Robotic Servicing of Geosynchronous Satellites (RSGS) Program Overview

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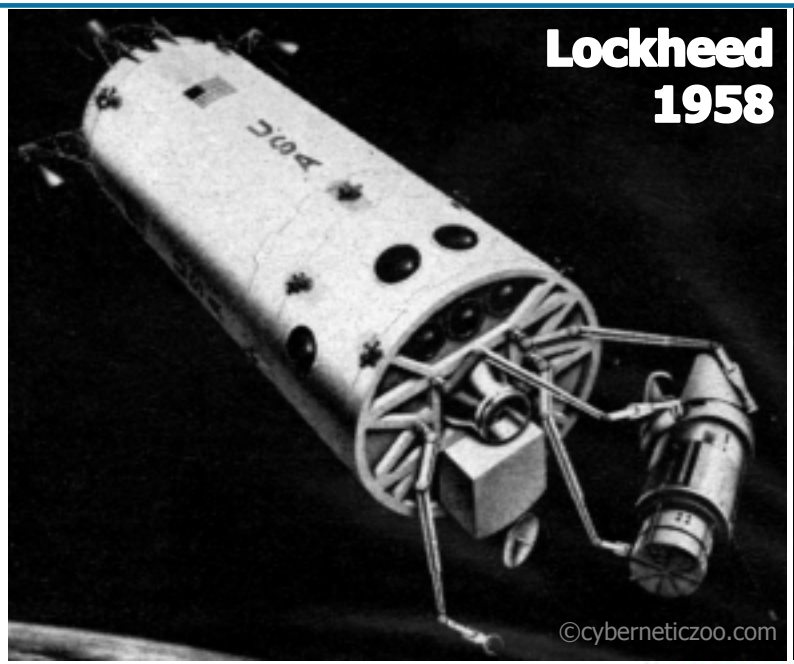
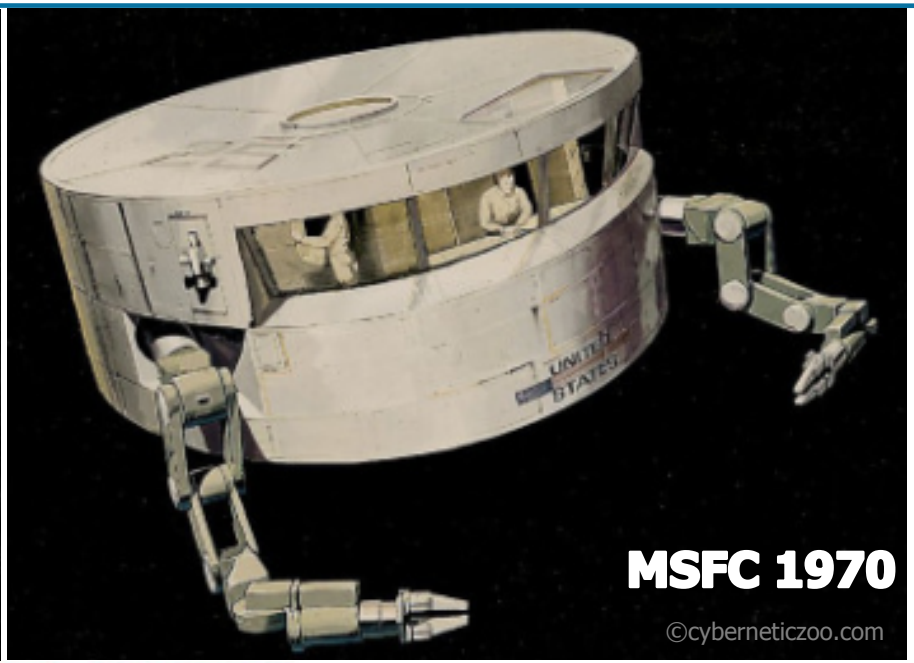
Future In-Space Operations Colloquium

