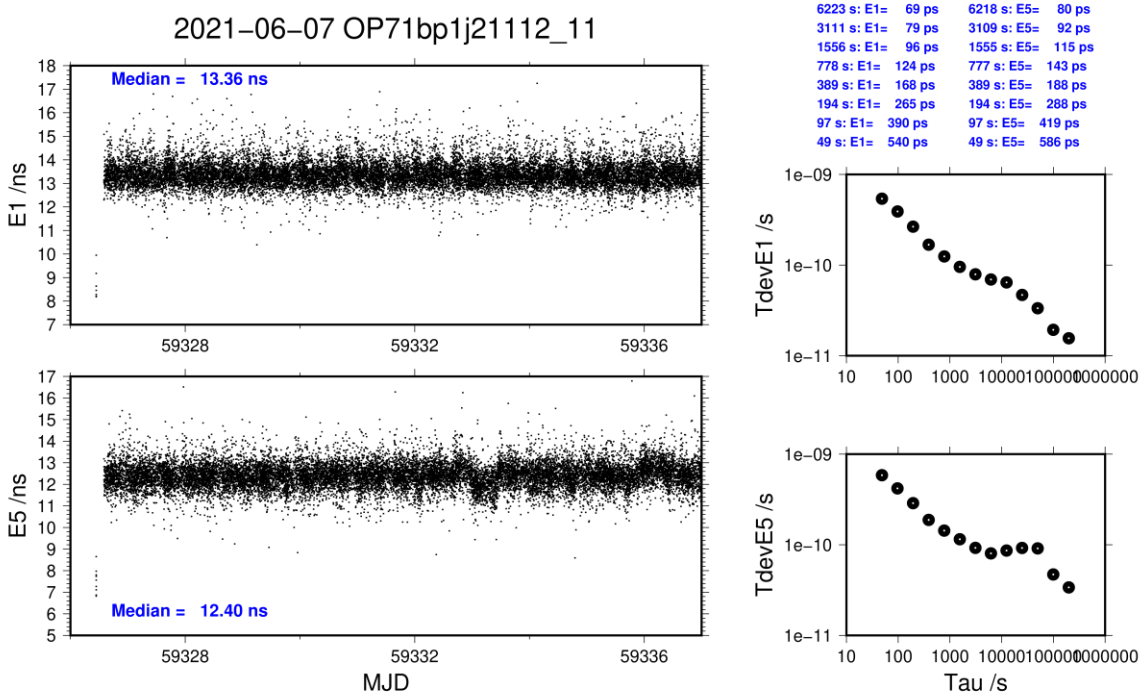
Code	#pts	ave/ns	rms/ns
C1	281477	13.427	1.237
C2	203489	12.413	1.451
P1	280214	13.359	1.360
P2	280214	12.415	1.232
E1	187799	13.409	0.980
E5	188004	12.398	0.908

Number of 300s epochs in out file = 3003

Code	#pts	median/ns	ave/ns	rms/ns
C1	28061	13.376	13.417	0.593
C2	20301	12.400	12.413	0.637
P1	27955	13.317	13.354	0.710
P2	27955	12.428	12.422	0.719
E1	18754	13.357	13.399	0.550
E5	18768	12.397	12.396	0.610




2021−06−07 OP71bp1j21112_11
Median = 13.32 ns
Median = 12.43 ns
P1 /ns
P2 /ns
MJD
267176 s: P1= 9 ps
133588 s: P1= 17 ps
66794 s: P1= 20 ps
33397 s: P1= 32 ps
16699 s: P1= 34 ps
8349 s: P1= 51 ps
4175 s: P1= 71 ps
2087 s: P1= 93 ps
1044 s: P1= 138 ps
522 s: P1= 170 ps
261 s: P1= 223 ps
130 s: P1= 360 ps
65 s: P1= 498 ps
33 s: P1= 713 ps
267176 s: P2= 31 ps
133588 s: P2= 45 ps
66794 s: P2= 66 ps
33397 s: P2= 99 ps
16699 s: P2= 81 ps
8349 s: P2= 62 ps
4175 s: P2= 83 ps
2087 s: P2= 95 ps
1044 s: P2= 125 ps
522 s: P2= 172 ps
261 s: P2= 238 ps
130 s: P2= 358 ps
65 s: P2= 500 ps
33 s: P2= 699 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−06−07 OP71bp1j21112_11
Median = 13.36 ns
Median = 12.40 ns
E1 /ns
E5 /ns
MJD
199132 s: E1= 16 ps
99566 s: E1= 19 ps
49783 s: E1= 33 ps
24892 s: E1= 47 ps
12446 s: E1= 64 ps
6223 s: E1= 69 ps
3111 s: E1= 79 ps
1556 s: E1= 96 ps
778 s: E1= 124 ps
389 s: E1= 168 ps
194 s: E1= 265 ps
97 s: E1= 390 ps
49 s: E1= 540 ps
198983 s: E5= 34 ps
99492 s: E5= 47 ps
49746 s: E5= 91 ps
24873 s: E5= 92 ps
12436 s: E5= 86 ps
6218 s: E5= 80 ps
3109 s: E5= 92 ps
1555 s: E5= 115 ps
777 s: E5= 143 ps
389 s: E5= 188 ps
194 s: E5= 288 ps
97 s: E5= 419 ps
49 s: E5= 586 ps
TdevE1 /s
TdevE5 /s
Tau /s

OP71-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 254156
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 40682 high elev obs : -28.658 -30.438
Iteration 0: Obs used = 429926; Huge residuals = 244; Large residuals = 378
Iteration 1: Obs used = 429926; Huge residuals = 0; Large residuals = 134
Computed code bias (P1/P2)/m = -28.537 -30.181
Computed baseline (X,Y,Z)/m = 1.761 -1.464 -1.656
RMS of residuals /m = 0.336

Number of phase differences to fit baseline
L1/L2 = 252638
L5 = 127757
A priori baseline (X,Y,Z)/m = 1.761 -1.464 -1.656
30296 clock jitters computed out of 30297 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 3.8

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.203 -0.029 -0.198
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = -0.213 -0.024 -0.206
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = -0.215 -0.036 -0.204
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 1.553 -1.491 -1.858
30296 clock jitters computed out of 30297 intervals
AVE jitter /ps = 0.0 RMS jitter /ps = 0.5

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = -0.004 -0.008 -0.006
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = -0.014 -0.003 -0.013
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = -0.014 -0.006 -0.015
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m = 1.549 -1.498 -1.864
Final baseline L2 (X,Y,Z)/m = 1.539 -1.494 -1.872

Final baseline L5 (X,Y,Z)/m = 1.540 -1.497 -1.873

COMPUTATION OF CODE DIFFERENCES

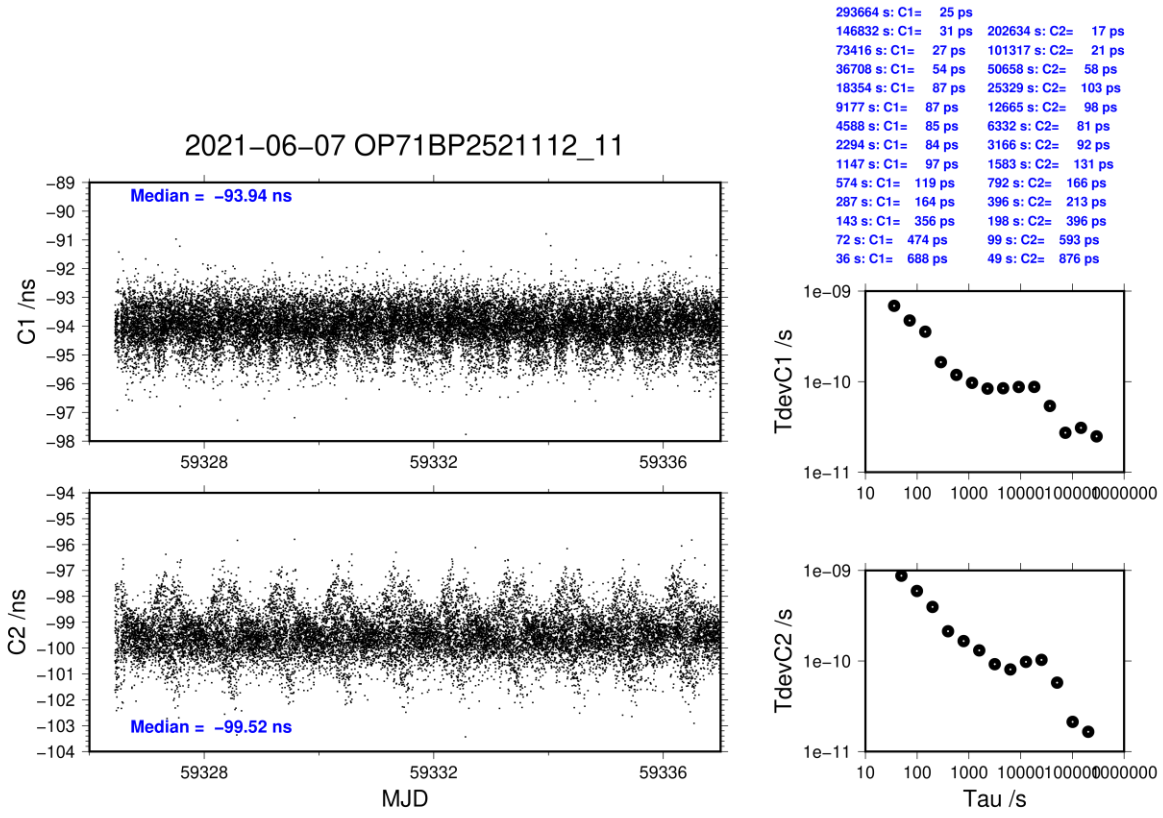
Total number of code differences = 830238

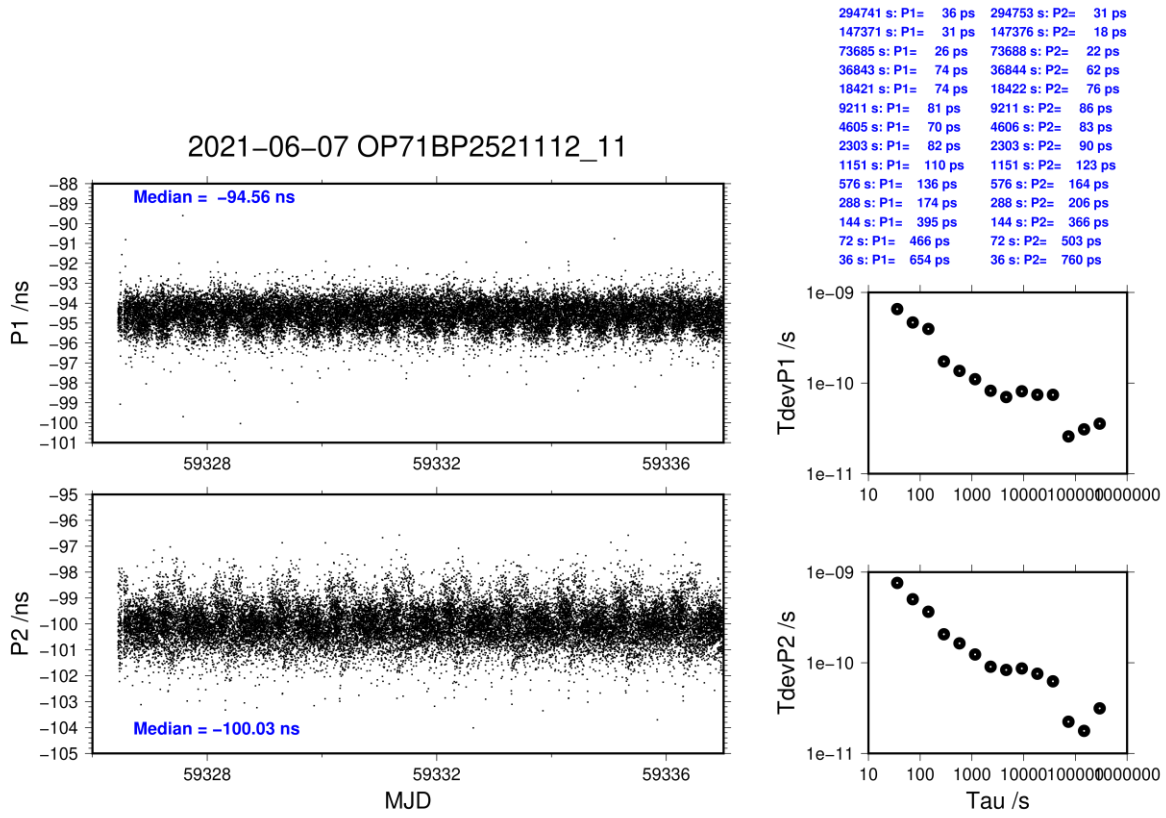
Global average of individual differences

