



# Taurus II Medium Class Launch Vehicle

May 2011



## Orbital Overview

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- Leading Developer and Manufacturer of Small- and Medium-Class Space Systems
  - Three Decade Record of Reliable, Rapid and Affordable Development and Production
  - Serving Customers in Commercial, National Security and Civil Government Markets
- About 1,000 Satellites and Launch Vehicles Built or Under Contract for Customers
  - 198 Satellites and Space Systems
  - 165 Space and Strategic Launch Vehicles
  - 631 Target Vehicles and Sounding Rockets
- 3,700 Employees and 1.7 Million Square Feet of State-of-the-Art Facilities
- Over \$5.6 Billion Total Contract Backlog With Premier Customers
- Revenues of About \$1.35 Billion Expected in 2011
- Conservative Balance Sheet With Strong Liquidity

# Orbital's Major Launch Vehicles



**Pegasus XL**



**Taurus II**



**Orbital Boost Vehicle**



**Taurus XL**



**Minotaur V**



**Minotaur I**

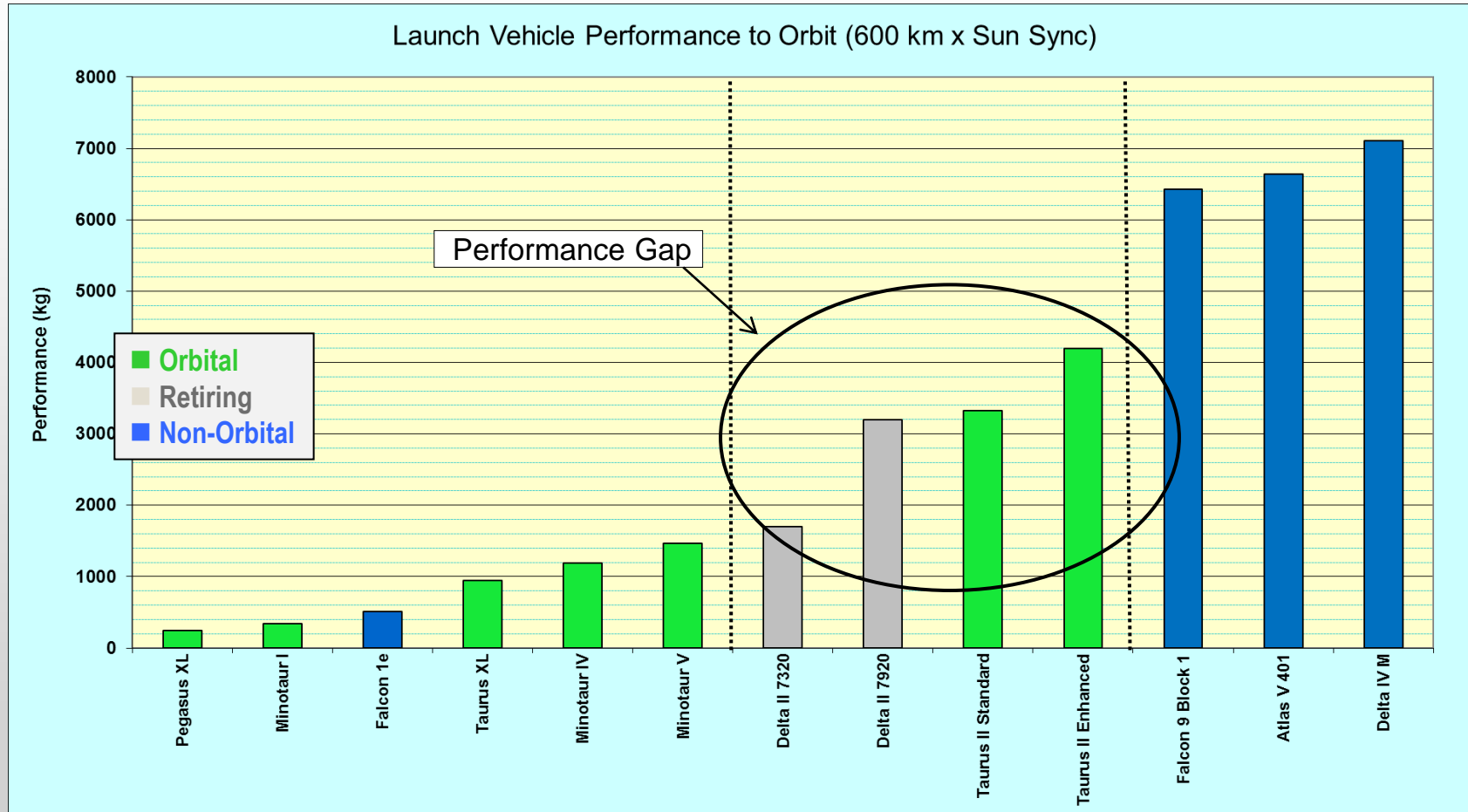


**Minotaur II**



**Minotaur IV**

# Taurus II: The New Standard for Medium Lift



Taurus II Addresses an Important Performance Gap  
in the Spectrum of U.S. Launch Capabilities

# Taurus II Program Summary

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## ● Program Objectives and Status

- Provide Medium-Class Space Launch Vehicle With High Reliability and Attractive Pricing
- Full Scale Development Started in Late 2007, Subsystem Development/Qualification Completed in Late 2010; First Launch on Track for Late Third Quarter 2011
- 10 Vehicles Under Contract to NASA for 2011-2015 Launches
- Planning for ~35 Total Launches Over Next 10 Years (2011-2020)

