



CONSORTIUM FOR SPACE MOBILITY  
AND ISAM CAPABILITIES

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## In-Space Servicing, Assembly, and Manufacturing (ISAM)

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# What is ISAM?

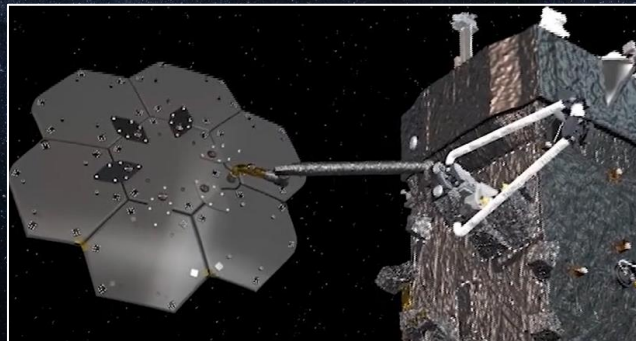
In-Space



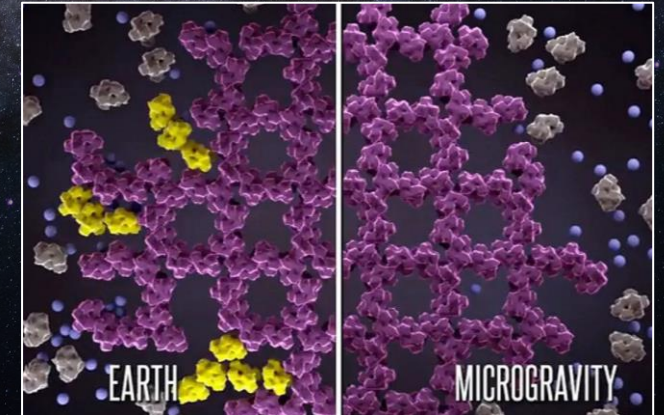
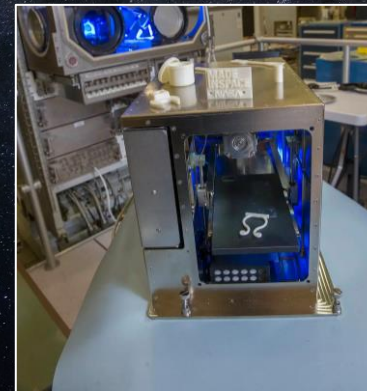
Servicing



