Launch Vehicle

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System Requirements

- Lift 350 kg to a C3 of 1.0 km^2/sec^2
- Launch inclination – 28.5 to 57°
- Accommodate the size of the STEREO spacecraft
- Accommodate a ≥1.1 m (39.4 in) diameter high-gain antenna
- Provide power, purge, and air conditioning interfaces
- Single launch
  - Earliest launch dates October 2002 and December 2002
  - Latest launch dates October 2004 and December 2004
- Dual launch
  - Earliest launch date October 2002
  - Latest launch date December 2004

Launch Vehicles Considered

- Taurus
- **Athena II**
- Delta II
- **Shuttle**
- Ariane
- DNEPR

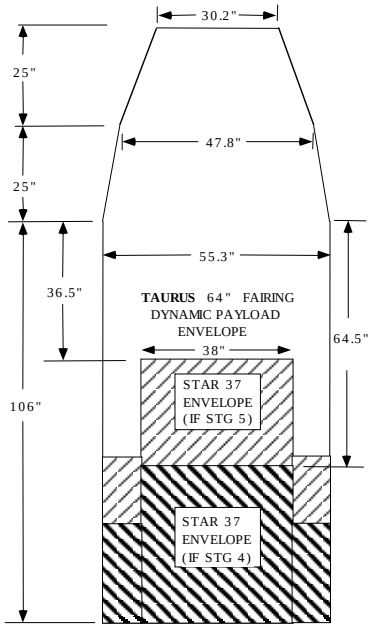
Taurus

Version	kg to C3 = 1.0 Fairing size	
	63”	**92”**
Std 4 Stg	289	242
XL 4 Stg[1]	343[2]	296
XL 5 Stg[1]	374[2]	327

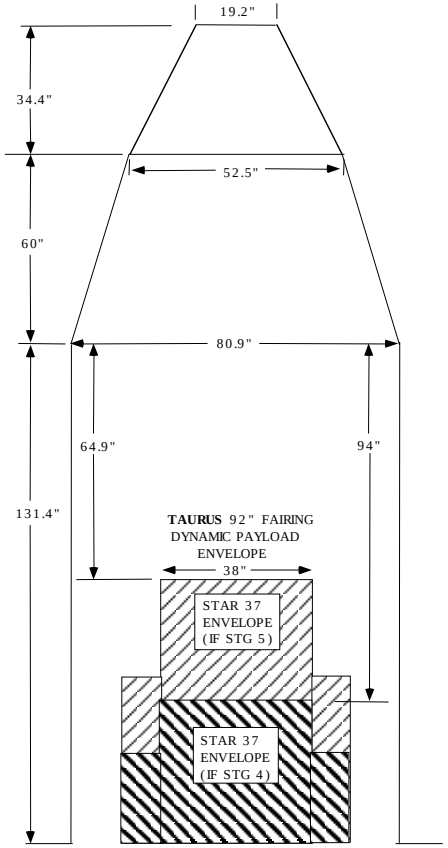
[1]Not qualified

[2]Estimated

63” FAIRING



92” FAIRING

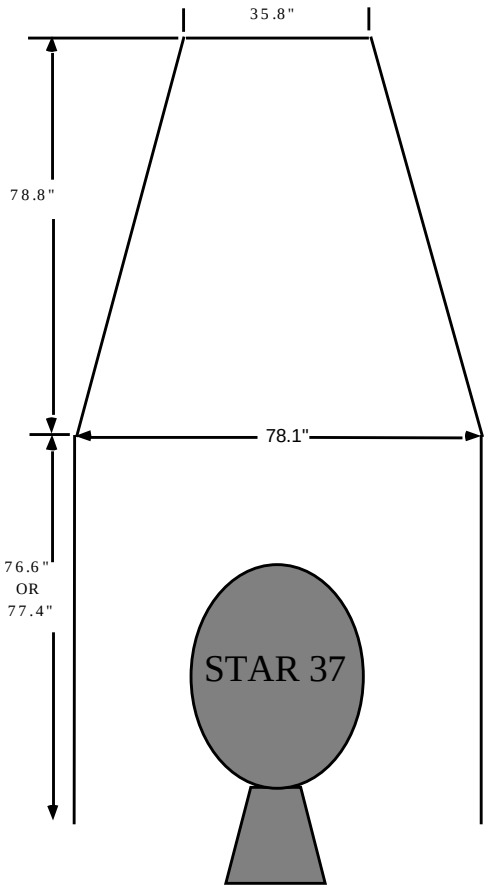


Athena

Version	kg to C3 = 1.0
II 6T MP w STAR 37V[1]	300
II 6T MP w STAR 37FM[2]	350
II 6T MP w STAR 48AV[1]	420

