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Gravitational deformations of the Medicina VLBI dish

S. Montaguti (1,2), **P. Sarti** (1), L. Vittuari (2)

(1) Istituto di Radioastronomia (IRA), Istituto Nazionale di Astrofisica (INAF), Via P. Gobetti N.101, Bologna, 40129, Italy, (2) DISTART - Università di Bologna, V.le Risorgimento 2, Bologna, 40136, Italy

Medicina VLBI radiotelescope routinely performes S-X geodetic observations and astronomic observations in the range between 1.4 and 22 GHz. S and X receivers are placed in the primary focus, as well as the 1.4, 1.6 and 22 GHz receivers; L band receivers (5 GHz and 6 GHZ) are placed in the cassegrain focus. Gravitational deformations degrade the accuracy of both geodetic and astromonic VLBI observations and can be related to a sag and a folding of the dish. In particular, as the dish moves in elevation, the primary mirror folds and its ideal parabolic shape is consequently corrupted. This effect increasingly affects the observations as the wavelength decreases. The gravitational sag of the dish and of the quadrupode directly and unpredictably modify the position of the receiver as the antenna moves in elevation; the instrument's reference point position will be affected, too. It is therefore important to investigate and quantify these deformations using suitable surveying approaches and eventaully build an elevation dependent gravitational deformation model that can be implemented in the VLBI data analysis, thus correcting the observations. We are presenting the investigations performed using terrestrial observations and laser scanning technique on the VLBI dish for determining, respectively, the gravitational sag of the dish and quadrupode within a local frame and the elevation-dependent folding of the primary mirror.