Assembly



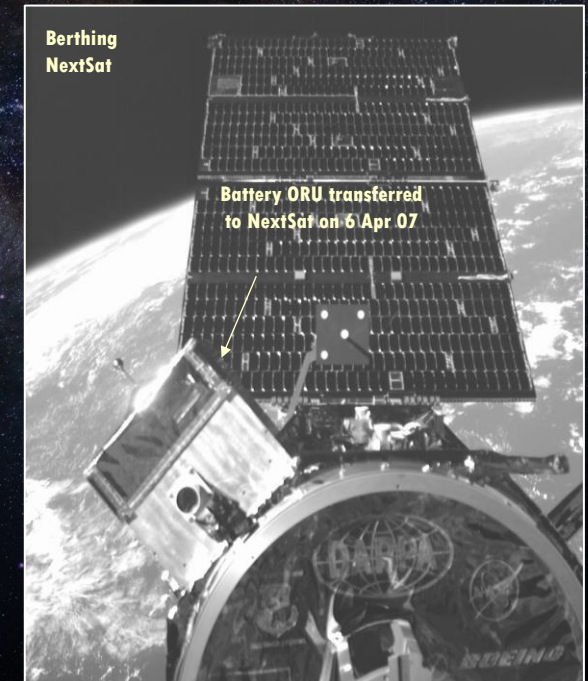
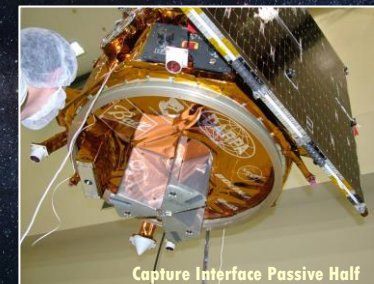
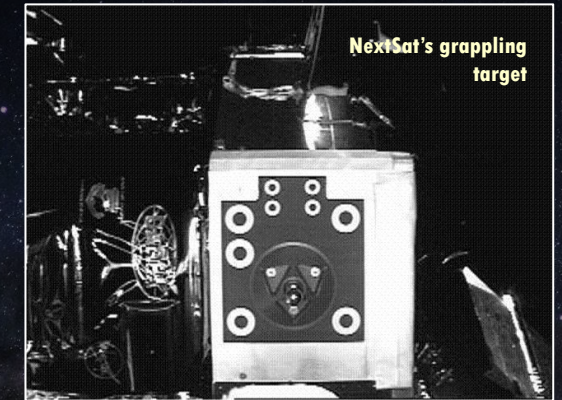
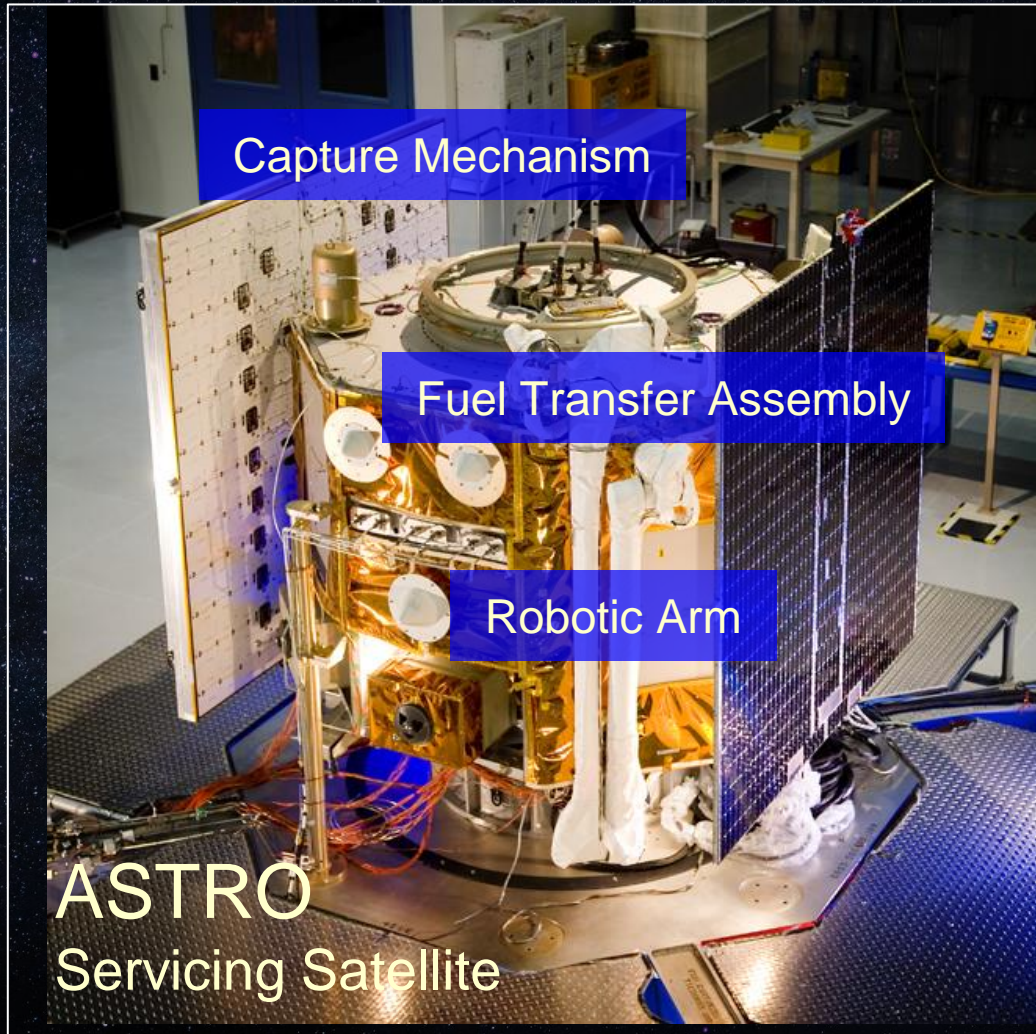
Manufacturing





