



### Vehicle Concept Characteristics - LV 41.5002.10051

#### UPPER STAGE

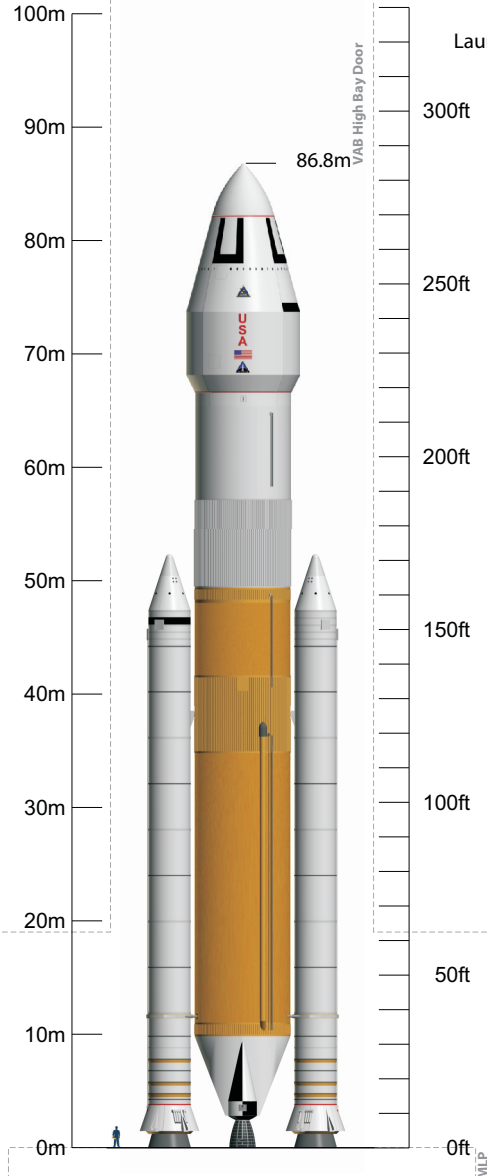
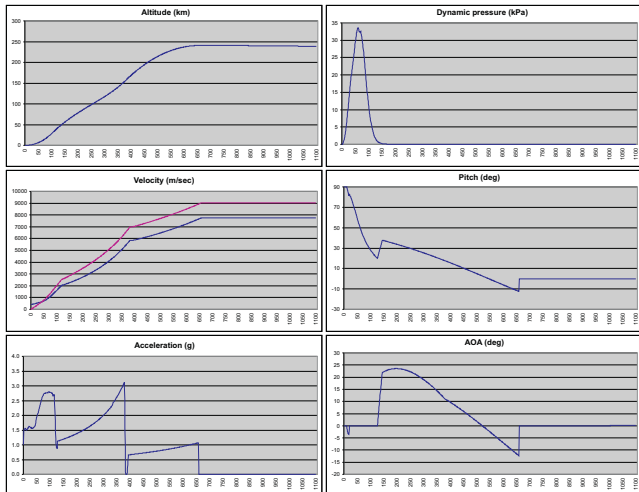
Design Heritage	Boeing ACES / Lockheed-Martin WBC
Propellants	LOX / LH2
Maximum Gross Propellant	438,746lb (199,012kg)
Usable Ascent Propellant	164,736lb (74,723kg)
Ascent Flight Performance Reserve	7,309lb (3,315kg)
Usable Post-Ascent Propellant	-
Post-Ascent Flight Performance Reserve	-
Unusable Residuals	4,220lb (1,914kg)
Ascent In-Flight Losses	42lb (19kg)
RCS Propellant	992lb (450kg)
Propellant Offload	59.22%
Stage pmf	0.9303
Dry Mass	28,314lb (12,843kg)
Burnout Mass	32,534lb (14,757kg)
# 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	271.9s
LEO Loiter Period	4 + 1 days
Pre-TLI Overboard Mass	-
ASE*	1,102lb (500kg)

#### DYNAMICS

Thrust : Weight @ Liftoff	1.511 : 1
Max Dynamic Pressure	700.3psf (33,530Pa)
Max g's During Ascent	3.11g
Insertion Altitude	130.0nmi (240.8km)

#### ASCENT PERFORMANCE

Delivery Orbit	130.0 x 130.0nmi, 29.0°
Payload w/ regular NASA GR&A's	261,596lb (118,658kg)
Payload w/ additional 10% Reserve	<b>235,436lb (106,792kg)</b>



#### Launch Site

KSC LC-39 (Latitude: 28.6084°)

#### GLOW

Payload Fairing	5,754,798lb (2,610,333kg)
Payload Envelope	32.8 x 18.4ft (10.0 x 5.6m)
Payload Fairing Jettison Mass	30.2 x 18.4ft (9.2 x 5.6m)
Payload Fairing Jettison	15,916lb (7,219kg)
Launch Abort System Jettison Mass	335.7s @ 72.5nmi
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	11,664lb (5,291kg)
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\* ASE is part of the Payload, not additional