

NATIONAL RECONNAISSANCE OFFICE

Office of Space Launch Atlas V Aft Bulkhead Carrier & Operationally Unique Technologies Satellite

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FREEDOM'S SENTINEL IN SPACE



ABC Platform

- ✦ Atlas V Centaur upper stage modified by United Launch Alliance (ULA) for longer missions – three small spherical helium tanks replaced with two large cylindrical tanks
- ✦ NRO's Office of Space Launch (OSL) funded the development of system to use available volume to enable launch of small Auxiliary Payload(s) (AP)
- ✦ System is known as Atlas V Aft Bulkhead Carrier (ABC)
- ✦ This made available a volume of approximately 20"x20"x30" for AP where the third 26" helium sphere used to be located



Groundrules

+ ABC

- No/minimal impact to primary mission
 - Mission Design
 - EMI/EMC
 - Launch Ops
 - Ground Ops - Environments/loads
 - Security
 - Electrical
 - Mission Integration
 - etc
- No redesign to existing Centaur upper stage or rest of vehicle

+ Auxiliary Payload

- Dormant/Powered off until ~30 min after deployment
- No fuel/propulsion
- No ordnance

+ Deployables: delayed release post separation



First Mission

- ✦ NROL-36 selected to fly auxiliary payload (June 2012 launch)
 - Excess mission performance and orbital characteristics make it a suitable mission for placing small satellites in a useful orbit consistent with space debris mitigation requirements

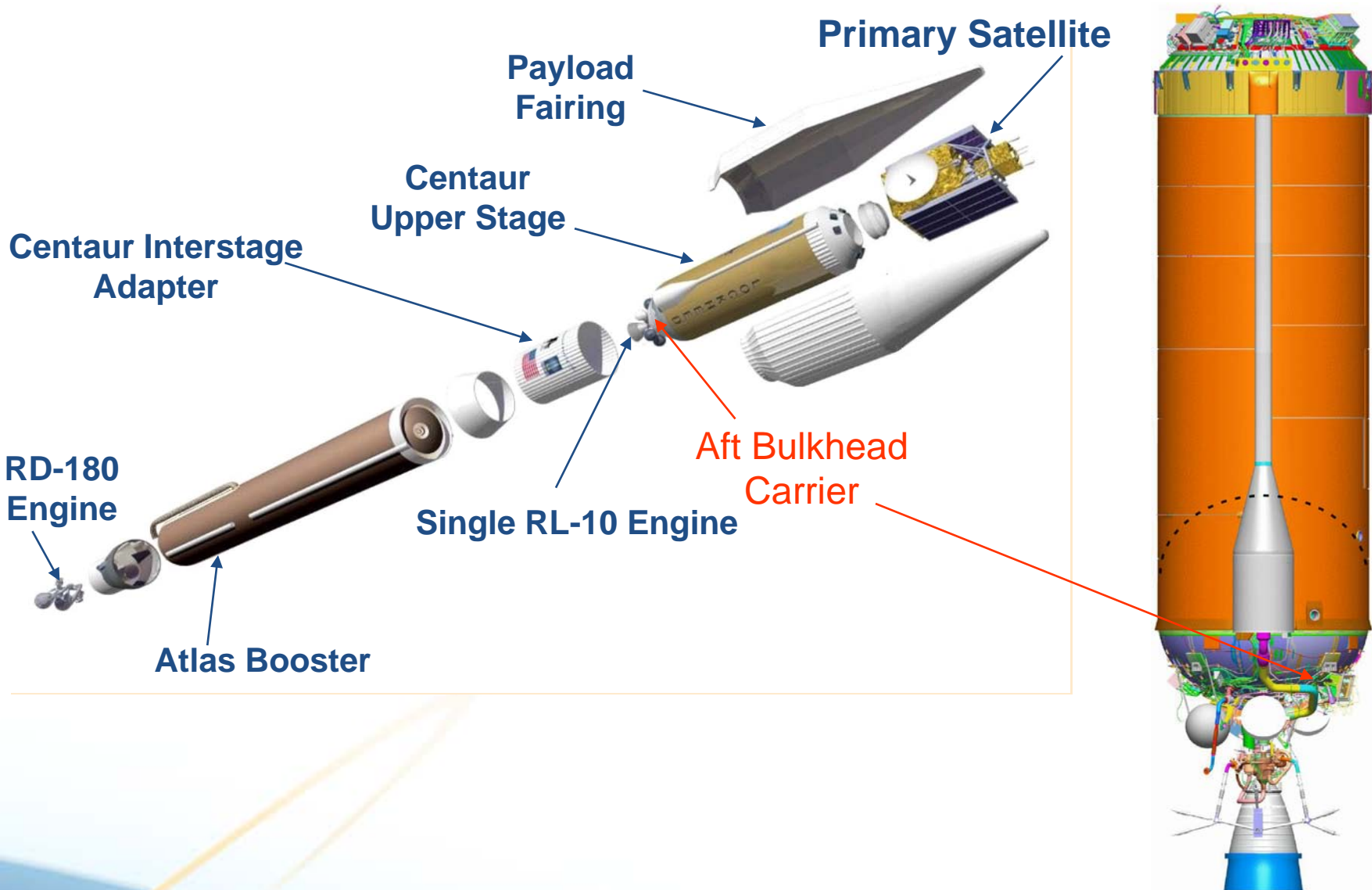
- ✦ “Operationally Unique Technique Satellite” (OUTSat) to use Atlas V ABC to deploy up to 8 3u/24 1u cubesats
 - Five NRO/MSD “3u” cubesats contained in five Poly Pico Orbital Deployers (PPOD)
 - Two NASA “3u”, one “2u”, and one “1u” cubesats in three PPOD’s

