GNSS calibration of NAO receiver with respect to NICT G1 (1012-2022)

Summary

In November-December 2021, the National Institute of Information and Communications Technology (NICT) conducted a trip to calibrate GPS equipment owned by the National Astronomical Obervatory of Japan in Misuzawa (UTC code NAO). The trip started and finished at the NICT, providing closure with respect to the NICT Group1 reference receivers NC4S and NC5S. The operations and report of measurements are described in the report by NICT.

- **Final results for the calibrated system**

The INTDLY value of the receiver given in Table 1 has been computed by NICT based on the results of the Group 1 trip 1001-2020 for NC4S and NC5S (GPS) and should not be updated to reflect later changes in the conventional INTDLY values of the reference receiver.

For a single frequency C1 UTC link A-B involving any Group 1 and any receiver in this trip, the uncertainty resulting from the calibration, U_B(A-B), is computed as

$$U_B(A\text{-}B) = (U_{CAL0}^2 + \Delta U_{CAL}(A)^2 + \Delta U_{CAL}(B)^2)^{1/2} \quad (1)$$

where U_{CAL0} = 2.5 ns is the conventional Group 2 value, and where ΔU_{CAL} (generally zero) is specified for each system. U_{CAL0} could be complemented by an additional component to represent systematic errors in the ionospheric model.

Changes in the set-up of the receivers after the calibration must be accounted for as described in section A.3.6 of the most recent Calibration guidelines in https://webtai.bipm.org/ftp/pub/tai/publication/gnss-calibration/guidelines/..

Table 1. Final C1 INTDLY value from the 1012-2022 exercise. Values of REFDLY and CABDLY used to compute calibration results are also indicated for reference. All values are in ns. “Meas. Date” refers to the first day of the differential calibration, to which the calibration results can be applied. “Impl. Date” is the MJD when the results should be implemented in the receiver.

System	BIPM	Meas. date	**INTDLY P1**	**INTDLY P2**	**TOTDLY C1**	**REF DLY**	**CAB DLY**	Note	**ΔU_{CAL}**	Impl. date
NAT2	NAT2	2021/11/16			**130.8**	0.0	0.0	(1)	2.0	59701

Notes:
(1) **ΔU_{CAL}** accounts for a larger uncertainty from local common-clock measurements at NAO and from the closure at NICT, see the NICT report. The result is a TOTDLY value.

Version history
V1.0 2022/04/04: Publication of results from V1.1 of the NICT report.