

KALL MORRIS INC

Keeping Space Clear for All™

Addressing Orbital Debris with our
Fleet of In-space Capabilities

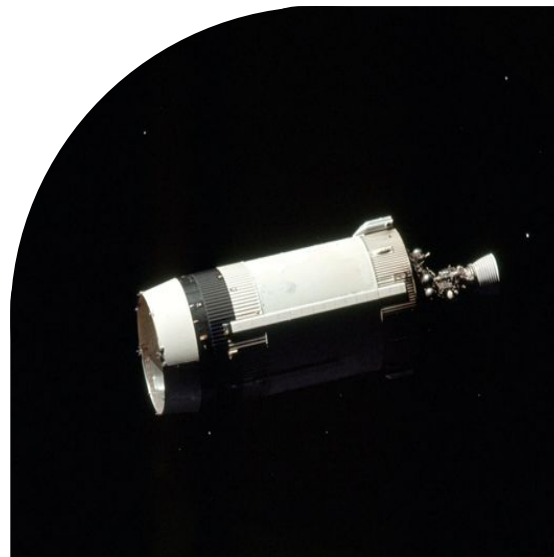


Introduction



Est. 2019
Marquette, MI

Presenter
Austin J. Morris
Co-founder & Director
of Engineering



KMI Mission Overview



Focus:

- Capture multiple uncontrolled orbital debris objects with a single reusable spacecraft

Goal:

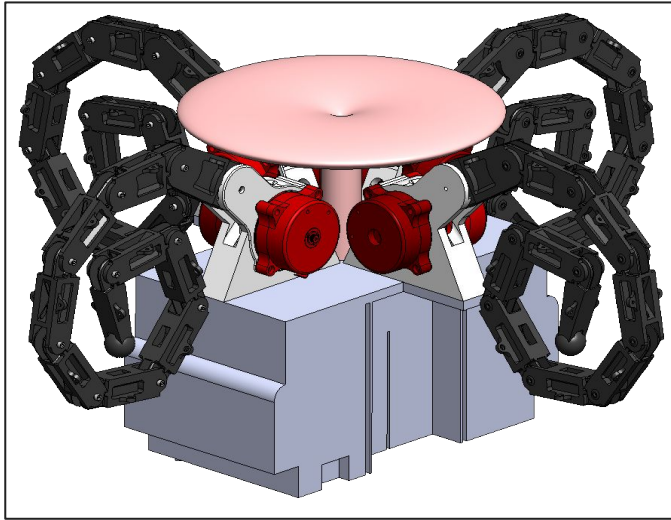
- Repeatable, efficient debris removal to stabilize the orbital environment

Steps:

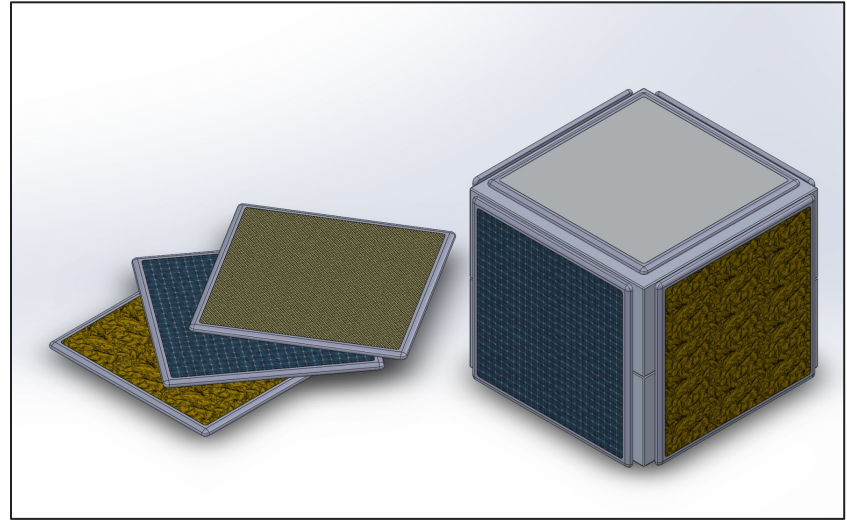
- Demo component technologies in relevant environments
- Combine technologies into system prototype
- Demo full system in orbit
- Establish ADR value chain
- Scale up industry to support space infrastructure development



