

PHASEFOUR

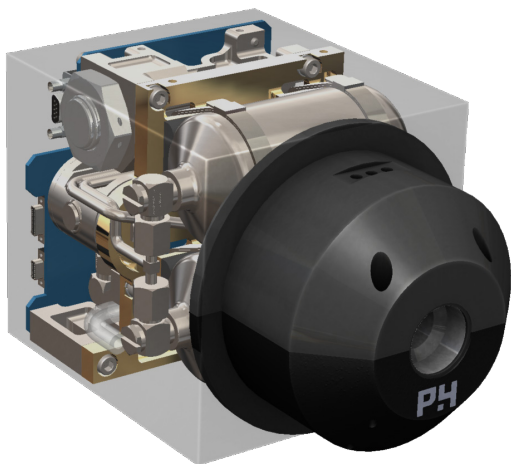
CASE STUDY: RAPID CONSTELLATION PHASING

OBJECTIVE : USE P4'S PLASMA ENGINE TO PHASE TWO 6U SATELLITES BY 180°

Two 6U satellites are placed in a polar orbit at 600 km altitude. The satellites perform an initial velocity increase of 1 m/s and then perform a series of burns in order to phase to 180°. During the phasing maneuver, the satellite thrusts on a 30% duty cycle. On each orbit, a single long duration burn in the velocity direction is centered around the periapsis of the orbit. The phasing orbit is made increasingly eccentric while maintaining the same periapsis altitude. Finally, the thrusting direction is reversed and the now elliptical orbits are reduced back to circular orbits, reaching the proper altitude and eccentricity as 180° phase is reached.



SATELLITE PROFILE



MISSION	REMOTE SENSING
SPACECRAFT VOLUME	6U (30x20x10cm)
SPACECRAFT MASS (kg)	11.5
CIRCULAR ALTITUDE (km)	600
INCLINATION (deg)	90
THRUST (mN)	2.0-2.5
SPECIFIC IMPULSE (s)	500
RF POWER (W)	50
XE PROPELLANT MASS (g)	100
P4 ENGINE VOLUME	<1U

RESULTS

Maneuver Duration : 9.5 days

Burn time : 2.8 days

Delta-v required : 35 m/s

Propellant required : 82 g

Maneuver time with alternative methods

Differential drag : 6 months

SIMULATION: PROPAGATOR - STK ASTROGATOR

PERTURBATIONS : J2, ATMOSPHERIC DRAG

