

***STEREO Launch Vehicle
Study***



The Johns Hopkins University
Applied Physics Laboratory
Laurel, Maryland 20723

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- **Requirements**
 - **Lift 350 Kg to a C3 of 1.0 km²/sec²**
 - **Accomodate a • 55” Dia. by • 70” Long Cylindrical Spacecraft**
 - **Acommodate a • 1.0 m(39.4 in) Dia. High Gain Antenna**
 - **Single Launch**
 - **Earliest Launch Dates Oct ‘02 & Dec ‘02**
 - **Latest Launch Dates Oct ‘04 & Dec ‘04**
 - **Dual Launch**
 - **Earliest Launch Date Oct ‘02**
 - **Latest Launch Date Dec ‘04**

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-
- **Launch Vehicles Studied**
 - **TAURUS**
 - **ATHENA II**
 - **DELTA II**
 - **SHUTTLE**
 - **ARIANE**
 - **DNEPR**

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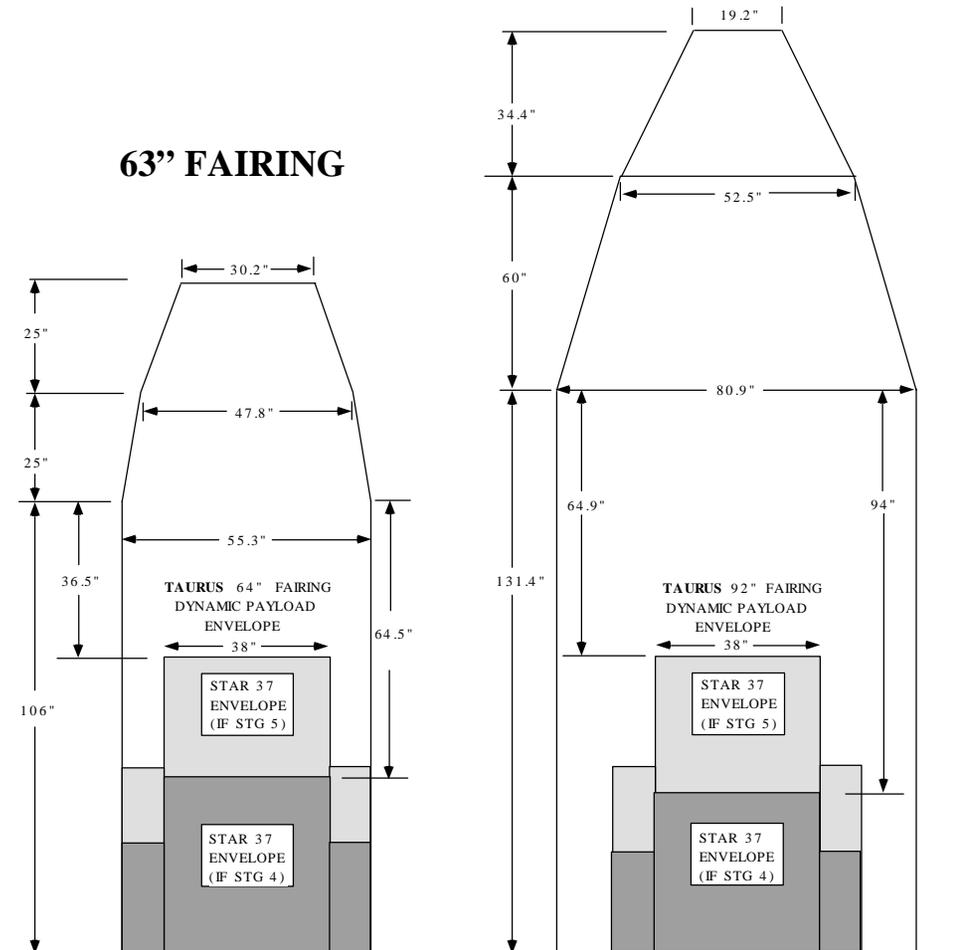
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• TAURUS

VERSION	C3 = 1.0 - KG	
	Fairing	
	63"	92"
Std 4 Stg	289	242
XL 4 Stg*	343**	296
XL 5 Stg*	374**	327