## ● Configuration Options and Payload Performance

- Taurus II: 5,100 kg to 51° / 200 km or 3,500 kg to 90° / 600 km
- Taurus Iie: 6,000 kg to 51° / 200 km or 4,200 kg to 90° / 600 km
- Taurus Iih: 1,100 kg to  $C3 = 0 \text{ km}^2 / \text{sec}^2$  or 1,400 kg to  $C3 = -10 \text{ km}^2 / \text{sec}^2$

## ● Available or Planned Ground Infrastructure

- Wallops Island Site: ILC in 2011 – Mid- to High-Inclination Orbits
- West Coast Site: ILC in 2014 – High-Inclination Orbits

## ● Delivery Schedule

- Earliest Availability for New-Order Launch ~Third Quarter 2013
- Normal Order-to-Launch Cycle ~21 Months (2014 or Later Launches)

## ● Attractive Pricing

- Taurus II = \$75-80 Million (2011 Order / 2013 Launch)
- Taurus Iie = \$85-90 Million (2011 Order / 2013 Launch)
- Taurus Iih = \$90-95 Million (2012 Order / 2014 Launch)

# Taurus II Key Industrial Partners



**Stage 2  
Propulsion**



**Fairing and  
Other Structures**



**Stage 1  
Airframe**



**Stage 1  
Propulsion**



**TVC  
Actuators**



**Wallops Flight Facility  
Launch Site**



**Stennis Space Center  
Engine Test Center**

# Taurus II Configurations

Taurus II Standard



Taurus II  
Castor 30B Upper Stage  
2011 ILC

Taurus II Enhanced



Taurus IIe  
Castor 30XL Upper Stage  
2013 ILC

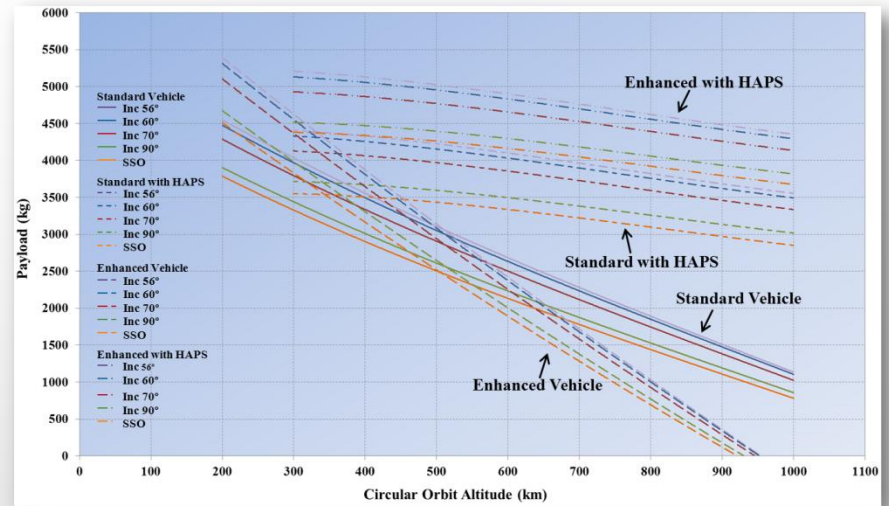
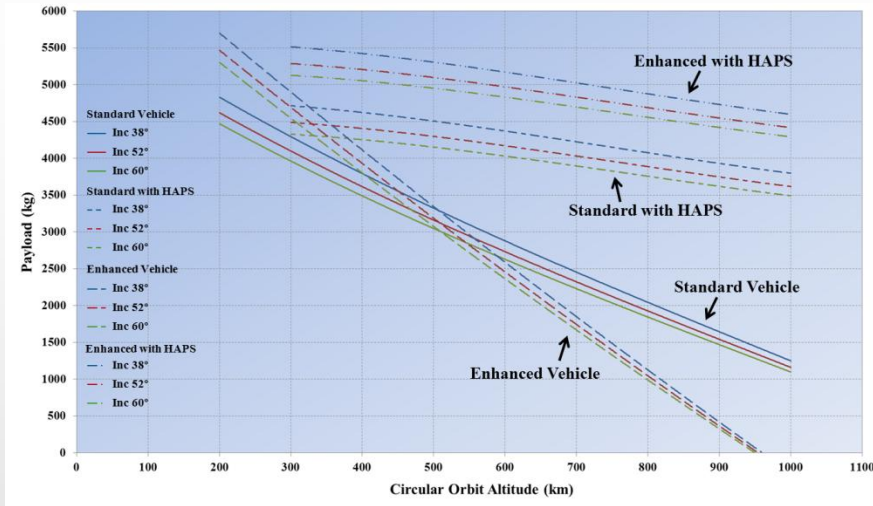
Taurus II High-Energy