REACCH Overview

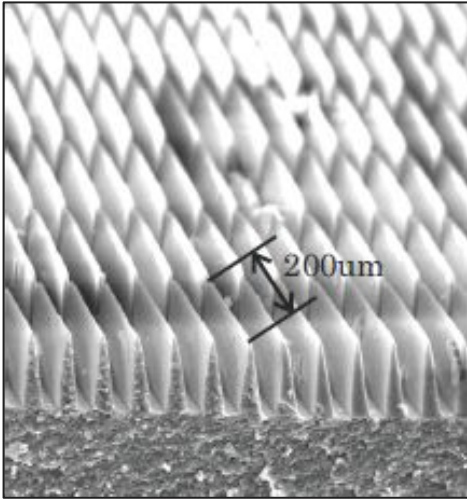


REACCH Astrobee Payload

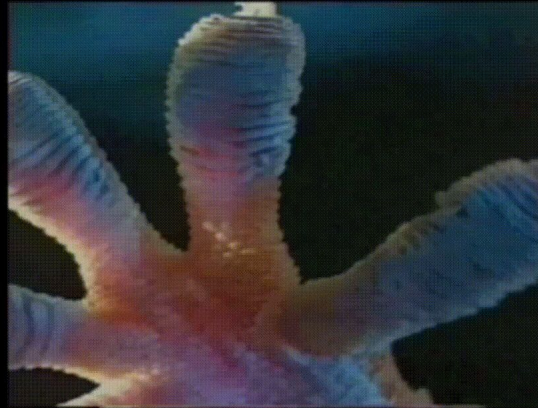


Capture Cube & Swappable Faceplates

Gecko Adhesion Overview



Getting Unstuck - Geckos Peel Toes



Robert Full: Learning from the gecko's tail,
TED2009 | February 2009



Courtesy of USC Information Sciences Institute &
Space Engineering Research Center 2018

