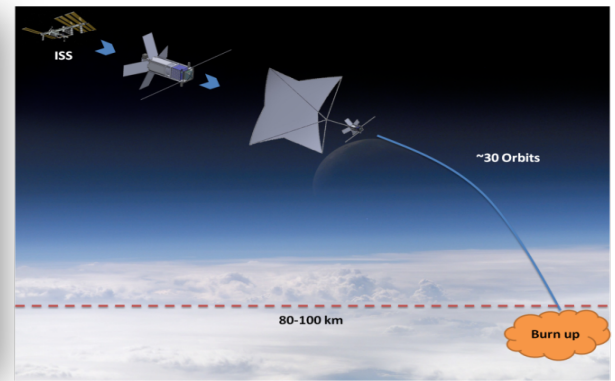
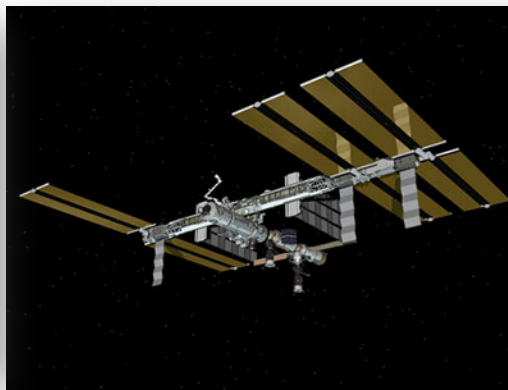


The Small Payload Quick Return System (SPQR) As A Testbed for Future Planetary Probe Missions

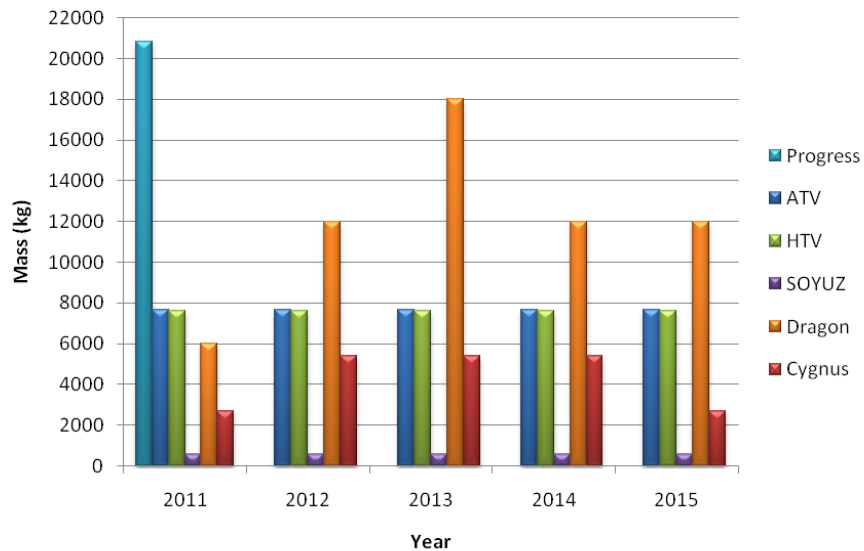
June 22, 2012

Marcus S. Murbach (POC)
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[marcus.s.murbach@nasa.gov]
650-604-3155
510 290 3158 (cell)



