The position of the GIOVE-A laser retro phase centre

GIOVE-A schematic

Reference frame origin

C

L

Satellite CoM

+Z nadir

Cubes' phase centres

LRA tray

14.6
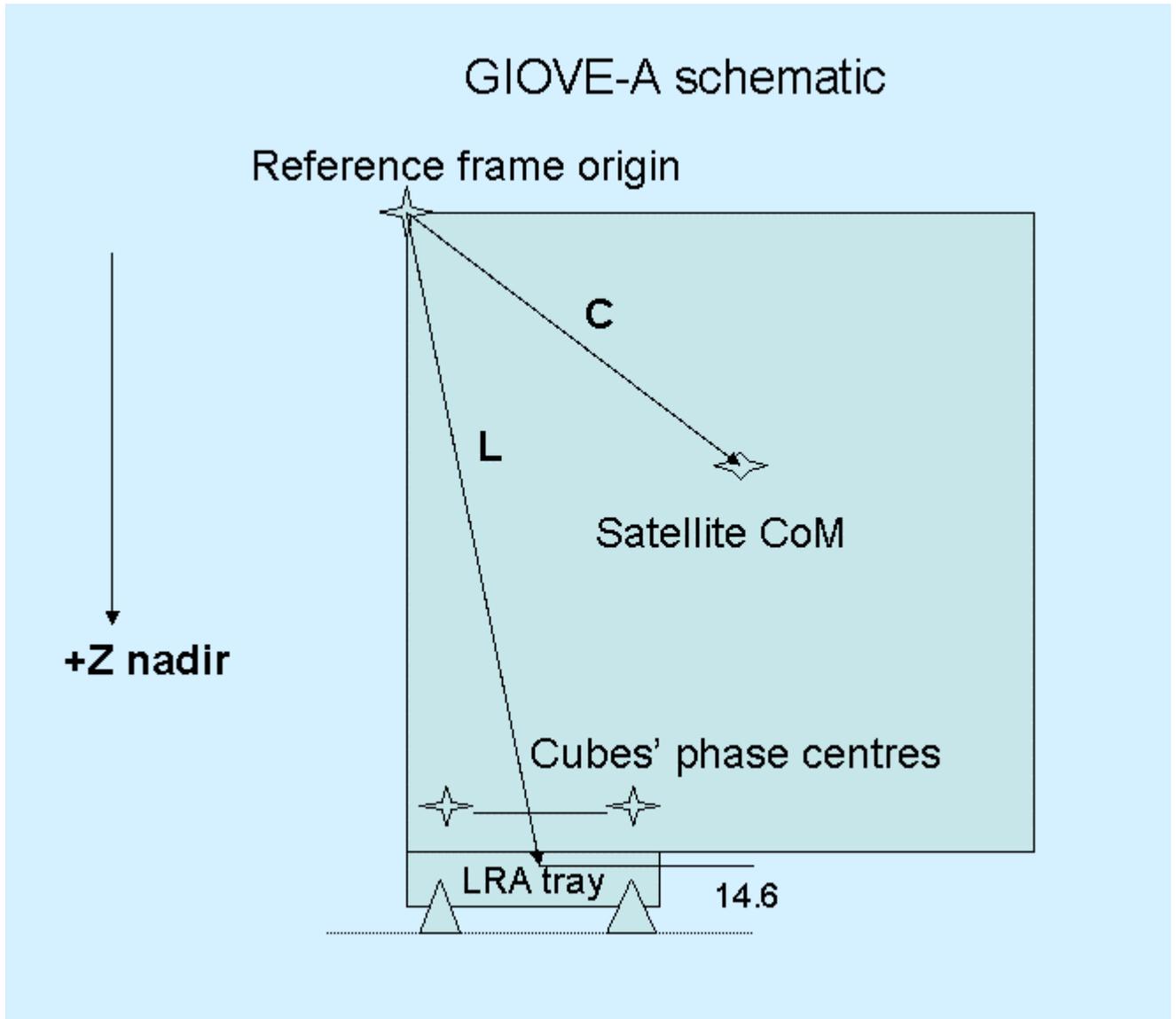
Vector **C** is from the spacecraft reference point to the satellite's centre of mass CoM.
Vector **L** is from the spacecraft reference point to the mass centre of the tray containing the 76 corner cubes.
From the ESA document '*Specification of GALILEO and GSTB-V2 Space Segment Properties Relevant for Satellite Laser Ranging*, ESTEC, Nov 2005':
C = (-4, +1, +788) mm,
L = (-832, -654, +1489) mm

The plane of the front faces of the cubes is +14.6mm in the Z direction from the LRA mass centre (V. Vasiliev, IPIE, Russia);
The cubes' phase centres are -h*n in the Z direction from the plane of the front faces of the cubes;
For the GIOVE-A cubes, h=19.1mm, n=1.46. So phase centres are -27.9mm in Z.
So z-component of array phase centre is (-27.9 +14.6) = -13.3mm from LRA mass centre.
So defining vector **L'** as the vector from the spacecraft reference point to the phase centre of the retro array, we have
L' = (-832, -654, (+1489– 13)), i.e. **L'** = (-832, -654, +1476)

Finally, the vector **CP** from the spacecraft centre of mass to the phase centre of the retro array is **CP = L' – C**
So **CP** = (-832, -654, +1476) - (-4, +1, +788) = (-828, -655, +688) in satellite fixed frame.