Taurus IIh  
Castor 30XL With STAR  
48BV Third Stage  
2014 ILC

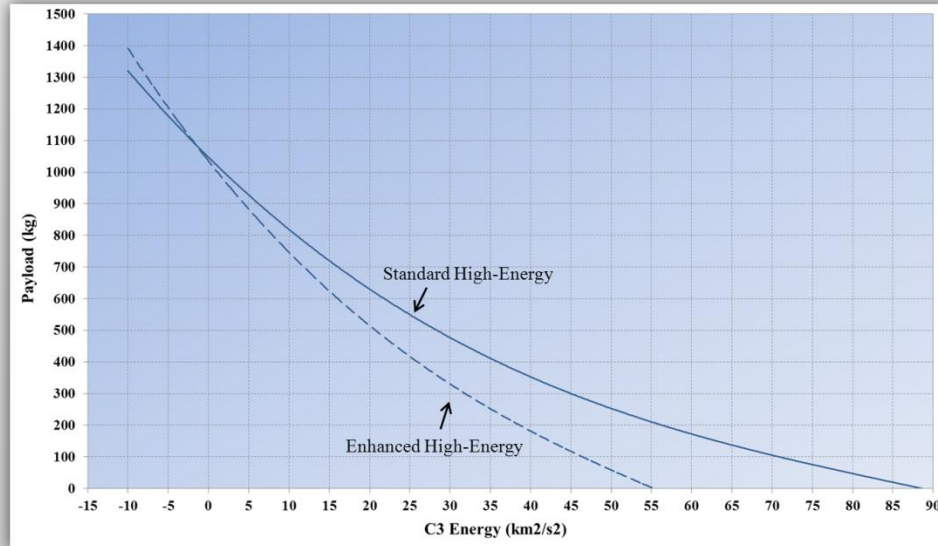
(Hydrazine Auxiliary Propulsion System Is Available Where Needed)

