



Vehicle Concept Characteristics - LV 41.5005.10050

UPPER STAGE

Design Heritage	Boeing ACES / Lockheed-Martin WBC
Propellants	LOX / LH2
Maximum Gross Propellant	433,061lb (196,433kg)
Usable Ascent Propellant	156,894lb (71,166kg)
Ascent Flight Performance Reserve	7,073lb (3,208kg)
Usable Post-Ascent Propellant	-
Post-Ascent Flight Performance Reserve	-
Unusable Residuals	4,174lb (1,893kg)
Ascent In-Flight Losses	168lb (76kg)
RCS Propellant	992lb (450kg)
Propellant Offload	60.52%
Stage pmf	0.9322
Dry Mass	27,037lb (12,264kg)
Burnout Mass	31,211lb (14,157kg)
# Engines / Type	4 / RL-60
Engine Thrust (@ 100%) Vac	64,992lbf (29,480kgf / 289,100N)
Engine Isp (@ 100%) Vac	459.0s
Mission Power Level	100.0%
Upper Stage Ascent Burn Time	397.9s
LEO Loiter Period	4 + 1 days
Pre-TLI Overboard Mass	-
ASE*	3,064lb (1,390kg)

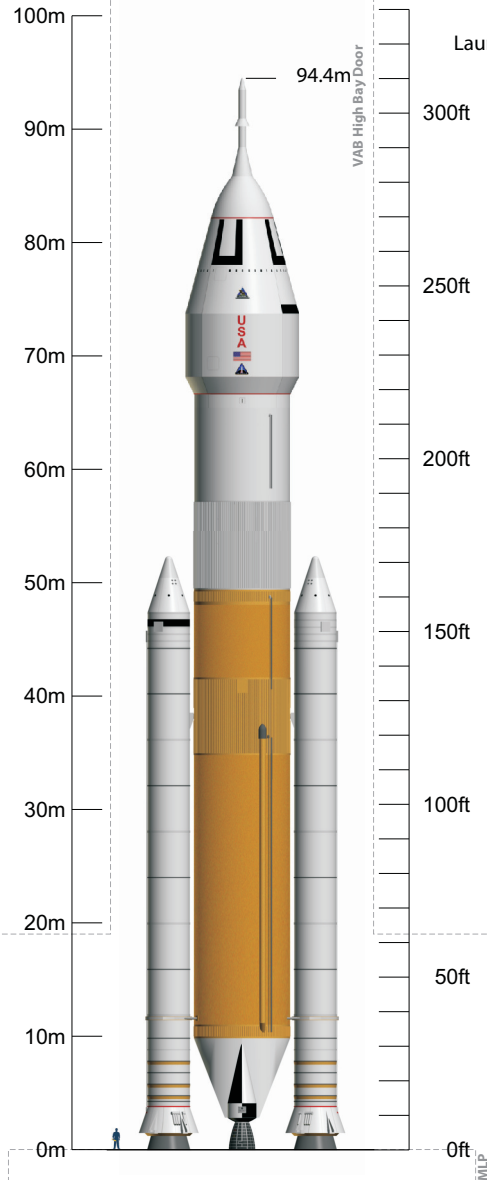
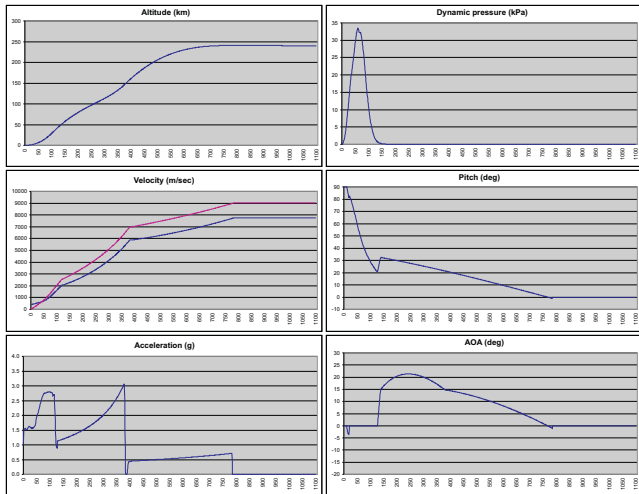
DYNAMICS

Thrust : Weight @ Liftoff	1.513 : 1
Max Dynamic Pressure	696.8psf (33,362Pa)
Max g's During Ascent	3.07g
Insertion Altitude	130.0nmi (240.8km)



ASCENT PERFORMANCE

Delivery Orbit	130.0 x 130.0nmi, 29.0°
Payload w/ regular NASA GR&A's	249,233lb (113,050kg) †
Payload w/ additional 10% Reserve	224,309lb (101,745kg) †



Launch Site

KSC LC-39 (Latitude: 28.6084°)

GLOW

Payload Fairing	5,745,918lb (2,606,305kg)
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 @ 88.4nmi

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)
----------	--------------------

* ASE is part of the Payload, not additional