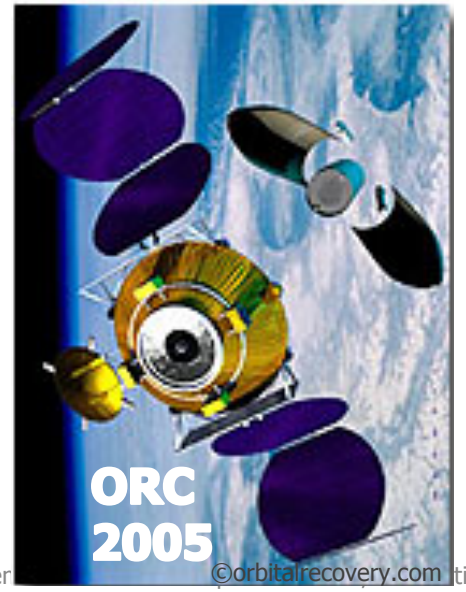
June 15, 2016

We've been talking about this for a long time…

Historical satellite servicing concepts



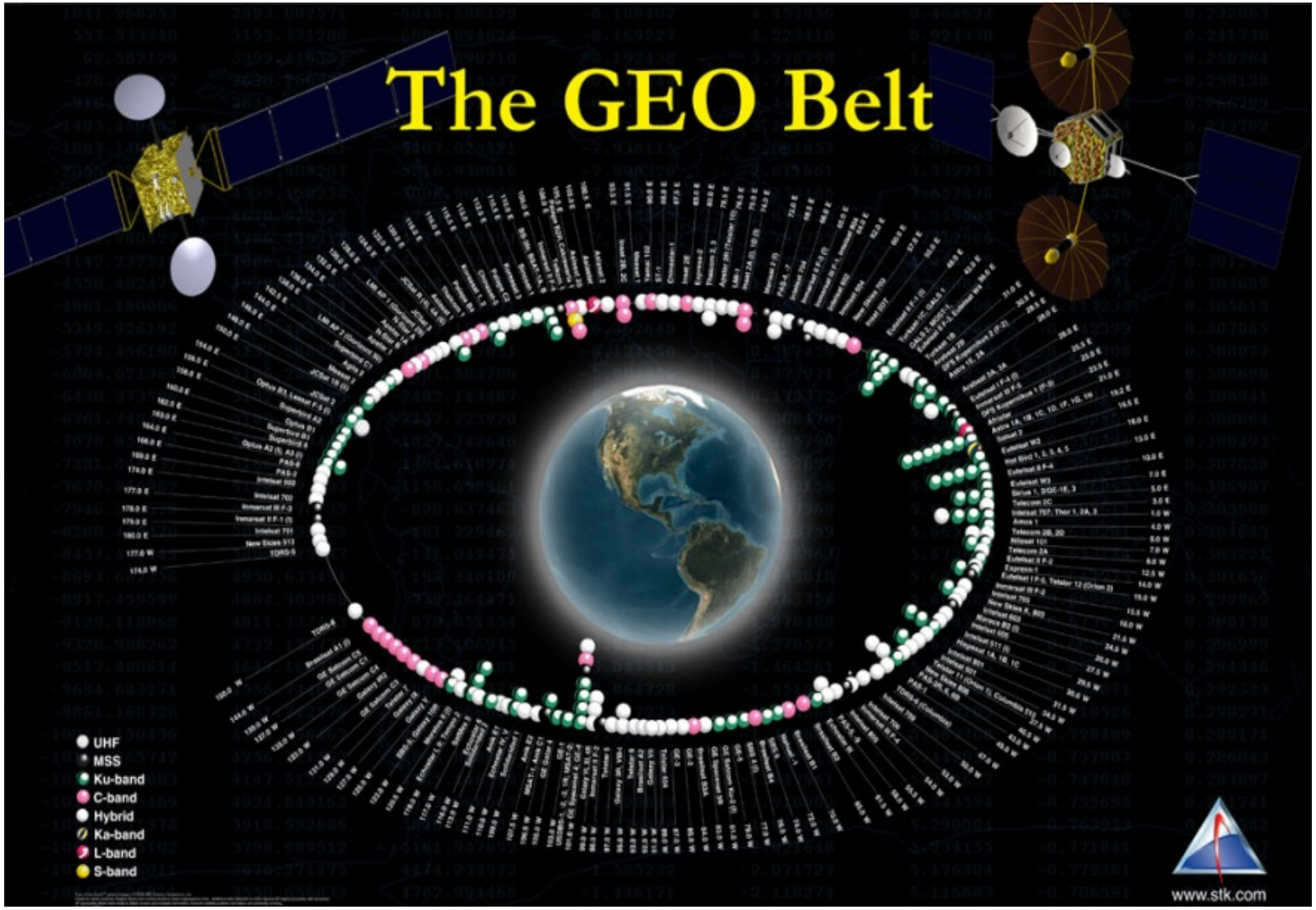




Automated robotics on orbit

DARPA Orbital Express