# Taurus II Payload Performance



**Launch from Wallops Island Site**

**Launch from West Coast Site**

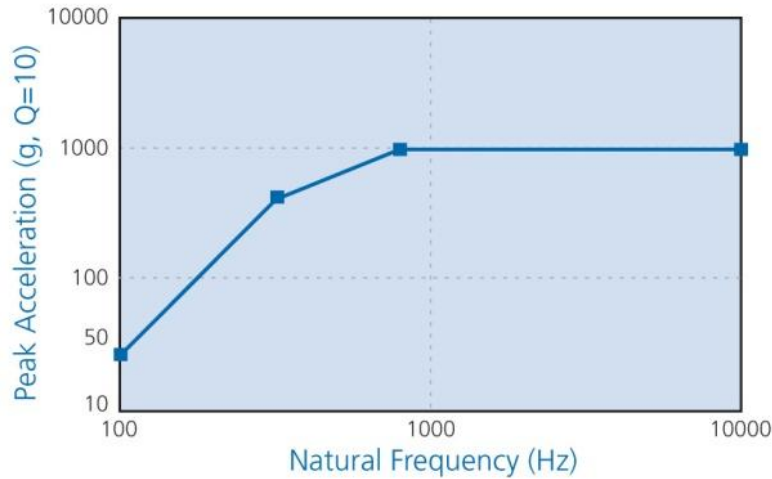


**Launch from Wallops Island Site**

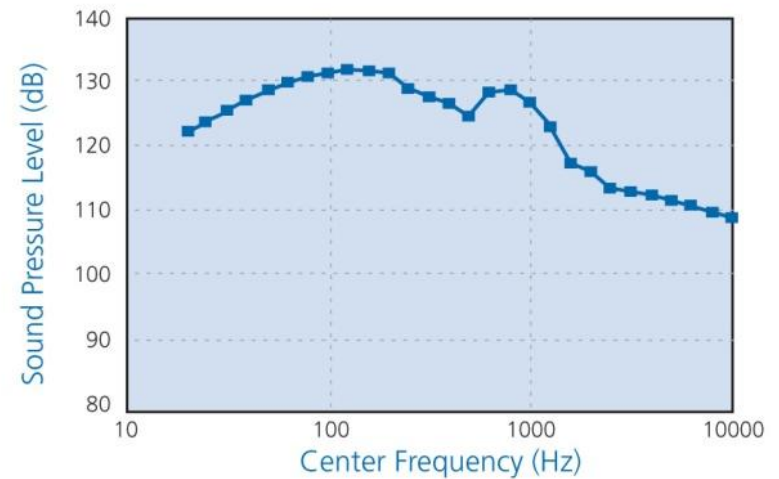


# Taurus II Payload Environments

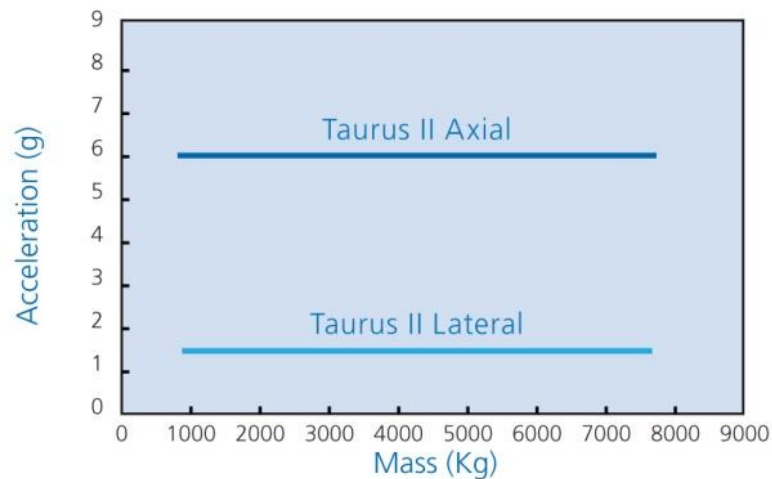
Shock Environment



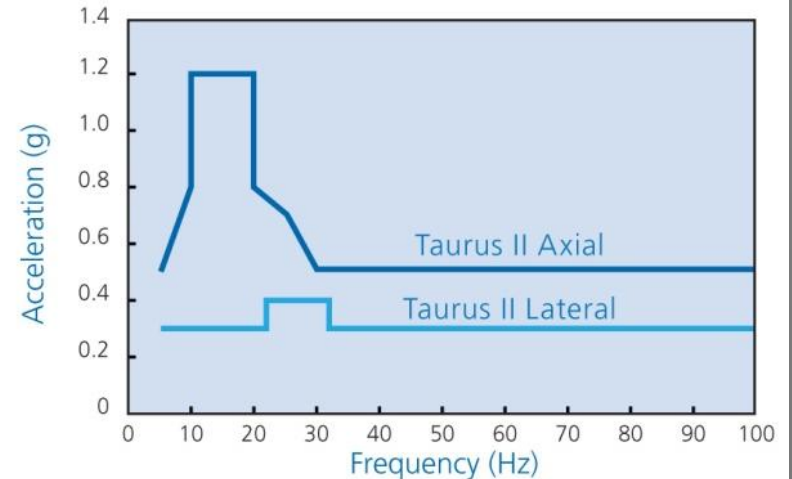
