RocketPod™ Update

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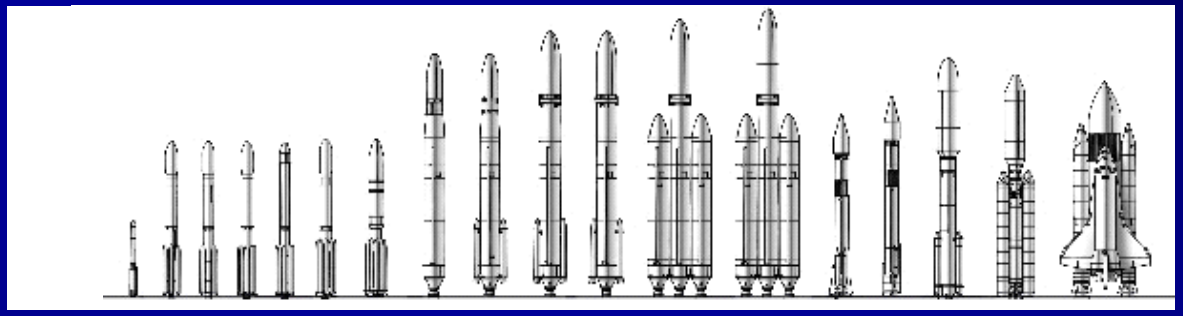
Flagship Product: RocketCam™



RocketCam™ is Qualified for These Systems, Plus Several Spacecraft and Other Platforms

MER A "Spirit"
2003

SpaceShipOne
2002-2004

Shuttle *Discovery*
2005

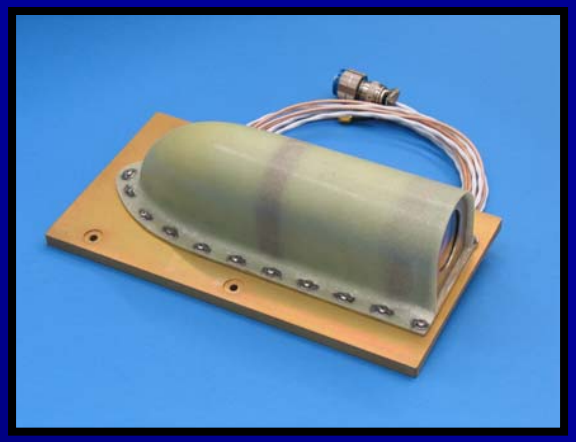
RocketCam Space Heritage

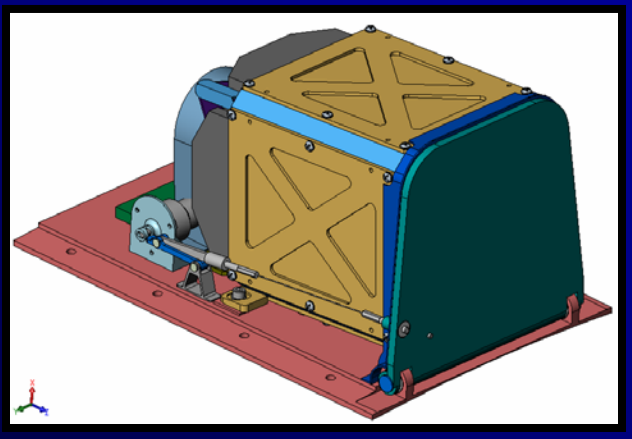
- **Launched on 40 projects since 1997**
  - 29 rockets to orbit (61 cameras)
  - 10 suborbital launches (20)
  - 1 spacecraft (1)
- **All relatively simple integrations**
- **All relatively low cost**
- **All successful**
- **Many more to come**

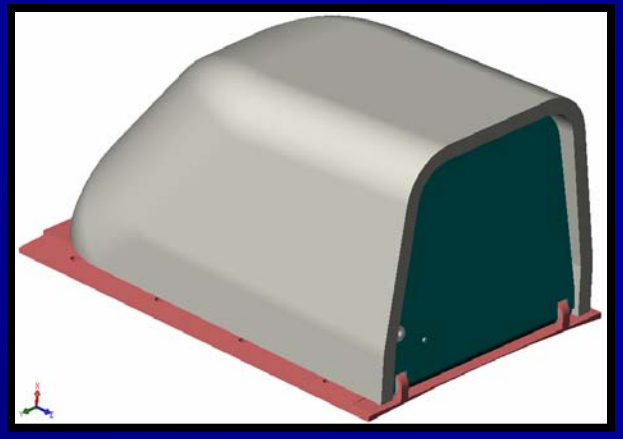
RocketPod™ Objectives

- **Leverage RocketCam interfaces and experience**
- **Create cost-effective nanosat launch program**
- **Address selected responsive space objectives**
  - U.S. ELVs (multiple families and models)
  - Predictable and reliable launch opportunities
  - <<1-year integration time (<1 week for selected payloads?)
  - Multiple launch opportunities on a single launch
- **Enable multi-mission capability**
  - Tech demo and operational
  - Deployable and attached payloads
  - Varied orbits (or suborbital)
- **Migration path to spacecraft host platforms**