# My Background in ISAM

*Started with DARPA's Orbital Express (launched 2007)*



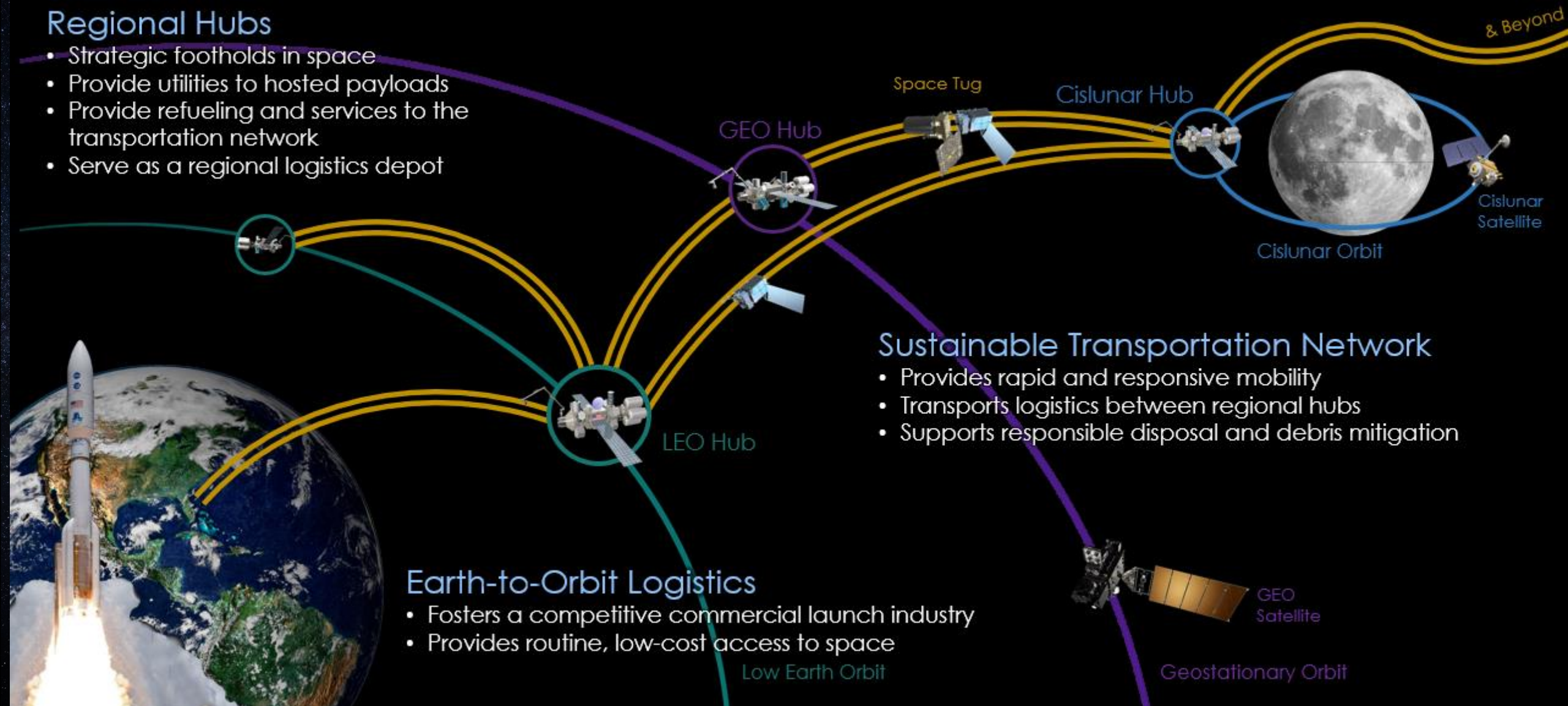


# OSAM National Initiative: Space Superhighway



## Regional Hubs

- Strategic footholds in space
- Provide utilities to hosted payloads
- Provide refueling and services to the transportation network
- Serve as a regional logistics depot