Demo



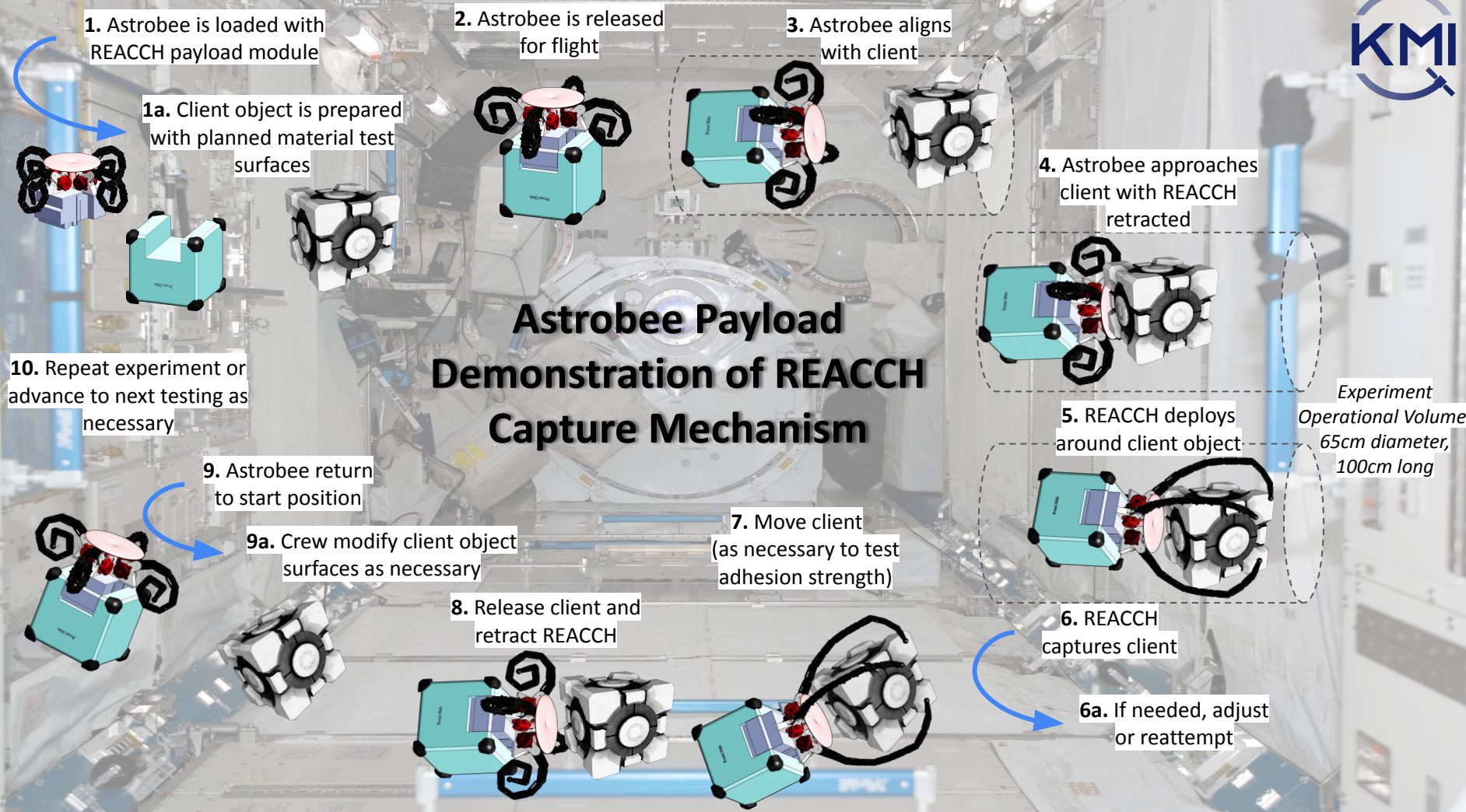
KALL MORRIS INC

REACCH Demonstration Video

Click to start

CONFIDENTIAL

Video Courtesy of USC



Astrobee Project Milestones



Experiment Objectives

- Demonstrate capture of a free-floating client object with REACCH
- Demonstrate capture of target objects having both smooth and rough surface conditions
 - This will include flat panels of Kapton, Pyralux, acrylic, and carbon fiber as well as MLI blanket, solar cell arrays, and 3D printed surfaces with large and small bumps covered in Kapton
- Demonstrate release of a captured target without remaining residue or damage from adhesion



Remaining Unknowns



Program Management

- Define remaining timeline details
- Schedule events requiring external coordination, including testing at non-KMI facilities
- Finalize experiment procedure and documentation

Design

- Define desired force and relative motion characteristics
- Establish level of on-station serviceability

Integration

- Ensure Astrobee software/control interfacing
- Determine EMI interference from station/Astrobee

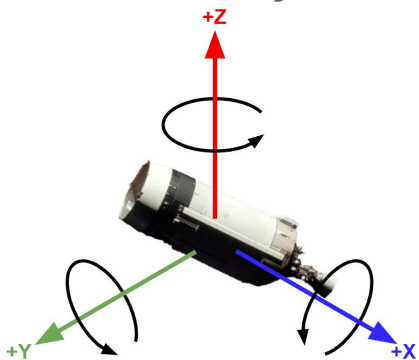
Testing

- Functional testing at NASA AMES
- Other testing facilities as necessary
- Launch survivability testing