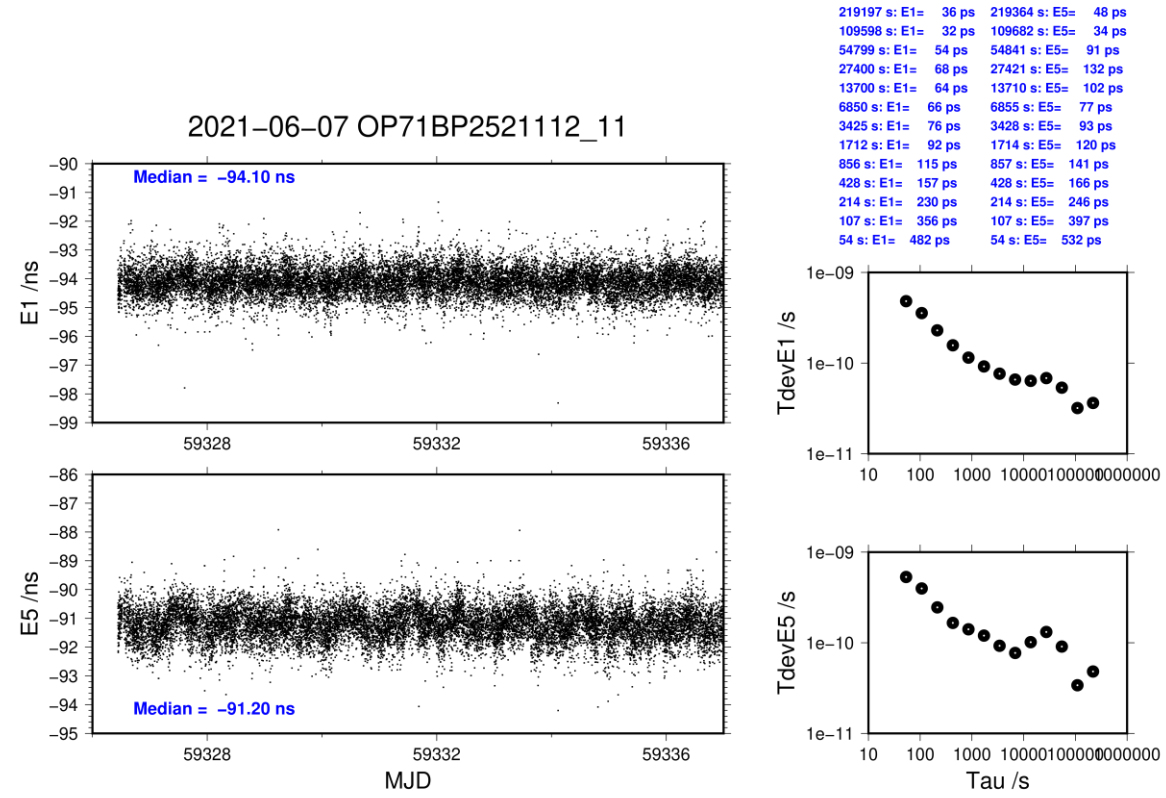
Code	#pts	ave/ns	rms/ns
C1	255023	-93.952	1.023
C2	184728	-99.473	1.236
P1	253975	-94.567	1.046
P2	253969	-100.011	1.103
E1	170624	-94.086	0.836
E5	170506	-91.209	0.777

Number of 300s epochs in out file = 3040

Code	#pts	median/ns	ave/ns	rms/ns
C1	25442	-93.941	-93.965	0.670
C2	18436	-99.520	-99.477	0.837
P1	25349	-94.557	-94.579	0.669
P2	25348	-100.027	-100.009	0.730
E1	17043	-94.104	-94.098	0.493
E5	17030	-91.200	-91.207	0.562




294741 s: P1= 36 ps
147371 s: P1= 31 ps
73685 s: P1= 26 ps
36843 s: P1= 74 ps
18421 s: P1= 74 ps
9211 s: P1= 81 ps
4605 s: P1= 70 ps
2303 s: P1= 82 ps
1151 s: P1= 110 ps
576 s: P1= 136 ps
288 s: P1= 174 ps
144 s: P1= 395 ps
72 s: P1= 466 ps
36 s: P1= 654 ps
294753 s: P2= 31 ps
147376 s: P2= 18 ps
73688 s: P2= 22 ps
36844 s: P2= 62 ps
18422 s: P2= 76 ps
9211 s: P2= 86 ps
4606 s: P2= 83 ps
2303 s: P2= 90 ps
1151 s: P2= 123 ps
576 s: P2= 164 ps
288 s: P2= 206 ps
144 s: P2= 366 ps
72 s: P2= 503 ps
36 s: P2= 760 ps
2021−06−07 OP71BP2521112_11
Median = −94.56 ns
P1 /ns
Median = −100.03 ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s


219197 s: E1= 36 ps
109598 s: E1= 32 ps
54799 s: E1= 54 ps
27400 s: E1= 68 ps
13700 s: E1= 64 ps
6850 s: E1= 66 ps
3425 s: E1= 76 ps
1712 s: E1= 92 ps
856 s: E1= 115 ps
428 s: E1= 157 ps
214 s: E1= 230 ps
107 s: E1= 356 ps
54 s: E1= 482 ps
219364 s: E5= 48 ps
109682 s: E5= 34 ps
54841 s: E5= 91 ps
27421 s: E5= 132 ps
13710 s: E5= 102 ps
6855 s: E5= 77 ps
3428 s: E5= 93 ps
1714 s: E5= 120 ps
857 s: E5= 141 ps
428 s: E5= 166 ps
214 s: E5= 246 ps
107 s: E5= 397 ps
54 s: E5= 532 ps
2021−06−07 OP71BP2521112_11
Median = −94.10 ns
E1 /ns
Median = −91.20 ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s

OP73-BP1J

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 275372
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 40348 high elev obs : 29.978 29.045
Iteration 0: Obs used = 469426; Huge residuals = 1974; Large residuals = 3954
Iteration 1: Obs used = 469190; Huge residuals = 0; Large residuals = 2216
Computed code bias (P1/P2)/m = 29.172 28.255
Computed baseline (X,Y,Z)/m = 5.703 0.884 -4.167
RMS of residuals /m = 0.500

Number of phase differences to fit baseline
L1/L2 = 272534
L5 = 138702
A priori baseline (X,Y,Z)/m = 5.703 0.884 -4.167
30009 clock jitters computed out of 30009 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 3.2

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.546 0.103 0.513
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.547 0.103 0.511
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.555 0.127 0.501
RMS of residuals L5 /m = 0.002

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 6.250 0.987 -3.655
30009 clock jitters computed out of 30009 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 1.3

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.024 0.007 0.024
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.025 0.007 0.022
RMS of residuals L2 /m = 0.004
Computed baseline L5 (X,Y,Z)/m = 0.028 0.009 0.021
RMS of residuals L5 /m = 0.002

Final baseline L1 (X,Y,Z)/m = 6.274 0.994 -3.631
Final baseline L2 (X,Y,Z)/m = 6.274 0.994 -3.633

Final baseline L5 (X,Y,Z)/m = 6.278 0.995 -3.634

COMPUTATION OF CODE DIFFERENCES

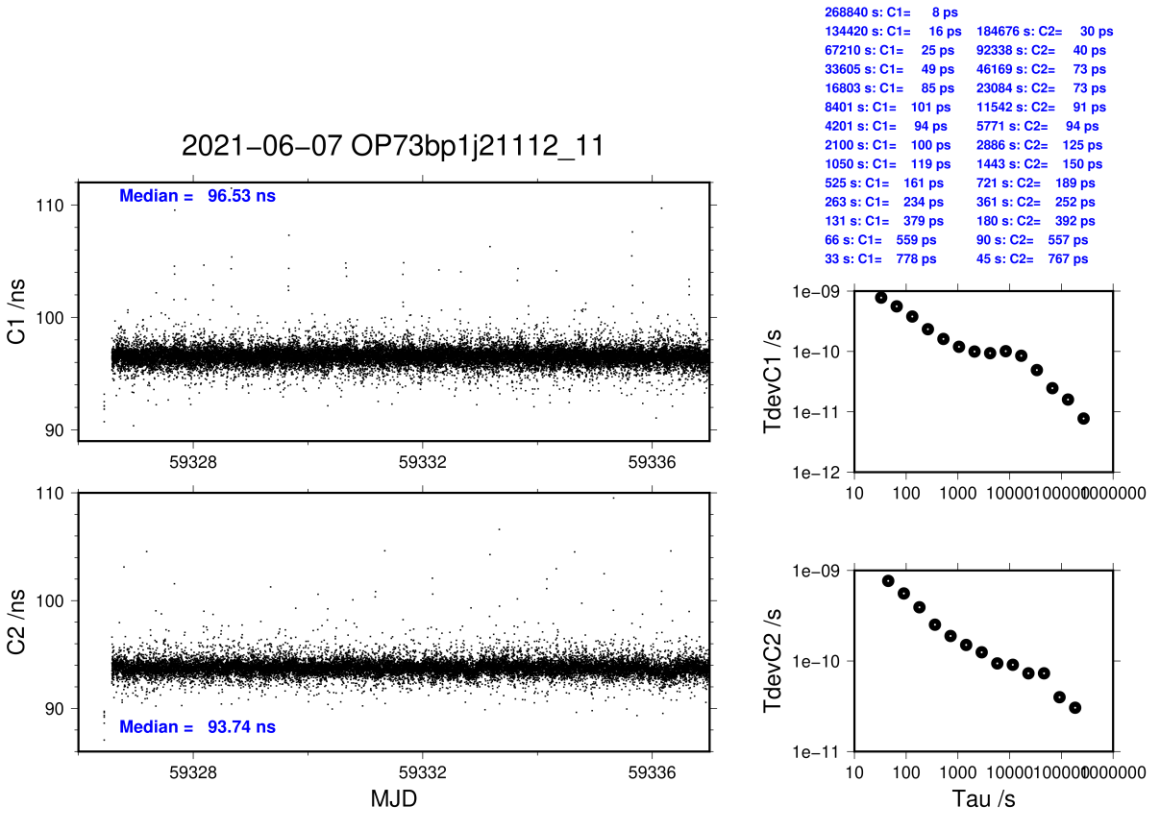
Total number of code differences = 691019

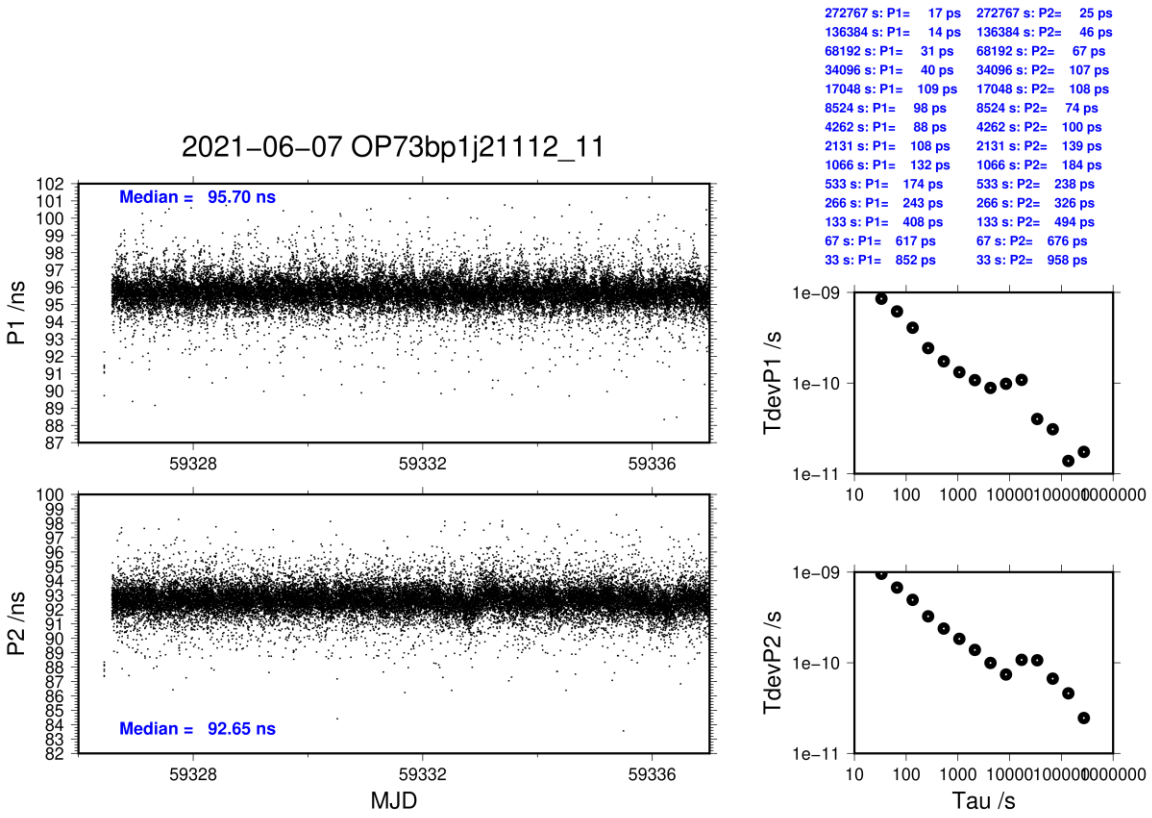
Global average of individual differences

