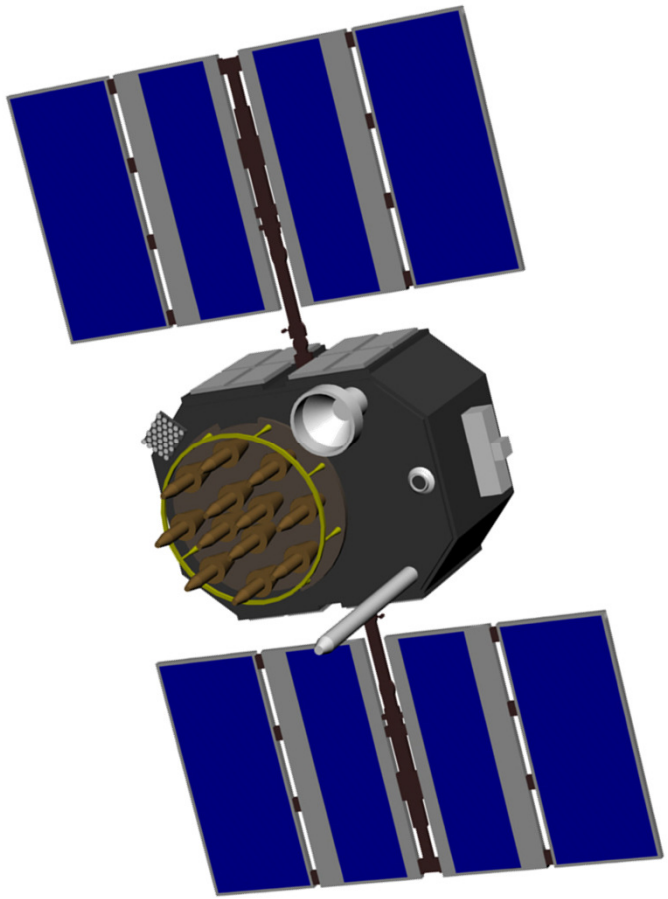
GNSS satellite data for orbit dynamics modelling

- Surface geometry and dimensions
- Surface optical properties (or material types)
- Nominal attitude model
- Transmitted power in all signals (and direction if relevant)
- Solar panel construction information (thickness, conductivity, power draw)
- Position and power output of radiators
- Thermal properties of multi-layered insulation



More detailed list

- Structural data/drawings of the satellite, with dimensions (surface only – we don’t need the internals)
- Optical properties (reflectivity, specularity) of the surface materials
- Identification of what is covered in multi-layered insulation (MLI) or ‘thermal blankets’
- Attitude model of the satellite
- Power of all transmitted signals (note we don’t need to know anything about function of the signals, only which way they are pointed, and how much power is transmitted)
- Construction data of the solar panel (material types, thickness, conductivity, surface properties – reflectivity, specularity, emissivity, power draw from the panel)

Other Necessary Information

- Centre of mass location
- Change of centre of mass over time (manoeuvres)
- Location of antenna reference point
- Phase centre offset for all frequencies w.r.t. antenna reference point
- Phase centre variation as function of azimuth and elevation (or as we are speaking about a satellite function of nadir and azimuth
  - The phase centre variation may differ for pseudo range and carrier phase observations. If the difference is large separate corrections for the pseudo range phase centre variations would be needed
- Knowledge about the epoch of change of the attitude mode (e.g. for QZSS and BeiDou that switch from Yaw-steering to normal-mode)
- Attitude of the satellite as measured/computed on board (i.e. those values used by the attitude control system)
- Differential group delays between the different signals (on board of the satellite)
  - Can be measured pre-launch but e.g. Galileo measures them on-board. I guess others do the same.