

# GNSS calibration of ORB receivers with respect to LNE-SYRTE G1 (1017-2023)

## Summary

In May 2023, the Laboratoire national de métrologie et d'essais. Systèmes de références Temps-Espace, Observatoire de Paris (LNE-SYRTE) conducted a trip to calibrate GNSS equipment owned by the Observatoire Royal de Belgique (ORB). The trip started and finished at LNE-SYRTE, providing closure with respect to the LNE-SYRTE Group1 reference receiver OP73.

The operations and report of measurements are described in the [report by LNE-SYRTE](#).

- **Final results for the calibrated systems**

The INTDLY values of the receivers given in Table 1 have been computed by LNE-SYRTE based on the results of the Group 1 trip [1001-2020](#) for OP73 (GPS and Galileo) and should not be updated to reflect later changes in the conventional INTDLY values of the reference receiver.

For a P3/E3/PPP 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

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

where  $U_{CAL0} = 2.5$  ns is the conventional Group 2 value, and where  $\Delta U_{CAL}$  (generally zero) is specified for each system.

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](#).

Table 1. Final P1/P2/E1/E5a INTDLY values from the 1017-2023 exercise. Values of REF DLY and CABDLY during the calibration are also indicated for reference. All values are in ns date in YYYY/MM/DD format. “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	INTDLY E1	INTDLY E5a	REF DLY	CABDLY	Note	$\Delta U_{CAL}$	Impl. date
BRUX	OR5Z	2023/05/06	27.9	23.9	30.1	30.1	68.7	237.5		0.0	60215
GRCB	OR20	2023/05/06	32.7	28.3	35.4	33.8	70.6	96.3		0.0	60215
ORBA	OR4Z	2023/05/06	54.6	55.5	55.7	65.6	158.7	149.2		0.0	60215

Notes:

Version history

V1.0 2023/09/08: Publication of results from V1.0 of the LNE-SYRTE report.