DIRECT v3

Jupiter-246 Heavy - Lunar EDS Launch Vehicle Configuration

Vehicle Concept Characteristics - LV 41.5004.08001

UPPER STAGE

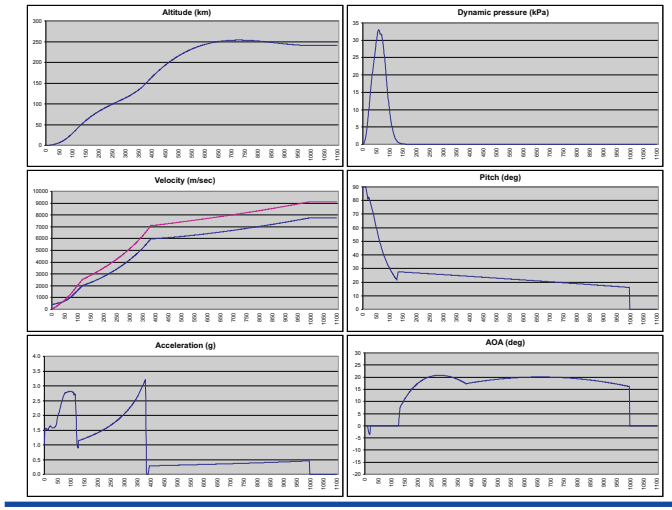
Design Heritage	Boeing ACES / Lockheed-Martin WBC
Propellants	LOX / LH2
Maximum Gross Propellant	420,749lb (190,849kg)
Usable Ascent Propellant	153,349lb (69,558kg)
Ascent Flight Performance Reserve	6,935lb (3,146kg)
Usable Post-Ascent Propellant	253,587lb (115,025kg)
Post-Ascent Flight Performance Reserve	2,561lb (1,162kg)
Unusable Residuals	4,073lb (1,848kg)
Ascent In-Flight Losses	244lb (111kg)
RCS Propellant	992lb (450kg)
Propellant Offload	0.00%
Stage pmf	0.9324
Dry Mass	26,128lb (11,852kg)
Burnout Mass	30,202lb (13,699kg)
# Engines / Type	6 / RL-10B-2
Engine Thrust (@ 100%) Vac	24,750lbf (11,226kgf / 110,093N)
Engine Isp (@ 100%) Vac	459.0s
Mission Power Level	100.0%
Upper Stage Ascent Burn Time	609.9s
LEO Loiter Period	4 + 1 days
Pre-TLI Overboard Mass	6,935lb (3,146kg)
ASE*	1,102lb (500kg)