## Sustainable Transportation Network

- Provides rapid and responsive mobility
- Transports logistics between regional hubs
- Supports responsible disposal and debris mitigation

## Earth-to-Orbit Logistics

- Fosters a competitive commercial launch industry
- Provides routine, low-cost access to space



# ISAM National Strategy and Implementation Plan



## FOSTER AN ECOSYSTEM TO LEVERAGE ISAM CAPABILITIES

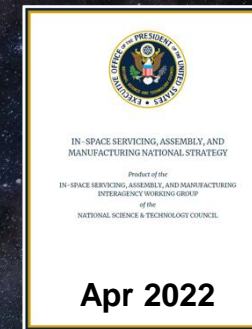
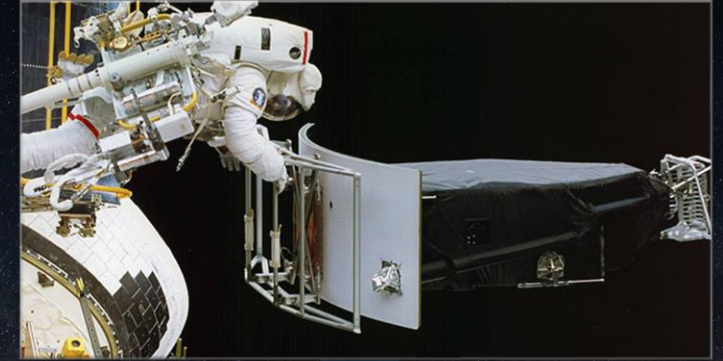
- Support and stimulate USG, academic, and commercial ISAM capability development
- Consistent with US Space Priorities Framework (Dec 2021)

## BENEFITS

- Promote a sustainable space environment
- Improve scientific output of spacecraft and payloads
- Create robust, sustainable, and enduring in-space infrastructure
- Expand performance, availability, resilience, and lifetime of space systems

## STRATEGIC GOALS

1. Advance ISAM research & development
2. Prioritize expanding scalable ISAM infrastructure
3. Accelerate the emerging ISAM commercial industry
4. Promote international collaboration and cooperation
5. Prioritize environmental sustainability
6. Inspire a diverse future space workforce





# Develop technologies supporting emerging space industries including Satellite Servicing & Assembly



## Enabling in-space...

### Close Inspection

Small inspectors diagnose anomalies, enabling corrective action and in-space repair operations. Small satellite inspectors launch "on need."



### Free-Flyer Capture and Relocation

Commercial servicers perform autonomous capture of active spacecraft and uncontrolled debris, relocating them to new operational, disposal or salvage orbits.



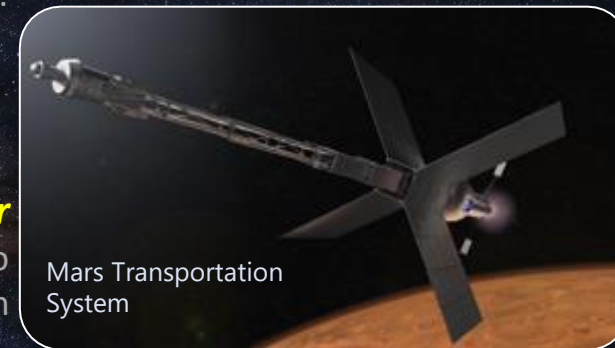
### Delivery and Aggregation

Commercial launch and high-efficiency in-space transportation systems deliver commodities and cargo to assets in multiple orbits, enabling frequent and lower-cost resupply.



### Maintenance & Repair

US spacecraft launch with standard interfaces enabling commercial robotic servicers to conduct planned and on-demand manufacturing, repair and maintenance. Human exploration spacecraft refurbished and recertified in space.



### Refueling and Fluid Transfer

Spacecraft launch with standard in-space fueling (and other) accommodations. Commercial servicers provide fueling on-demand in multiple orbits and planetary surfaces.



### Installation and Upgrade

Great Observatories and platforms in multiple orbits enable hosting of operational and experimental instruments and payloads. Commercial servicers provide delivery, installation and hosting services.