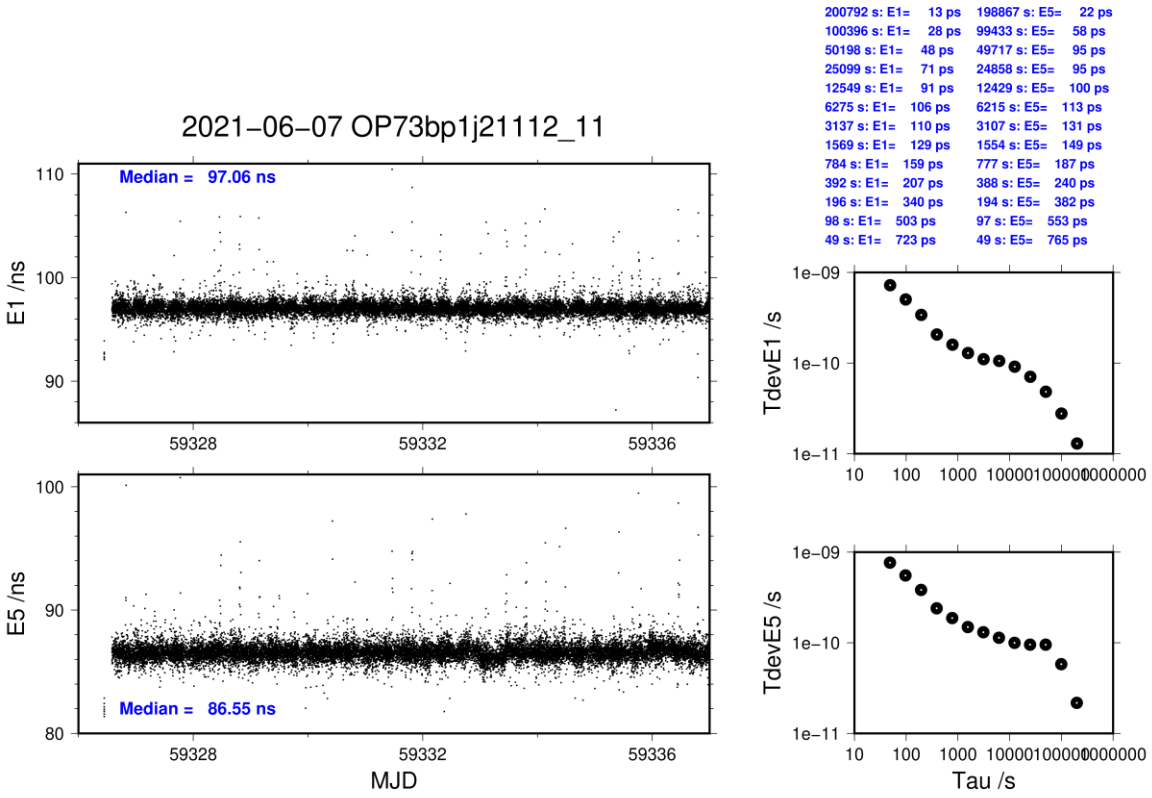
Code	#pts	ave/ns	rms/ns
C1	278499	96.539	1.522
C2	202618	93.779	1.617
P1	274288	95.721	1.456
P2	274288	92.655	1.622
E1	186206	97.079	1.197
E5	187914	86.590	1.178

Number of 300s epochs in out file = 3003

Code	#pts	median/ns	ave/ns	rms/ns
C1	27782	96.529	96.532	0.775
C2	20222	93.742	93.780	0.790
P1	27382	95.699	95.714	0.844
P2	27382	92.652	92.661	0.976
E1	18599	97.061	97.084	0.716
E5	18779	86.550	86.595	0.789




2021−06−07 OP73bp1j21112_11
Median = 95.70 ns
Median = 92.65 ns
P1 /ns
P2 /ns
MJD
59328
59332
59336
272767 s: P1= 17 ps
136384 s: P1= 14 ps
68192 s: P1= 31 ps
34096 s: P1= 40 ps
17048 s: P1= 109 ps
8524 s: P1= 98 ps
4262 s: P1= 88 ps
2131 s: P1= 108 ps
1066 s: P1= 132 ps
533 s: P1= 174 ps
266 s: P1= 243 ps
133 s: P1= 408 ps
67 s: P1= 617 ps
33 s: P1= 852 ps
272767 s: P2= 25 ps
136384 s: P2= 46 ps
68192 s: P2= 67 ps
34096 s: P2= 107 ps
17048 s: P2= 108 ps
8524 s: P2= 74 ps
4262 s: P2= 100 ps
2131 s: P2= 139 ps
1066 s: P2= 184 ps
533 s: P2= 238 ps
266 s: P2= 326 ps
133 s: P2= 494 ps
67 s: P2= 676 ps
33 s: P2= 958 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−06−07 OP73bp1j21112_11
Median = 97.06 ns
Median = 86.55 ns
E1 /ns
E5 /ns
MJD
59328
59332
59336
200792 s: E1= 13 ps
100396 s: E1= 28 ps
50198 s: E1= 48 ps
25099 s: E1= 71 ps
12549 s: E1= 91 ps
6275 s: E1= 106 ps
3137 s: E1= 110 ps
1569 s: E1= 129 ps
784 s: E1= 159 ps
392 s: E1= 207 ps
196 s: E1= 340 ps
98 s: E1= 503 ps
49 s: E1= 723 ps
198867 s: E5= 22 ps
99433 s: E5= 58 ps
49717 s: E5= 95 ps
24858 s: E5= 95 ps
12429 s: E5= 100 ps
6215 s: E5= 113 ps
3107 s: E5= 131 ps
1554 s: E5= 149 ps
777 s: E5= 187 ps
388 s: E5= 240 ps
194 s: E5= 382 ps
97 s: E5= 553 ps
49 s: E5= 765 ps
TdevE1 /s
TdevE5 /s
Tau /s

OP73-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 250400
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 40682 high elev obs : -2.553 -4.876
Iteration 0: Obs used = 420975; Huge residuals = 0; Large residuals = 1817
Iteration 1: Obs used = 420975; Huge residuals = 0; Large residuals = 1817
Computed code bias (P1/P2)/m = -3.164 -5.430
Computed baseline (X,Y,Z)/m = 3.740 2.153 -2.955
RMS of residuals /m = 0.459

Number of phase differences to fit baseline
L1/L2 = 248314
L5 = 126517
A priori baseline (X,Y,Z)/m = 3.740 2.153 -2.955
30296 clock jitters computed out of 30297 intervals
AVE jitter /ps = 0.2 RMS jitter /ps = 3.8

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.550 0.094 0.500
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.540 0.098 0.485
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.552 0.119 0.475
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 4.286 2.249 -2.462
30296 clock jitters computed out of 30297 intervals
AVE jitter /ps = -0.0 RMS jitter /ps = 1.2

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.029 0.012 0.030
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.019 0.017 0.016
RMS of residuals L2 /m = 0.003
Computed baseline L5 (X,Y,Z)/m = 0.025 0.017 0.013
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m = 4.315 2.261 -2.431
Final baseline L2 (X,Y,Z)/m = 4.305 2.266 -2.446

Final baseline L5 (X,Y,Z)/m = 4.311 2.266 -2.449

COMPUTATION OF CODE DIFFERENCES

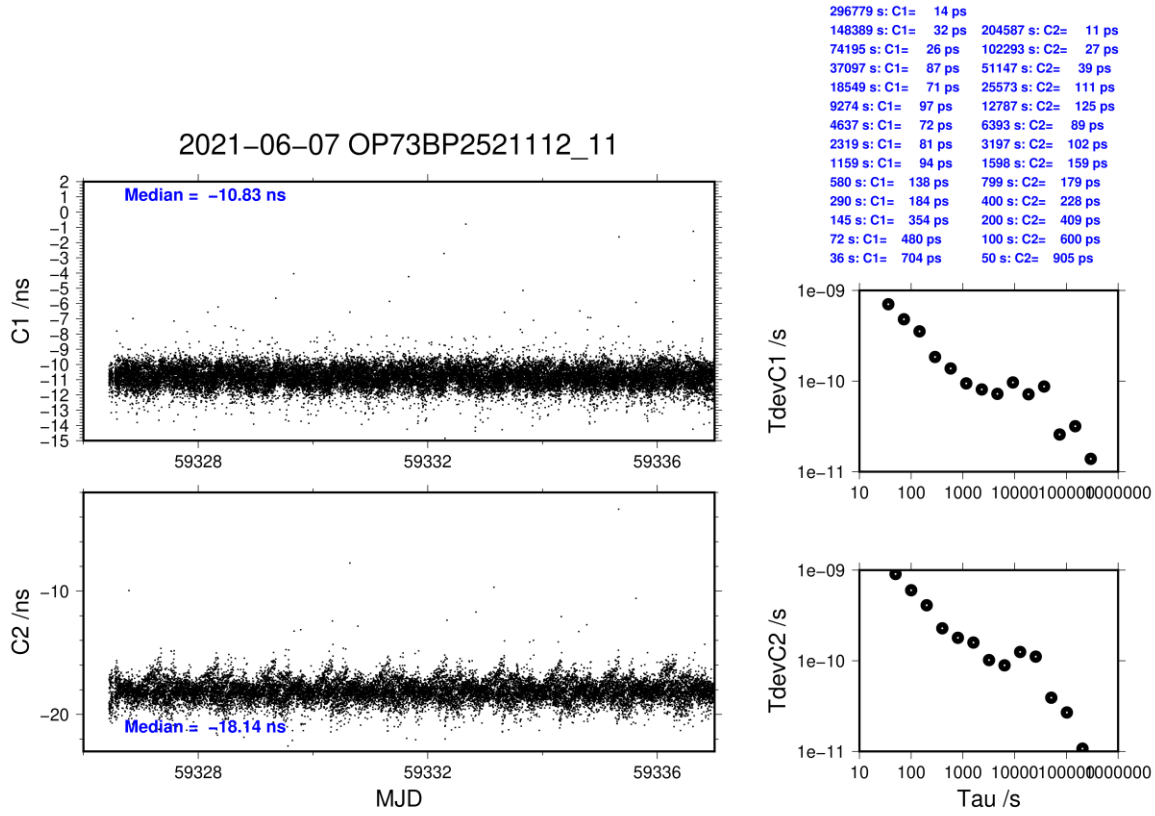
Total number of code differences = 863652