GEO represents maximum customer set



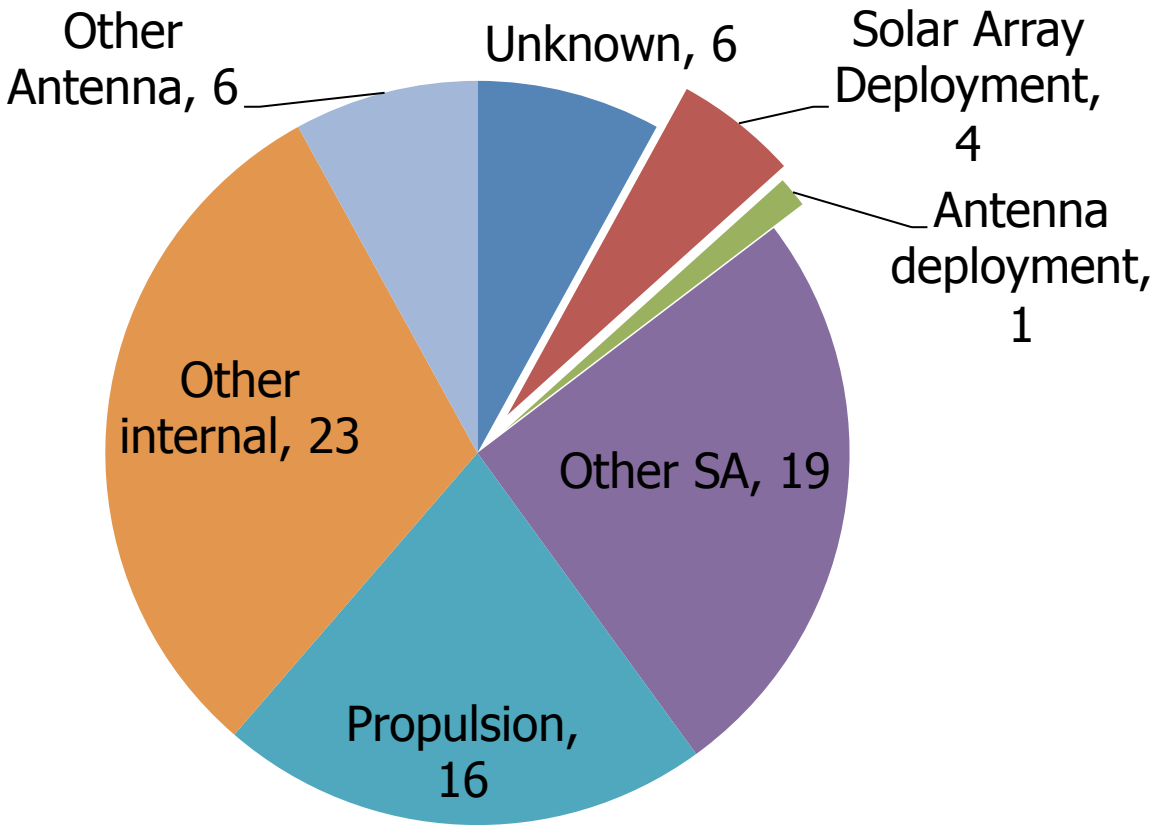
~5:1 commercial to government

Recent satellite anomalies

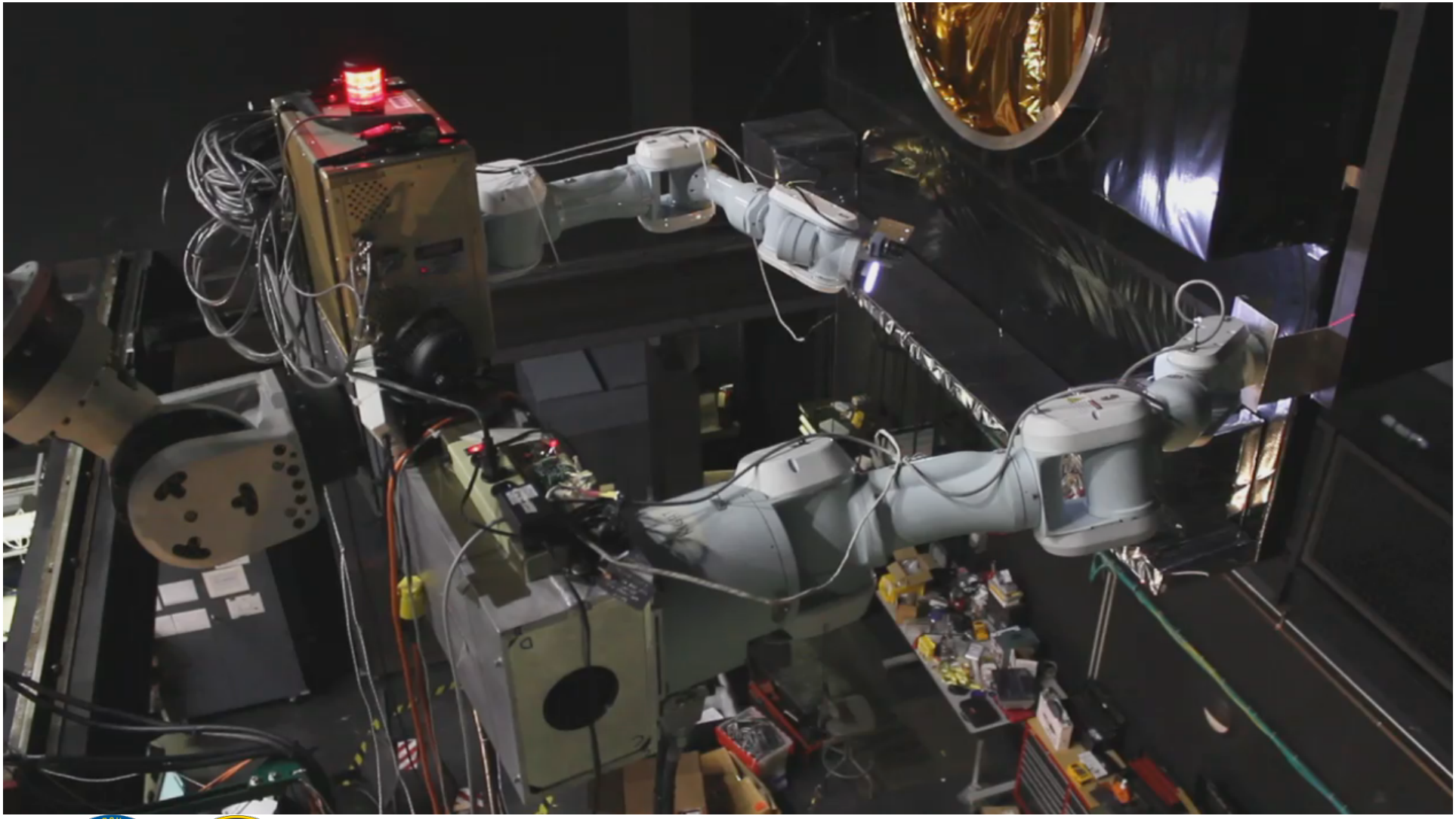
AEHF-1

New Dawn

Ten years' worth of anomalies

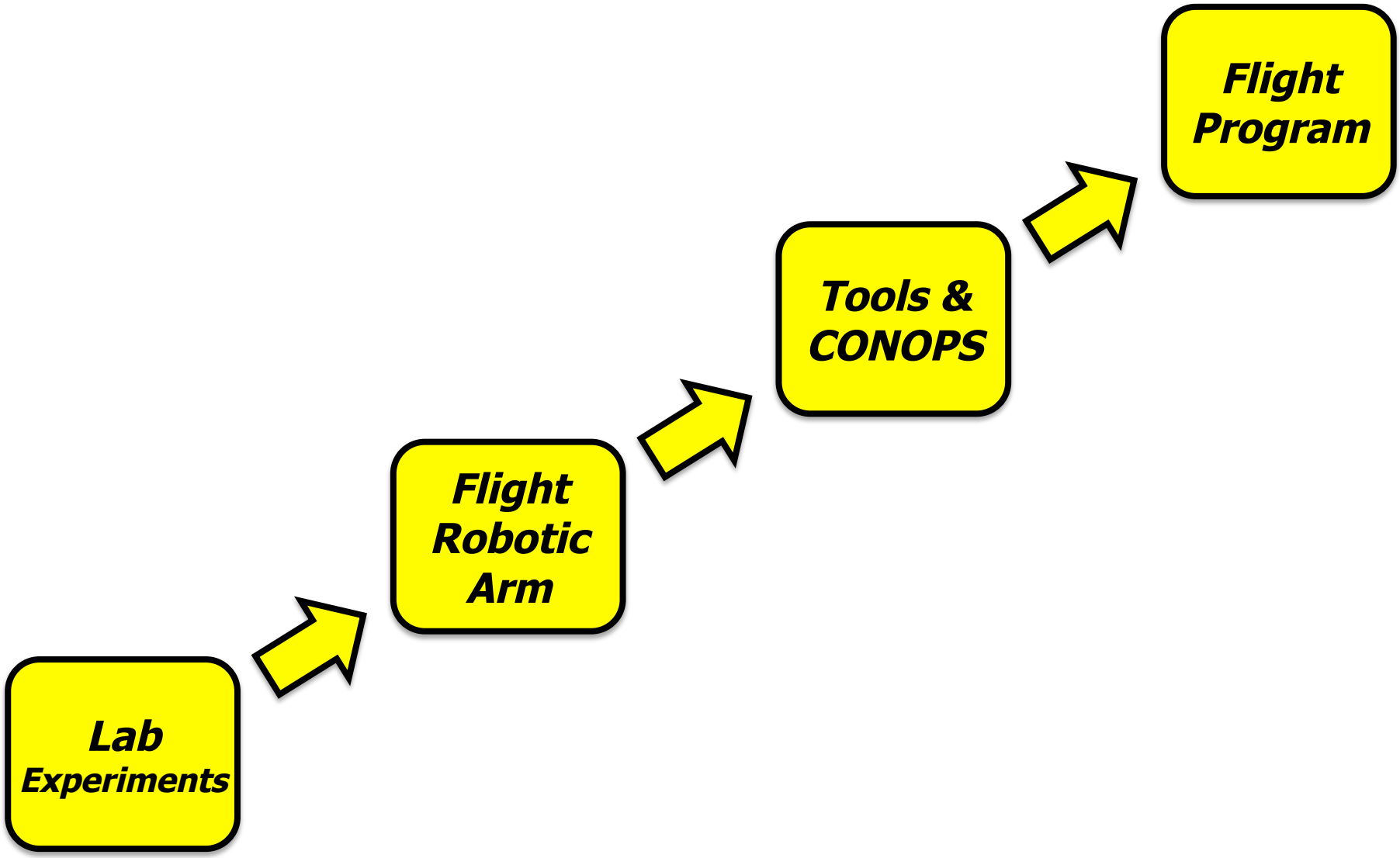