Acoustic Environment



Acceleration Environment



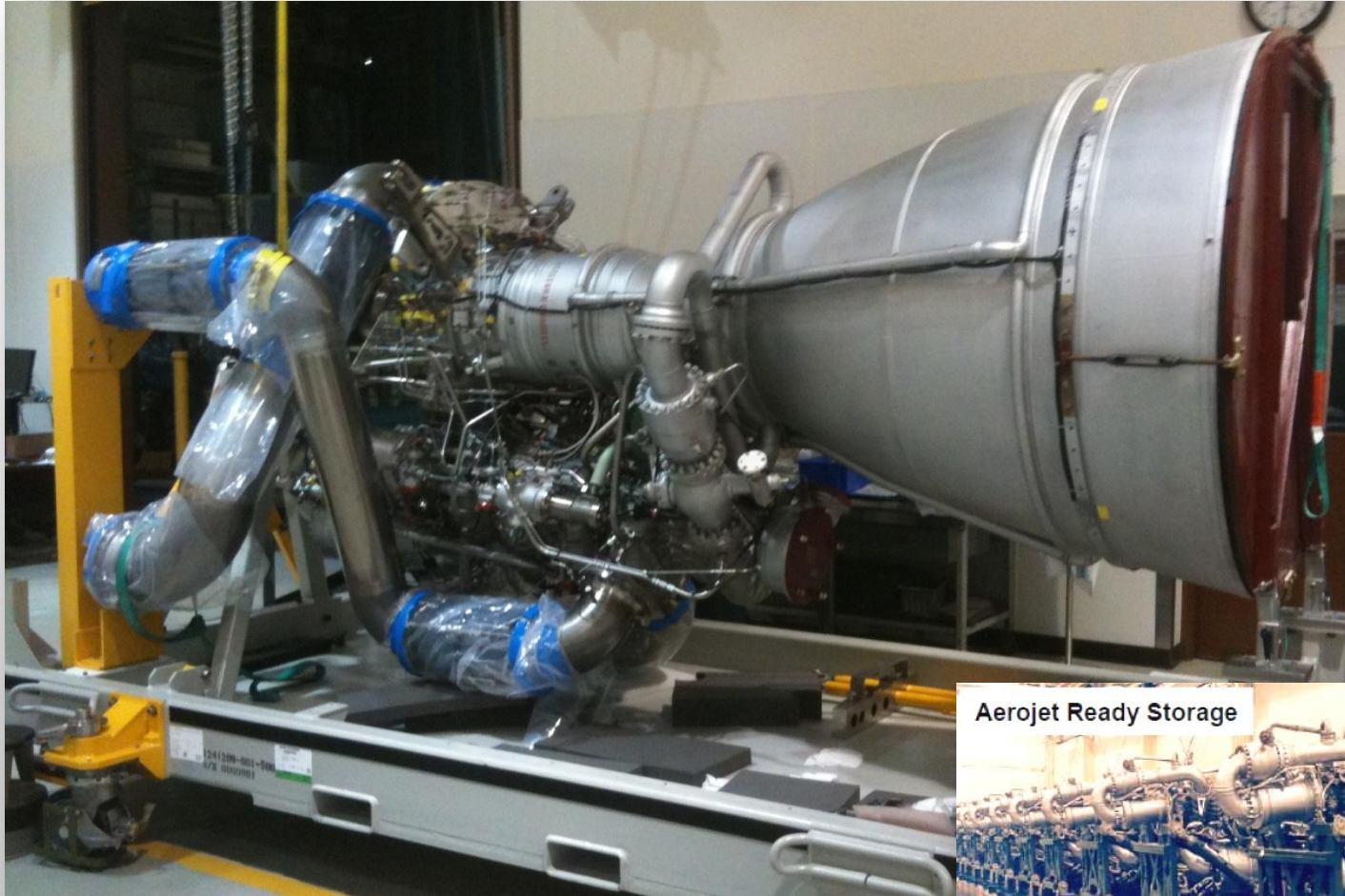
Sine Vibration Environment



# Taurus II First Stage at Wallops Island



# Taurus II First Stage Rocket Engines



# AJ26 Engine Testing at Stennis Space Center



Developmental Testing Completed in 2010  
Acceptance Testing Continuing in 2011 and Beyond

