<u>mass estimate</u>																
mu =	3.986E+14 m^3/s^2					thruster: R-40B										
r_earth =	6,378,136 r	m			†	type:	Biprop									
g_0	9.80665 m/s^2				f	fuel	NTO (MO	N-3)/MM	Н							
parking orbit altitude =	200 l	km P =	5309.64	s 1.47 hrs	1	SP =	293	S								
insertion accuracty =	30 l	km			r	mass =	6.80	kg								
HST altitude in 2020 =	532 k	km P =	5,717	s 1.59 hrs												
reboost altitude =	616 k	km P =	5,821	s 1.62 hrs												
de-orbit altitude =	120 k	km P =	5,213	s 1.45 hrs												
HST mass =	12,273 k	kg														
HSTRV final mass =	757 k	kg	(dry mass	+ evasive ma	aneuver re	eserve + 2	20% fuel r	eserve) - i	terated o	n 'mass est	imate' tab					
	initial final															
	initial	final										final	initial	prop		
	initial altitude	final altitude	V_initial	а	V_1	ΔV_1	V_2	V_final	ΔV_2	Total ΔV		final mass	initial mass	prop 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		time (hr)
	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) 0.77
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) 757	mass (kg) 795	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) 757 13,068	mass (kg) 795 13,278	mass (kg) 38 210	time (s) 2,757	time (hr) 0.77 1.60
de-orbit (ellipse) re-boost (HT) rendezvous & dock (cold ga	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) 23	(m/s) -140 46 25	1.050 1.016 1.036	mass (kg) 757 13,068 1,005	mass (kg) 795 13,278 1,041	mass (kg) 38 210 (36)	time (s) 2,757 5,769	time (hr) 0.77 1.60
de-orbit (ellipse) re-boost (HT) rendezvous & dock (cold ga	altitude (km) 616 532 as)	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) 23	(m/s) -140 46 25	1.050 1.016 1.036	mass (kg) 757 13,068 1,005	mass (kg) 795 13,278 1,041	mass (kg) 38 210 (36)	time (s) 2,757 5,769	time (hr) 0.77 1.60 1.53

total propellant mass for main thruster:

382 kg

3.89