**EAE-298 Winter 2016 – Project Update 1/27/16**

* Design flow:
  + Customer Requirements
  + Mission Objectives
  + Mission Design/Functional requirements
  + System requirements
  + Preliminary designs to meet requirements
  + Specific analyses to support that designs meet requirements
  + Report/Review

***Develop requirements for each of these bullets:***

* Prioritized Mission Objectives list (used in case of failure-induced downmodes)
* Spacecraft design and operations timeline – now until de-orbit
* Mission Design – what should the vehicle do?
  + Launch – select launcher based on required V performance to orbit
  + Rendezvous
    - approach trajectory
    - required HST attitude for docking
  + Docking/undocking
    - attitude and approach rate requirement for docking/undocking
  + Re-boost:
    - determine required orbital adjust parameters
    - determine req’d combined spacecraft V to achieve new orbit
  + De-orbit
  + Mission operations, safety & success
    - No single failure should result in a collision
    - Level of autonomy/human control
    - Role of ground operations – mission control
    - Mission phase telemetry requirements
* Operations Concept diagram (like NASA Handbook Fig. 4.1-4)

***Develop requirements for each of these bullets:***

* Spacecraft Systems: how will the vehicle do it?
  + Vehicle dynamics
    - Determine volume, mass, and layout of spacecraft subsystems
    - Calculate mass properties: CM and inertial
    - Structural framework (bus)
  + Propulsion system (thrusters, propellant) required to achieve required V for:
    - Rendezvous
    - Attitude control (if propulsive)
    - Reboost
    - Undock
  + GNC for proximity operations
    - Maintaining absolute and HST-relative state vectors
      * Onboard sensors vs ground-radar-supplied
    - Sensors for range/range rate from HST
  + Attitude Determination and Control System
    - Define attitude (pointing) requirements
    - Choose sensors to detect attitude
    - Choose method(s)/system(s) to change attitude
    - Design rudimentary control system for spacecraft attitude
  + Electrical Power System
    - Requirements
    - Block diagram (but not detail design)
  + Computer system
    - Requirements
    - Block diagram (but not detail design)
  + Telemetry/Comm system
    - Requirements
    - Block diagram (but not detail design)
  + Docking system
    - Mechanical design
  + MMOD shielding
    - Requirements/design

**Project Schedule Outline**

* Week 1: Choose Mission
* Week 2: Mission Objectives
* Week 3: Mission Design Requirements
* Week 4: Subsystem Design Requirements
* Week 5: Requirements Review
* Week 6: Subsystem Design/Analysis
* Week 7: Subsystem Design/Analysis
* Week 8: Report Development
* Week 9: Report Development
* Week 10: Preliminary Design Review