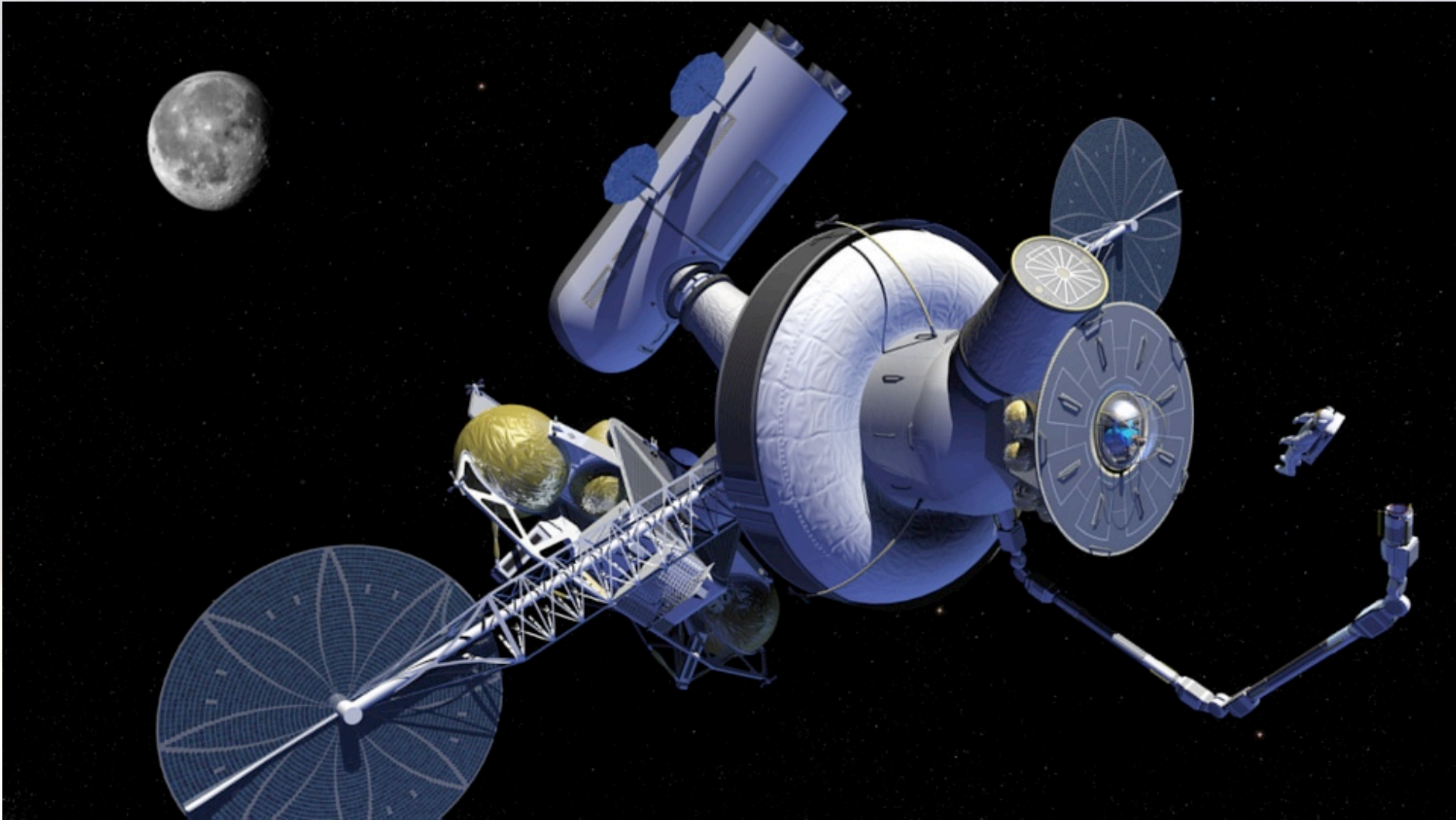


Term Project - Cislunar Space Transport



UNIVERSITY OF
MARYLAND

Course Overview; Orbital Mechanics
ENAE 791 - Launch and Entry Vehicle Design

Term Project - Top Level Requirements

- Design a system to allow the construction and support of multiple habitats in cislunar space
 - Earth-Moon L1 for deep space staging
 - Low lunar orbit for lunar surface exploration
 - Lunar distant retrograde orbit for asteroid resource recovery
- Mission models
 - Human and cargo launch and human return from cislunar space
 - Max annual cost \$3B



Crew Launch and Entry Vehicle

- Top level requirements
 - Crew of four
 - Habitable volume of 14 m^3
 - Crew and crew systems mass 2500 kg
 - Earth entry velocity 11 km/sec (TBR)
- External mold lines (shape)
- Heat shield shape, composition, analysis
- Selection of L/D and CG location
- Nominal and contingency trajectory design
- Abort and EDL systems



Launch Vehicle

- Multipurpose launch vehicle design
 - Human lunar missions (100 MT to TLI/mission)
 - Cislunar habitat support (50 MT to TLI/year)
 - Human Mars missions (500 MT to LEO/mission)
 - Number of missions/year open-ended – maximize based on available funding
- Launch vehicle design optimization (propellants, number of stages, DV distribution, sizing, etc.)
- Trajectory analysis with abort cases
- TBD



Term Project

- Work as individuals or two-person teams (your choice)
- Design an architecture to support cislunar operations in the most cost effective manner possible
- All vehicles will be conceptually designed from scratch (no “catalog engineering”!)
- Parametric design parameters will be provided for human spacecraft systems not ENAE791-relevant
- Design process should proceed throughout the term
- Formal design presentations at end of term