Repair is feasible

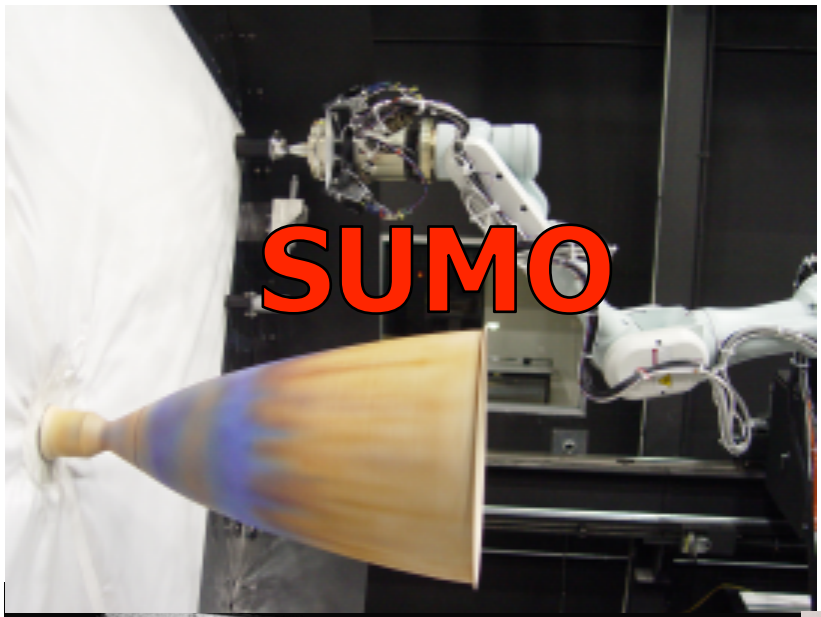


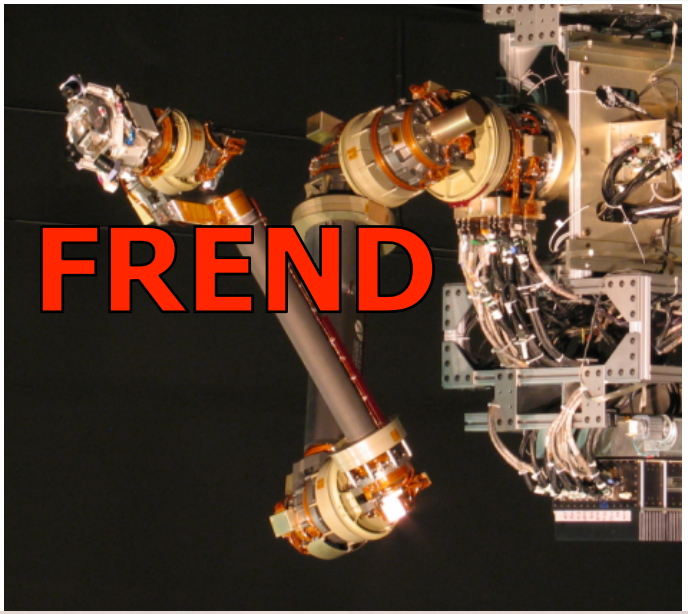
U.S. Naval Research Laboratory BICEP test 2010

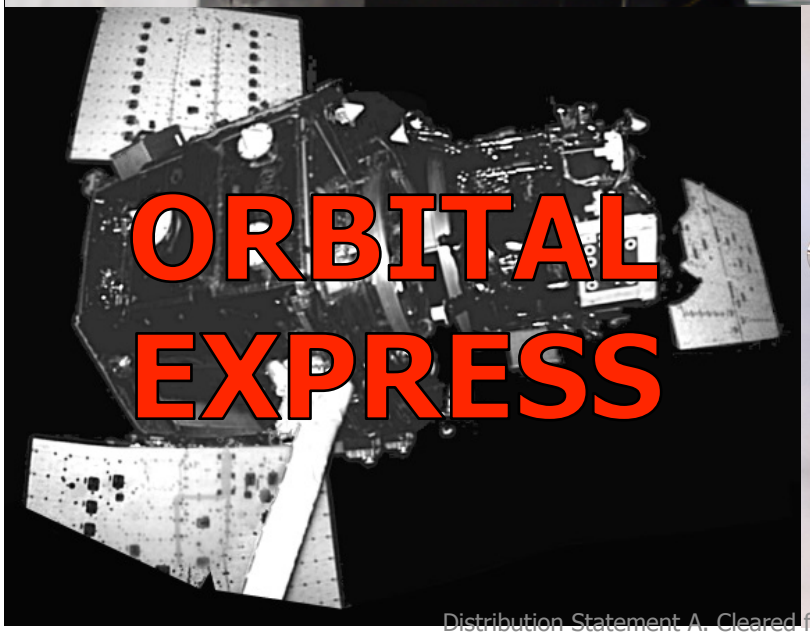
RSGS evolved from past technology investments