* Not Qualified
** Estimated

92" FAIRING



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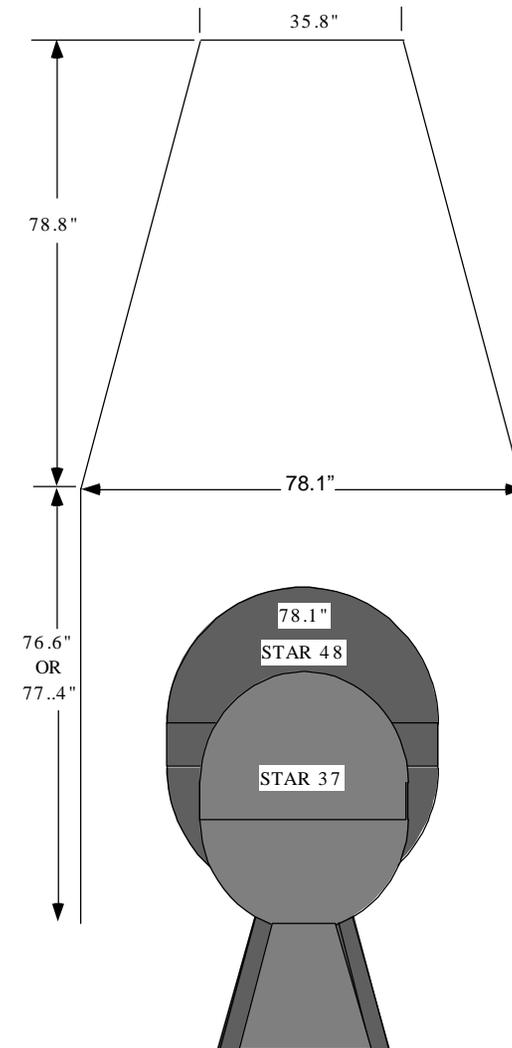
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• ATHENA