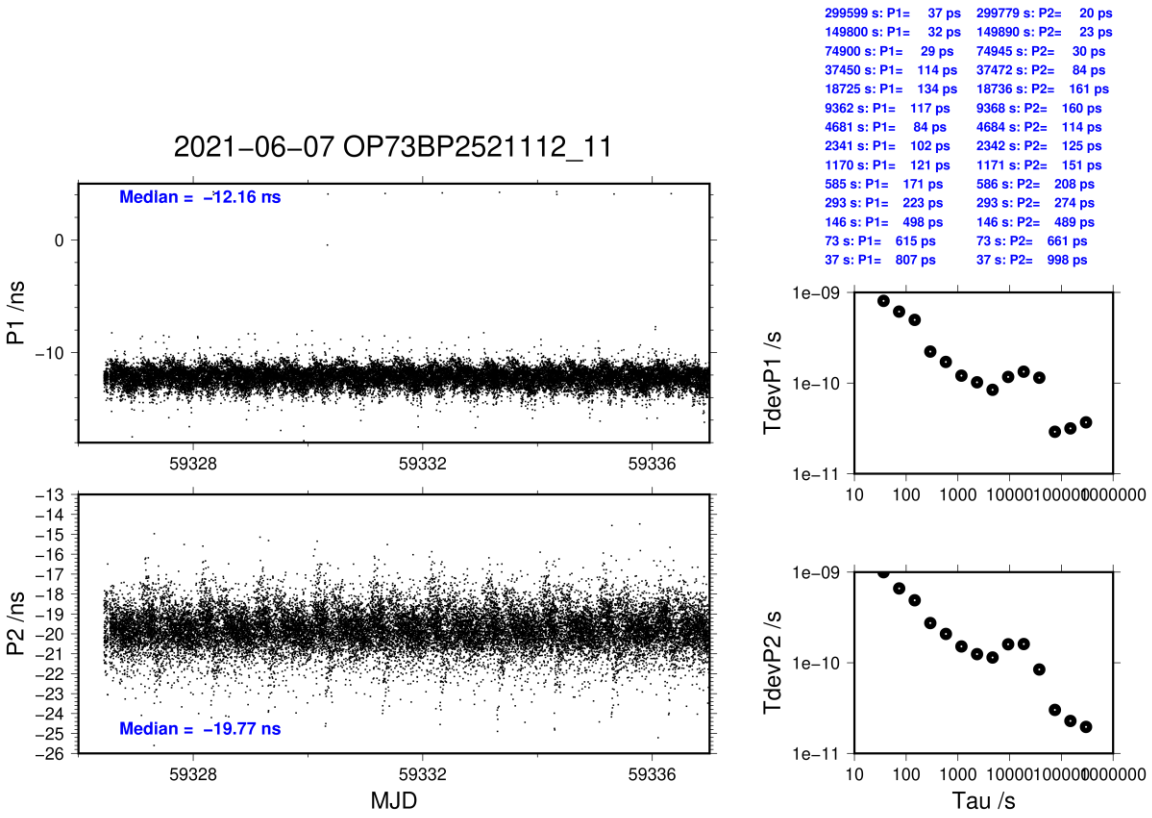
Global average of individual differences

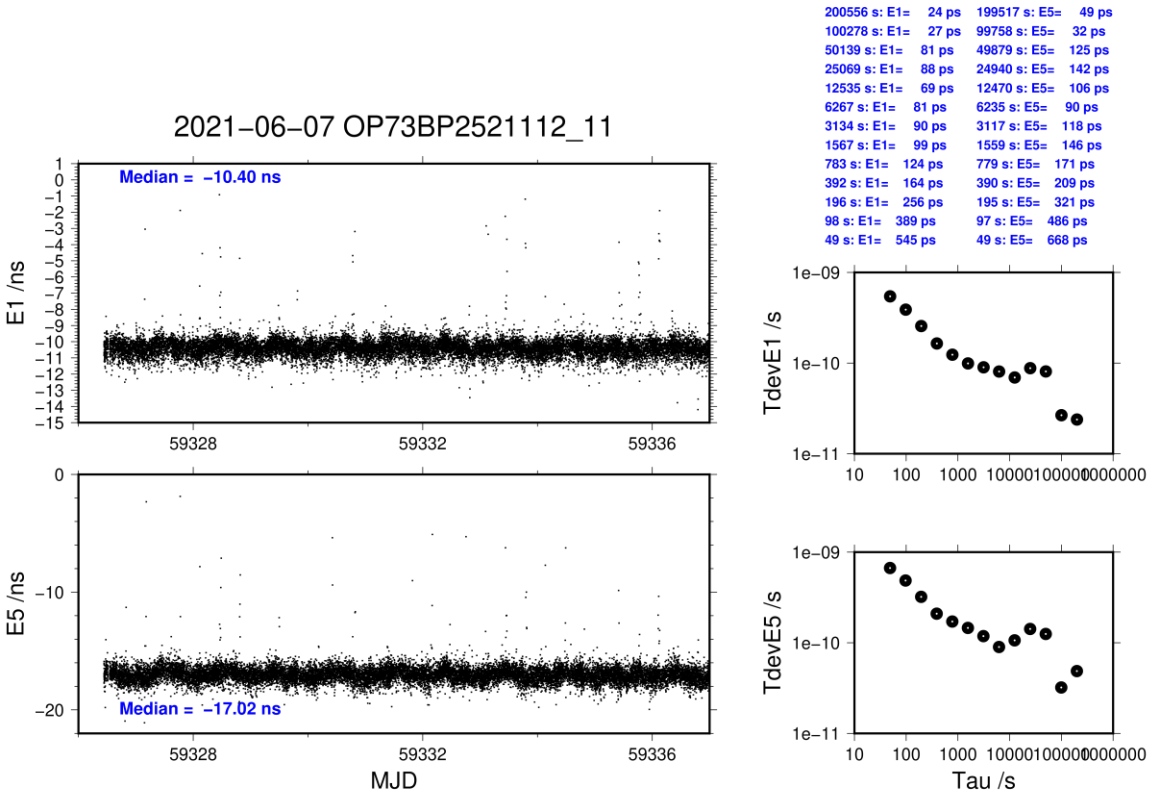
Code	#pts	ave/ns	rms/ns
C1	252326	-10.818	1.207
C2	183059	-18.116	1.351
P1	249975	-12.175	1.257
P2	249746	-19.773	1.488
E1	186614	-10.405	0.936
E5	187552	-17.016	0.977

Number of 300s epochs in out file = 3040

Code	#pts	median/ns	ave/ns	rms/ns
C1	25175	-10.832	-10.829	0.684
C2	18260	-18.140	-18.123	0.865
P1	24938	-12.158	-12.192	0.853
P2	24923	-19.774	-19.768	0.971
E1	18627	-10.397	-10.404	0.550
E5	18724	-17.025	-17.012	0.698




2021−06−07 OP73BP2521112_11
Median = −12.16 ns
Median = −19.77 ns
P1 /ns
P2 /ns
MJD
299599 s: P1= 37 ps
149800 s: P1= 32 ps
74900 s: P1= 29 ps
37450 s: P1= 114 ps
18725 s: P1= 134 ps
9362 s: P1= 117 ps
4681 s: P1= 84 ps
2341 s: P1= 102 ps
1170 s: P1= 121 ps
585 s: P1= 171 ps
293 s: P1= 223 ps
146 s: P1= 498 ps
73 s: P1= 615 ps
37 s: P1= 807 ps
299779 s: P2= 20 ps
149890 s: P2= 23 ps
74945 s: P2= 30 ps
37472 s: P2= 84 ps
18736 s: P2= 161 ps
9368 s: P2= 160 ps
4684 s: P2= 114 ps
2342 s: P2= 125 ps
1171 s: P2= 151 ps
586 s: P2= 208 ps
293 s: P2= 274 ps
146 s: P2= 489 ps
73 s: P2= 661 ps
37 s: P2= 998 ps
TdevP1 /s
TdevP2 /s
Tau /s


2021−06−07 OP73BP2521112_11
Median = −10.40 ns
Median = −17.02 ns
E1 /ns
E5 /ns
MJD
200556 s: E1= 24 ps
100278 s: E1= 27 ps
50139 s: E1= 81 ps
25069 s: E1= 88 ps
12535 s: E1= 69 ps
6267 s: E1= 81 ps
3134 s: E1= 90 ps
1567 s: E1= 99 ps
783 s: E1= 124 ps
392 s: E1= 164 ps
196 s: E1= 256 ps
98 s: E1= 389 ps
49 s: E1= 545 ps
199517 s: E5= 49 ps
99758 s: E5= 32 ps
49879 s: E5= 125 ps
24940 s: E5= 142 ps
12470 s: E5= 106 ps
6235 s: E5= 90 ps
3117 s: E5= 118 ps
1559 s: E5= 146 ps
779 s: E5= 171 ps
390 s: E5= 209 ps
195 s: E5= 321 ps
97 s: E5= 486 ps
49 s: E5= 668 ps
TdevE1 /s
TdevE5 /s
Tau /s

OPMT-BP1J

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 251695
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 40348 high elev obs : 106.587 110.230
Iteration 0: Obs used = 415437; Huge residuals = 290; Large residuals = 10589
Iteration 1: Obs used = 414600; Huge residuals = 0; Large residuals = 11136
Computed code bias (P1/P2)/m = 105.585 109.199
Computed baseline (X,Y,Z)/m = 5.280 -0.369 -3.618
RMS of residuals /m = 0.645

Number of phase differences to fit baseline
L1/L2 = 250556
L5 = 0
A priori baseline (X,Y,Z)/m = 5.280 -0.369 -3.618
30009 clock jitters computed out of 30009 intervals
AVE jitter /ps = -0.9 RMS jitter /ps = 4.2

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.643 0.176 0.739
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.649 0.177 0.740
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 5.926 -0.193 -2.879
30009 clock jitters computed out of 30009 intervals
AVE jitter /ps = 0.6 RMS jitter /ps = 1.7

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.045 -0.035 0.041
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.051 -0.035 0.042
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = 5.971 -0.228 -2.837
Final baseline L2 (X,Y,Z)/m = 5.978 -0.227 -2.837
Final baseline L5 (X,Y,Z)/m = 5.975 -0.228 -2.837

COMPUTATION OF CODE DIFFERENCES

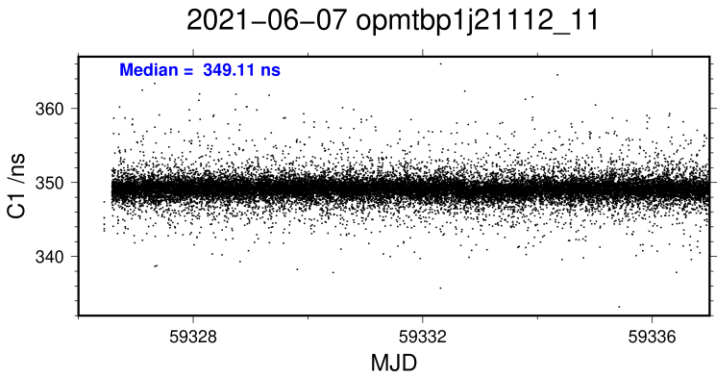
Total number of code differences = 254596

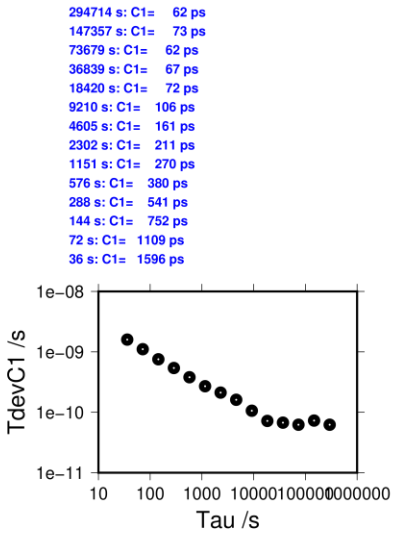
Global average of individual differences