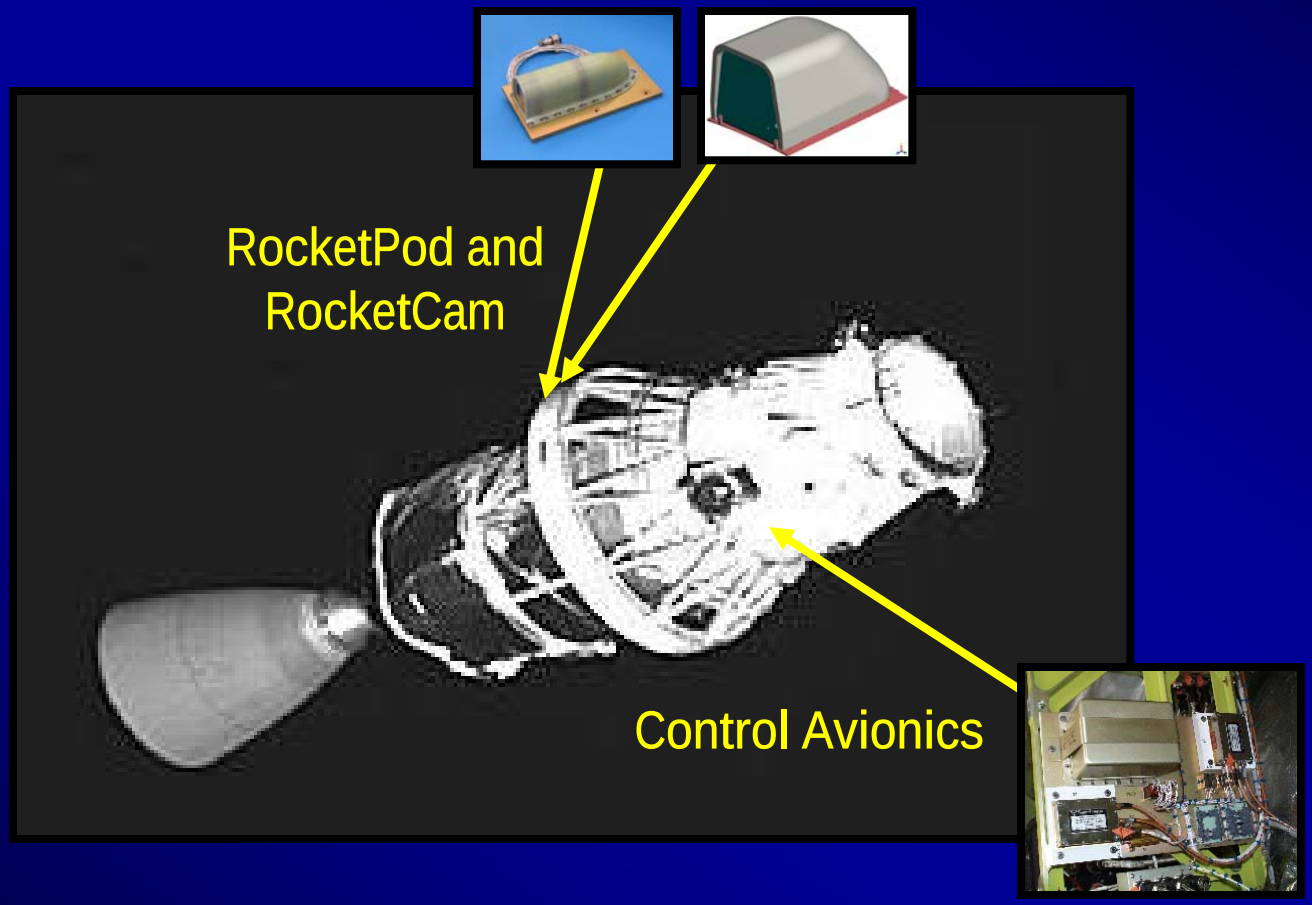
RocketCam to RocketPod
(Delta II example)