### Manufacturing and Assembly

Purpose-built in-space systems enable audacious new science, exploration, and commercialization of space: a 20-meter space telescope discovers signs of life on extrasolar planets; an outer planets human exploration mission departs aboard an in-space assembled craft; manufacturing products for use in space and on Earth provide a stimulus to the U.S. economy.



Not all activities depicted are currently funded or approved. Depicts "notional future" to guide technology vision.



# Space Access, Mobility and Logistics 2030





# Commercial ISAM Is Growing



And many, many, many more...



# COSMIC: A Nationwide Alliance for ISAM



## VISION

Create a nationwide alliance that enables the U.S. space community to provide global leadership in ISAM.

## MISSION STATEMENT

Making ISAM a routine part of space architectures and mission lifecycles.



### CAPABILITY DEVELOPMENT

Develop, mature, and demonstrate ISAM technologies that enable and enhance mission utility.



### ECOSYSTEM ECONOMICS

Promote U.S. leadership in ISAM technologies and capabilities that change the business model away from single-use space assets.

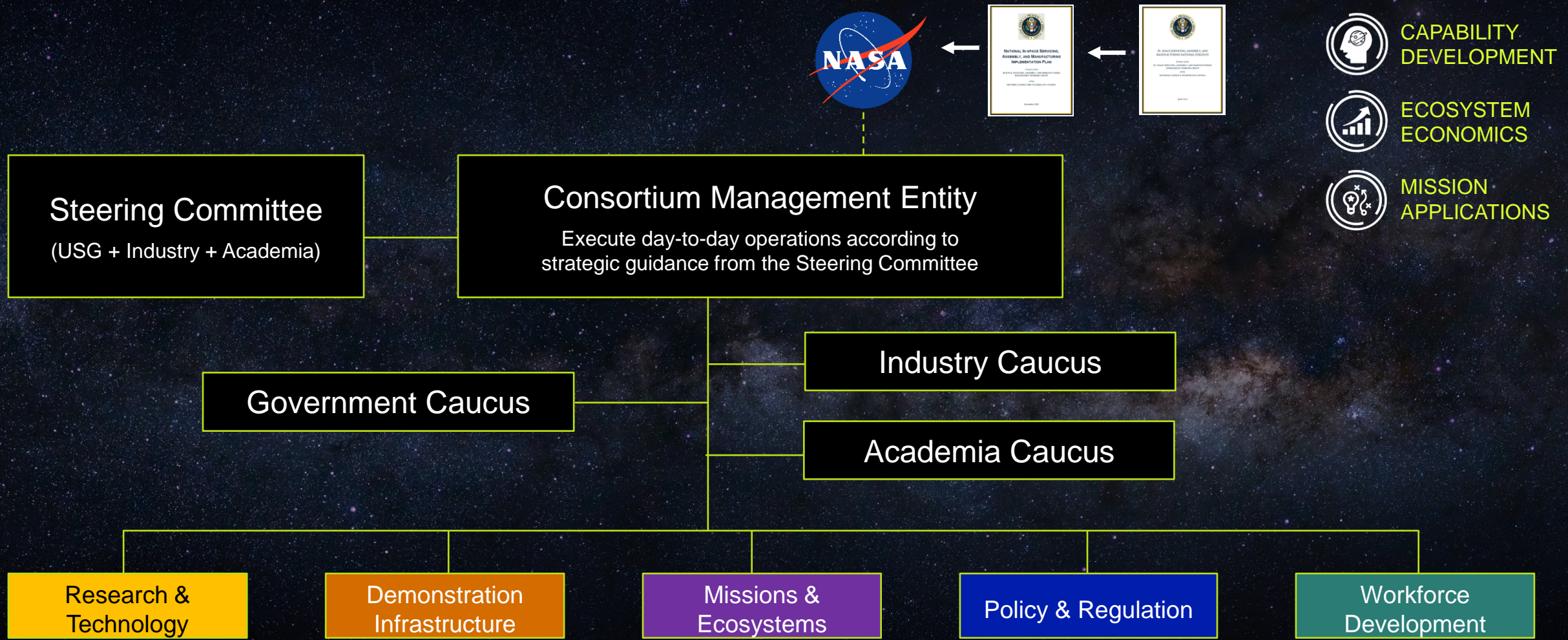


### MISSION APPLICATIONS

Encourage and guide missions to use ISAM capabilities as part of commercial and government program lifecycles.

