

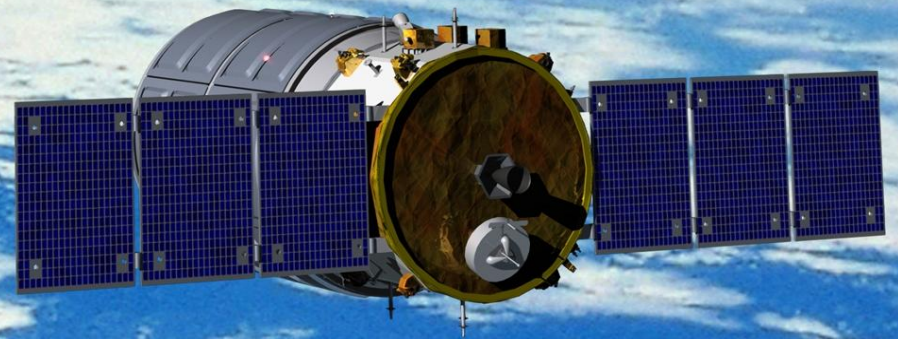


INNOVATION YOU CAN COUNT ON™

# Perspectives on Enabling Commercial Spaceflight

Presented to the International On-Orbit  
Satellite Servicing Study Workshop

Bob Richards, Vice President, Human  
Spaceflight





# COTS/CRS Summary



- **Commercial Orbital Transportation Services (COTS)**
  - Orbital Selected In February 2008 For a Single 2011 Demonstration Mission
  - Safety Review Panel Phase II completed November 2009
- **Commercial Resupply Services (CRS)**
  - Operational Service-Phase Follow-on to COTS Demonstration
  - Orbital Selection December 2008
  - 8 Flights Over Period From 2011-2015
  - Features two Pressurized Cargo Modules – Standard and Enhanced

# Cygnus Visiting Vehicle



- **The Cygnus vehicle is comprised of two major modules**

- **Service Module**

- Provides all utility services to the cargo modules
- Manages the autonomous rendezvous to the ISS
- Provides required resources to allow the mission to be successfully completed
- Structural interface to the launch vehicle and cargo modules

- **Pressurized Cargo Module**

- Supports NASA Cargo Requiring a Pressurized Environment



# Taurus II System Features

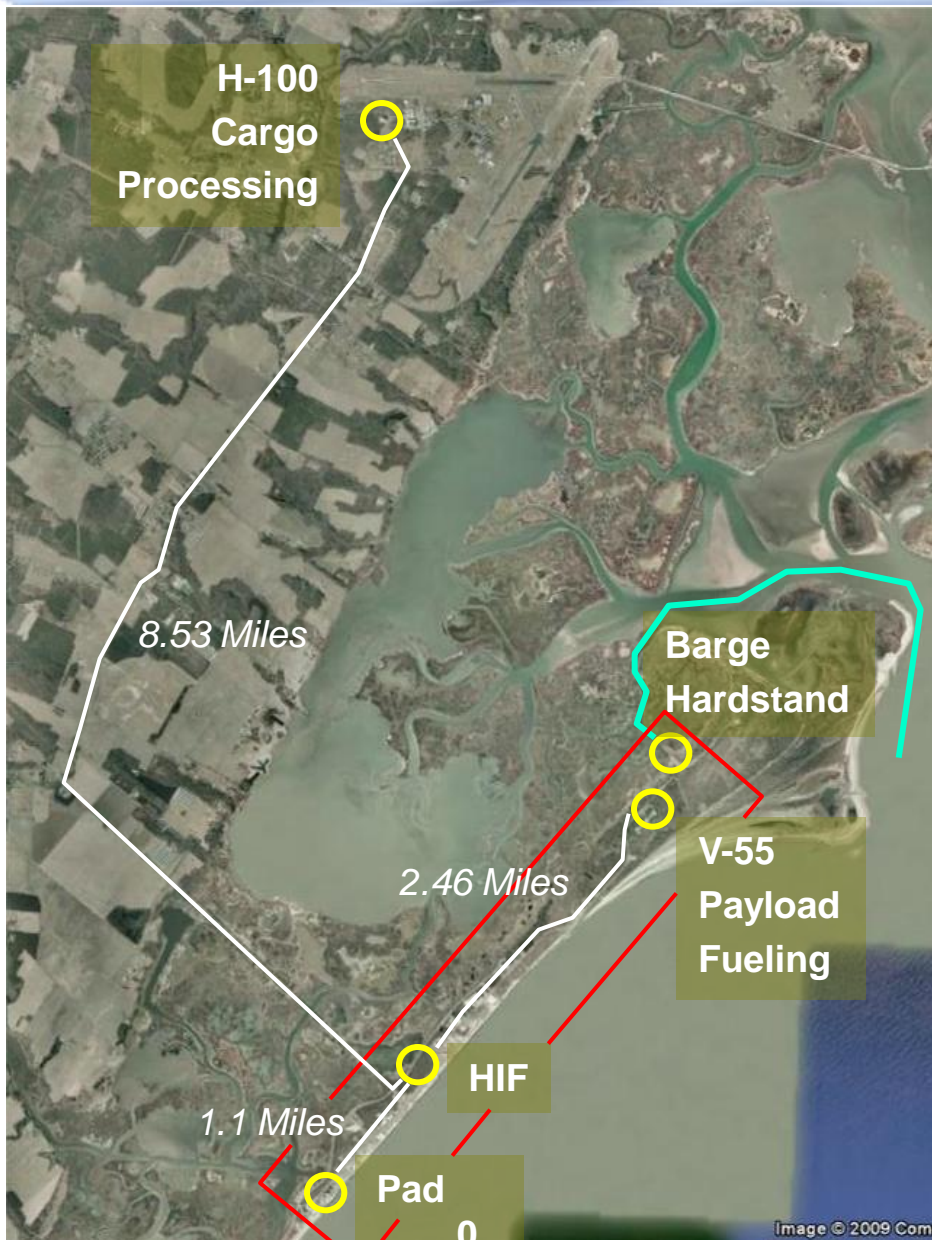


- Incorporates both solid and liquid stages and proven technology to meet mission requirements
- Provides substantial payload performance into a variety of low inclination low-Earth orbits (LEO), sun-synchronous, GEO-transfer and interplanetary orbits
- 3.9 meter fairing accommodates large payloads
- Capable of launching single and multiple payloads
- Compatible with the Western Range at Vandenberg Air Force Base (VAFB), Eastern Range at Cape Canaveral Air Force Station and Wallops Flight Facility (WFF), providing customers with a variety of launch locations and trajectories





# Taurus II COTS/CRS Wallops Footprint





# Taurus II Launch Site at Wallops Flight Facility





# Questions and Discussion