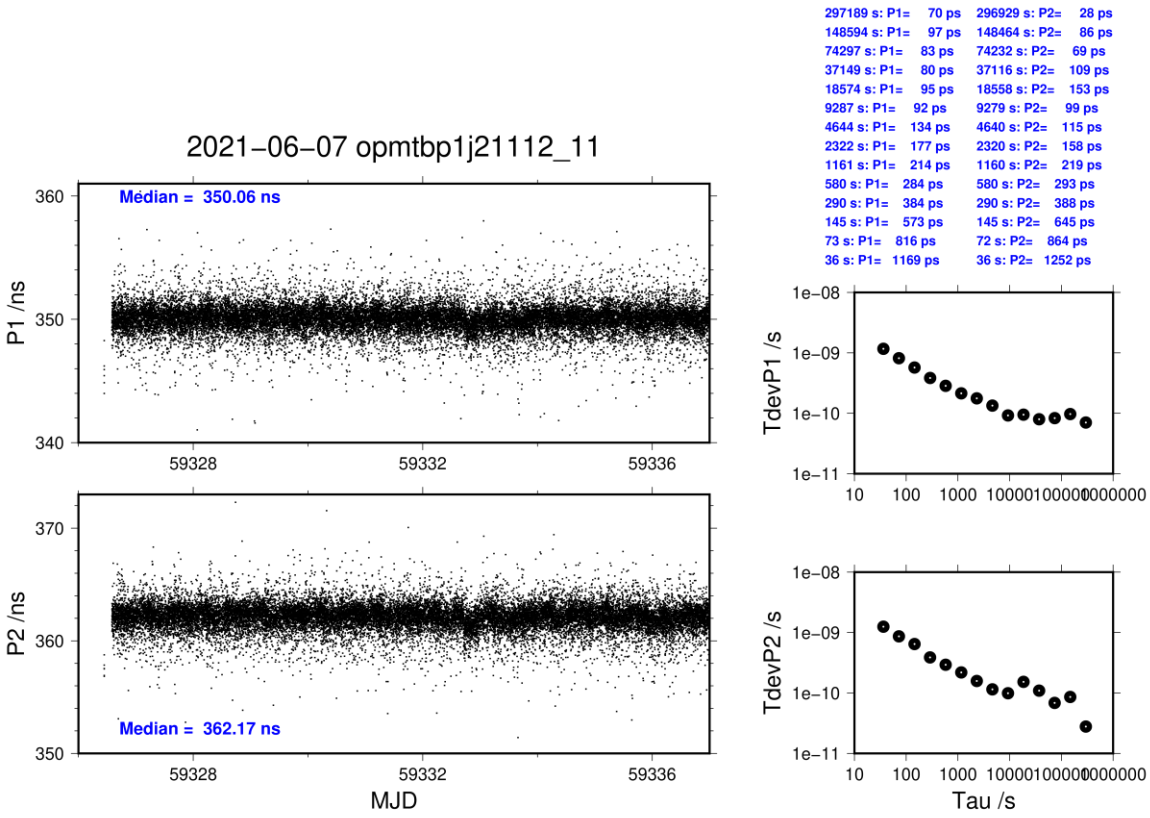
Code	#pts	ave/ns	rms/ns
C1	253357	349.094	3.336
P1	251735	350.013	2.289
P2	251759	362.072	2.282

Number of 300s epochs in out file = 3003

Code	#pts	median/ns	ave/ns	rms/ns
C1	25343	349.107	349.125	1.572
P1	25132	350.060	350.034	1.168
P2	25154	362.169	362.088	1.248






2021−06−07 opmtbp1j21112_11
Median = 350.06 ns
Median = 362.17 ns
P1 /ns
P2 /ns
MJD
297189 s: P1= 70 ps
296929 s: P2= 28 ps
148594 s: P1= 97 ps
148464 s: P2= 86 ps
74297 s: P1= 83 ps
74232 s: P2= 69 ps
37149 s: P1= 80 ps
37116 s: P2= 109 ps
18574 s: P1= 95 ps
18558 s: P2= 153 ps
9287 s: P1= 92 ps
9279 s: P2= 99 ps
4644 s: P1= 134 ps
4640 s: P2= 115 ps
2322 s: P1= 177 ps
2320 s: P2= 158 ps
1161 s: P1= 214 ps
1160 s: P2= 219 ps
580 s: P1= 284 ps
580 s: P2= 293 ps
290 s: P1= 384 ps
290 s: P2= 388 ps
145 s: P1= 573 ps
145 s: P2= 645 ps
73 s: P1= 816 ps
72 s: P2= 864 ps
36 s: P1= 1169 ps
36 s: P2= 1252 ps
TdevP1 /s
TdevP2 /s
Tau /s

OPMT-BP25

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 238980
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 40682 high elev obs : 74.056 76.293
Iteration 0: Obs used = 393747; Huge residuals = 204; Large residuals = 6205
Iteration 1: Obs used = 393313; Huge residuals = 0; Large residuals = 6435
Computed code bias (P1/P2)/m = 73.170 75.433
Computed baseline (X,Y,Z)/m = 3.434 0.955 -2.374
RMS of residuals /m = 0.621

Number of phase differences to fit baseline
L1/L2 = 237851
L5 = 0
A priori baseline (X,Y,Z)/m = 3.434 0.955 -2.374
30296 clock jitters computed out of 30297 intervals
AVE jitter /ps = -0.4 RMS jitter /ps = 4.1

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 0
Iter 1 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.546 0.094 0.703
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.539 0.096 0.686
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2

New iteration of baseline
New apriori baseline (X,Y,Z)/m = 3.977 1.051 -1.679
30296 clock jitters computed out of 30297 intervals
AVE jitter /ps = 0.3 RMS jitter /ps = 1.6

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 0
Iter 2 Large residuals L5= 0
Computed baseline L1 (X,Y,Z)/m = 0.040 -0.017 0.045
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.033 -0.015 0.028
RMS of residuals L2 /m = 0.004
No computed baseline L5, will use L1/L2

Final baseline L1 (X,Y,Z)/m = 4.017 1.034 -1.634
Final baseline L2 (X,Y,Z)/m = 4.010 1.036 -1.651
Final baseline L5 (X,Y,Z)/m = 4.013 1.035 -1.643

COMPUTATION OF CODE DIFFERENCES

Total number of code differences = 240980

COMPUTATION OF CODE DIFFERENCES

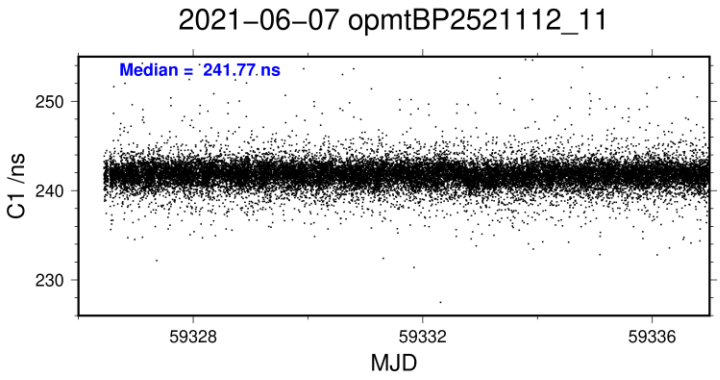
Total number of code differences = 240980

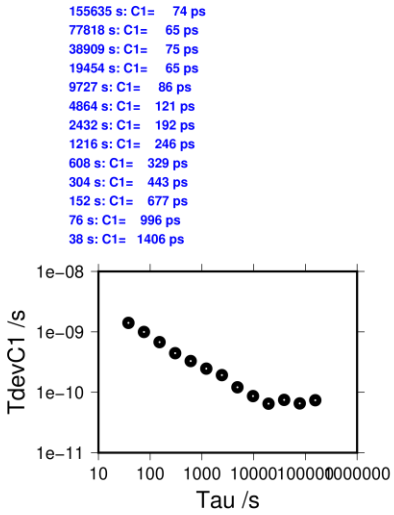
Global average of individual differences

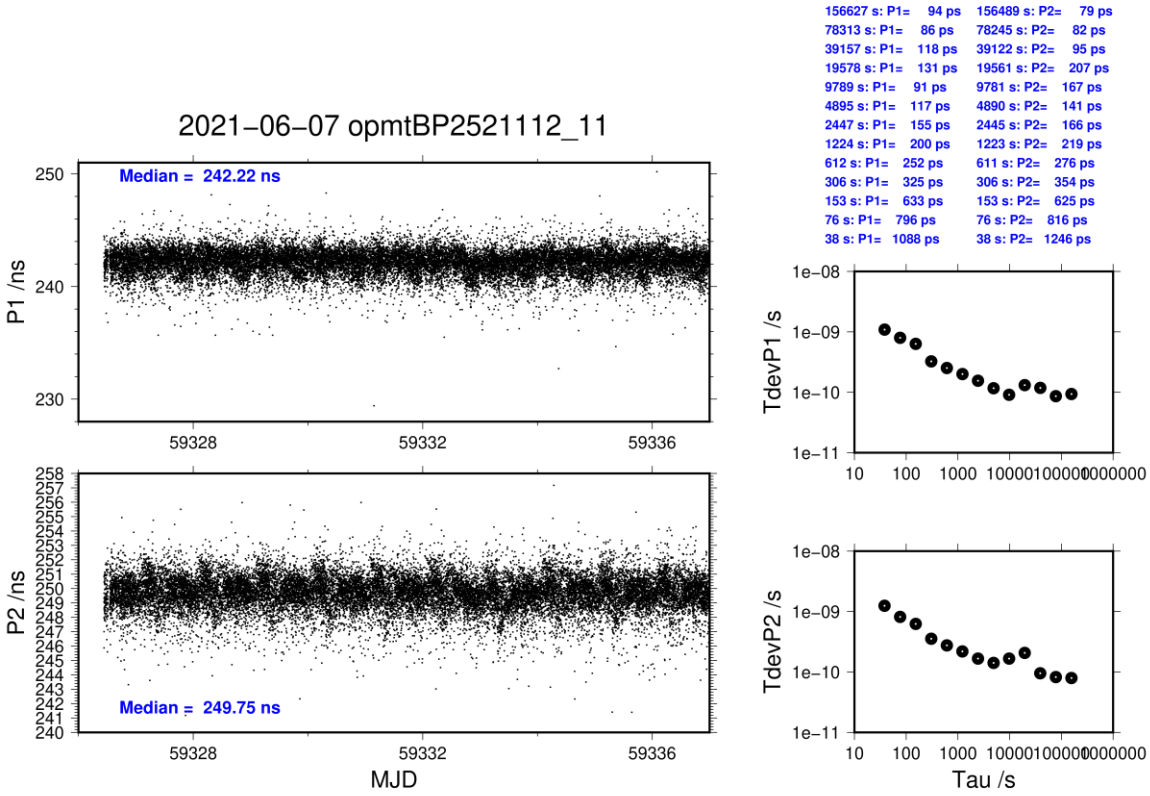
Code	#pts	ave/ns	rms/ns
C1	240270	241.716	2.961
P1	238988	242.100	2.046
P2	239099	249.671	2.075

Number of 300s epochs in out file = 3040

Code	#pts	median/ns	ave/ns	rms/ns
C1	24003	241.773	241.752	1.388
P1	23851	242.220	242.127	1.126
P2	23872	249.745	249.686	1.219






2021−06−07 opmtBP2521112_11
Median = 242.22 ns
Median = 249.75 ns
P1 /ns
P2 /ns
MJD
59328
59332
59336
156627 s: P1= 94 ps
78313 s: P1= 86 ps
39157 s: P1= 118 ps
19578 s: P1= 131 ps
9789 s: P1= 91 ps
4895 s: P1= 117 ps
2447 s: P1= 155 ps
1224 s: P1= 200 ps
612 s: P1= 252 ps
306 s: P1= 325 ps
153 s: P1= 633 ps
76 s: P1= 796 ps
38 s: P1= 1088 ps
156489 s: P2= 79 ps
78245 s: P2= 82 ps
39122 s: P2= 95 ps
19561 s: P2= 207 ps
9781 s: P2= 167 ps
4890 s: P2= 141 ps
2445 s: P2= 166 ps
1223 s: P2= 219 ps
611 s: P2= 276 ps
306 s: P2= 354 ps
153 s: P2= 625 ps
76 s: P2= 816 ps
38 s: P2= 1246 ps
TdevP1 /s
TdevP2 /s
Tau /s

2.5/ BIPM (21148)

Period

MJD 59362 to 59371

Delays

BP1J: (cf page 114)

X_O = 142.11 ns (210.65-68.54)

X_P = 53.54 ns (68.54-15.0)

REFDLY = 195.65 ns

CABDLY = 176.38 ns (C211)

BP25: (cf page 115)

REFDLY = 53.44 ns (68.44-15.0)

CABDLY = 176.24 ns (C208)

BP21: (cf page 114)

REFDLY = 43.27 ns (58.27-15.0)

CABDLY = 140.80 ns (C201)

Setup at the BIPM

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory:	BIPM
Date and hour of the beginning of measurements:	MJD 59362
Date and hour of the end of measurements:	MJD 59371

Information on the system

	Local:	**Travelling:**
4-character BIPM code	BP21	BP1J
• Receiver maker and type: Receiver serial number:	Septentrio PolaRx5TR 4701229	Septentrio PolaRx4proTR 27
1 PPS trigger level /V:		
• Antenna cable maker and type: Phase stabilised cable (Y/N):	LMR-195	HYLM195
Length outside the building /m:	~ 15 m	~ 15 m
• Antenna maker and type: Antenna serial number:	Septentrio SEPCHOKE B3E6 5253	Septentrio SEPCHOKE MC 5131
Temperature (if stabilised) /°C		

Measured delays /ns

(if needed fill box "Additional Information" below)

	Local:	**Travelling:**
• Delay from local UTC to receiver 1 PPS-in:	43.27 ns	53.54 ns
Delay from 1 PPS-in to internal Reference (if different): (see section 2 for details)	PPSin compensation enable	142.11 ns
• Antenna cable delay:	140.80 ns	173.38 ns
Splitter delay (if any):		(1)
Additional cable delay (if any):		(1)

Data used for the generation of CGGTTS files

• INT DLY (GPS) /ns:	
• INT DLY (Galileo) /ns:	
• INT DLY (GLONASS) /ns:	
• CAB DLY /ns:	
• REF DLY /ns:	
• Coordinates reference frame:	
Latitude or X /m:	
Longitude or Y /m:	
Height or Z /m:	

General information

• Rise time of the local UTC pulse:	
• Is the laboratory air conditioned:	
Set temperature value and uncertainty:	22 ± 1°C
Set humidity value and uncertainty:	

(1) For a trip with closure, not needed if the traveling equipment is used in the same set-up throughout.