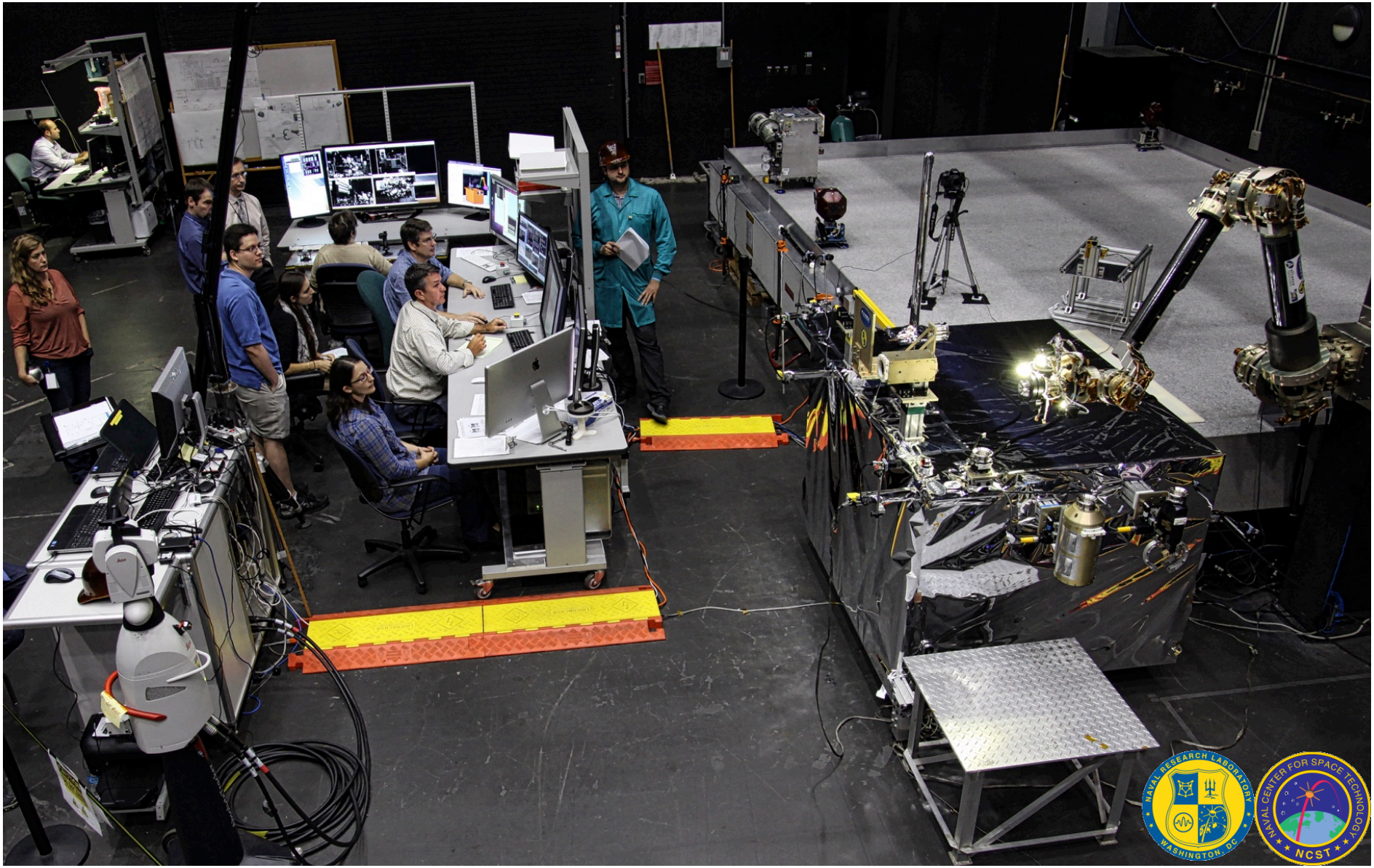
Pulling together technologies



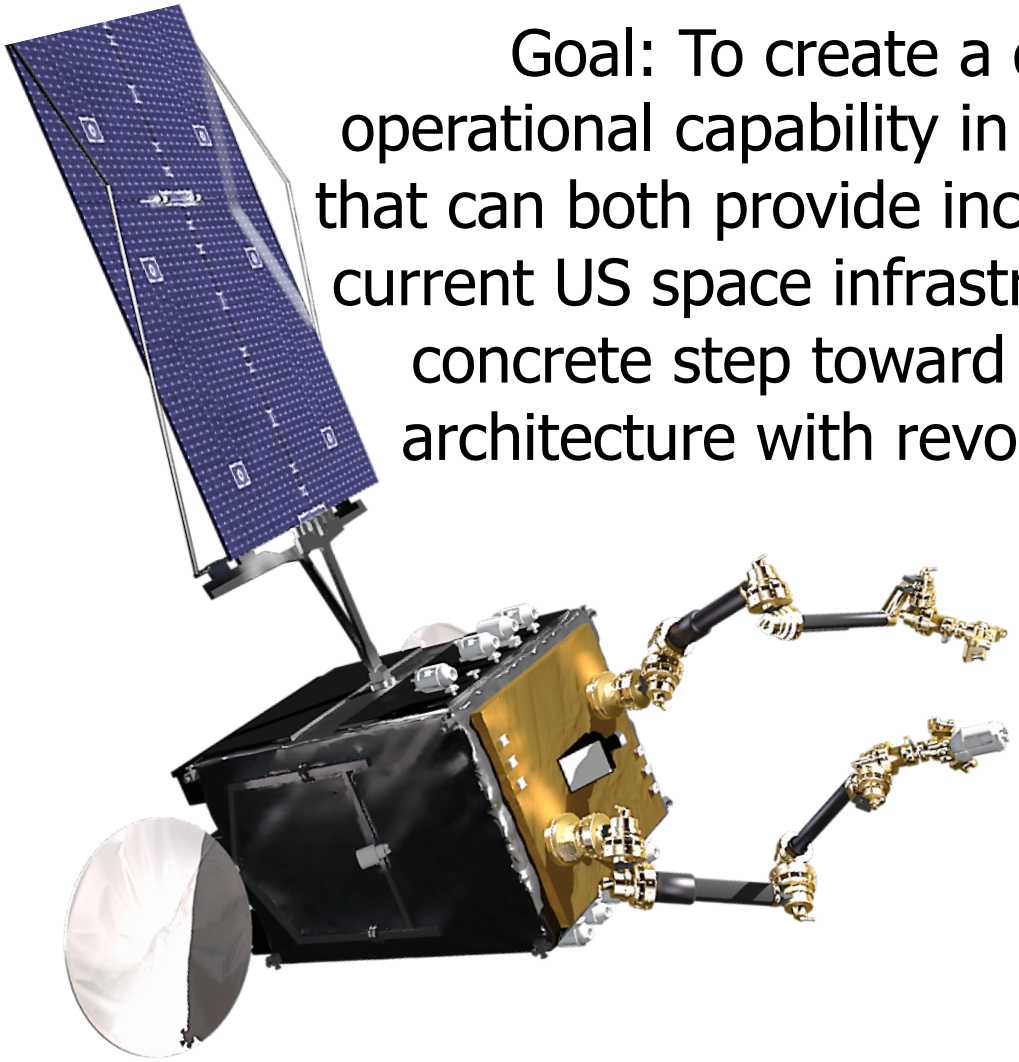




Increasing levels of integrated testing

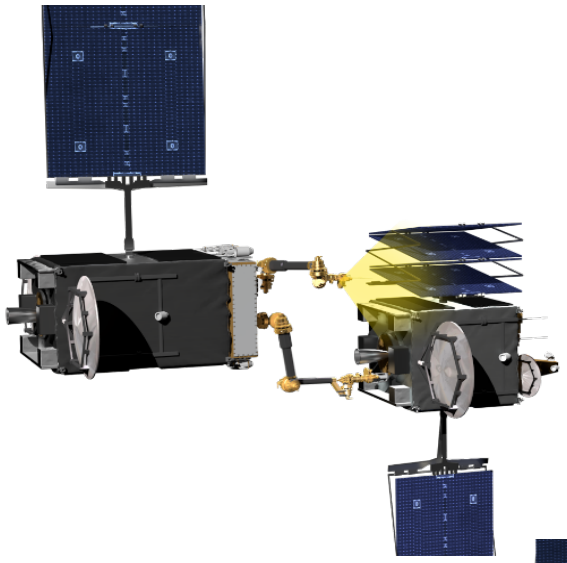


RSGS: resilience and transformation

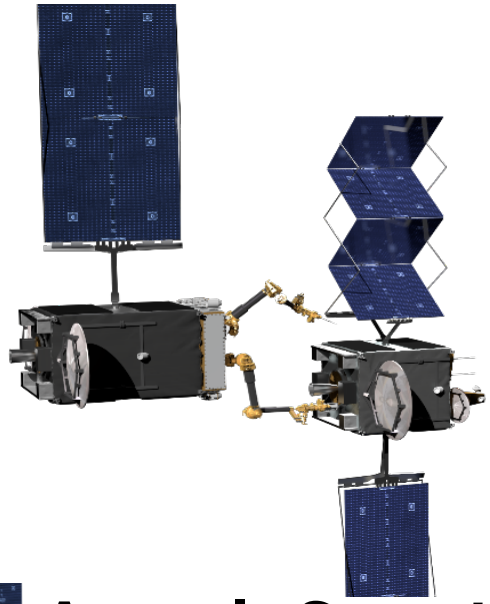


Goal: To create a dexterous robotic operational capability in Geosynchronous Orbit, that can both provide increased resilience for the current US space infrastructure, and be the first concrete step toward a transformed space architecture with revolutionary capabilities.