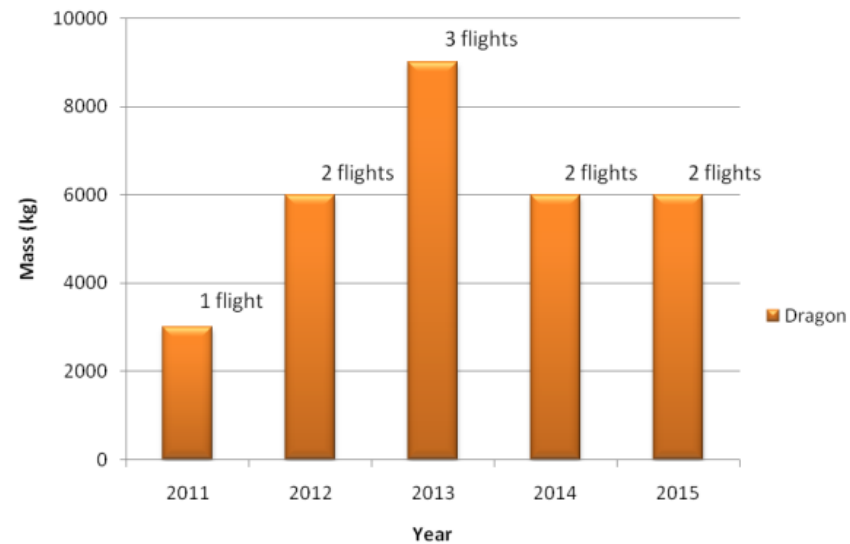
Introduction

Payload Upmass Capabilities per Year



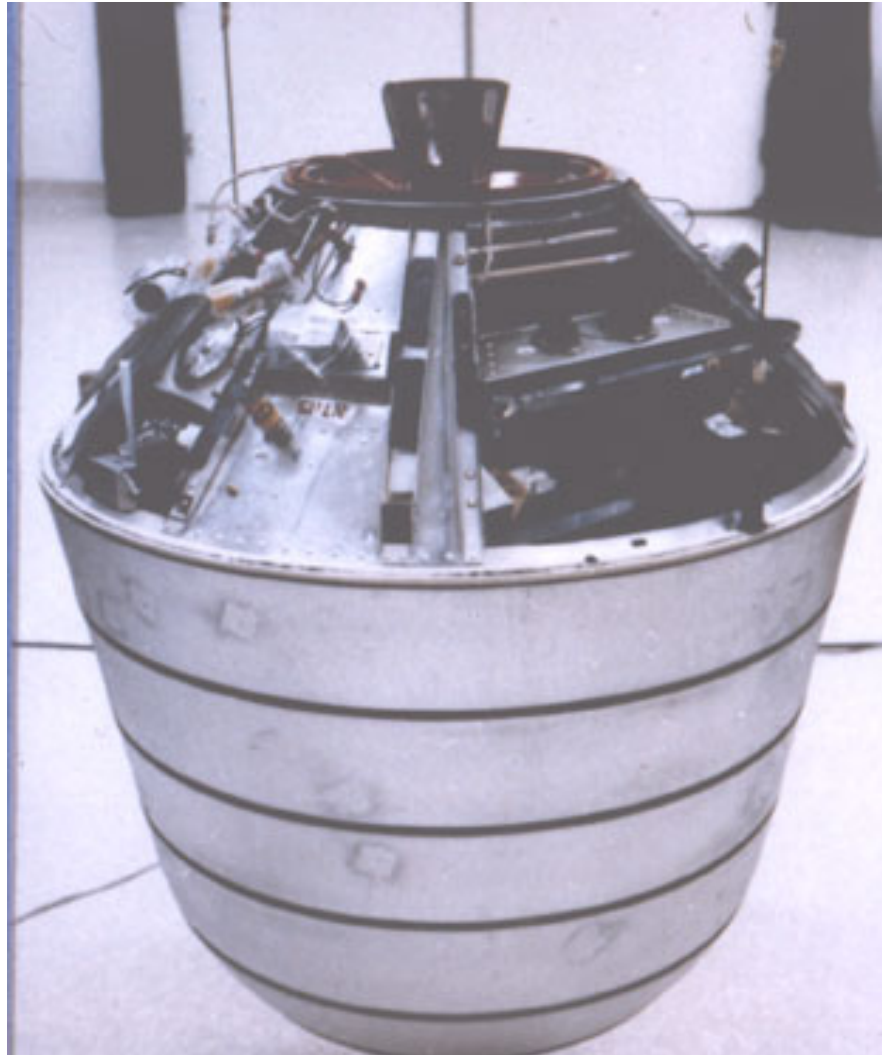
Projected future upmass capability