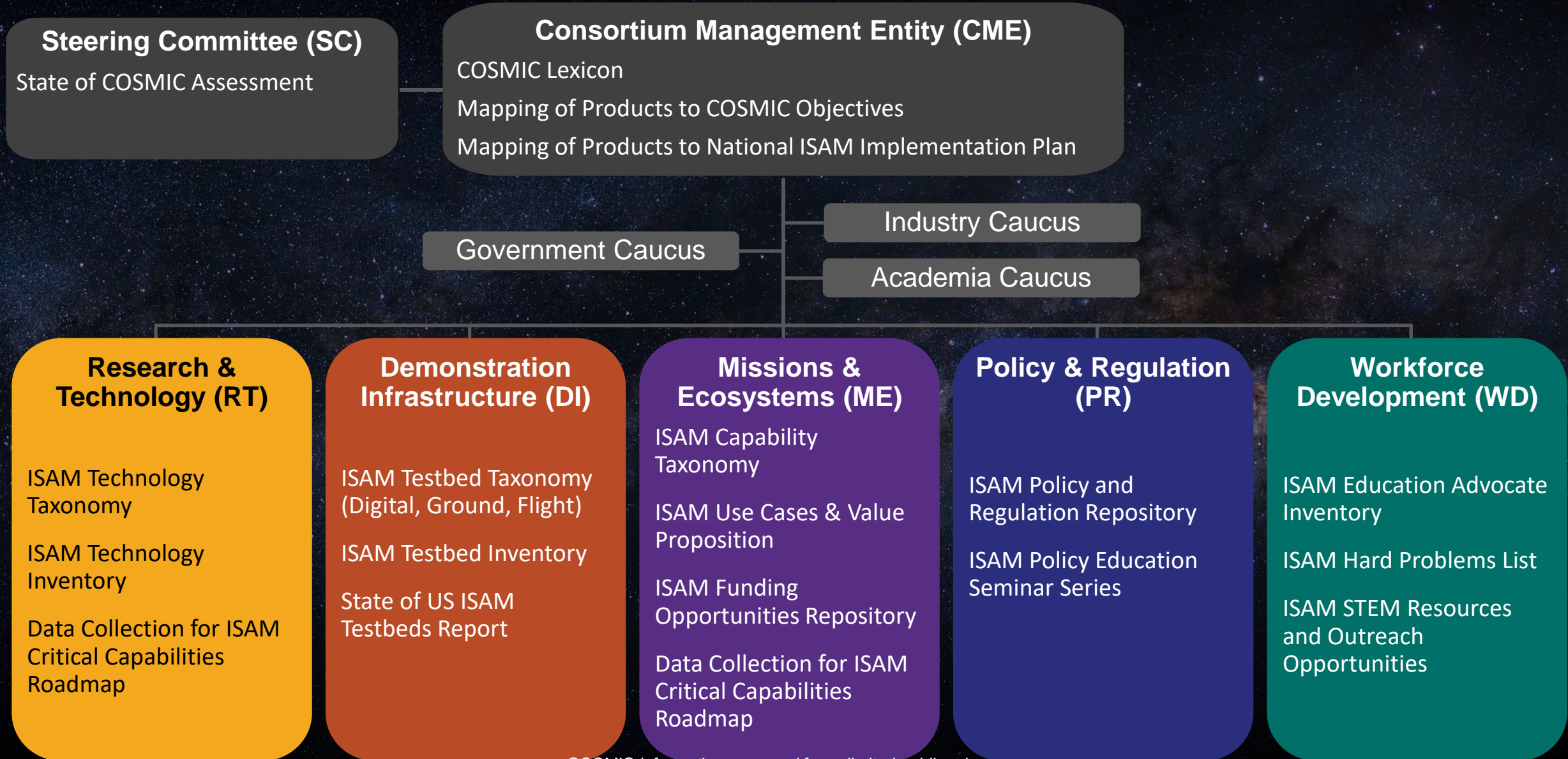


# COSMIC Organization





# COSMIC 2024 Products





# COSMIC Supports the National ISAM Implementation Plan



LEGEND:

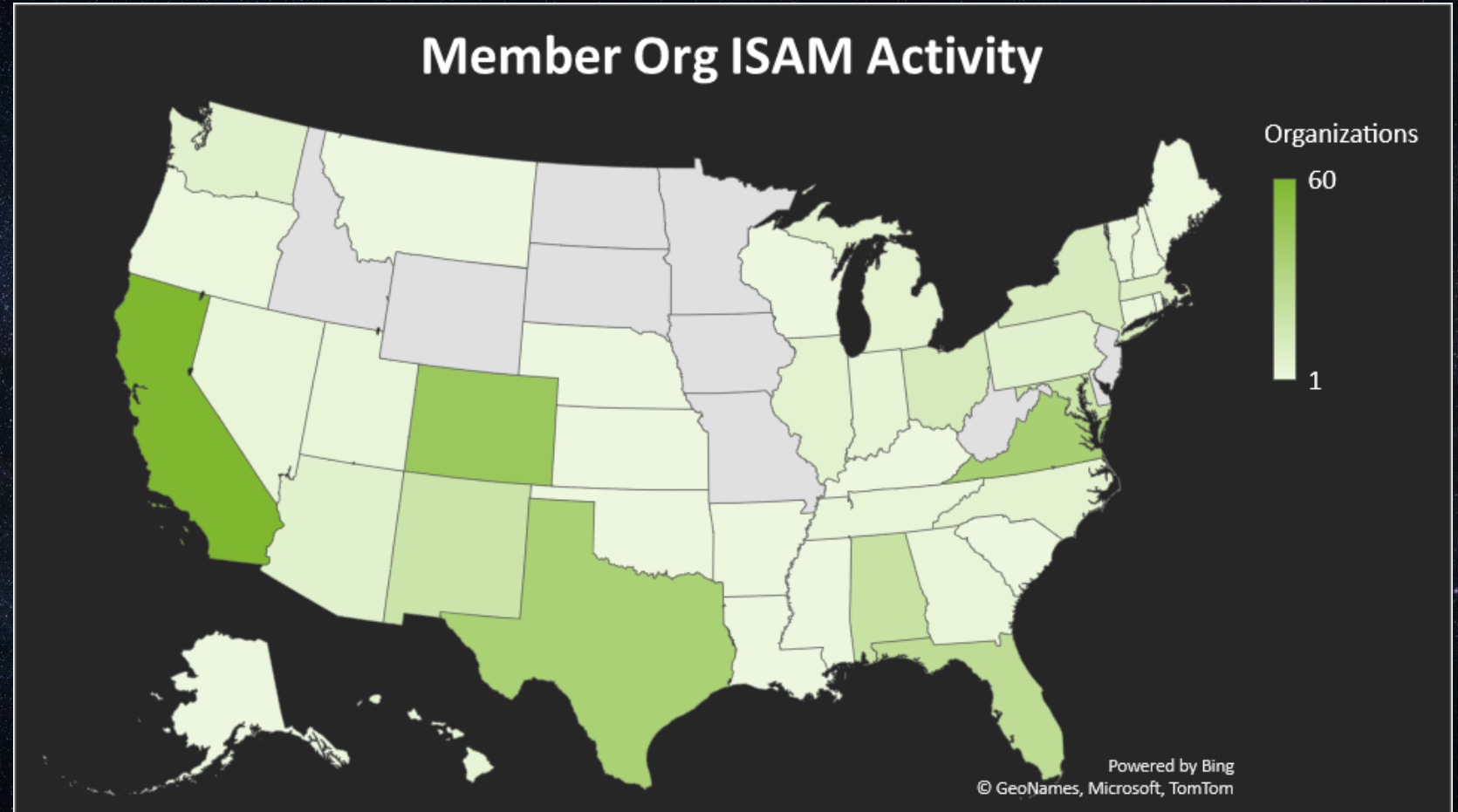
- Indirectly informs

- Directly supports



# COSMIC Membership

- 180 member organizations
- 791 authorized participants
  - 51% industry
  - 39% government
  - 10% academia
- No cost to join
  - US persons working for US organizations with a vested interest in US leadership in ISAM