[1]Not qualified

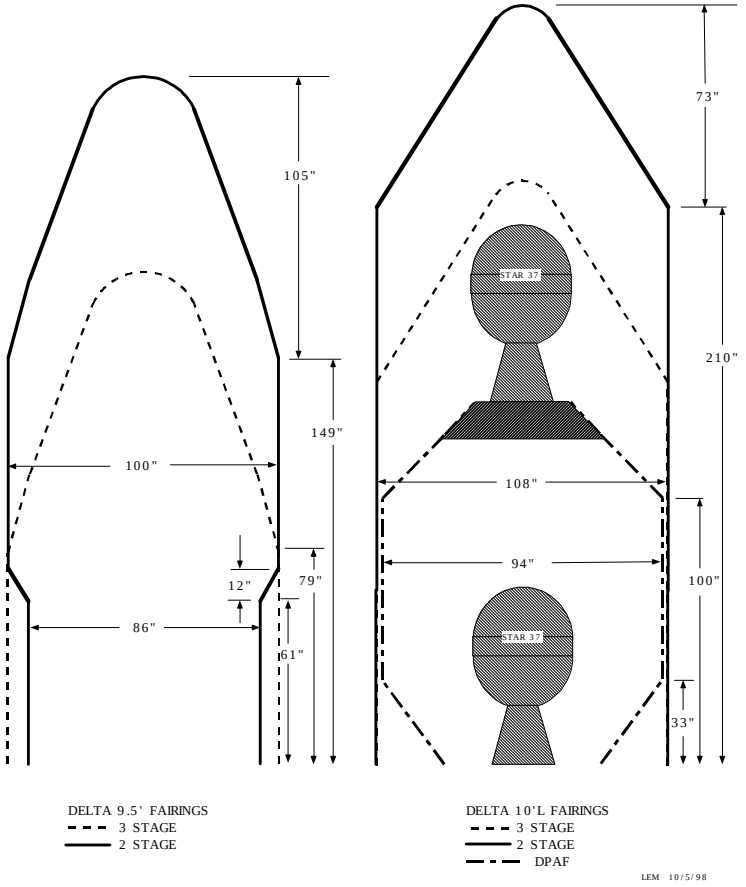
[2]Lunar Prospector configuration



Delta II

Version	kg to C3 = 1.0
Single S/C per launch	
7326-9.5 (STAR 37FM)	600[1]
7920-9.5[4]	650[1]
7325-9.5	710
7925-9.5	1300
Dual S/C launch	
7920-10L DPAF[2]	413(4970[3])
7320-10L DPAF[2]	413(2735[3])

[1]OLS number
[2]To 100 nmi park orbit
[3]3450 kg required for 3310 m/sec
[4]3-axis stabilized release

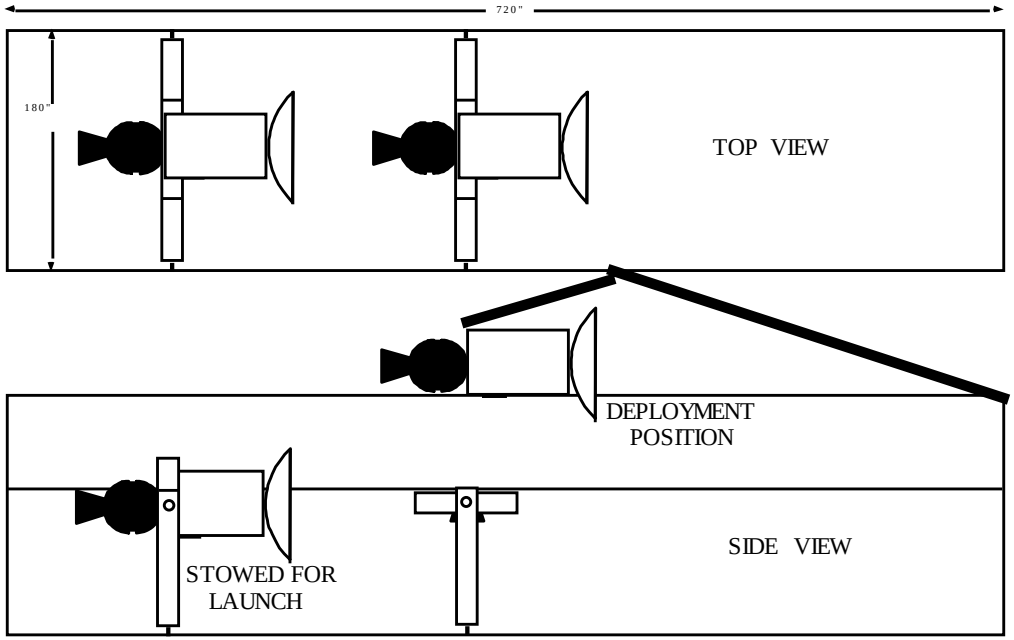


Shuttle

kg to Version	C3 = 1.0
STAR 37FM[1]	<350[2]
STAR 48V	500[2]

[1] GSFC FSS cradles for STAR 48 exist but require modification

[2] 3310 m/sec from 100 nmi park orbit



Other Options Considered

- Ariane 44L + SPELDA

  No detailed data but would be similar to Delta II + DPAF

- DNEPR

  Not qualified in time for STEREO

Requirements Compliance So Far

- Two Delta II 7326-9.5's meet all requirements, but their cost would exceed the allocated launch vehicle dollars.
- Two Delta II 7920's would provide a 3-axis release.
- Taurus XL in a 92" fairing falls about 25 kg short on payload and requires qualification. Pegasus XL has flown successfully 12 times.
- Athena II, Delta II DPAF, and Shuttle options require the spacecraft to be built around or on a separate injection solid. Only the Athena II Lunar Prospector Star 37FM Stage has flight heritage.
- Athena II and Delta II DPAF fairing height is severely limited by the injection solid. Longer Athena II fairing requires qualification and would eat into payload capability.
- Shuttle option requires refurbished FSS cradles for STAR 48V.

There is no clear winner, but the Pre-Phase A Report will make a recommendation.