Payload Downmass Capabilities per Year



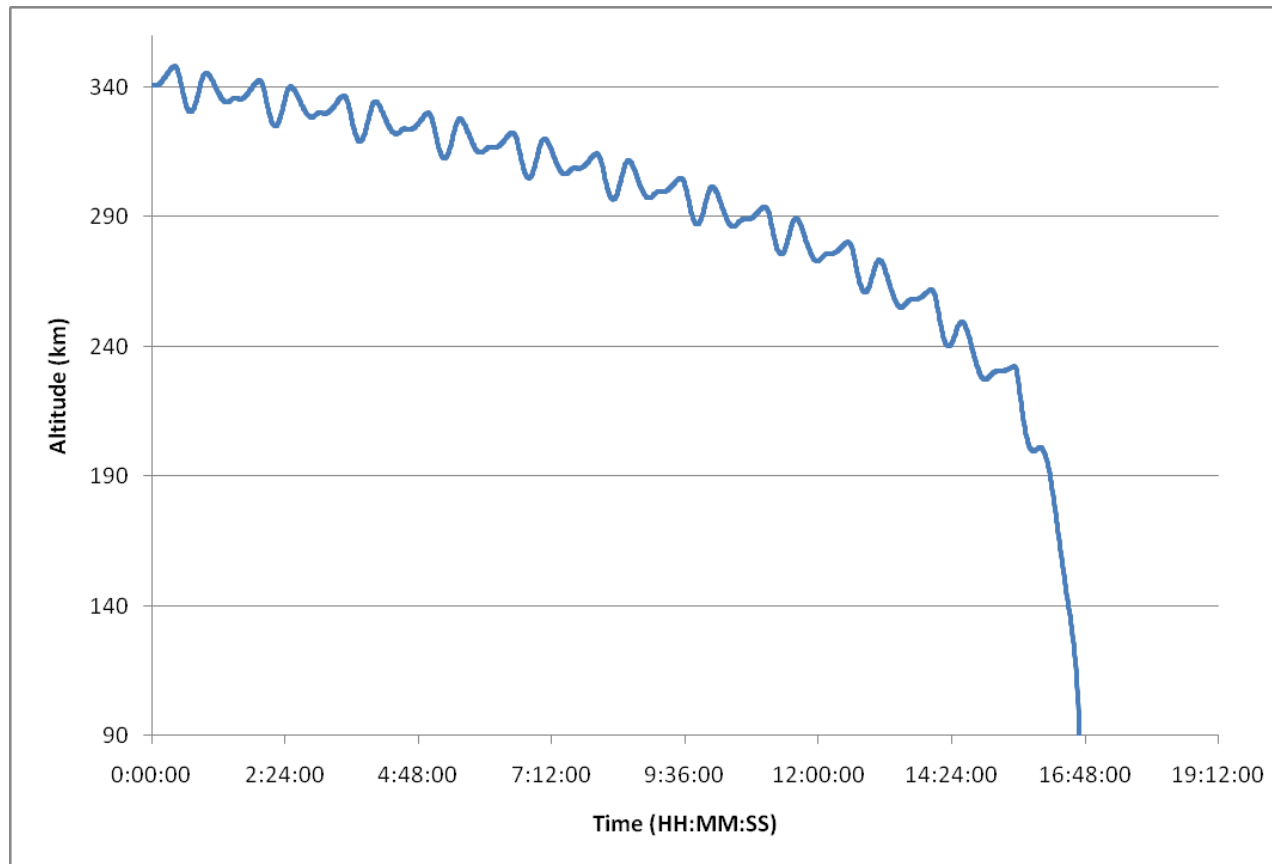
Projected future downmass capability

Hot gas de-orbit system