# NOW ACCEPTING MEMBERSHIP APPLICATIONS



MEMBER ORGANIZATIONS



AUTHORIZED PARTICIPANTS



COLLABORATION SITE

Join today!! [cosmicspace.org/membership](https://cosmicspace.org/membership)



# ISAM Research & Technology

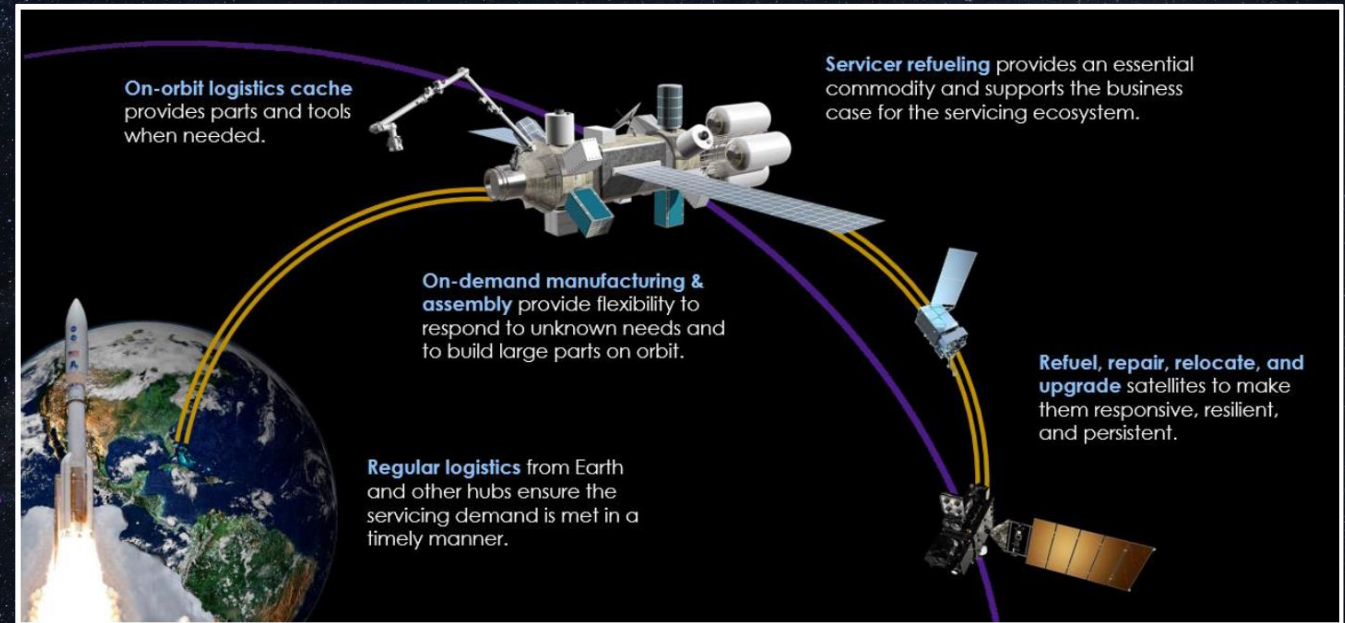
- In-space manufacturing for Earth
  - Semiconductors
  - Optical fibers
  - Pharmaceuticals
  - Tissues
- In-space assembly and manufacturing for Space
  - Robotic assembly of large structures
  - Robotic assembly of spacecraft and spacecraft components
- In-space servicing
  - Inspection
  - Life Extension
  - Refueling (robotic spacecraft, crewed missions to the Moon or Mars)
  - Upgrade / Repair





# Making ISAM a Routine Part of Space

- “ISAM includes capabilities where the future looks different through the windshield than it does through the rearview mirror” – Ron Birk
- Information sharing for collaboration
- Use cases and value propositions
- Gaps – technology, operations, acquisition, policy, legal, funding
- Standardization / interoperability







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[cosmicspace.org](https://cosmicspace.org)

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