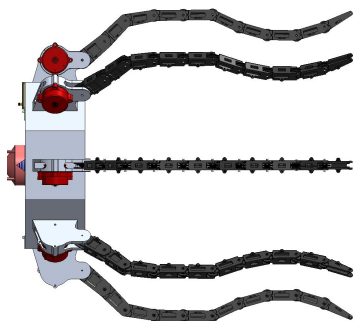
Technology Overview



TumblEye

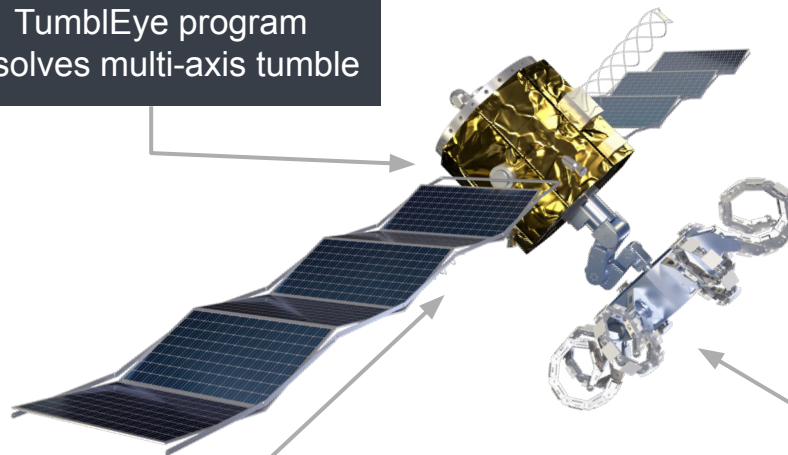


REACCH



Laelaps

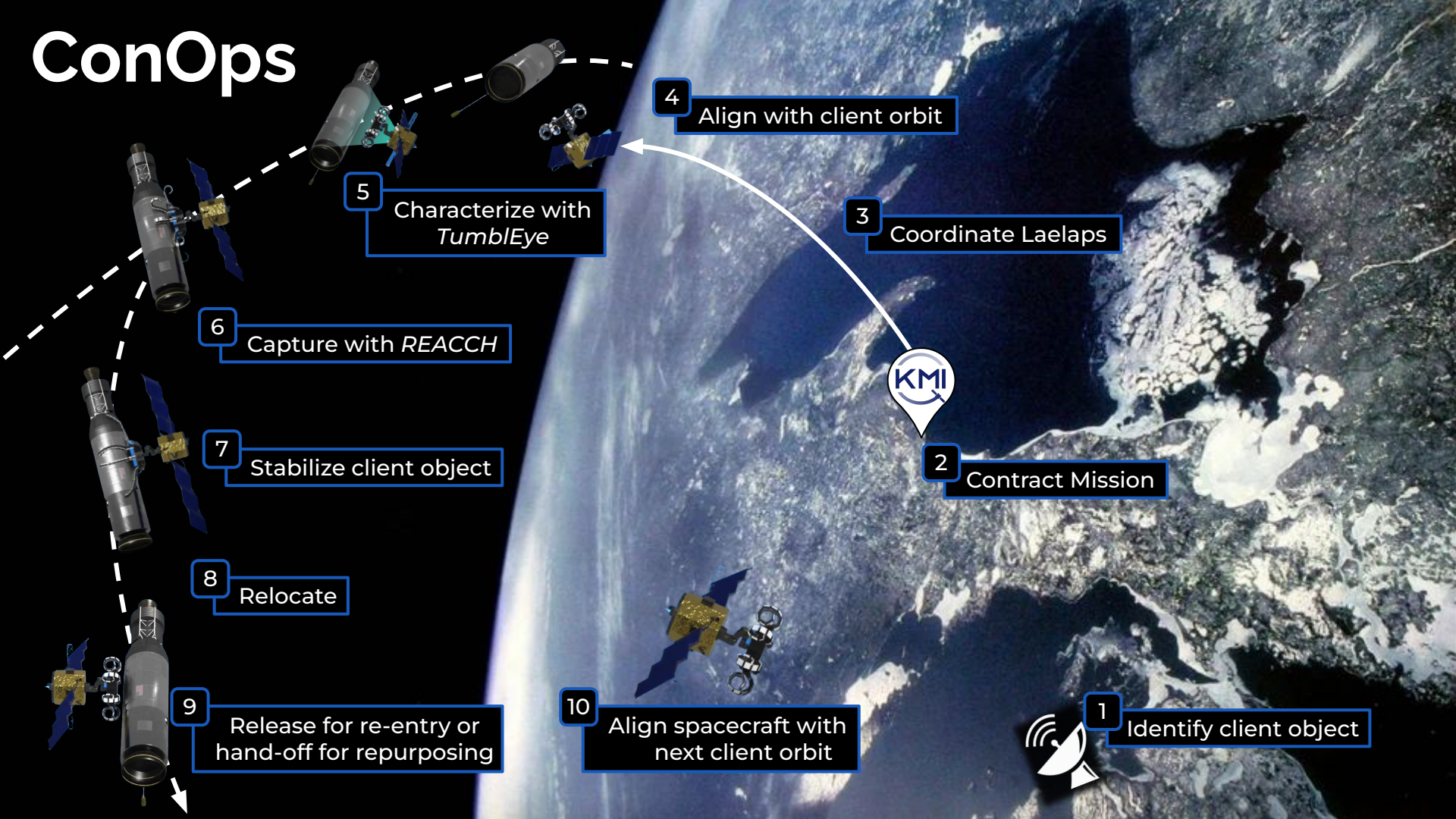
TumblEye program
resolves multi-axis tumble



Flight-proven, efficient
COTS bus and systems

REACCH end effector for
secure, non-destructive,
reversible grapple

ConOps



Thank You

Contact

Austin J. Morris
austin@kallmorris.com

Connect

kallmorris.com

