GLONASS retroreflector array position relative to CoM

Table 1

	X ± Δ X	**Y ± ΔY**	**Z ± ΔZ**
GLONASS-87, 89	-1582,6 ± 2	0 ± 10	0 ± 2
GLONASS-95, -99, -102	-1901.6 ± 3	-137 ± 3	3 ± 3

SC reference frame: zero in the SC CoM, X-axis direction – opposite to direction towards the Earth center, Y-axis direction – towards the Sun.

The array position reference point is the center of the input optical aperture (prism face plane). The prism face plane is normal to the X-axis.

The range to SC CoM determined in accordance to Table 1 is to be reduced by the optical correction value δ calculated from the following expression

$$\delta = \frac{h \cdot n}{\sqrt{1 - \frac{\sin^2 \varepsilon}{n^2}}}$$

where ε is the light incidence angle (between the beam and the perpendicular to the prism face plane), h is the prism height, and n is the prism refraction index.

At λ = 532 nm n = 1.4607; h = 19.1 mm. Then

$$\delta = \frac{27.899}{\sqrt{1 - \frac{\sin^2 \varepsilon}{2.1336}}}$$

Table 2

ε, deg	δ, mm	ε, deg	δ, mm
0	27.899	8	28.03
1	27.901	9	28.06
2	27.91	10	28.10
3	27.92	11	28.14
4	27.93	12	28.19
5	27.95	13	28.24
6	27.97	14	28.29
7	28.00	15	28.35

The range to the SC to CoM is the measured range plus total correction value $\Delta_c = L_{CoM} - \delta$, where L_{CoM} is the SC CoM distance from the array input plane, and δ is the optical correction value.

For example, when the SC CoM and the array aperture center are on the X-axis (see also Figure 1): $L_{CoM} = -X \cdot \cos \varepsilon$, where X is from Table 1, and $\Delta_c = -X \cdot \cos \varepsilon - \delta$

Figure 1. Range reduction to the SC CoM