RocketPod Integration
(Delta II example)



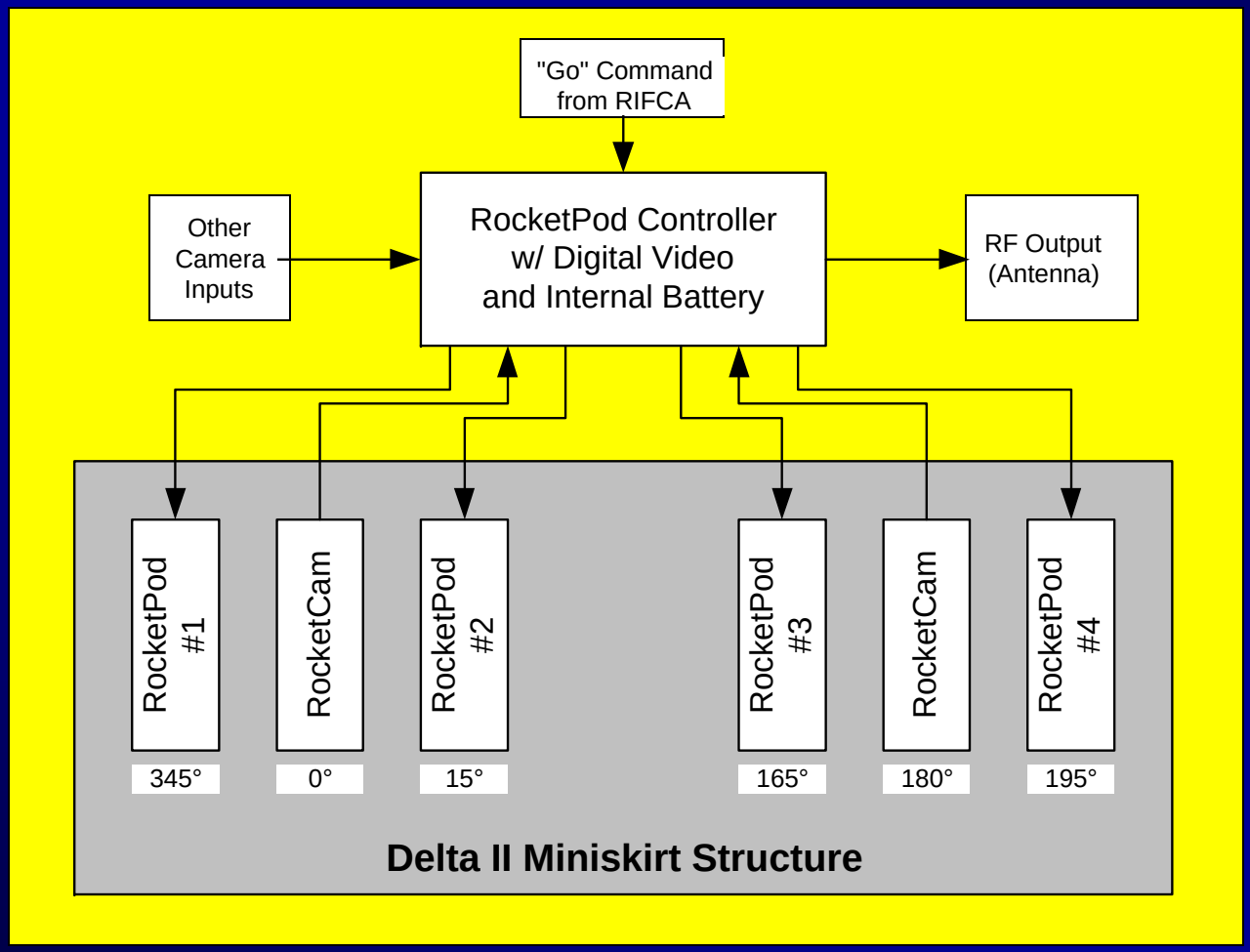
RocketPod Key Features

- Sized to hold one CubeSat
- Sized to fit on Delta II miniskirt structure
- Provides more payload mass and volume than CubeSat