Annex A - Information Sheet

(to be repeated for each calibrated system)

Laboratory:	BIPM
Date and hour of the beginning of measurements:	MJD 59362
Date and hour of the end of measurements:	MJD 59371

Information on the system

	Local:	Travelling:
4-character BIPM code	BP21	BP25
• Receiver maker and type: Receiver serial number:	Septentrio PolaRx5TR 4701229	Mesit GTR55 1808001
1 PPS trigger level /V:		
• Antenna cable maker and type: Phase stabilised cable (Y/N):	LMR-195	HYLM195
Length outside the building /m:	~ 15 m	~ 15 m
• Antenna maker and type: Antenna serial number:	Septentrio SEPCHOKE B3E6 5253	Novatel GNSS-850 NMLK18070096N
Temperature (if stabilised) /°C		

Measured delays /ns

(if needed fill box "Additional Information" below)

	Local:	Travelling:
• Delay from local UTC to receiver 1 PPS-in:	43.27 ns	53.44 ns
Delay from 1 PPS-in to internal Reference (if different): (see section 2 for details)	PPSin compensation enable	
• Antenna cable delay:	140.80 ns	176.24 ns
Splitter delay (if any):		(1)
Additional cable delay (if any):		(1)

Data used for the generation of CGGTTS files

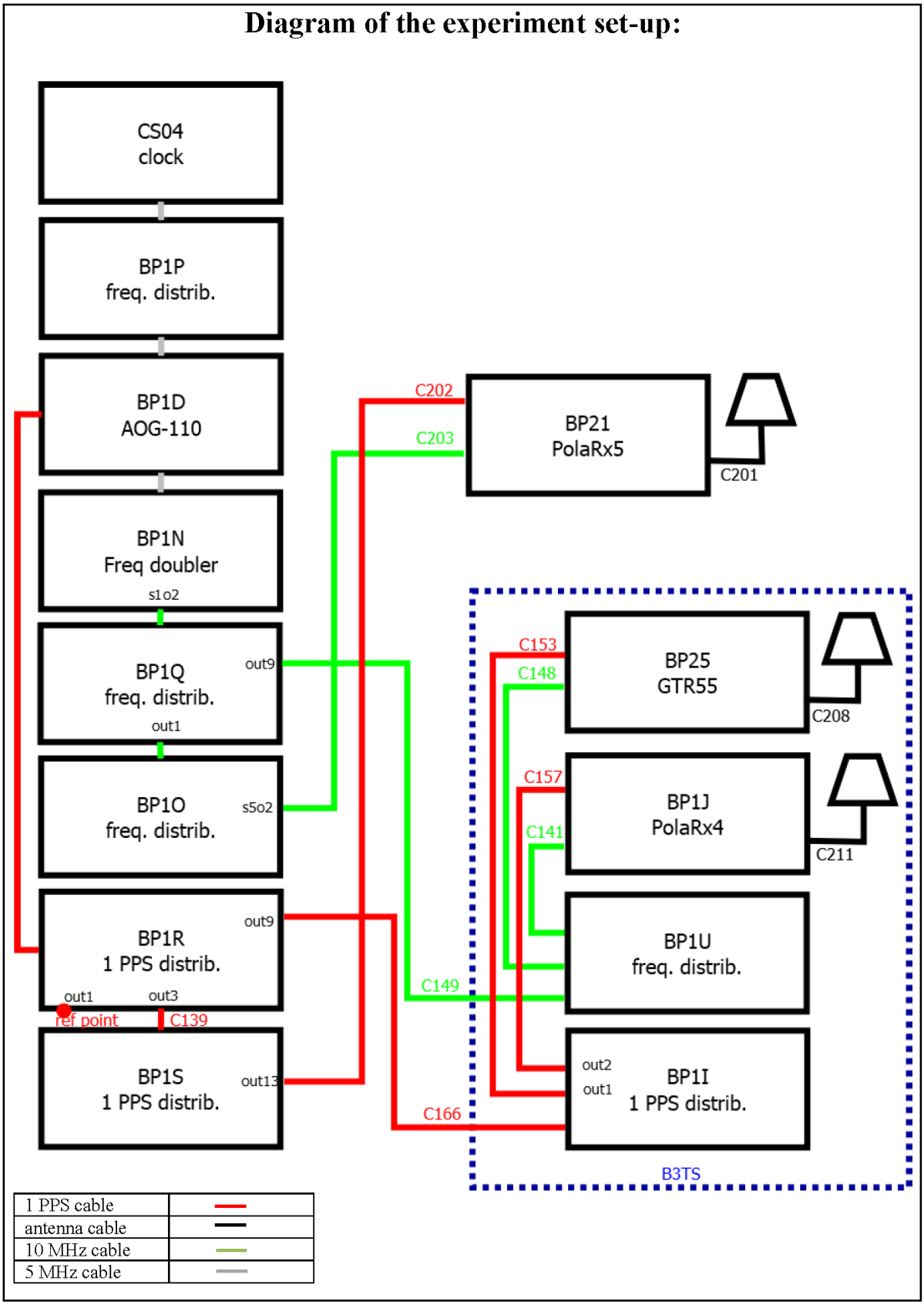
• INT DLY (GPS) /ns:	
• INT DLY (Galileo) /ns:	
• INT DLY (GLONASS) /ns:	
• CAB DLY /ns:	
• REF DLY /ns:	
• Coordinates reference frame:	
Latitude or X /m:	
Longitude or Y /m:	
Height or Z /m:	

General information

• Rise time of the local UTC pulse:	
• Is the laboratory air conditioned:	
Set temperature value and uncertainty:	22 ± 1°C
Set humidity value and uncertainty:	

(1) For a trip with closure, not needed if the traveling equipment is used in the same set-up throughout.

Diagram of the experiment set-up:



Log of Events / Additional Information :

All measurements at BIPM carried out by L. Tisserand.

Equipment used to measure delays is a Time Interval Counter (TIC), model 53230A, maker Keysight, S/N MY58390132, with measurement uncertainty typically less than 0.5 ns (using external reference frequency as timebase).

BP1J-BP21

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 199856
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 38096 high elev obs : -27.371 -27.073
Iteration 0: Obs used = 308719; Huge residuals = 4402; Large residuals = 18367
Iteration 1: Obs used = 315554; Huge residuals = 1; Large residuals = 7130
Iteration 2: Obs used = 315555; Huge residuals = 0; Large residuals = 7128
Computed code bias (P1/P2)/m = -27.512 -27.198
Computed baseline (X,Y,Z)/m = -3.686 -0.601 3.250
RMS of residuals /m = 0.633

Number of phase differences to fit baseline
L1/L2 = 193579
L5 = 96135
A priori baseline (X,Y,Z)/m = -3.686 -0.601 3.250
28796 clock jitters computed out of 28796 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 4.1

Iter 1 Large residuals L1= 2
Iter 1 Large residuals L2= 11
Iter 1 Large residuals L5= 2
Computed baseline L1 (X,Y,Z)/m = 0.093 0.029 0.118
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.093 0.027 0.122
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = 0.096 0.029 0.126
RMS of residuals L5 /m = 0.003

Iter 2 Large residuals L1= 2
Iter 2 Large residuals L2= 11
Iter 2 Large residuals L5= 2
Computed baseline L1 (X,Y,Z)/m = 0.093 0.029 0.118
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.093 0.027 0.122
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = 0.096 0.029 0.126
RMS of residuals L5 /m = 0.003

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -3.593 -0.572 3.370
28796 clock jitters computed out of 28796 intervals
AVE jitter /ps = 0.1 RMS jitter /ps = 0.3

Iter 3 Large residuals L1= 2
Iter 3 Large residuals L2= 11

Iter 3 Large residuals L5= 2
Computed baseline L1 (X,Y,Z)/m = 0.010 -0.003 0.005
RMS of residuals L1 /m = 0.003
Computed baseline L2 (X,Y,Z)/m = 0.010 -0.005 0.008
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = 0.011 -0.008 0.013
RMS of residuals L5 /m = 0.003

Final baseline L1 (X,Y,Z)/m = -3.583 -0.575 3.375
Final baseline L2 (X,Y,Z)/m = -3.583 -0.577 3.379
Final baseline L5 (X,Y,Z)/m = -3.582 -0.580 3.383

COMPUTATION OF CODE DIFFERENCES

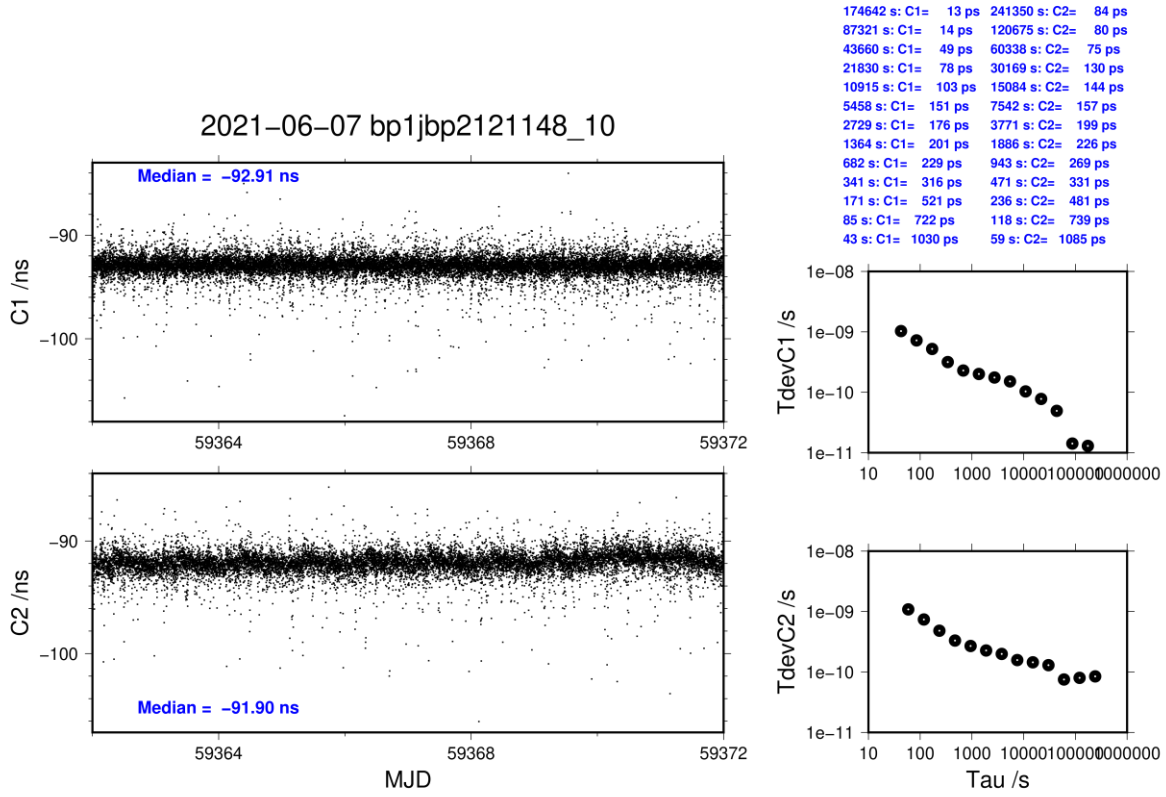
Total number of code differences = 516734

