



### Vehicle Concept Characteristics - LV 41.4003.10050

#### UPPER STAGE

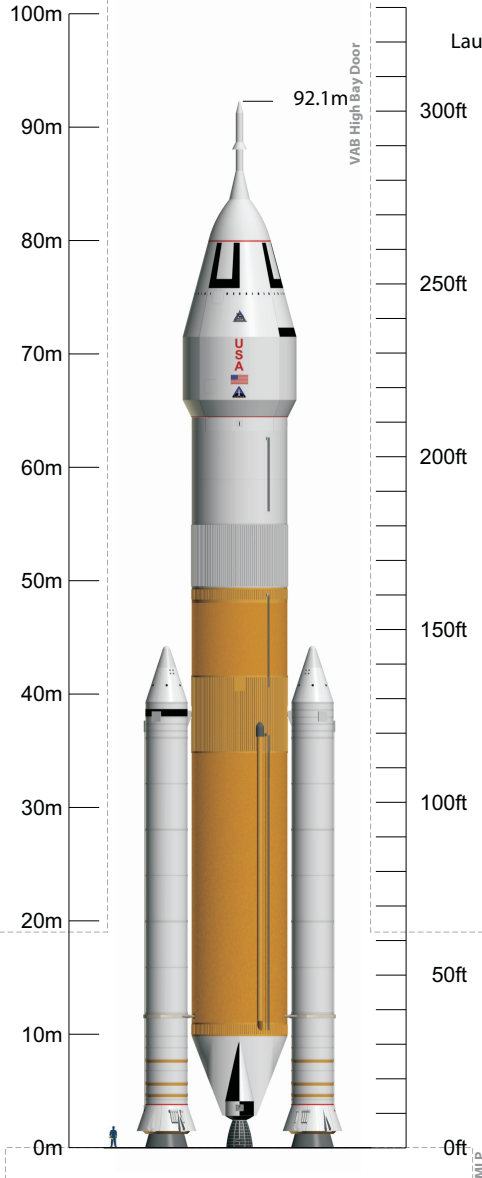
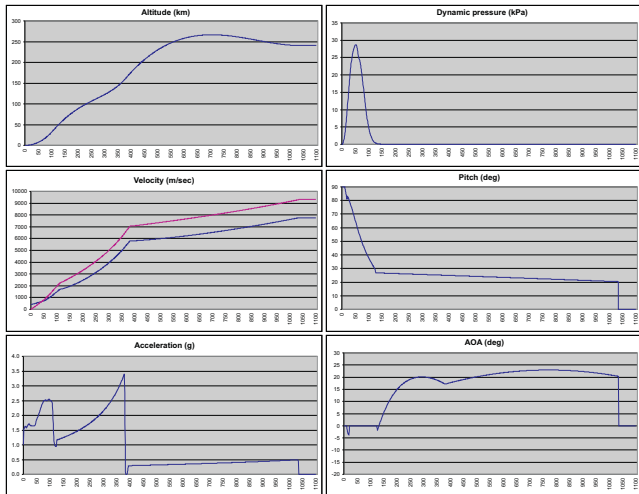
Design Heritage	Boeing ACES / Lockheed-Martin WBC
Propellants	LOX / LH2
Maximum Gross Propellant	379,321lb (172,057kg)
Usable Ascent Propellant	151,961lb (68,928kg)
Ascent Flight Performance Reserve	6,418lb (2,911kg)
Usable Post-Ascent Propellant	-
Post-Ascent Flight Performance Reserve	-
Unusable Residuals	3,735lb (1,694kg)
Ascent In-Flight Losses	220lb (100kg)
RCS Propellant	992lb (450kg)
Propellant Offload	56.63%
Stage pmf	0.9342
Dry Mass	22,737lb (10,313kg)
Burnout Mass	26,473lb (12,008kg)
# 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	646.9s
LEO Loiter Period	4 + 1 days
Pre-TLI Overboard Mass	-
ASE*	3,064lb (1,390kg)

#### DYNAMICS

Design Heritage	Blackzone Safe Trajectory
Thrust : Weight @ Liftoff	1.535 : 1
Max Dynamic Pressure	599.0psf (28,678Pa)
Max g's During Ascent	3.40g
Insertion Altitude	130.0nmi (240.8km)

#### ASCENT PERFORMANCE

Delivery Orbit	130.0 x 130.0nmi, 29.0°
Payload w/ regular NASA GR&A's	200,903lb (91,128kg) †
Payload w/ additional 10% Reserve	<b>180,812lb (82,015kg) †</b>



#### Launch Site

KSC LC-39 (Latitude: 28.6084°)

#### GLOW

Design Heritage	4,790,986lb (2,173,155kg)
Payload Fairing	32.8 x 18.4ft (10.0 x 5.6m)
Payload Envelope	30.2 x 18.4ft (9.2 x 5.6m)
Payload Fairing Jettison Mass	12,571lb (5,702kg)
Payload Fairing Jettison	After Orbital Insertion
Launch Abort System Jettison Mass	16,083lb (7,295kg)
Launch Abort System Jettison	405.0s @ 96.7nmi

#### BOOSTERS (each)

Design Heritage	Shuttle RSRM - Flown Unchanged
Propellants	PBAN
Usable Propellant	1,111,604lb (504,215kg)
Stage pmf	0.8561
Dry Mass	183,948lb (83,437kg)
Burnout Mass	186,864lb (84,760kg)
# Boosters / Type	2 / 4-segment Shuttle RSRM
Booster Thrust (@ 0.7s) SL	2,892,912lbf (1,312,203kgf / 12,868,314N)
Vac	3,142,302lbf (1,425,324kgf / 13,977,656N)
Booster Isp (@ 0.7s) SL	237.0s
Vac	269.1s
Booster Burn Time	123.8s

#### 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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\* ASE is part of the Payload, not additional

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