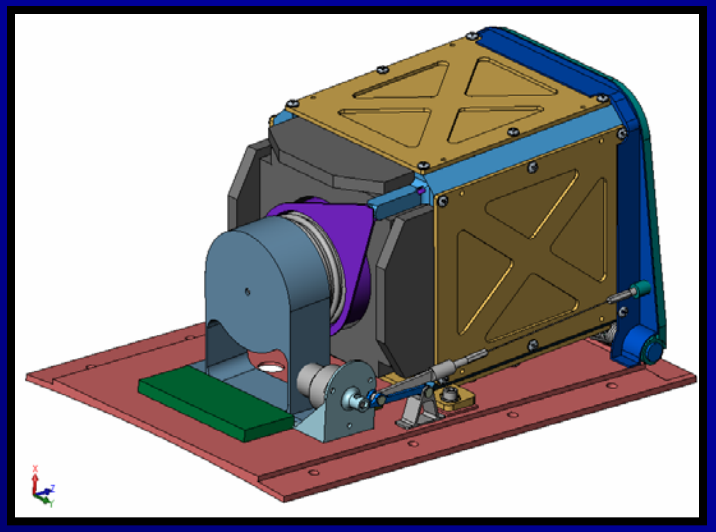
- Payload is kinematically restrained during launch
- Release behavior is independent of payload mass
- Fault-tolerant with respect to premature release

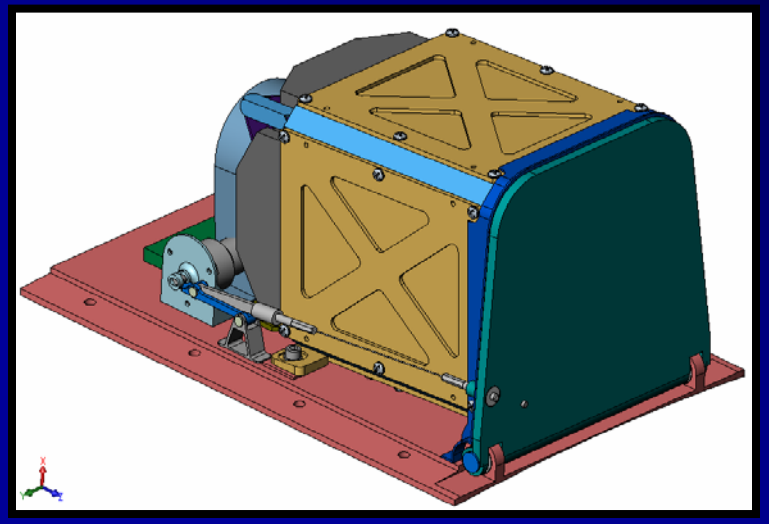
- Payload final integration is completed before shipping
- Environmental closeout protects payload after integration
- Electrical access to payload until mounting to host
- Nitrogen purge option

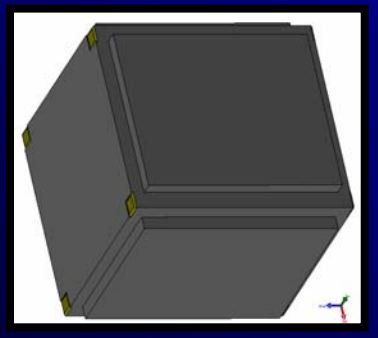
Baseline Delta II Configuration



RocketPod Internal View

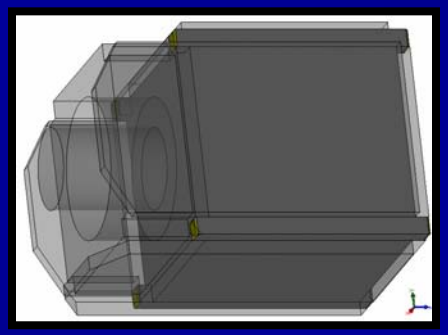






Sep velocities:

- **2.6 m/s for 0.6 kg payload**
- **2.0 m/s for 1.0 kg**
- **1.4 m/s for 2.0 kg**

