mass estimate																
mu =	3.986E+14 m^3/s^2					thruster:	R-40B									
r_earth =	6,378,136	m			•	type:	Biprop									
g_0	9.80665	m/s^2			•	fuel	NTO (MO	N-3)/MMI	1							
parking orbit altitude =	200	km P =	5309.64	s 1.47 hrs		SP =	293	S								
insertion accuracty =	30	km				mass =	6.80	kg								
HST altitude in 2020 =	532	km P =	5,717	s 1.59 hrs												
reboost altitude =	616	km P =	5,821	s 1.62 hrs												
de-orbit altitude =	120	km P =	5,213	s 1.45 hrs												
HST mass =	12,273	kg														
HSTRV final mass =	705	kg	(dry mass	+ evasive m	aneuver r	eserve + 2	20% fuel r	eserve) - i	terated o	n 'mass est	imate' tab					
	initial	final										final	initial	nron		
	IIIILIai	IIIIdi										IIIIai	IIIILIAI	prop		
	altitude	altitude	V_initial	а	V_1	ΔV_1	V_2	V_final	ΔV_2	Total ΔV		mass	mass	mass	maneuver	maneuver
mission phase			V_initial (m/s)	a (m)	V_1 (m/s)	ΔV_1 (m/s)	V_2 (m/s)	V_final (m/s)	ΔV_2 (m/s)	Total ΔV (m/s)	m_i/m_f				maneuver time (s)	maneuver time (hr)
mission phase de-orbit (ellipse)	altitude	altitude	_ (m/s)								m_i/m_f 1.050	mass	mass	mass		
· · · · · · · · · · · · · · · · · · ·	altitude (km)	altitude (km)	(m/s) 7,549	(m)	(m/s)	(m/s)				(m/s)		mass (kg)	mass (kg)	mass (kg)	time (s)	time (hr)
de-orbit (ellipse)	altitude (km) 616 532	altitude (km) 120	(m/s) 7,549	(m) 6,746,136	(m/s) 7,409	(m/s) -140	(m/s)	(m/s)	(m/s)	(m/s) -140	1.050	mass (kg) 705	mass (kg) 740	mass (kg)	time (s) 2,757	time (hr) 0.77
de-orbit (ellipse) re-boost (HT)	altitude (km) 616 532	altitude (km) 120	7,549 7,595	(m) 6,746,136	(m/s) 7,409	(m/s) -140	(m/s)	(m/s)	(m/s)	(m/s) -140 46	1.050 1.016	mass (kg) 705 13,013	mass (kg) 740 13,221	mass (kg) 35 209	time (s) 2,757	time (hr) 0.77
de-orbit (ellipse) re-boost (HT) rendezvous & dock (cold g	altitude (km) 616 532 as)	altitude (km) 120 616	7,549 7,595	(m) 6,746,136 6,952,136	(m/s) 7,409 7,618	(m/s) -140 23	(m/s) 7,526	(m/s) 7,549	(m/s)	(m/s) -140 46 25	1.050 1.016 1.036	mass (kg) 705 13,013 949	mass (kg) 740 13,221 982	mass (kg) 35 209 (34)	time (s) 2,757 5,769	time (hr) 0.77 1.60
de-orbit (ellipse) re-boost (HT) rendezvous & dock (cold g	altitude (km) 616 532 as) 170	altitude (km) 120 616 532	7,549 7,595 7,802	(m) 6,746,136 6,952,136 6,729,136	(m/s) 7,409 7,618 7,906	(m/s) -140 23 104	(m/s) 7,526 7,492	(m/s) 7,549 7,595	(m/s)	(m/s) -140 46 25	1.050 1.016 1.036	mass (kg) 705 13,013 949	mass (kg) 740 13,221 982	mass (kg) 35 209 (34)	time (s) 2,757 5,769	time (hr) 0.77 1.60
de-orbit (ellipse) re-boost (HT) rendezvous & dock (cold g parking to rendezvous	altitude (km) 616 532 as) 170	altitude (km) 120 616 532	7,549 7,595 7,802	(m) 6,746,136 6,952,136 6,729,136	(m/s) 7,409 7,618 7,906	(m/s) -140 23 104	(m/s) 7,526 7,492	(m/s) 7,549 7,595	(m/s)	(m/s) -140 46 25 207	1.050 1.016 1.036 1.075	mass (kg) 705 13,013 949 982	mass (kg) 740 13,221 982 1,056	mass (kg) 35 209 (34) 73	time (s) 2,757 5,769 5,494	time (hr) 0.77 1.60 1.53