

Validation of Metadata of GNSS Satellites

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This contribution discusses the attitude modes, the total masses and dimensions of GNSS satellites, the optical properties of satellite surface, and the antenna thrust power employed by the TUM center. The Galileo and QZSS (Quasi-Zenith Satellite System) system providers have already published all the detailed metadata except for the optical properties of QZS-1 satellite. Metadata of BeiDou satellites is not yet published, only 'best guess' values were presented by several publications. By using an adjustable box-wing model we estimate the optical parameters of QZS-1 and BeiDou satellites based on the data of a tracking network covering half a year. Validations from orbit prediction and precise orbit determination show that the stretched body satellites benefit significantly by using the box-wing model as an a priori model with respect to the ECOM model. For the fully developed GPS and GLONASS constellations optical properties are estimated for each block type. An orbit improvement is expected for the cylindrically shaped GLONASS-M satellites using an adjusted a priori box-wing model.