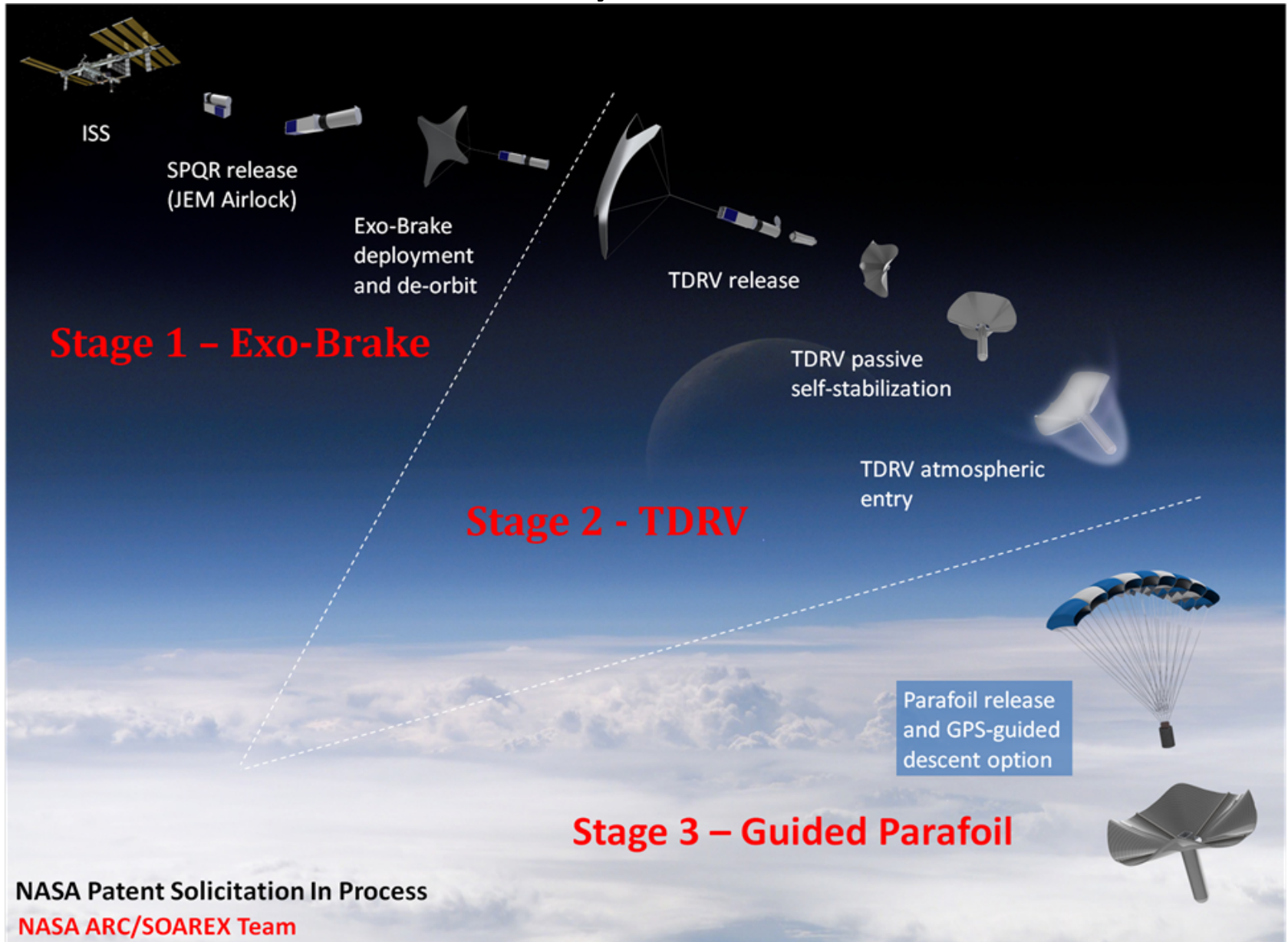
Corona style re-entry vehicle

Drag-assisted techniques



Sample De-orbit with $\beta=1$ (Jacchia-Roberts Atmospheric Model)

