AAE450, Fall 2001
Tentative Team Member Assignments

1. Aerothermodynamics
   (a) Evaluate vehicle shapes
   (b) Hypersonic and supersonic $C_L, C_D,$ and $L/D$
   (c) Pitching moment, static stability, and trim
   (d) Determine yaw stability, if feasible
   (e) Develop relations for the heating loads
   (f) Provide subroutine for trajectory aerodynamics
   (g) Provide code for analysis of aeroheating

2. Thermal Protection System
   (a) Compute TPS ablation at selected points using SODDIT code, based on heating
data from aerothermodynamics
   (b) If a non-ablating TPS is also to be used, provide material and thickness data to
help compute the heating for this system also
   (c) Determine TPS material and thickness. This must be an iterative process in
cooperation with aerothermodynamics, structures, systems, and trajectories

3. Structures and Materials
   (a) Analyze the vehicle loads
   (b) Analyze the vehicle structure by developing an approximate finite-element model
   (c) Design the structure and estimate the structural weight

4. Aerobraking Trajectories
   (a) Determine flight trajectories from the incoming interplanetary orbit to landing
   (b) Show the range of possible landing sites
   (c) Calculate aerothermal properties using code provided by aerothermodynamics
   (d) Iterate vehicle designs, using input from Structures, Systems, TPS, Aerother-
   (e) Find tolerances for the incoming orbit, de-orbit points, flight path angles at
   (f) Control angle of attack and roll angle
5. Systems Engineer

(a) Study and check the specifications for the interior components of the vehicle. Revise these as needed
(b) Develop a drawing of the interior components and vehicle shell
(c) Determine the component masses, their c.g. locations, and the mass moments of inertia. In cooperation with the other team members, iterate this component layout.

6. Propulsion (tentative)

(a) Select boost vehicle (?)
(b) Develop boost trajectory to orbit insertion
(c) Develop gimbal control algorithms for boost
(d) Determine trajectories of discarded stages
(e) Determine stagnation point temperature and acceleration in boost
(f) Develop thrust-time relations for boost engines
(g) Provide thrust corrections for altitude changes
(h) Select vehicle main engines and do tank design
(i) Select RCS thrusters and do tank design
(j) Design parachute