



**Calibration Transfer Report 1018-2017
OR1Z → OR5Z**

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On February 24, 2020, the receiver of the station BRUX which was a Septentrio PolaRx4TR (SN 3001376) was replaced by a Septentrio PolaRx5TR (SN 3057609).

The BIPM code name of BRUX changes from OR1Z into OR5Z.

1. The antenna and antenna cable were unchanged.
2. The REFdelay (XP+XO) of the PolaRx5TR was measured with a SR620 : 68.97 ns ($u=200$ ps)
3. The INTDLY was measured using the calibration transfer from ORBA (OR4A)

The Final calibration values for OR5Z are:

INT DELAY P1 GPS (in ns): 28.71 ns

INT DELAY P2 GPS (in ns): 24.69 ns

Detail of the transfer:

Station ORBA calibrated in the 1018-2017 campaign, and with a unchanged setup since that time, was used as reference.

The pseudorange differences between BRUX and ORBA around the receiver change are plotted in Figure 1. The HW delays as determined in the 1018-2017 campaign are used for both stations. Therefore the HW delays of BRUX over the whole period are those of the PolaRX4.

The differences of the averages before and after the receiver change are -62.75ns(P1) and -61.7ns(P2).

After removing from these values the difference of refDLY and the INTDLY values of BRUX as given by the 1018-2017 campaign, we get the intDLY values of OR5Z (see Table 1).

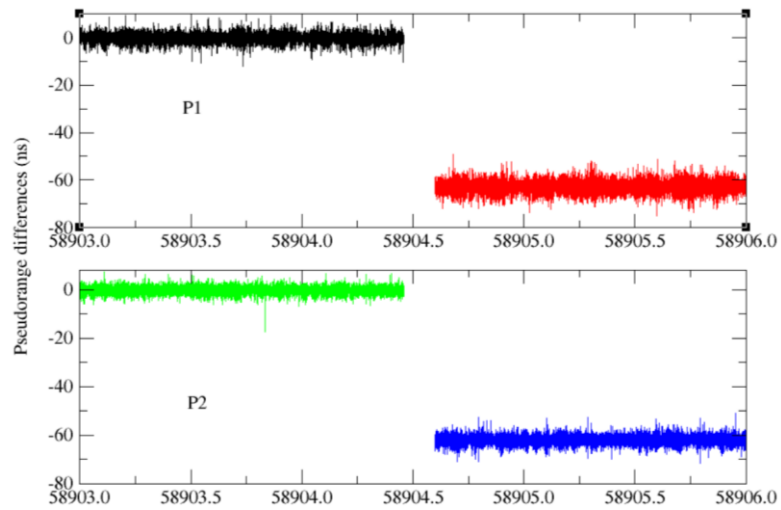


Figure 1. Differences BRUX-ORBA before and after the receiver change

Table 1. Computation of the new INT DELAY of BRUX (OR5Z)

		P1 (ns)	P2 (ns)
A	Refdel (1)	157.55	157.55
B	Refdel (2)	68.97	68.97
C	Pseudorange differences	-62.75	-61.7
D	INT DELAY (OR1Z) given by the 1018-2017 campaign	54.54	51.57
D-C+B-A	INT DELAY (OR5Z)	28.71	24.69

Uncertainty budget:

The noise level of the differences is a bit larger after the receiver change due to the multipath mitigation which was not directly activated in the PolarX5. This was activated one week later, but as shown in the AKAL project, this option does not have an impact on the determined hardware delay.

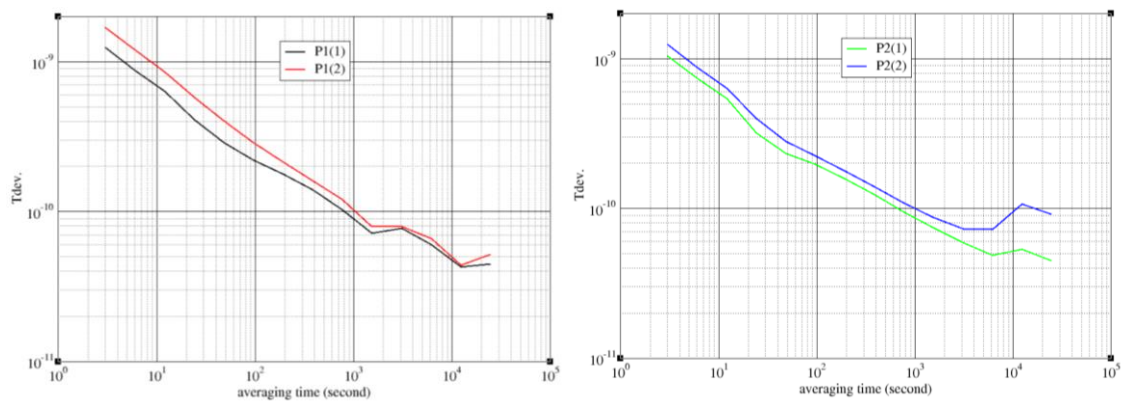


Figure2. Tdev of the pseudorange differences before and after the receiver change.



Table 2. uncertainty budget for the calibration transfer OR1Z-OR5Z

	P1 (ns)	P2 (ns)
Ref DELAY OR1Z	0.2	0.2
Ref DELAY OR5Z	0.2	0.2
Pseudorange differences (Tdev @ 6h)	0.1	0.1
Uncertainty on OR1Z int DELAY	1.2	1.2
Final uncertainty uB for OR5Z	1.2	1.2