SPQR – Small Payload Quick Return

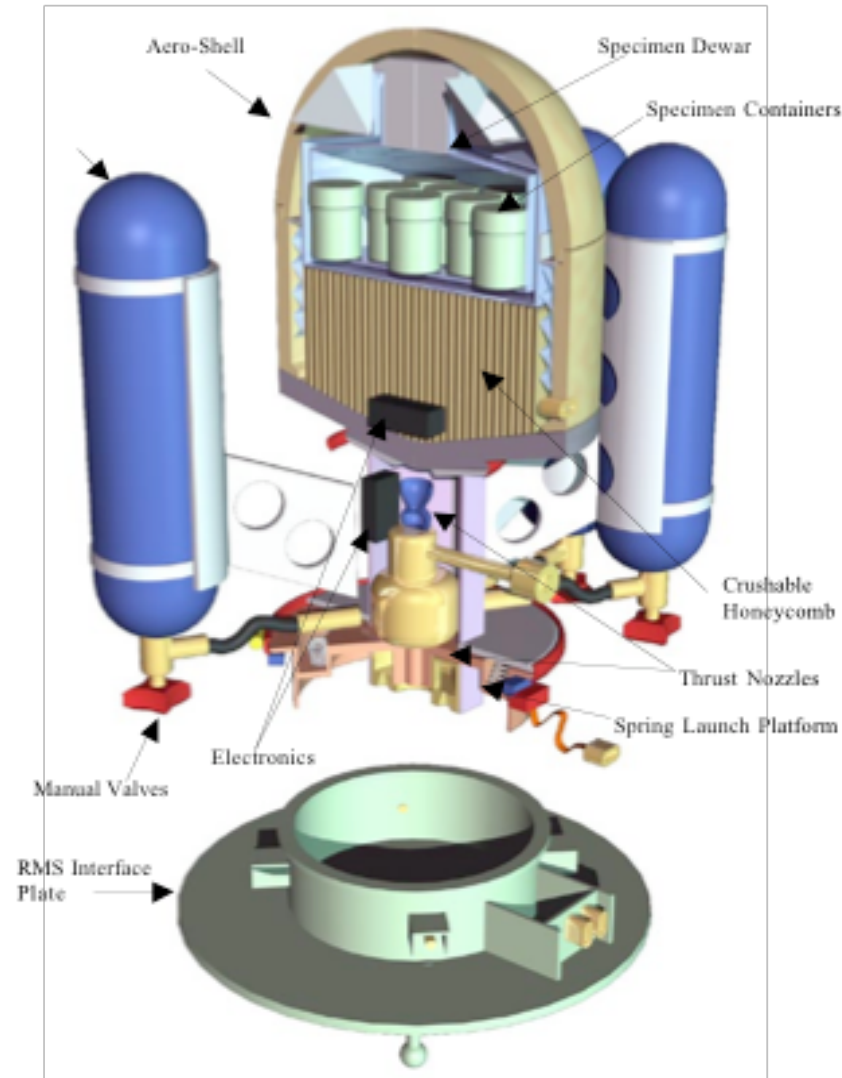


NASA Patent Solicitation In Process

NASA ARC/SOAREX Team

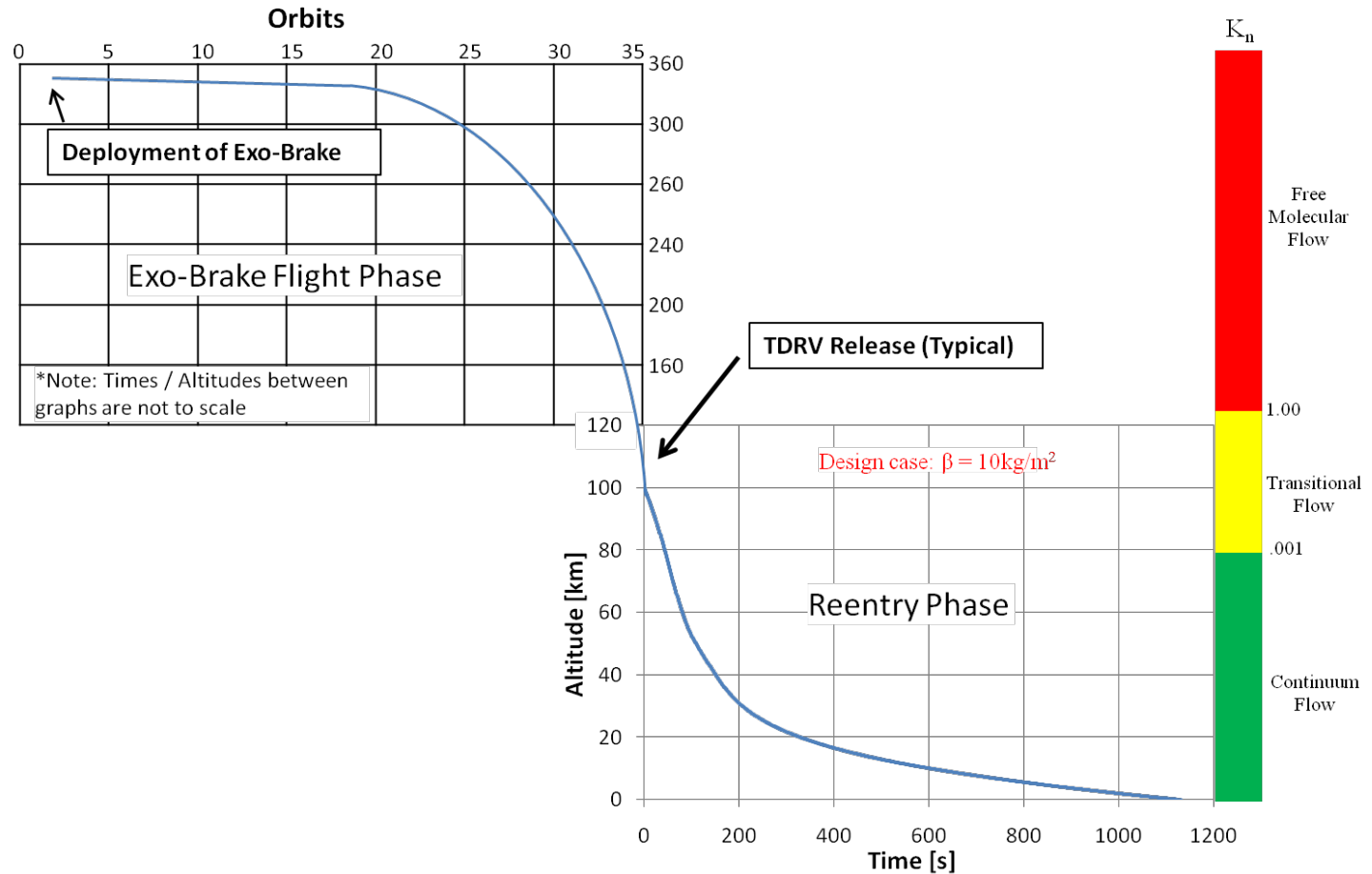
SPQR concept of operations

Cold gas ISS payload return system



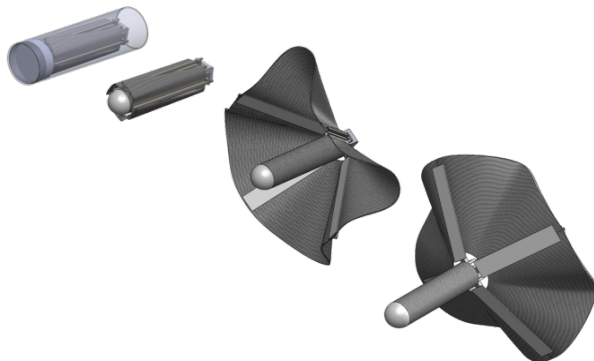
Earlier ISS Cold-gas Sample Return Capsule (SRC study)