# First Castor 30 Motor Nearing Delivery



Stage 2 Motor Qualification Completed in 2009  
Stage 2 First Flight Motor Planned Delivery in June 2011 to Wallops

# Payload Fairing Testing Complete

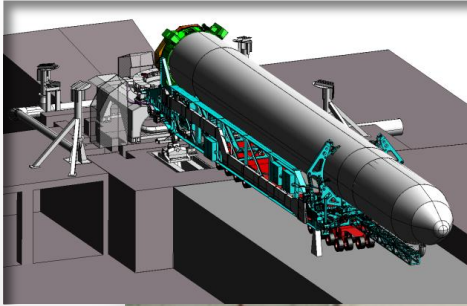


# Wallops Horizontal Integration Facility Open



Horizontal Integration Facility Complete  
Processing of First 2 Vehicle Airframes and Engines Underway

# Transport / Erector / Launcher Assembled

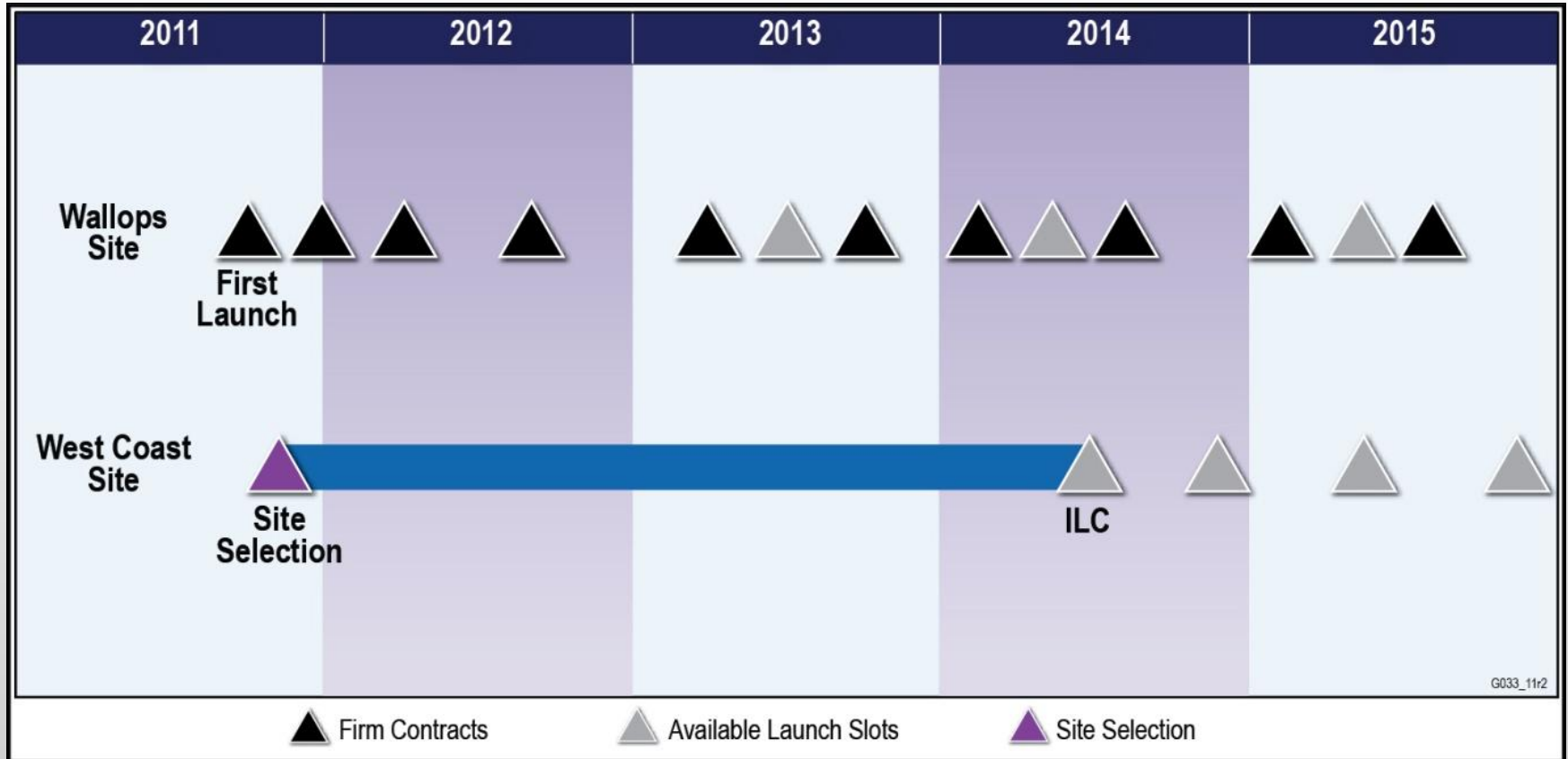




# Wallops Launch Pad Nearing Completion

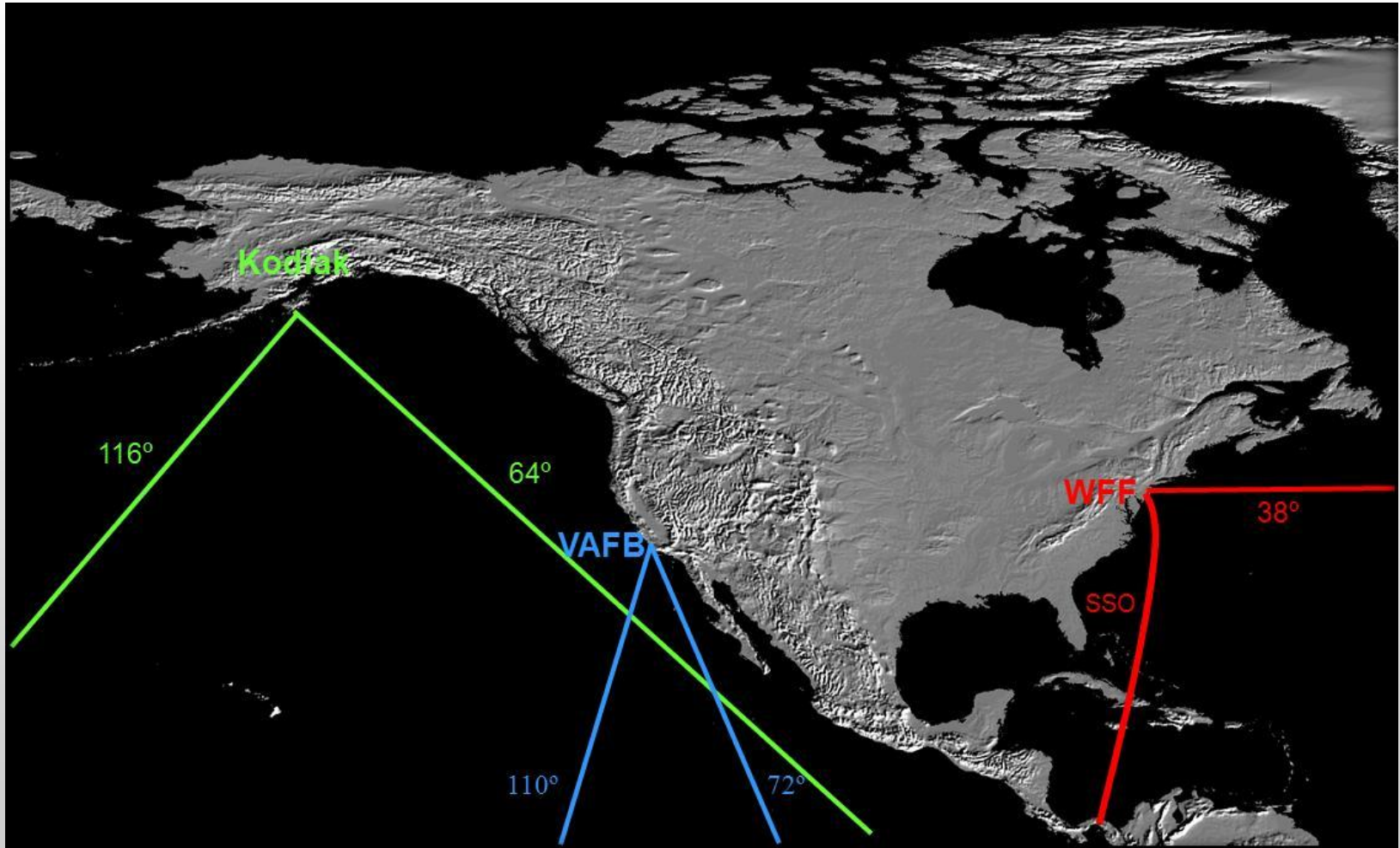


# Taurus II Launch Manifest

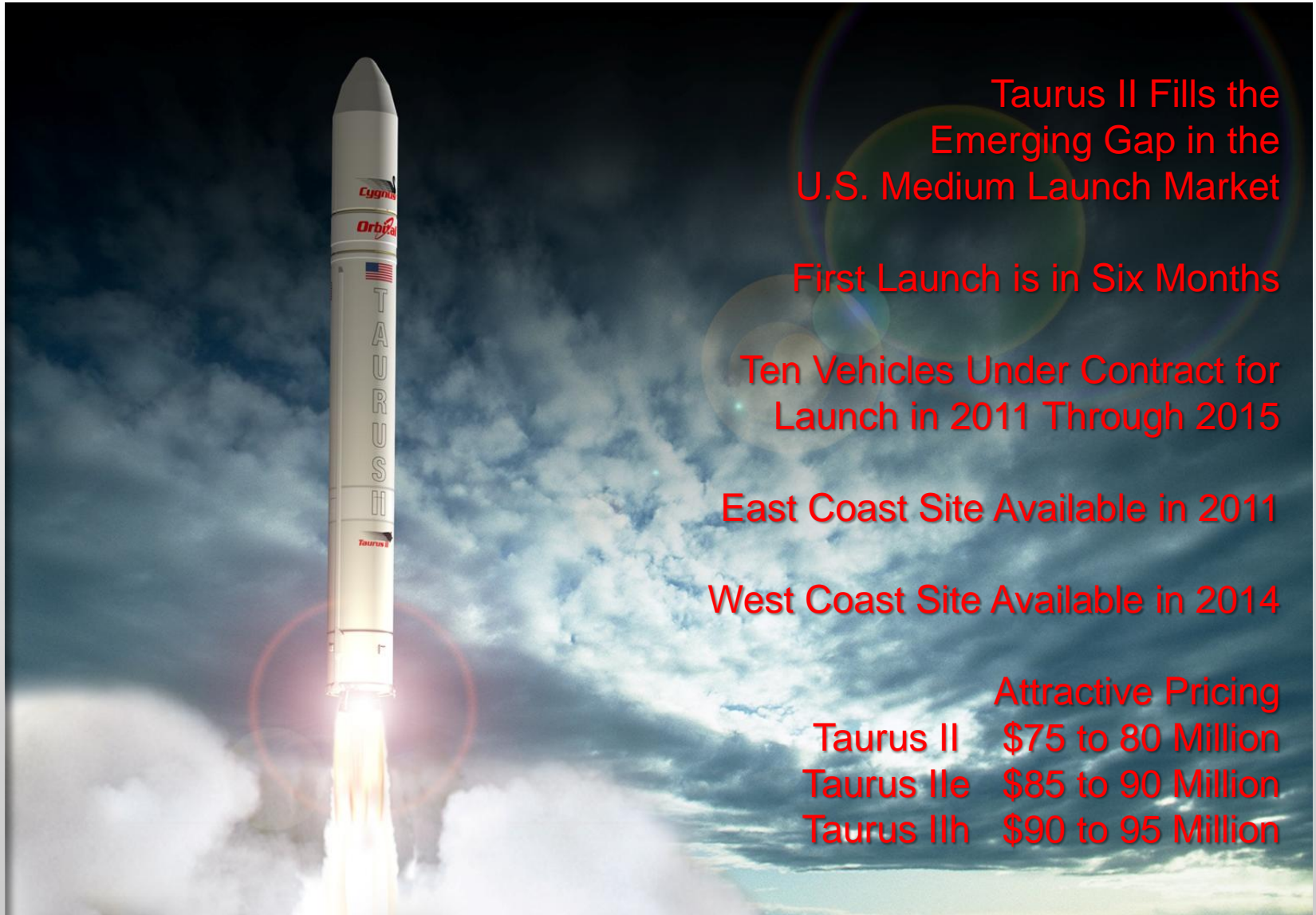


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# Taurus II Launch Site Flexibility



