



### Vehicle Concept Characteristics - LV 41.5003.08001

#### UPPER STAGE

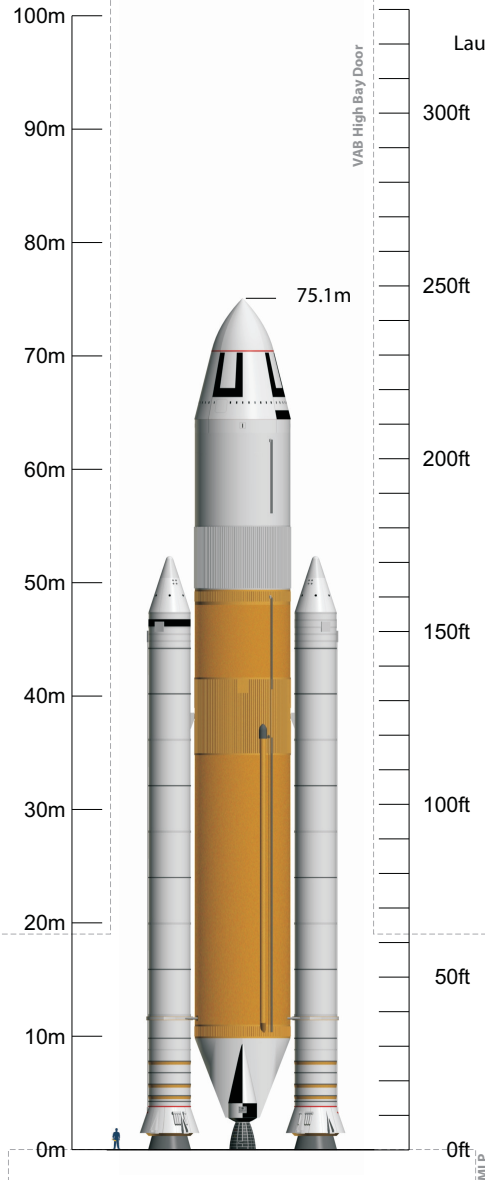
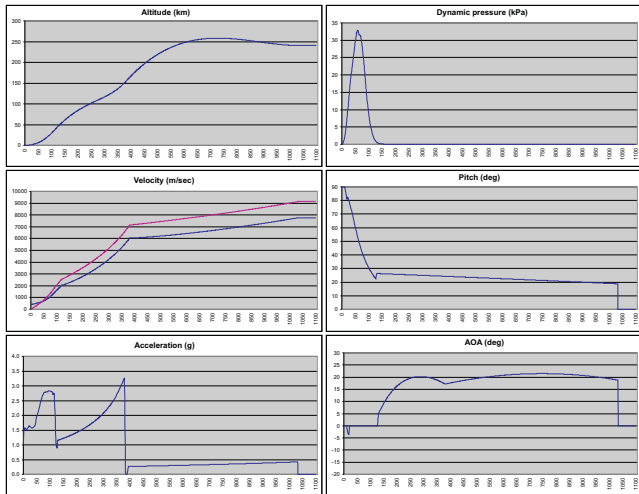
Design Heritage	Boeing ACES / Lockheed-Martin WBC
Propellants	LOX / LH2
Maximum Gross Propellant	412,601lb (187,152kg)
Usable Ascent Propellant	150,522lb (68,276kg)
Ascent Flight Performance Reserve	6,977lb (3,165kg)
Usable Post-Ascent Propellant	248,348lb (112,649kg)
Post-Ascent Flight Performance Reserve	2,509lb (1,138kg)
Unusable Residuals	4,006lb (1,817kg)
Ascent In-Flight Losses	239lb (109kg)
RCS Propellant	992lb (450kg)
Propellant Offload	0.00%
Stage pmf	0.9357
Dry Mass	24,068lb (10,917kg)
Burnout Mass	28,074lb (12,734kg)
# Engines / Type	6 / RL-10A-4-2
Engine Thrust (@ 100%) Vac	22,300lbf (10,115kgf / 99,195N)
Engine Isp (@ 100%) Vac	445.2s
Mission Power Level	100.0%
Upper Stage Ascent Burn Time	644.9s
LEO Loiter Period	4 + 1 days
Pre-TLI Overboard Mass	6,977lb (3,165kg)
ASE*	1,102lb (500kg)

#### DYNAMICS

Thrust : Weight @ Liftoff	1.521 : 1
Max Dynamic Pressure	686.9psf (32,889Pa)
Max g's During Ascent	3.26g
Insertion Altitude	130.0nmi (240.8km)

#### ASCENT PERFORMANCE

Delivery Orbit	130.0 x 130.0nmi, 29.0°
Payload w/ regular NASA GR&A's	252,950lb (114,736kg) †
Payload w/ additional 10% Reserve	<b>227,655lb (103,263kg) †</b>



#### Launch Site

KSC LC-39 (Latitude: 28.6084°)

#### GLOW

<b>GLOW</b>	<b>5,717,119lb (2,593,242kg)</b>
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	349.6s @ 73.5nmi
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 / 4-segment Shuttle RSRM
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)
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#### EDS TLI PERFORMANCE

2-Launch EOR	2-Launch EOR
TLI dV (Adj. for Gravity Losses)	3,220.0m/s (+ FPR)
LEO Loiter Period	5.0 days
TLI Payload Performance*	<b>190,752lb (86,524kg) ‡</b>

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