SPQR – Small Payload Quick Return



Sample SPQR Altitude vs. Orbit/Time Plot

TDRV – Tube Deployed Re-entry Vehicle SPQR



TDRV deployment



TDRV on board camera view



Deployment 134km May 2009

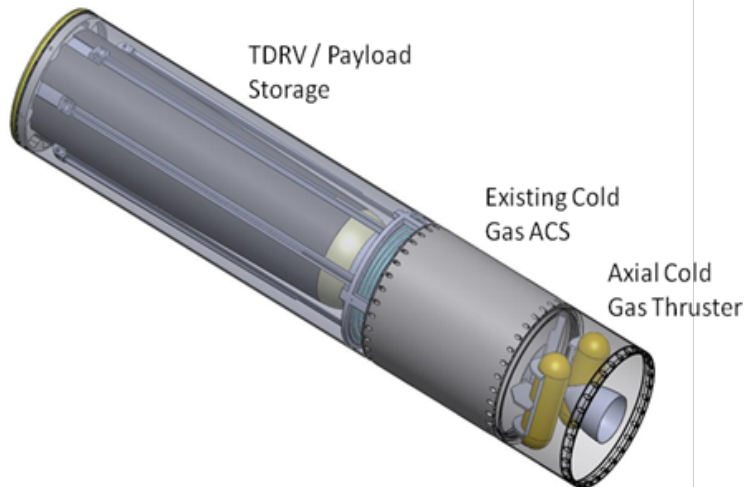
The SPQR cannister



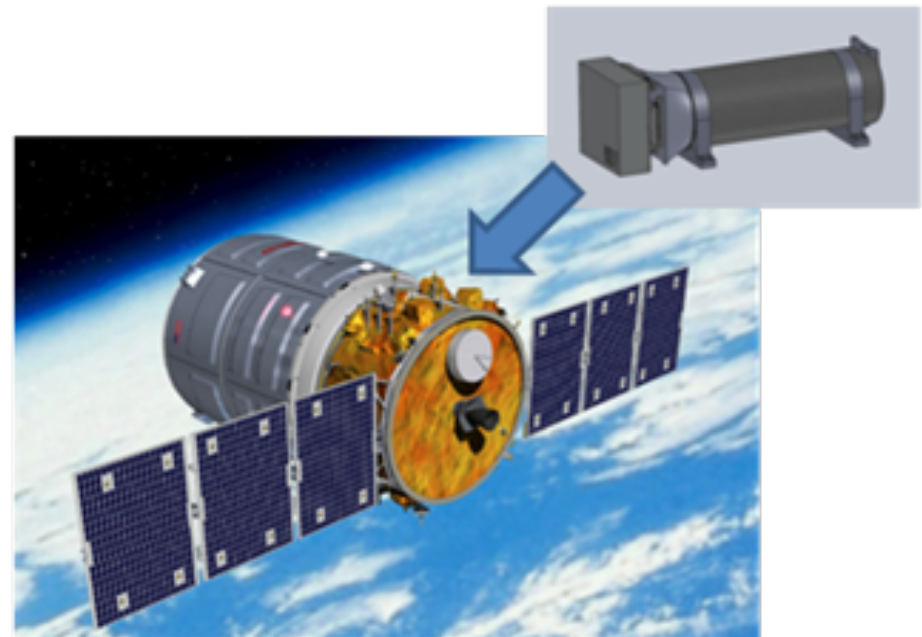
Phase Change Thermal Control Unit integrated module (model)

Propulsive and Other De-orbit Options

Cold gas concept



Cygnus Piggy Back concept (courtesy Orbital Sciences Corp.)



Atromos Mars 2-point Network

