Dear Bart, Sebastiaan, and Pap,

Although the precise process and methods will be described in detail in the final report, I would like to use this short presentation to outline the general method used to design the Attitude and Orbital Control System (AOCS).

A first-order sizing of the AOCS used a design process consisted of six distinct steps: requirements determination, attitude control method selection, geometry model, quantification of disturbance torques, hardware selection, and budget updates. Illustrated in the figure on the following page, the orange blocks are the primary steps, the blue blocks represent the sub-categories, and the result or final calculation to be made is highlighted in green. The results of these calculations are summarized in the table below.

Due to many uncertainties in the overall design of the spacecraft, such as the geometric properties of the orbiter and probe, maneuver requirements, or operations requirements, many input variables were estimated using combination of heritage data and rough sizing. Additionally, worst-case scenarios were used for all sizing computations. For example: the lowest altitude during aerobraking was used for quantifying the aerodynamic disturbance torques, and the total required torque and momentum calculations consider situations where the actuation of the solar arrays and antennas coincides with the peak external disturbance torques. Naturally, the mission can be planned to prevent these occurrences, but this provides an upper estimate of the performance requirements.

The diagram below speaks a thousand words, and shows all the major steps of the design process. I will give a brief overview during the meeting to add clarification if necessary. I’m looking forward to your feedback on Thursday, please let me know if you have questions or concerns.

Kind regards,

Luigi