# Taurus II Summary



Taurus II Fills the  
Emerging Gap in the  
U.S. Medium Launch Market

First Launch is in Six Months

Ten Vehicles Under Contract for  
Launch in 2011 Through 2015

East Coast Site Available in 2011

West Coast Site Available in 2014

Attractive Pricing

Taurus II \$75 to 80 Million

Taurus IIe \$85 to 90 Million

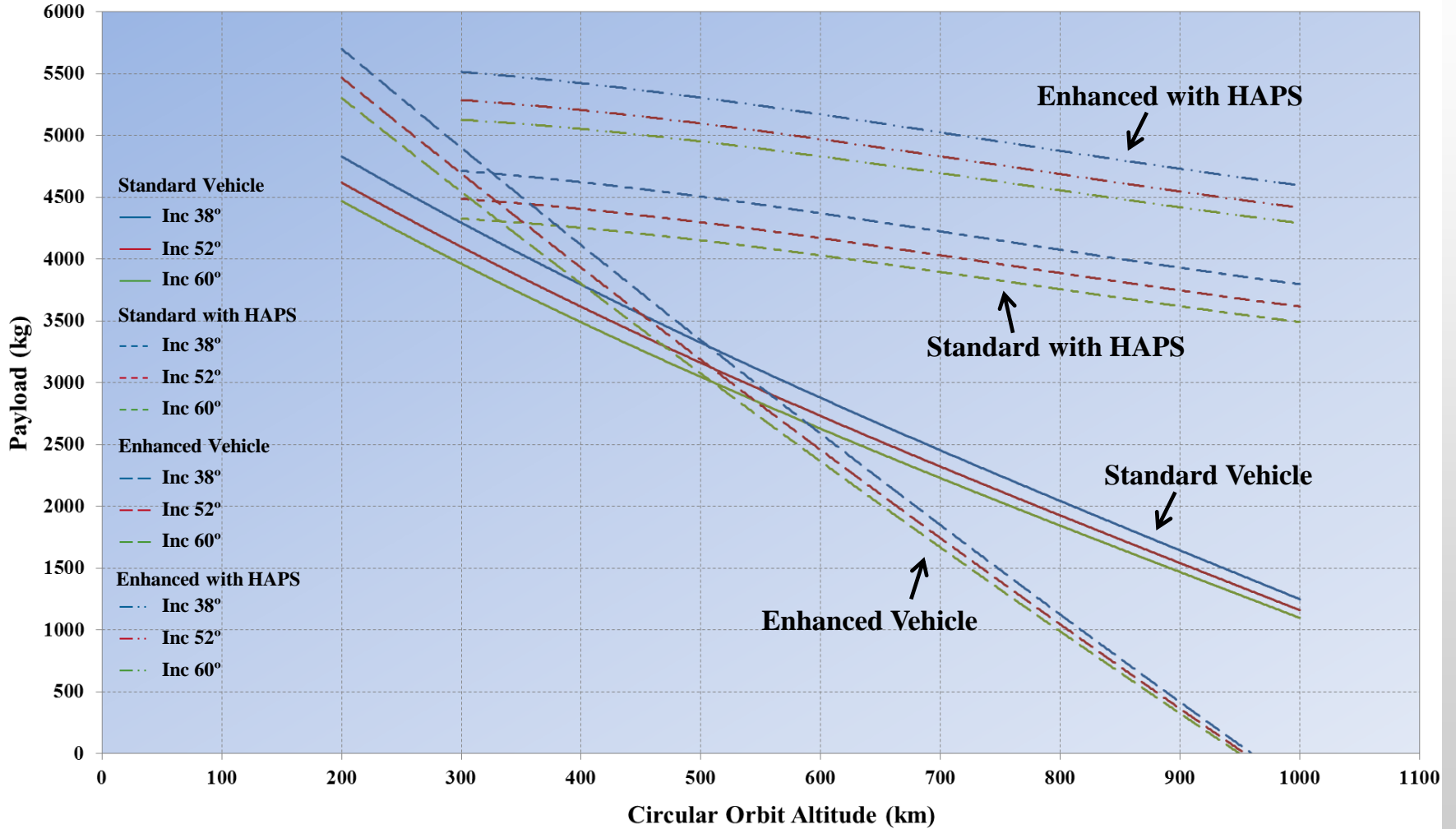
Taurus IIh \$90 to 95 Million



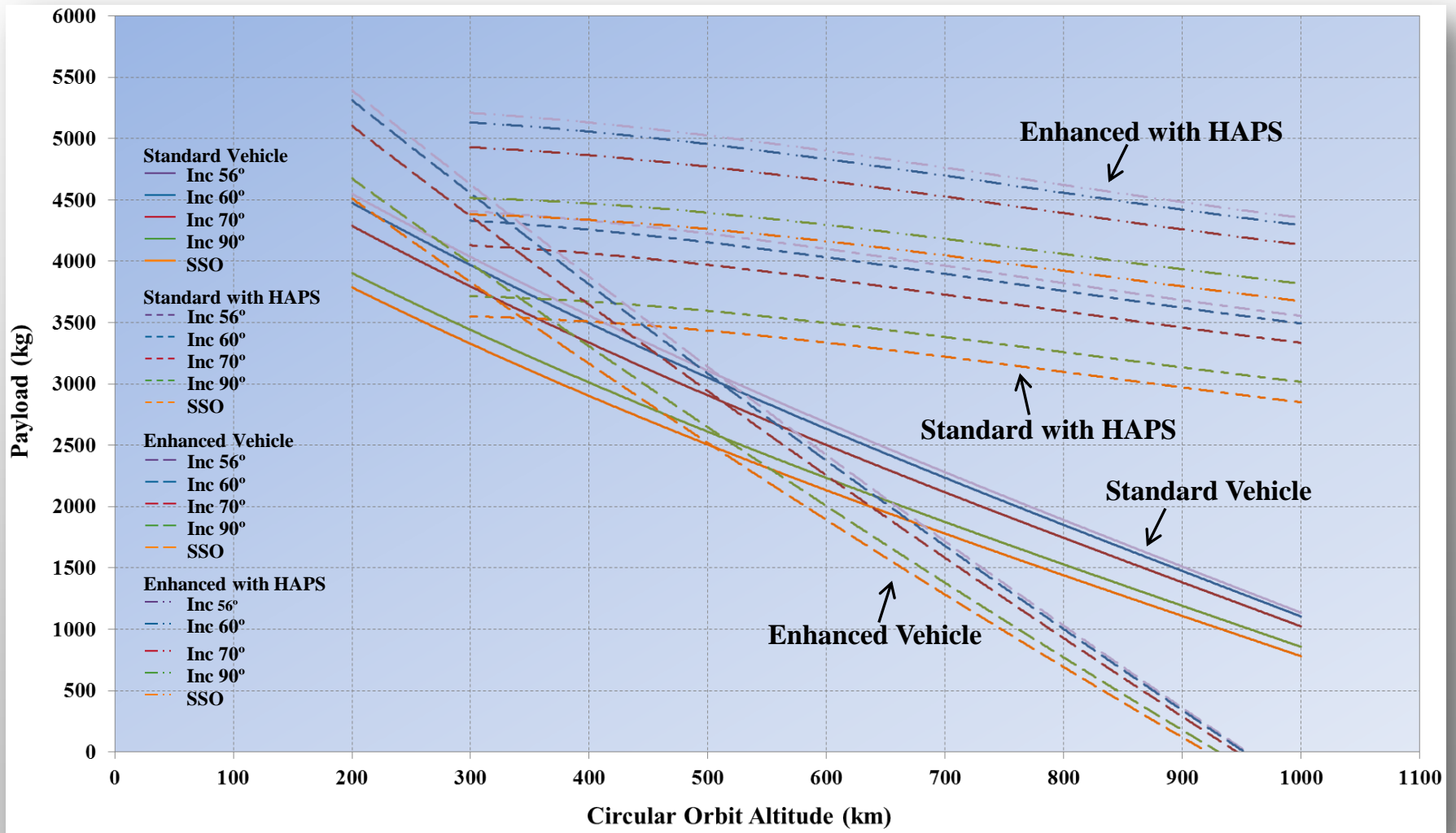
# Detailed Payload Performance Information



# Payload Performance from Wallops Island



# Payload Performance from West Coast Site\*



\*For Launches from Either Vandenberg AFB, California or Kodiak Island, AK

# High-Energy Performance from Wallops Island