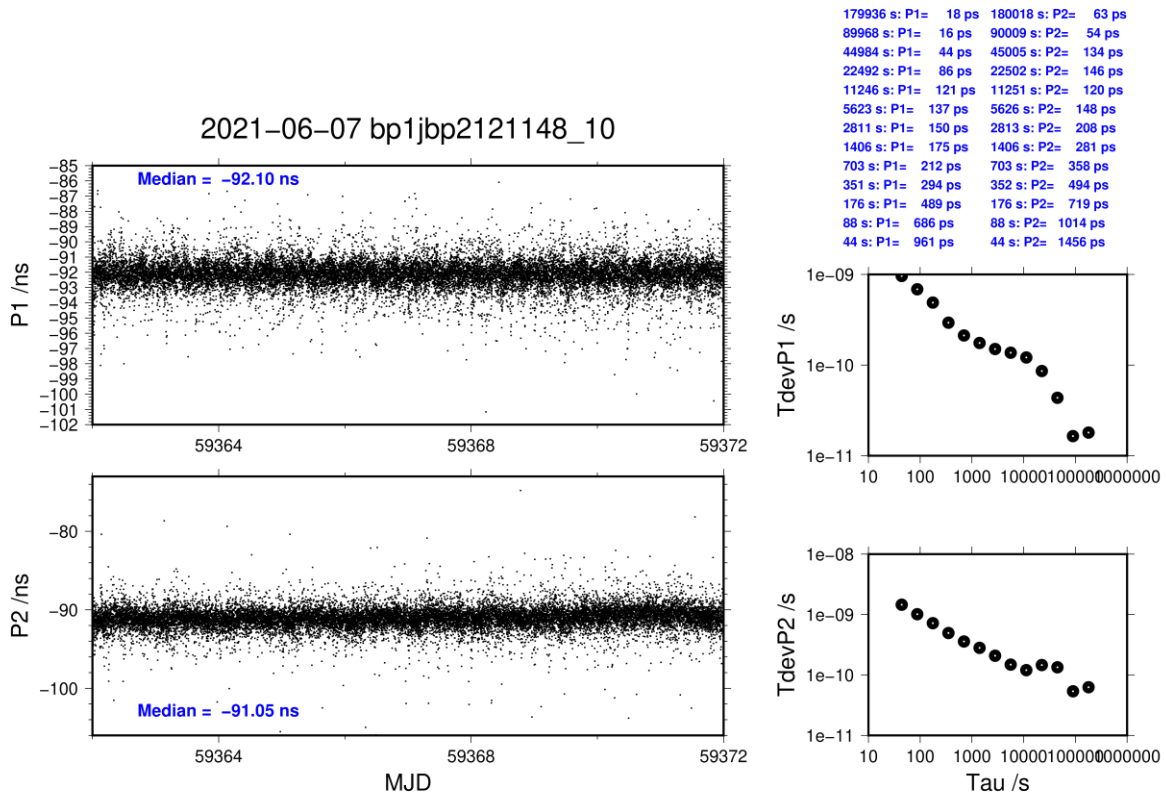
Global average of individual differences

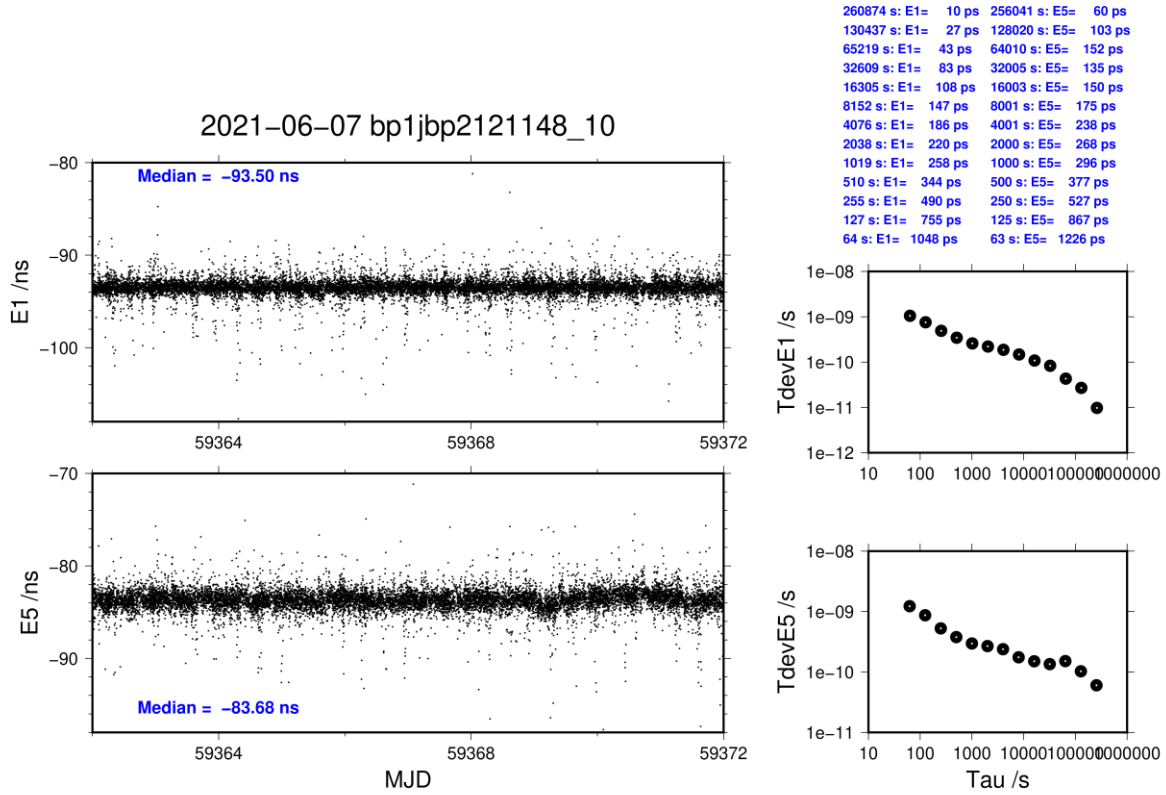
Code	#pts	ave/ns	rms/ns
C1	202836	-92.936	2.094
C2	146880	-91.937	2.018
P1	197600	-92.134	1.866
P2	197499	-91.080	2.659
E1	135873	-93.505	1.916
E5	138326	-83.682	1.917

Number of 300s epochs in out file = 2880

Code	#pts	median/ns	ave/ns	rms/ns
C1	20258	-92.911	-92.944	1.031
C2	14659	-91.901	-91.945	1.087
P1	19662	-92.100	-92.129	0.967
P2	19653	-91.054	-91.072	1.469
E1	13562	-93.502	-93.527	1.055
E5	13818	-83.676	-83.706	1.232


174642 s: C1= 13 ps 241350 s: C2= 84 ps
87321 s: C1= 14 ps 120675 s: C2= 80 ps
43660 s: C1= 49 ps 60338 s: C2= 75 ps
21830 s: C1= 78 ps 30169 s: C2= 130 ps
10915 s: C1= 103 ps 15084 s: C2= 144 ps
5458 s: C1= 151 ps 7542 s: C2= 157 ps
2729 s: C1= 176 ps 3771 s: C2= 199 ps
1364 s: C1= 201 ps 1886 s: C2= 226 ps
682 s: C1= 229 ps 943 s: C2= 269 ps
341 s: C1= 316 ps 471 s: C2= 331 ps
171 s: C1= 521 ps 236 s: C2= 481 ps
85 s: C1= 722 ps 118 s: C2= 739 ps
43 s: C1= 1030 ps 59 s: C2= 1085 ps
2021–06–07 bp1jbp2121148_10
Median = –92.91 ns
C1 /ns
Median = –91.90 ns
C2 /ns
MJD
TdevC1 /s
TdevC2 /s
Tau /s


179936 s: P1= 18 ps 180018 s: P2= 63 ps
89968 s: P1= 16 ps 90009 s: P2= 54 ps
44984 s: P1= 44 ps 45005 s: P2= 134 ps
22492 s: P1= 86 ps 22502 s: P2= 146 ps
11246 s: P1= 121 ps 11251 s: P2= 120 ps
5623 s: P1= 137 ps 5626 s: P2= 148 ps
2811 s: P1= 150 ps 2813 s: P2= 208 ps
1406 s: P1= 175 ps 1406 s: P2= 281 ps
703 s: P1= 212 ps 703 s: P2= 358 ps
351 s: P1= 294 ps 352 s: P2= 494 ps
176 s: P1= 489 ps 176 s: P2= 719 ps
88 s: P1= 686 ps 88 s: P2= 1014 ps
44 s: P1= 961 ps 44 s: P2= 1456 ps
2021–06–07 bp1jbp2121148_10
Median = –92.10 ns
P1 /ns
Median = –91.05 ns
P2 /ns
MJD
TdevP1 /s
TdevP2 /s
Tau /s


2021−06−07 bp1jbp2121148_10
Median = −93.50 ns
Median = −83.68 ns
E1 /ns
E5 /ns
MJD
260874 s: E1= 10 ps 256041 s: E5= 60 ps
130437 s: E1= 27 ps 128020 s: E5= 103 ps
65219 s: E1= 43 ps 64010 s: E5= 152 ps
32609 s: E1= 83 ps 32005 s: E5= 135 ps
16305 s: E1= 108 ps 16003 s: E5= 150 ps
8152 s: E1= 147 ps 8001 s: E5= 175 ps
4076 s: E1= 186 ps 4001 s: E5= 238 ps
2038 s: E1= 220 ps 2000 s: E5= 268 ps
1019 s: E1= 258 ps 1000 s: E5= 296 ps
510 s: E1= 344 ps 500 s: E5= 377 ps
255 s: E1= 490 ps 250 s: E5= 527 ps
127 s: E1= 755 ps 125 s: E5= 867 ps
64 s: E1= 1048 ps 63 s: E5= 1226 ps
TdevE1 /s
TdevE5 /s
Tau /s

BP25-BP21

COMPUTATION OF BASELINE

Number of codes to fit baseline and biases = 195669
Compute baseline with sin(elev) between 0.05 and 0.90
Apriori codes biases from 38096 high elev obs : 3.871 5.583
Iteration 0: Obs used = 311654; Huge residuals = 8; Large residuals = 7058
Iteration 1: Obs used = 311650; Huge residuals = 0; Large residuals = 7054
Computed code bias (P1/P2)/m = 3.600 5.239
Computed baseline (X,Y,Z)/m = -4.996 -0.653 4.540
RMS of residuals /m = 0.602

Number of phase differences to fit baseline
L1/L2 = 188807
L5 = 94771
A priori baseline (X,Y,Z)/m = -4.996 -0.653 4.540
28796 clock jitters computed out of 28796 intervals
AVE jitter /ps = -0.4 RMS jitter /ps = 4.8

Iter 1 Large residuals L1= 0
Iter 1 Large residuals L2= 10
Iter 1 Large residuals L5= 11
Computed baseline L1 (X,Y,Z)/m = -0.049 -0.077 0.137
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = -0.026 -0.070 0.159
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = -0.022 -0.066 0.164
RMS of residuals L5 /m = 0.004

Iter 2 Large residuals L1= 0
Iter 2 Large residuals L2= 10
Iter 2 Large residuals L5= 11
Computed baseline L1 (X,Y,Z)/m = -0.049 -0.077 0.137
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = -0.026 -0.070 0.159
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = -0.022 -0.066 0.164
RMS of residuals L5 /m = 0.004

New iteration of baseline
New apriori baseline (X,Y,Z)/m = -5.033 -0.726 4.688
28796 clock jitters computed out of 28796 intervals
AVE jitter /ps = 0.3 RMS jitter /ps = 0.3

Iter 3 Large residuals L1= 0
Iter 3 Large residuals L2= 10
Iter 3 Large residuals L5= 11

Computed baseline L1 (X,Y,Z)/m = 0.000 -0.028 -0.005
RMS of residuals L1 /m = 0.004
Computed baseline L2 (X,Y,Z)/m = 0.023 -0.022 0.018
RMS of residuals L2 /m = 0.005
Computed baseline L5 (X,Y,Z)/m = 0.033 -0.022 0.023
RMS of residuals L5 /m = 0.004

Final baseline L1 (X,Y,Z)/m = -5.033 -0.754 4.683
Final baseline L2 (X,Y,Z)/m = -5.010 -0.748 4.706
Final baseline L5 (X,Y,Z)/m = -5.000 -0.749 4.711

