In the main input file, there are 5 different ways to choose the attitude of the spacecraft:

* nadir
* sun\_pointed
* file attitude (pitch, roll, yaw) as a function of time
* ensemble\_angular\_velocity
* ensemble\_initial\_attitude
* (pitch\_ang\_velo; roll\_ang\_velo; yaw\_ang\_velo)

This document explains how to use the third option (text file). For the other options, please see the description of the main input file.

The document starts with a header:

#BEGINNINGOFHEADER

*put your header here*

#ENDOFHEADER

Then, each line is:

Date and time (pitch; roll; yaw) (order pitch; order roll; order yaw)

The documents ends with:

#ENDOFFILE

The angles represent the rotation of the body coordinate system with respect to the LVLH coordinate system.

Recall:

* LVLH\_Z is the position vector (away from the Earth).
* LVLH\_Y is the cross product between the position and the velocity
* LVLH\_X is the cross product between LVLH\_Y and LVLH\_Z. LVLH\_X is the same as the velocity vector *only* if the eccentricity of the orbit is perfectly 0.

Note: the coordinate system that has the X axis equal to the velocity vector (even if the eccentricity is not 0) is sometimes called the NTW reference system (NTW\_X = velocity; NTW\_Y = position cross product with velocity; NTW\_Z = NTW\_X cross product with NTW\_Y).

The order of rotation is very important! Rolling then pitching is of course not the same as pitching then rolling. This is why you need to indicate, for each rotation, the order of rotation:

* 1: first rotation
* 2: second rotation
* 3: third rotation

For example:

2016-10-17T17:02 (20; 30; 12) (1; 3; 2)

means that on Oct 17th, 2016, at 5:02 pm UTC, the satellite:

* first it pitches by 20°
* then it yaws by 12 °
* finally it rolls by 30°

Note: if pitch = roll = yaw = 0 then it corresponds to Nadir pointing.

An example file is provided in ./input/attitude/example\_attitude\_file.txt.

The propagator linearly interpolates in time to get the attitude at each time step of the simulation.