Propulsion Requirements

The propulsion requirements for the mission depend on the maneuvering required for each phase. The propulsion requirements for each phase of the mission can be summarized as follows:

1. Launch
   1. The HRV shall carry enough propellant to make up for orbital insertion inaccuracy (-30 km).
   2. Delta V included in phase 3.
2. Parking Orbit
   1. The parking orbit shall be maintained for the phasing time required.
   2. The HRV shall carry enough propellant to overcome perturbations & dodge debris while in the parking orbit.
   3. The HRV shall be able to perform a total Delta V of approximately 150 m/s.
3. Transfer to HST
   1. The HRV shall do a Hohmann transfer (two burns) to the HST altitude.
   2. The HRV shall perform a total Delta V of approximately 207 m/s.
4. Rendezvous and Dock
   1. The HRV shall use cold gas thrusters for propulsion during rendezvous and dock to avoid damage or contamination to HST.
   2. The HRV shall perform a total Delta V of approximately 50 m/s.
5. Reboost
   1. The HRV shall do a Hohmann transfer (two burns) with the HST attached. The re-boost acceleration shall not damage the HST.
   2. The HRV shall perform a total Delta V of approximately 46 m/s.
6. Undock and Separation
   1. The HRV shall use docking spring and cold gas thrusters to avoid damage or contamination to the HST.
   2. The Delta V required for undock and separation is negligible.
7. Maintain Orbit for Phasing Time
   1. The orbit shall be maintained for the phasing time required.
   2. The HRV shall carry enough propellant to overcome perturbations while waiting for de-orbit window.
   3. The Delta V required for maintenance of the reboosted orbit is negligible.
8. De-orbit
   1. The HSTRV shall do a ½ Hohmann transfer (1 burn) to de-orbit to the upper atm (120 km) over the ocean.
   2. The Delta V required for de-orbit is approximately 140 m/s.