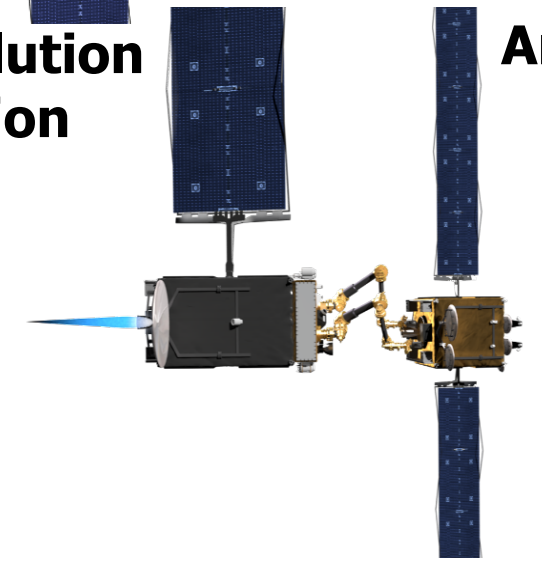
The DARPA baseline mission set



High-Resolution Inspection



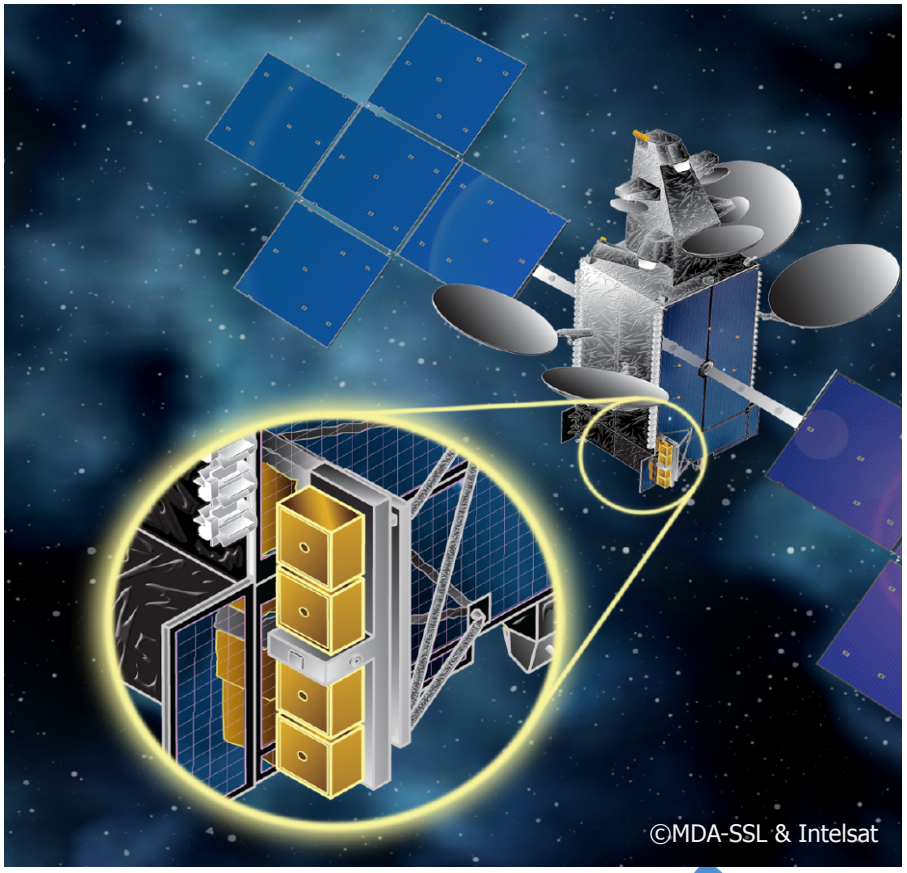
Anomaly Correction

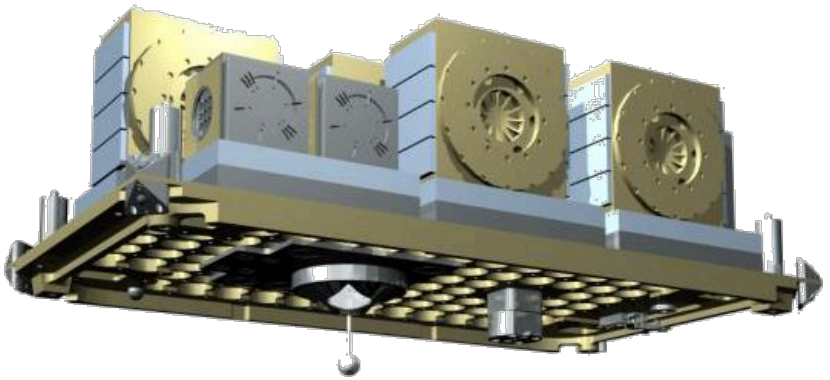


Cooperative Relocation

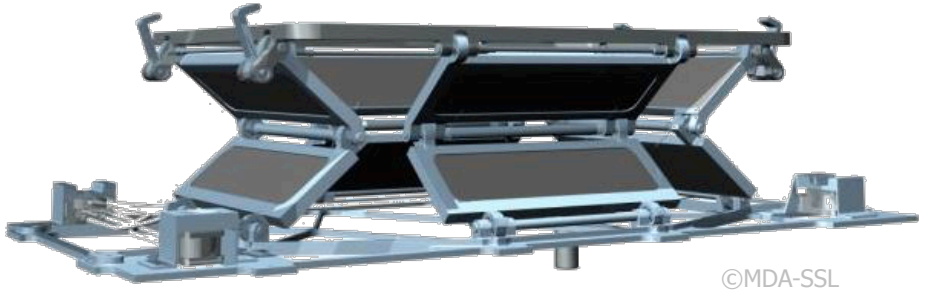
Upgrade Installation

Space Logistics

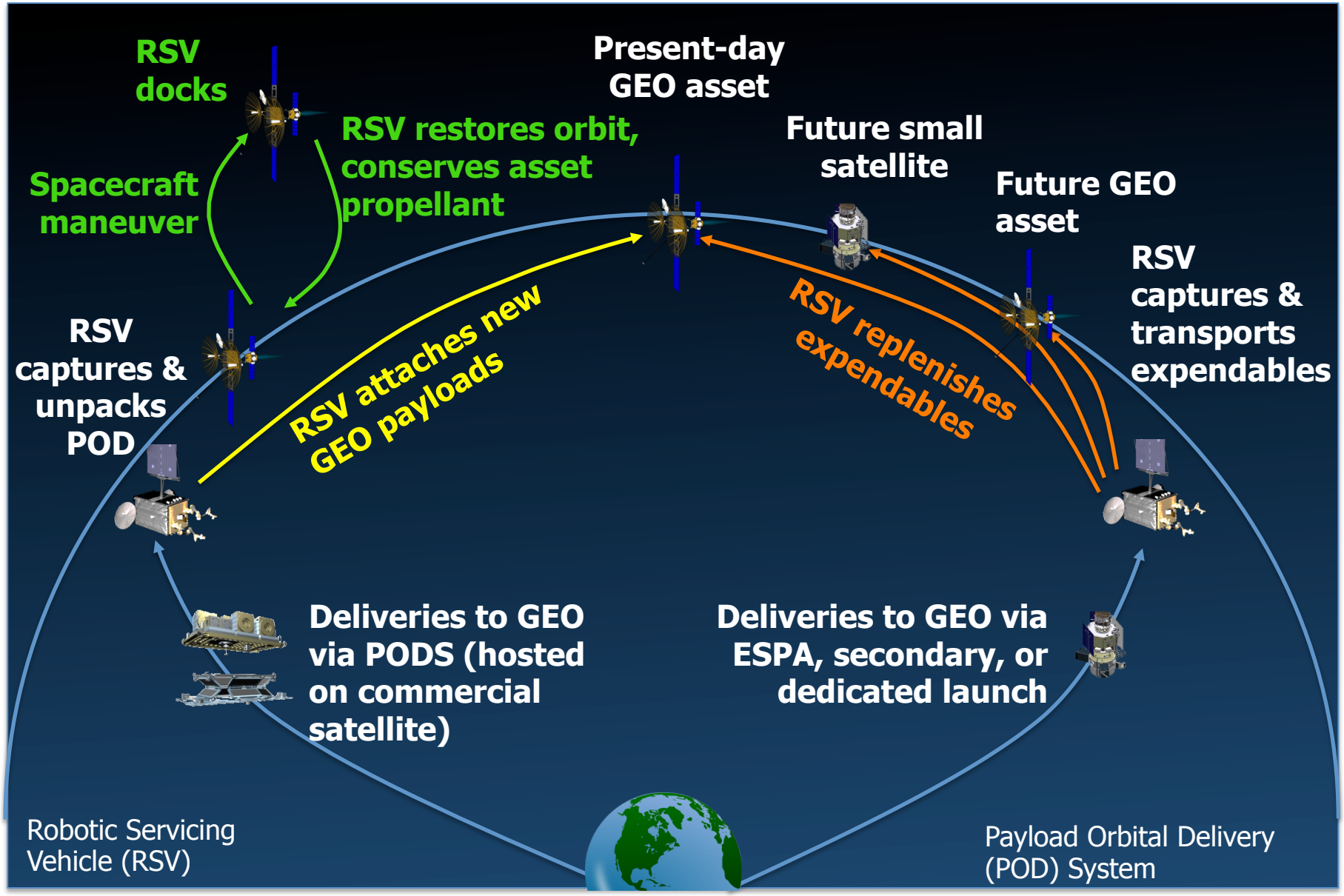




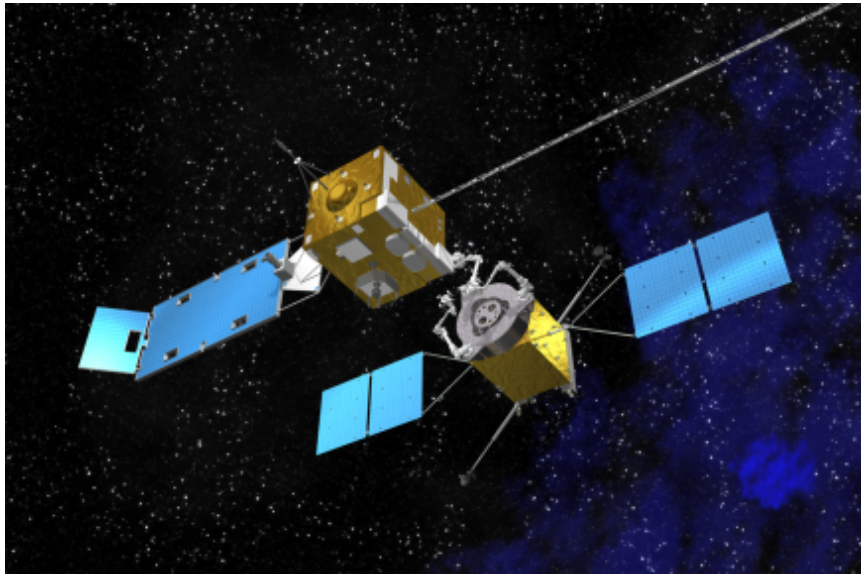
DARPA PODS

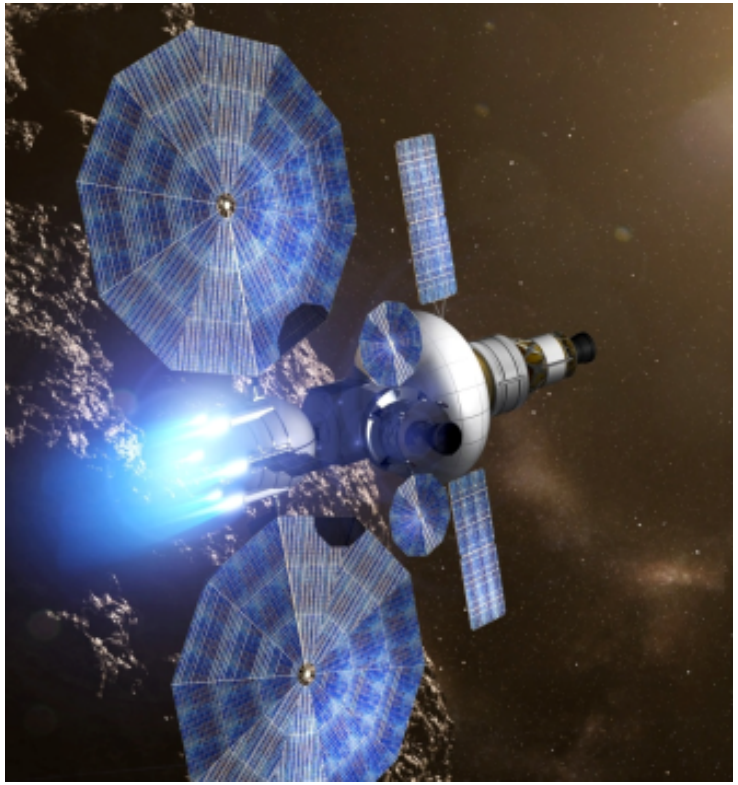


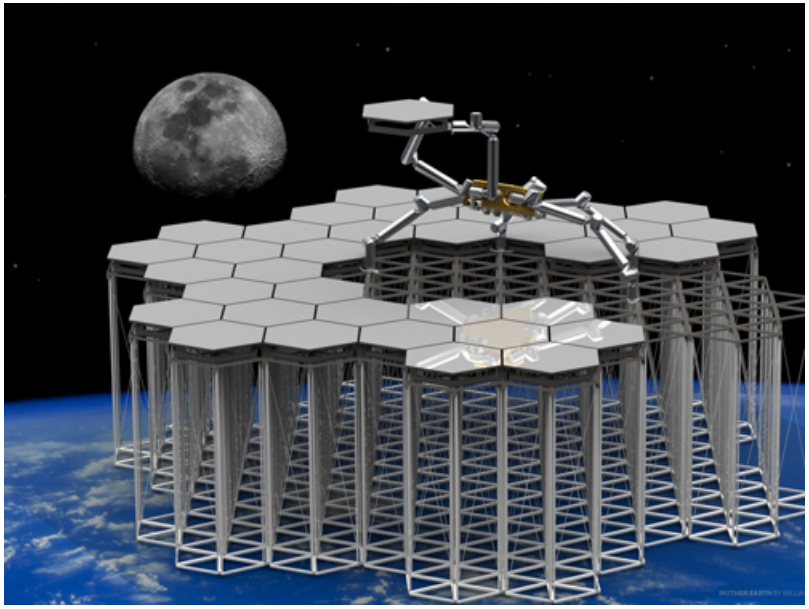
RSGS + POD = *logistics infrastructure*



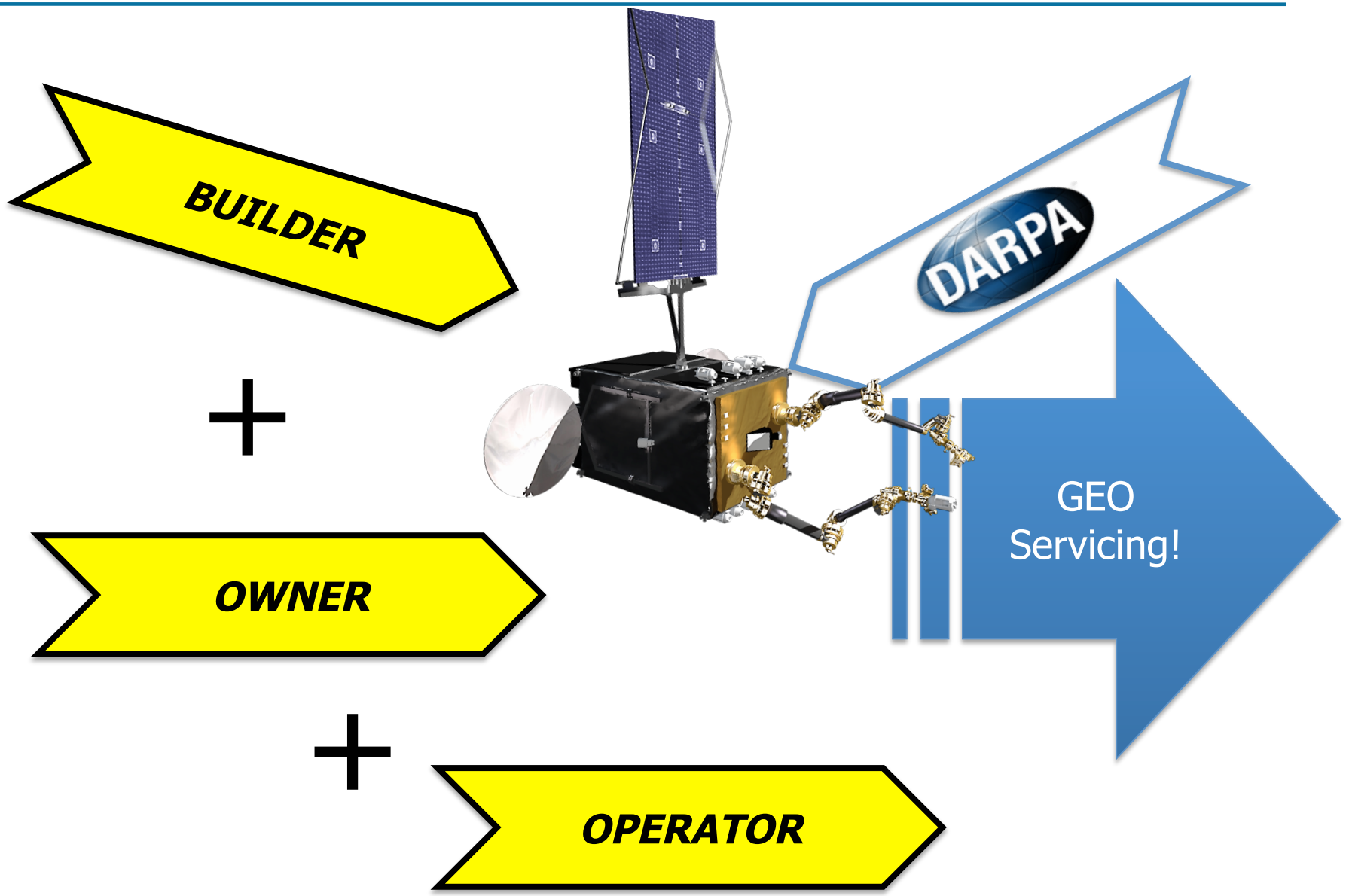
Robotics: centerpiece of growth



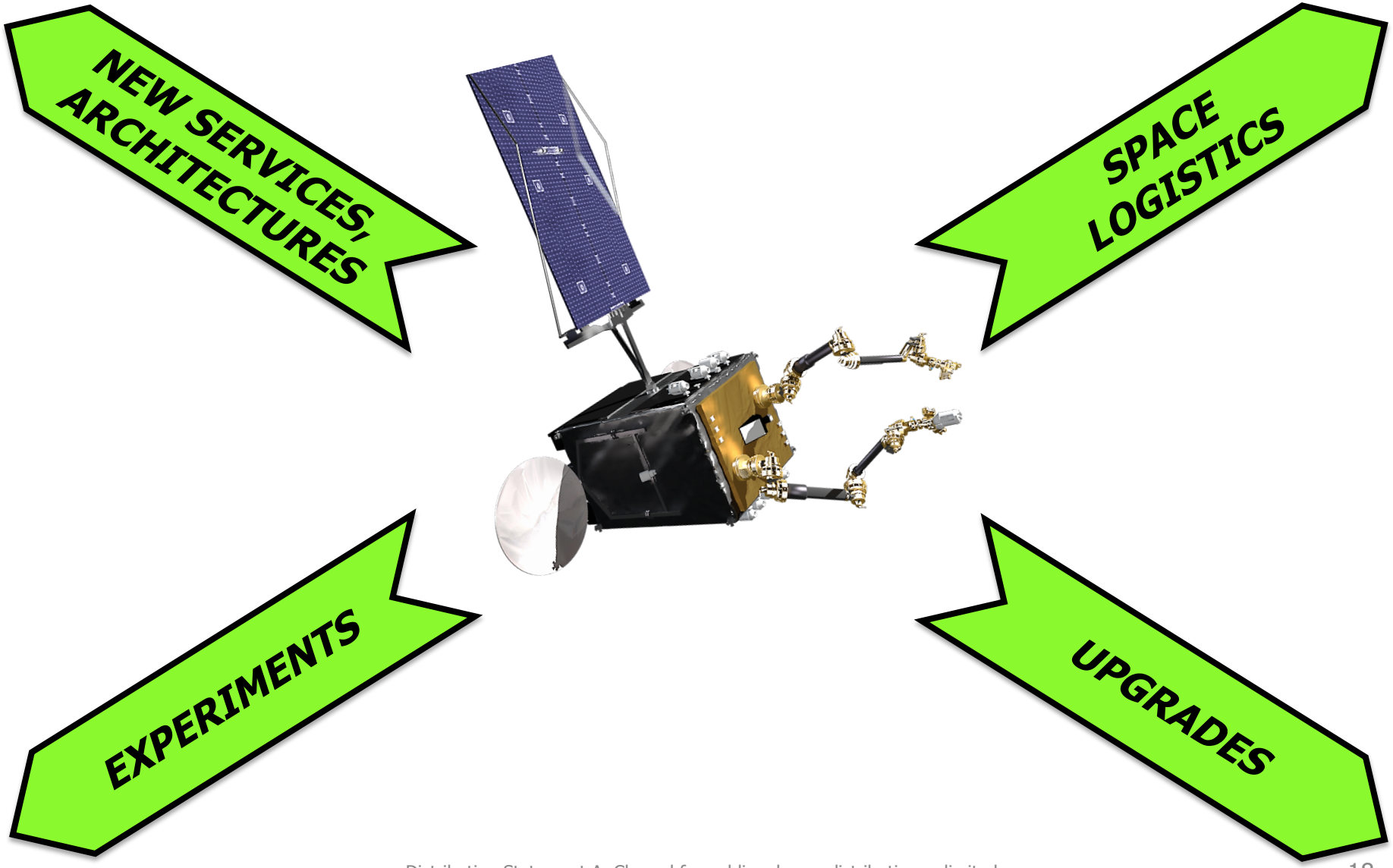




We are looking for our partner



Nurturing the transformation



An innovative partnership

What

- Government contribution: robotic payload, launch, milestone payment upon demo completion
- Partner team: GEO heritage spacecraft bus, integration, ground segment

Why

- More customers
- More opportunities to learn
- Help close the servicing business case
- Government access, favorable terms

How

- Other Transactions (OT) for Prototype: ***true partnership***
- US space industry Builder-Owner-Operator partner team
- Management structure proposed by partner
- Collaborative decision making

Capability demonstration and after

- DARPA will arrange for one or more GEO vehicles as test customers
- Once on-orbit RSGS vehicle will
  - Complete a checkout and calibration phase
  - Demonstrate capabilities that support inspection, tug, anomaly resolution, and upgrade capabilities
  - Estimated 6 to 9 months followed by Milestone Payment
- Following demo, partner conducts revenue generating operations
  - Commercial satellite servicing
  - Government fee-for-service missions

Payload being designed for 5-8 years of GEO operations to facilitate Partner ROI

Schedule and milestones

Partner Selection ~ November 2016

Bus, Payload component assembly and test 2018

Bus and Payload integration 2019

RSGS launch September 2020 – March 2021

Capability Demonstration 6-9 months

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