- ✦ OUTSat coordination and manifest managed by OSL

- ✦ Auxiliary Payload Integrating Contractor (APIC) - Cal Poly to:
 - Manage the OUTSat assembly, integration, and test of cubesats, PPODs, and integrated SV
 - Manage the integration of the OUTSat to the Atlas V Centaur

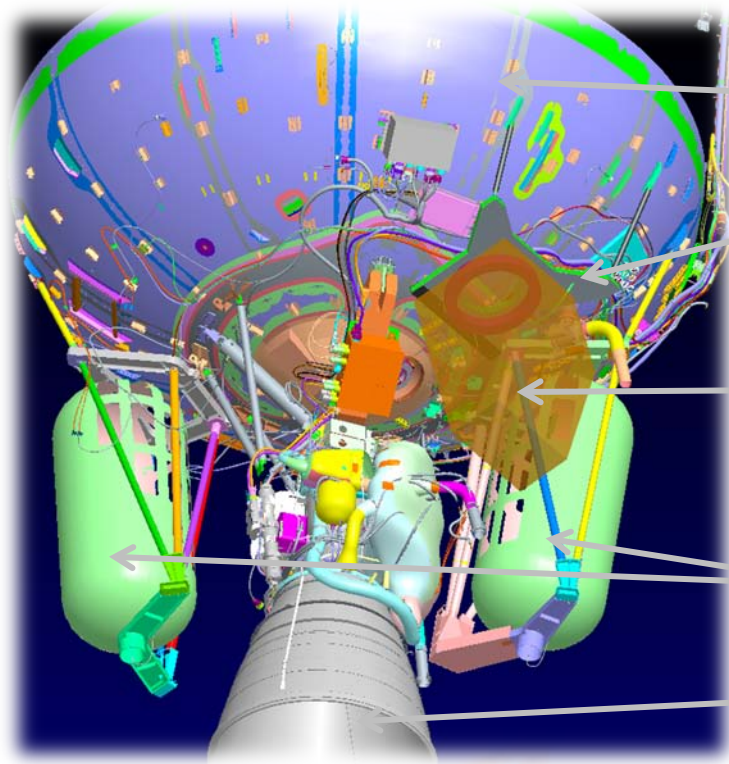


Atlas V with Aft Bulkhead Carrier





ABC Location and Volume



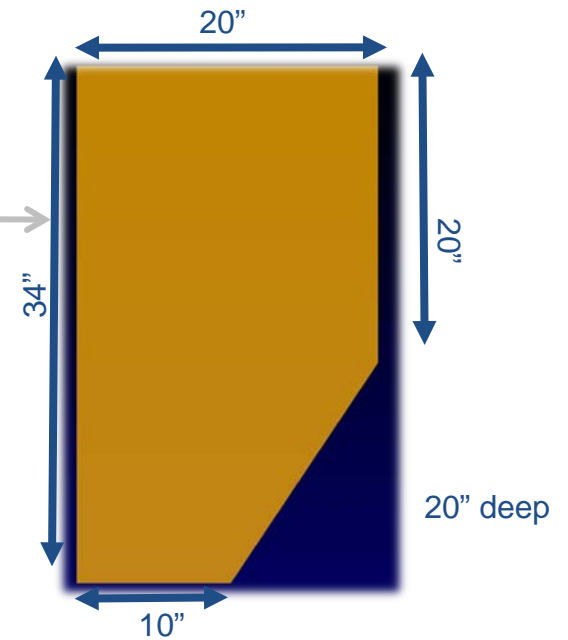
Centaur Aft Bulkhead

Aft Bulkhead Carrier

Auxiliary Payload Volume

Large Helium Tanks

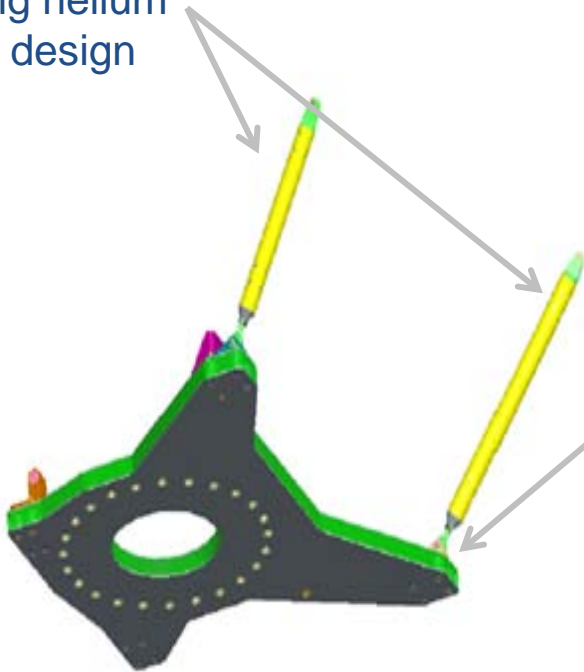
RL-10 Engine





ABC Details

Struts based on existing helium tank design



ABC plate constructed of typical Atlas V construction
- Aluminum facesheets with aluminum honeycomb core

Auxiliary payload maximum weight = 180 lbs
- factor of safety = 2.0
- no additional structural testing
- max weight consistent with volume



OUTSat Auxiliary Payload

Cubesats provided by various organizations, labs, universities, contractors

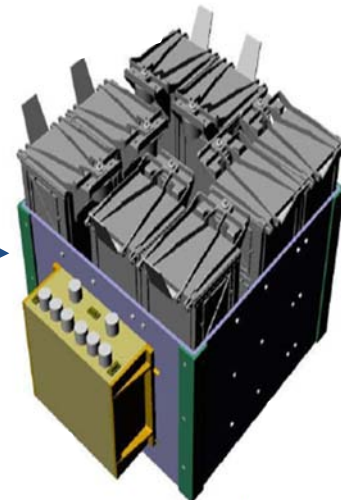
NPSCuL Structure provided by Naval Postgraduate School



