**Take Home Report**

**Based on the attached references kindly replay to the following questions (note: Allowed time 10 days…you can use all internet resources, books, papers, thesis, net, even ask others to fulfill the task )**

1. Given the AsteroidFinder satellite mission, the main task is to get a detailed knowledge of the mission and the actual state of the attitude control system development.

2. It is required to develop a simulation in Matlab/Simulink,

Hint: For the development of an attitude control system, it is important to investigate the behavior of the complete control loop. A simulation should be developed to support this development.

3. It is required to develop an attitude-determination algorithm.

Hint: For the attitude determination algorithm, a KALMAN-Filter for the sensor configuration should be developed. The detailed design of the KALMAN-Filter should be identified.

4. It is required to test the attitude determination algorithm with the simulation.

Hint: The attitude determination algorithm accuracy should be tested and validated with respect to the simulation.

5. Please develop an attitude control algorithm.

Hint: There are high-pointing requirements for the AsteroidFinder Mission. The main task of this report is to develop two different attitude control algorithms for two different operational modes (inertial pointing, and target pointing). To fulfill this task it is important to investigate the control loop and choose a dedicated development procedure for the controller.

6. It is required to do a Performance analysis of the attitude control in the closed-loop simulation

hint: The performance of the attitude control algorithm in the closed-loop simulation should be validated and tested.

The required report focuses on the development of the attitude determination and control algorithm. Therefore a simulation environment should be programmed and the suggested two different KALMAN filters are investigated as attitude determination algorithms. These are the extended KALMAN filter and the unscented KALMAN filter. Afterward, a guidance strategy should be derived to reach the main mission goals. It is followed by the development of different attitude control strategies (PD, LQR, SMC …etc) . In the end, the algorithm's functionality should be validated through simulation.