COMPUTATION OF CODE DIFFERENCES

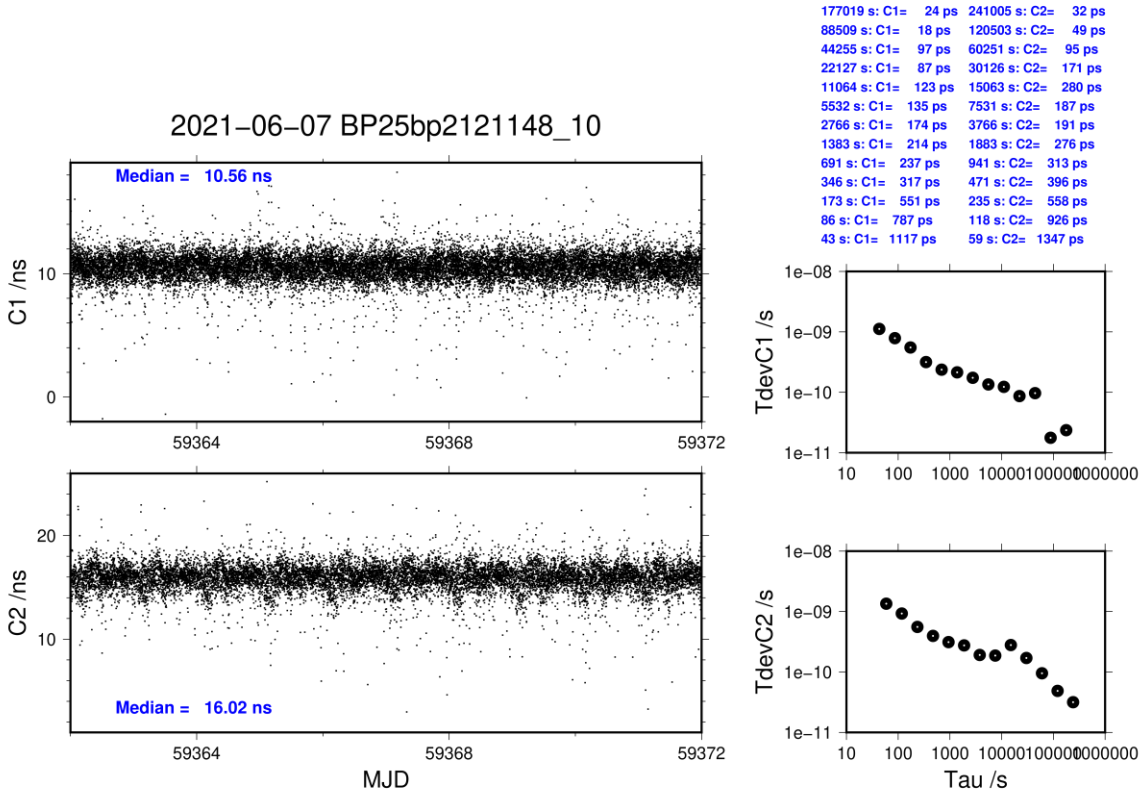
Total number of code differences = 684932

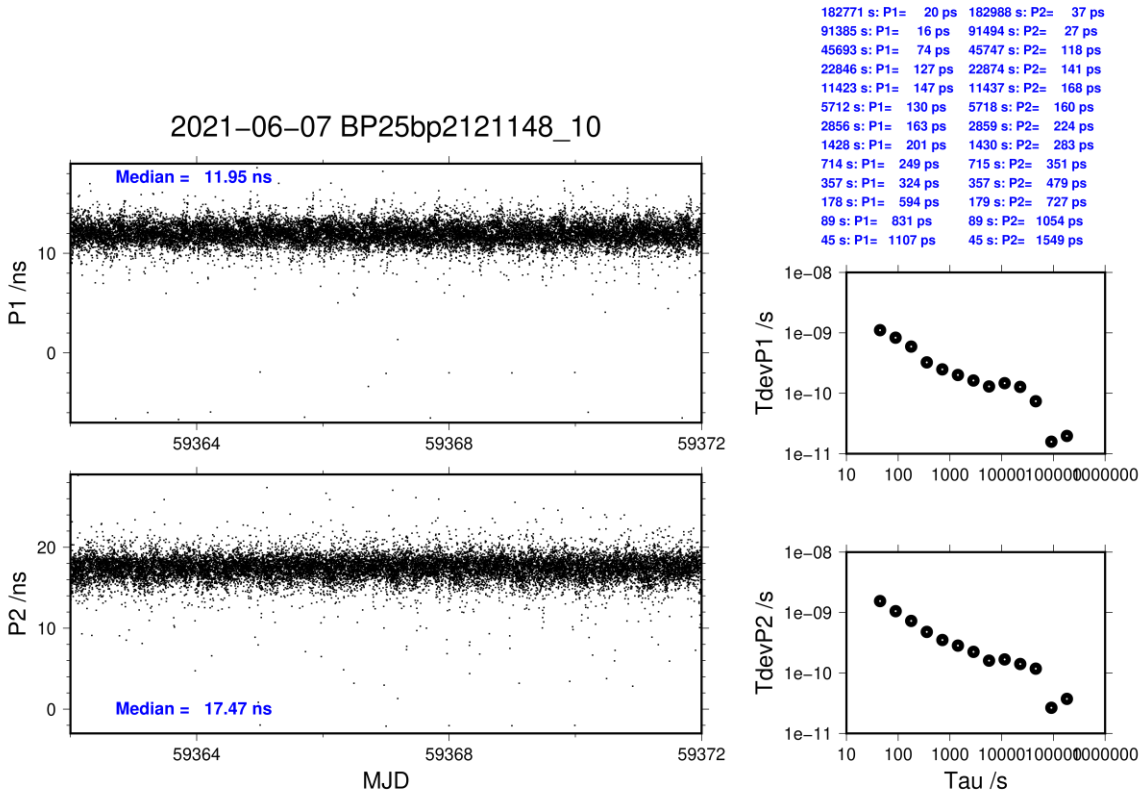
Global average of individual differences

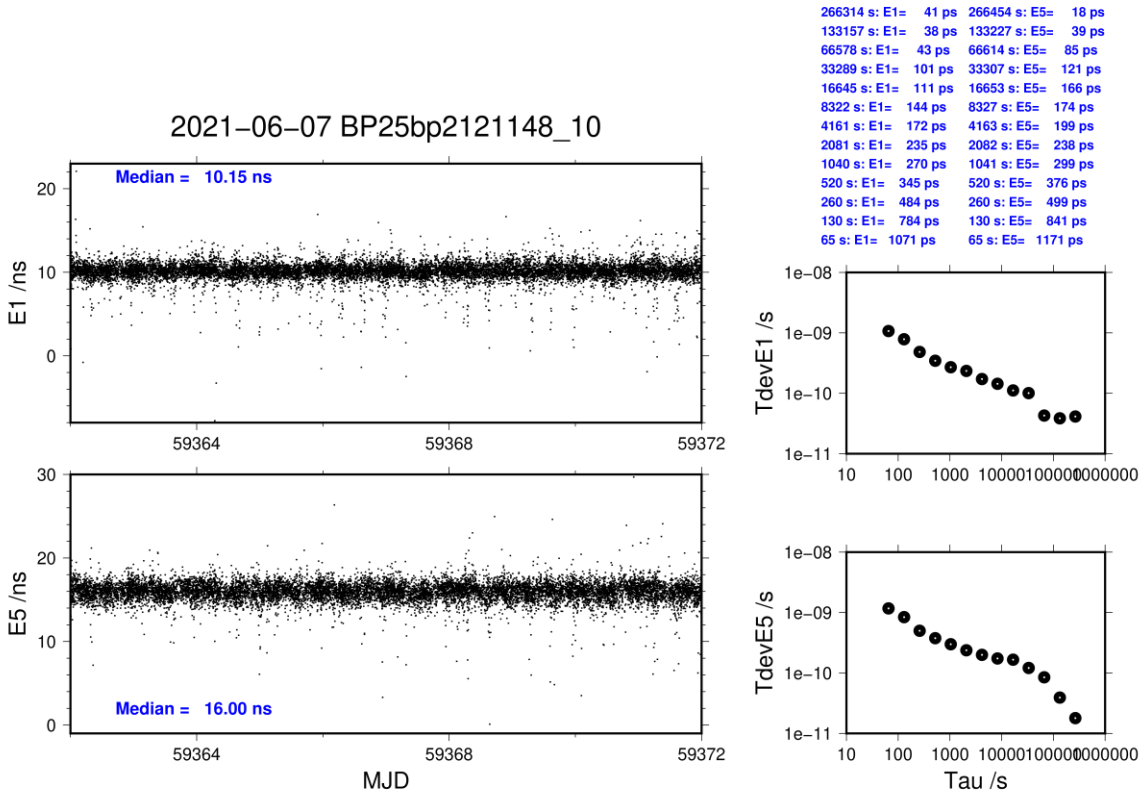
Code	#pts	ave/ns	rms/ns
C1	200627	10.510	2.003
C2	147329	15.926	2.147
P1	195122	11.913	1.907
P2	194718	17.392	2.529
E1	133142	10.135	1.788
E5	133384	15.974	1.755

Number of 300s epochs in out file = 2880

Code	#pts	median/ns	ave/ns	rms/ns
C1	19986	10.563	10.518	1.106
C2	14680	16.021	15.928	1.318
P1	19357	11.950	11.953	1.136
P2	19334	17.471	17.413	1.513
E1	13285	10.149	10.113	1.080
E5	13278	15.998	15.960	1.170


2021−06−07 BP25bp2121148_10
Median = 10.56 ns
Median = 16.02 ns
C1 /ns
C2 /ns
MJD
59364
59368
59372
177019 s: C1= 24 ps 241005 s: C2= 32 ps
88509 s: C1= 18 ps 120503 s: C2= 49 ps
44255 s: C1= 97 ps 60251 s: C2= 95 ps
22127 s: C1= 87 ps 30126 s: C2= 171 ps
11064 s: C1= 123 ps 15063 s: C2= 280 ps
5532 s: C1= 135 ps 7531 s: C2= 187 ps
2766 s: C1= 174 ps 3766 s: C2= 191 ps
1383 s: C1= 214 ps 1883 s: C2= 276 ps
691 s: C1= 237 ps 941 s: C2= 313 ps
346 s: C1= 317 ps 471 s: C2= 396 ps
173 s: C1= 551 ps 235 s: C2= 558 ps
86 s: C1= 787 ps 118 s: C2= 926 ps
43 s: C1= 1117 ps 59 s: C2= 1347 ps
TdevC1 /s
TdevC2 /s
Tau /s


2021−06−07 BP25bp2121148_10
Median = 11.95 ns
Median = 17.47 ns
P1 /ns
P2 /ns
MJD
59364
59368
59372
182771 s: P1= 20 ps 182988 s: P2= 37 ps
91385 s: P1= 16 ps 91494 s: P2= 27 ps
45693 s: P1= 74 ps 45747 s: P2= 118 ps
22846 s: P1= 127 ps 22874 s: P2= 141 ps
11423 s: P1= 147 ps 11437 s: P2= 168 ps
5712 s: P1= 130 ps 5718 s: P2= 160 ps
2856 s: P1= 163 ps 2859 s: P2= 224 ps
1428 s: P1= 201 ps 1430 s: P2= 283 ps
714 s: P1= 249 ps 715 s: P2= 351 ps
357 s: P1= 324 ps 357 s: P2= 479 ps
178 s: P1= 594 ps 179 s: P2= 727 ps
89 s: P1= 831 ps 89 s: P2= 1054 ps
45 s: P1= 1107 ps 45 s: P2= 1549 ps
TdevP1 /s
TdevP2 /s
Tau /s


266314 s: E1= 41 ps 266454 s: E5= 18 ps
133157 s: E1= 38 ps 133227 s: E5= 39 ps
66578 s: E1= 43 ps 66614 s: E5= 85 ps
33289 s: E1= 101 ps 33307 s: E5= 121 ps
16645 s: E1= 111 ps 16653 s: E5= 166 ps
8322 s: E1= 144 ps 8327 s: E5= 174 ps
4161 s: E1= 172 ps 4163 s: E5= 199 ps
2081 s: E1= 235 ps 2082 s: E5= 238 ps
1040 s: E1= 270 ps 1041 s: E5= 299 ps
520 s: E1= 345 ps 520 s: E5= 376 ps
260 s: E1= 484 ps 260 s: E5= 499 ps
130 s: E1= 784 ps 130 s: E5= 841 ps
65 s: E1= 1071 ps 65 s: E5= 1171 ps
2021−06−07 BP25bp2121148_10
Median = 10.15 ns
E1 /ns
Median = 16.00 ns
E5 /ns
MJD
TdevE1 /s
TdevE5 /s
Tau /s