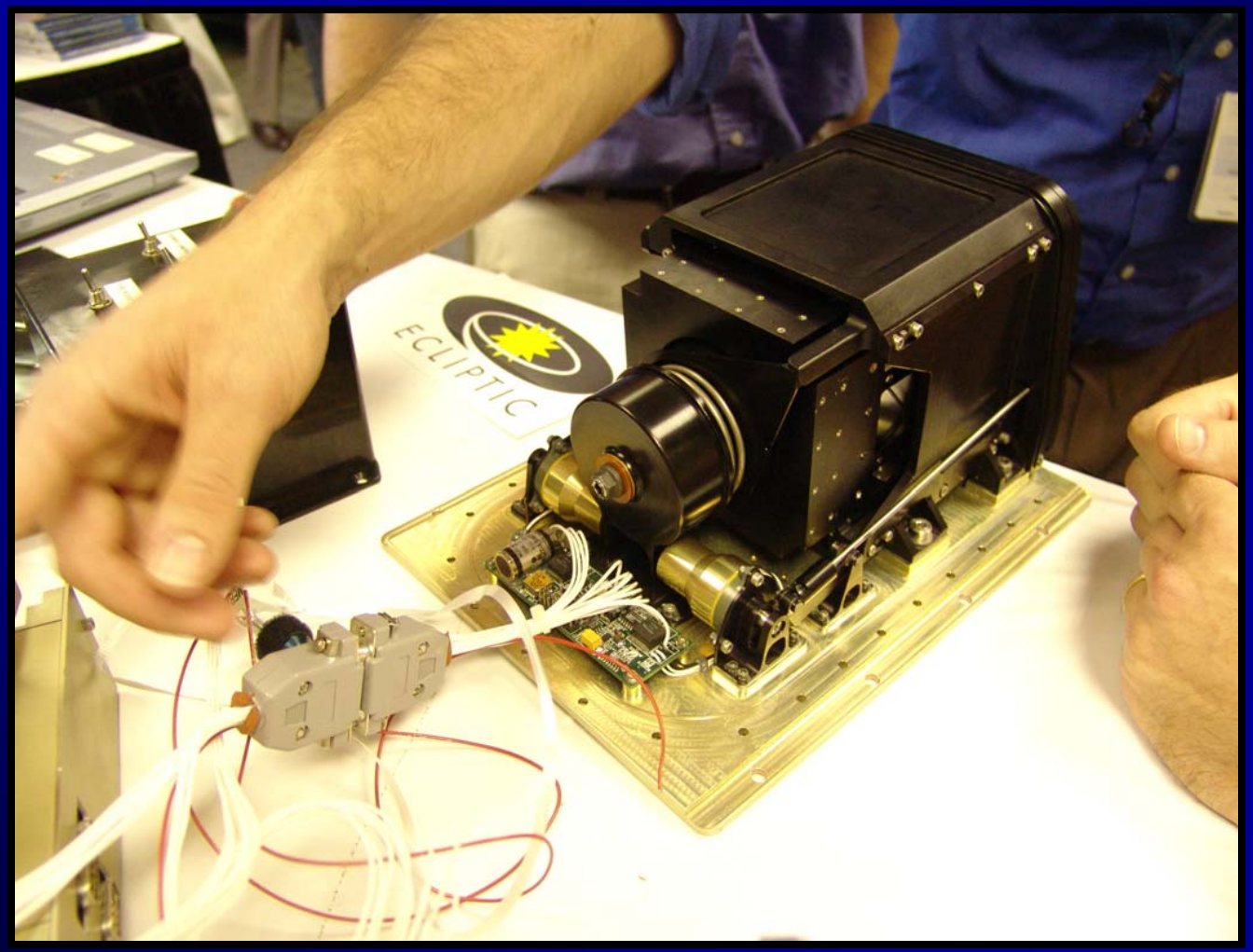


What Makes RocketPod™ Attractive?

Traditional Secondary Payload Model		RocketPod™ Secondary Payload Model
Unique payload design	→	Standard payload design
Single payload per launch	→	Multiple payloads per launch
Mission-specific interfaces	→	Standard interfaces
Mission-specific analyses	→	Enveloping analyses
Mission-specific trajectory	→	Standard deployment options
Mission-specific safety requirements	→	Standard safety requirements
Unique launch-site processing	→	Standard launch-site processing

Standardization enables lower recurring launch cost and a low-cost secondary launch program; can be key component of Responsive Space for kg-class systems

Launchable Hardware



Zero-G Tests

2004 Sep 16

Fit Check and Deployment Tests

Current Near-Term Activities

- **Currently assessing integration issues for other U.S. ELVs besides Delta II, plus on spacecraft**
  - E.g., Delta IV, Atlas 5, Minotaur, Taurus, SpaceX Falcons
- **On contract to provide flight system for suborbital launch in about a year**
- **Working several ways to take advantage of two possible launch opportunities late this year**
  - One suborbital
  - One orbital
- **Working w/SAT to assess launch option for Falcon launch next year (Malaysians)**

Longer-Term Efforts

- **Discussing CubeSat payload opportunities with several interested parties**
  - U.S. government
  - Commercial
- **Discussing business case for recurring RocketPod launch program with one U.S. ELV supplier**
- **Pursuing RocketPod improvements via IRAD**
  - Concept and design details
  - Integration and test process

Making progress!