



Vehicle Concept Characteristics - LV 41.4002.10050

UPPER STAGE

Design Heritage	Boeing ACES / Lockheed-Martin WBC
Propellants	LOX / LH2
Maximum Gross Propellant	400,519lb (181,672kg)
Usable Ascent Propellant	159,634lb (72,409kg)
Ascent Flight Performance Reserve	6,677lb (3,029kg)
Usable Post-Ascent Propellant	-
Post-Ascent Flight Performance Reserve	-
Unusable Residuals	3,911lb (1,774kg)
Ascent In-Flight Losses	39lb (18kg)
RCS Propellant	992lb (450kg)
Propellant Offload	56.91%
Stage pmf	0.9282
Dry Mass	26,785lb (12,150kg)
Burnout Mass	30,696lb (13,924kg)
# Engines / Type	1 / J-2X
Engine Thrust (@ 100%) Vac	294,000lbf (133,356kgf / 1,307,777N)
Engine Isp (@ 100%) Vac	448.0s
Mission Power Level	100.0%
Upper Stage Ascent Burn Time	261.9s
LEO Loiter Period	4 + 1 days
Pre-TLI Overboard Mass	-
ASE*	3,064lb (1,390kg)

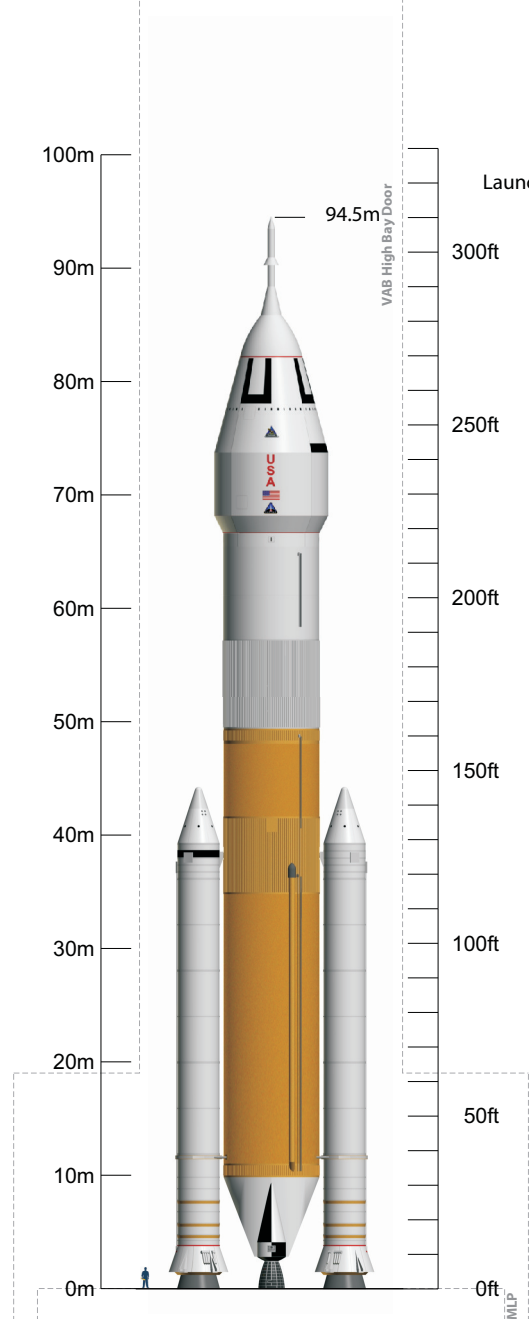
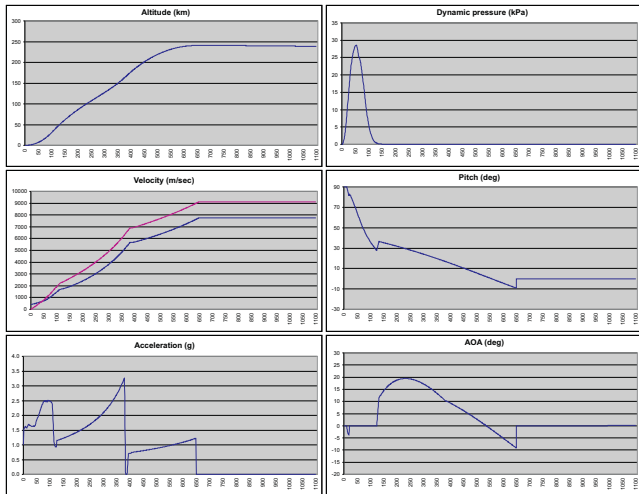
DYNAMICS

Thrust : Weight @ Liftoff	1.526 : 1
Max Dynamic Pressure	598.9psf (28,676Pa)
Max g's During Ascent	3.25g
Insertion Altitude	130.0nmi (240.8km)



ASCENT PERFORMANCE

Delivery Orbit	130.0 x 130.0nmi, 29.0°
Payload w/ regular NASA GR&A's	214,054lb (97,093kg)
Payload w/ additional 10% Reserve	192,649lb (87,384kg)



Launch Site

KSC LC-39 (Latitude: 28.6084°)

GLOW

Payload Fairing	4,819,162lb (2,185,935kg)
Payload Envelope	32.8 x 18.4ft (10.0 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 @ 97.1nmi

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	11,664lb (5,291kg)
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* ASE is part of the Payload, not additional