VERSION	C3 = 1.0 - KG
II 6T MP w STAR 37V*	300
II 6T MP w STAR 37FM**	350
II 6T MP w STAR 48AV*	420

* Not Qualified
** Lunar Prospector Configuration

92" FAIRING



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• DELTA II

VERSION **C3 = 1.0 - KG**

Single S/C per Launch

7326-9.5 (STAR 37FM) 600*

7920-9.5** 650***

7325-9.5 710

7925-9.5 1300

Dual S/C Launch

7920-10L DPAF 413(4970****)**

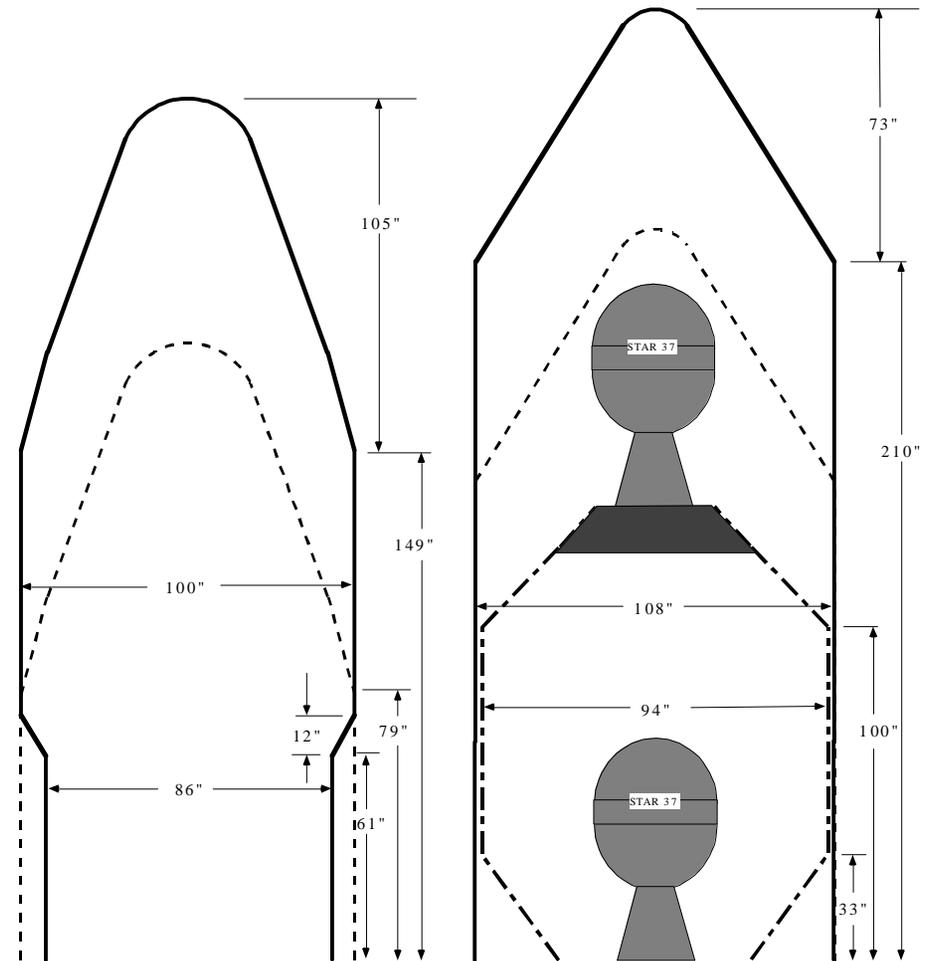
7320-10L DPAF 413(2735****)**

***OLS Number**

****To 100 NMi Park Orbit**

***** 3450 Kg Required For 3310 m/sec**

****** 3-axis Stabilized Release**



DELTA 9.5' FAIRINGS
 - - - 3 STAGE
 ——— 2 STAGE

DELTA 10'L FAIRINGS
 - - - 3 STAGE
 ——— 2 STAGE
 - - - DPAF

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• SHUTTLE

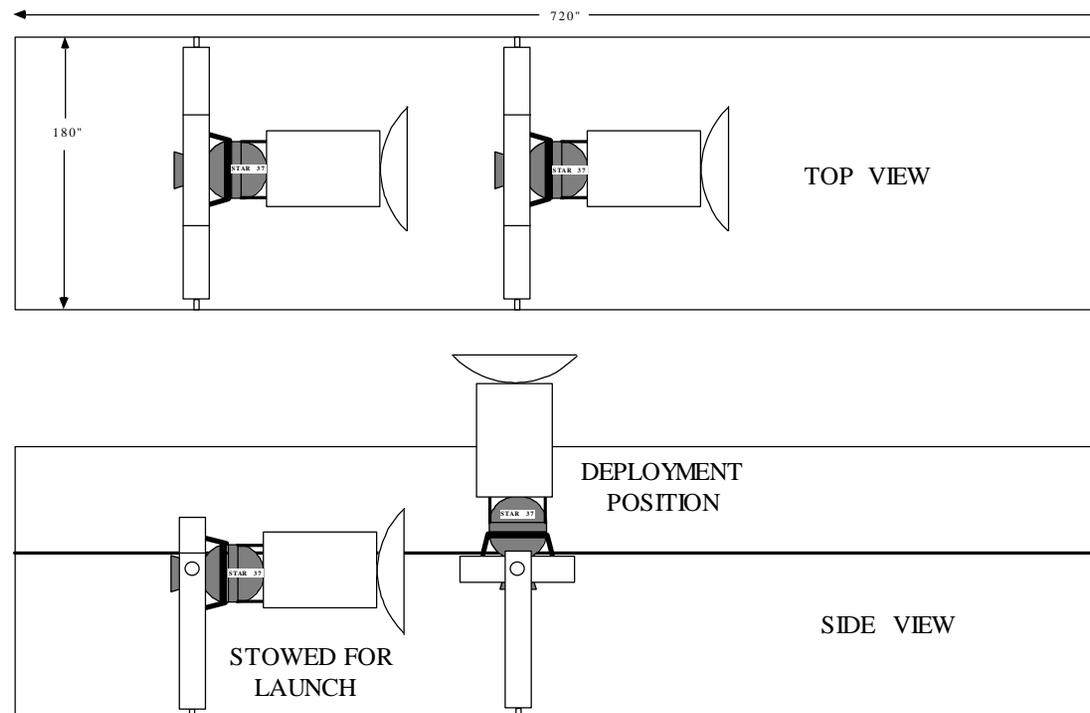
VERSION C3 = 1.0 - KG

STAR 37FM* 413**

STAR 48V 788**

* Cradle for STAR 37 Does Not Exist. Cradle for STAR 48 Exists (PAM-D) But Requires Refurbishment

** 3310m/sec From 100 NMi Park Orbit



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-
- **ARIANE 44L + SPELDA**
 - No Detailed Data But Would Be Similar To DELTA II + DPAF
 - **DNEPR**
 - Data From Thiokol Coming

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• **Conclusions So Far**

- **2 DELTA II 7326-9.5's meet all requirements.**
- **2 DELTA II 7920's would provide a 3-axis release.**
- **TAURUS XL in a 92" fairing is acceptably close to meeting requirements, but 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.**
- **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 requires new cradle for STAR 37 or refurbished PAM-D cradle for STAR 48.**
- **DNEPR is a new Russian launch vehicle marketed in the US by Thiokol that will not have a first flight until 1999.**