CubeSats installed in P-POD



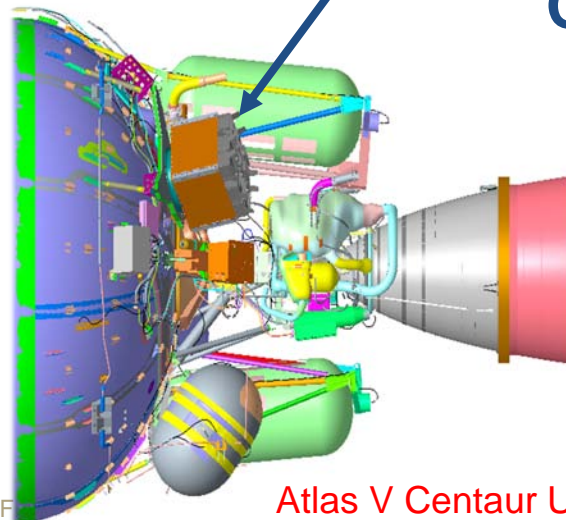
P-PODs (qty 8) installed in NPSCuL



OUTSat

NPSCuL installed on Centaur aft bulkhead

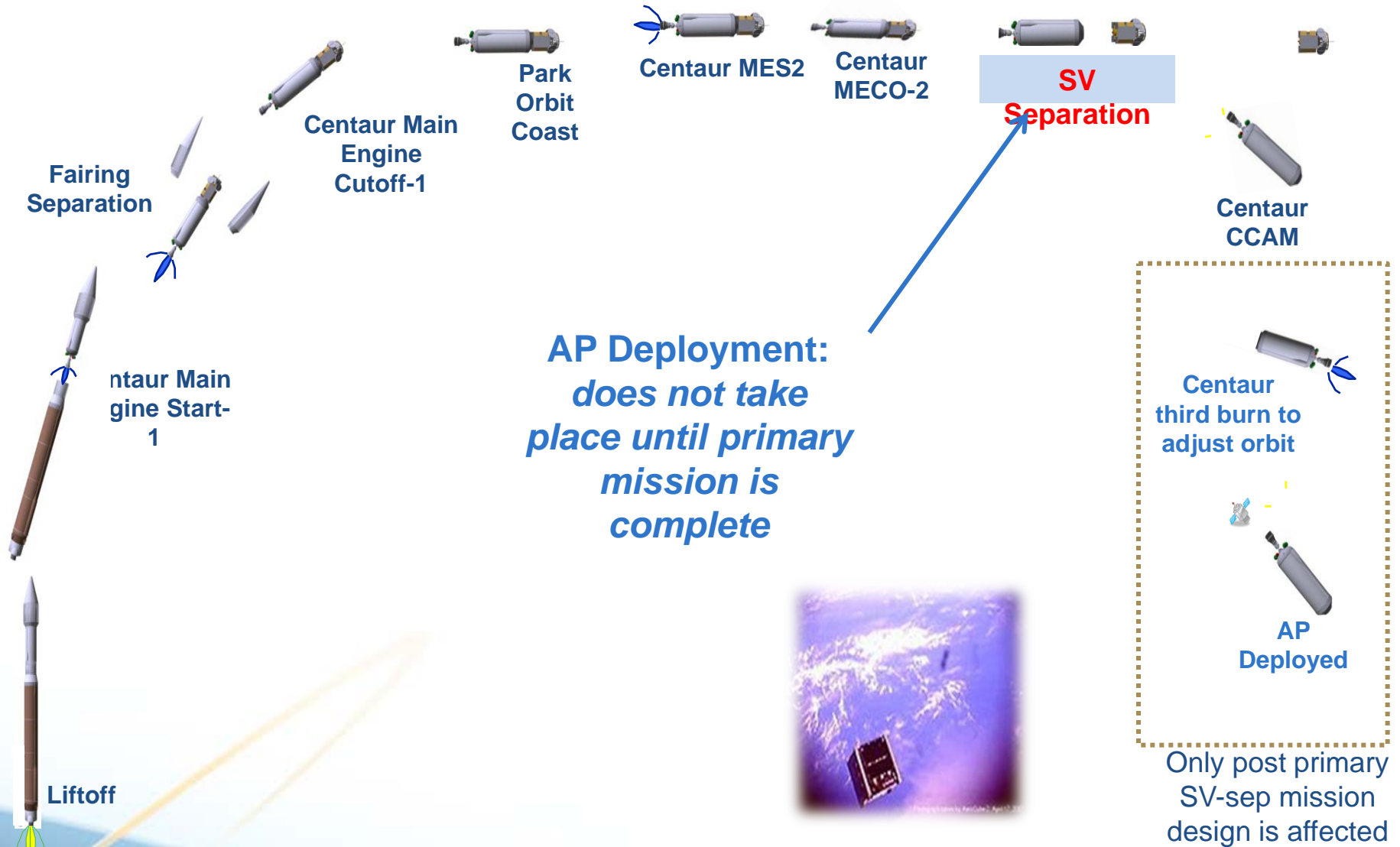
Poly Pico Orbital Deployer (P-POD) provided by Cal Poly



Atlas V Centaur Upper Stage Aft



Nominal Auxiliary Payload Mission



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