NTNU
Norwegian University of
Science and Technology

Faculty of Information Technology,
Mathematics and Electrical Engineering
Department of Engineering Cybernetics

MSC THESIS DESCRIPTION SHEET

Name:	Tale Sundlisæter
Department:	Engineering Cybernetics
Thesis title (Norwegian):	Estimering av attityde og baneparametere for satellitt med bruk av GPS og treghetsmålinger
Thesis title (English):	Spacecraft Attitude and Orbit Estimation using GPS and Inertial Measurements

Background: The NTNU Test Satellite (NUTS) project was started in September 2010. The project is part of the Norwegian student satellite program run by NAROM (Norwegian Centre for Space-related Education). The project's goal is to design, manufacture, and launch a double CubeSat by 2014. This MSc-thesis is part of the NUTS project.

The following items should be considered:

1) Present a mission analysis describing small satellite projects, including NUTS.
2) Investigate GPS attitude estimation, and GPS/INS integration methods. Suggest and implement (Matlab/Simulink) a solution method for the Integer Ambiguity Resolution problem that arises.
3) Implement (Matlab/Simulink) an Extended Kalman Filter for the combination of GPS and IMU measurements for attitude and orbit estimation.
4) Develop a spacecraft simulator that generates all measurements needed for numerical computation of the Extended Kalman Filter.
5) Present your results in a report and include simulation case studies.

Start date:	2012-02-01
Due date:	2012-07-04

Thesis performed at:	Department of Engineering Cybernetics, NTNU
Supervisor:	Professor Thor I. Fossen, Dept. of Eng. Cybernetics, NTNU