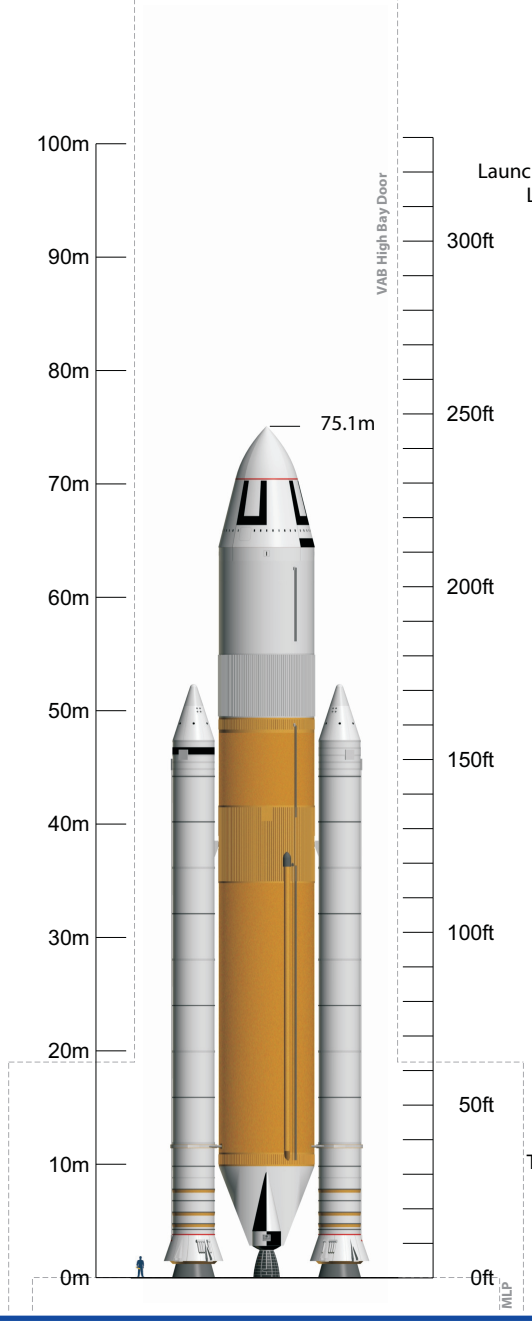
DYNAMICS

Thrust : Weight @ Liftoff	1.518 : 1
Max Dynamic Pressure	690.2psf (33,045Pa)
Max g's During Ascent	3.21g
Insertion Altitude	130.0nmi (240.8km)

ASCENT PERFORMANCE

Delivery Orbit	130.0 x 130.0nmi, 29.0°
Payload w/ regular NASA GR&A's	258,243lb (117,137kg) †
Payload w/ additional 10% Reserve	**232,418lb (105,423kg) †**





Launch Site	**KSC LC-39 (Latitude: 28.6084°)**
GLOW	**5,727,381lb (2,597,896kg)**
Payload Fairing	27.6 x 0.0ft (8.4 x 0.0m)
Payload Envelope	25.0 x 0.0ft (7.6 x 0.0m)
Payload Fairing Jettison Mass	8,724lb (3,957kg)
Payload Fairing Jettison	354.1s @ 73.6nmi
Launch Abort System Jettison Mass	-
Launch Abort System Jettison	-

BOOSTERS (each)

Design Heritage	Shuttle-derived 5-segment RSRMV
Propellants	PBAN
Usable Propellant	1,380,873lb (626,353kg)
Stage pmf	0.8656
Dry Mass	228,620lb (103,700kg)
Burnout Mass	232,608lb (105,509kg)
# Boosters / Type	2 / 5-segment RSRMV
Booster Thrust (@ 0.7s) SL	3,510,791lbf (1,592,468kgf / 15,616,776N)
Vac	3,510,791lbf (1,592,468kgf / 15,616,776N)
Booster Isp (@ 0.7s) SL	237.0s
Vac	267.4s
Booster Burn Time	126.6s

CORE STAGE

Design Heritage	Shuttle Super Light Weight Tank ET
Propellants	LOX / LH2
Gross Propellant	1,621,191lb (735,360kg)
Usable Ascent Propellant	1,604,979lb (728,006kg)
Unusable Residuals	16,047lb (7,279kg)
In-Flight Losses	325lb (147kg)
Propellant Offload	0.00%
Stage pmf	0.9075
Dry Mass	147,479lb (66,895kg)
Burnout Mass	163,526lb (74,174kg)
# Engines / Type	4 / SSME-Block-II
Engine Thrust (@ 104.5%) SL	392,326lbf (177,956kgf / 1,745,155N)
Vac	490,847lbf (222,644kgf / 2,183,396N)
Engine Isp (@ 104.5%) SL	361.4s
Vac	452.2s
Mission Power Level	104.5%
Core Burn Time	384.1s

INTERSTAGE

Dry Mass	8,748lb (3,968kg)

EDS TLI PERFORMANCE

	2-Launch EOR
TLI dV (Adj. for Gravity Losses)	3,215.0m/s (+ FPR)
LEO Loiter Period	5.0 days
TLI Payload Performance*	**203,764lb (92,426kg)**

Work In Progress

8th June 2009

* ASE is part of the Payload, not additional

† Ascent Performance for Jupiter-246 protects for Upper Stage Single-Engine-Out and full FPR

‡ TLI Performance for Jupiter-246 protects for Upper Stage Dual-Engine-Out and full FPR