



# Space Studies Board Review

## Commercialization Opportunities and Challenges



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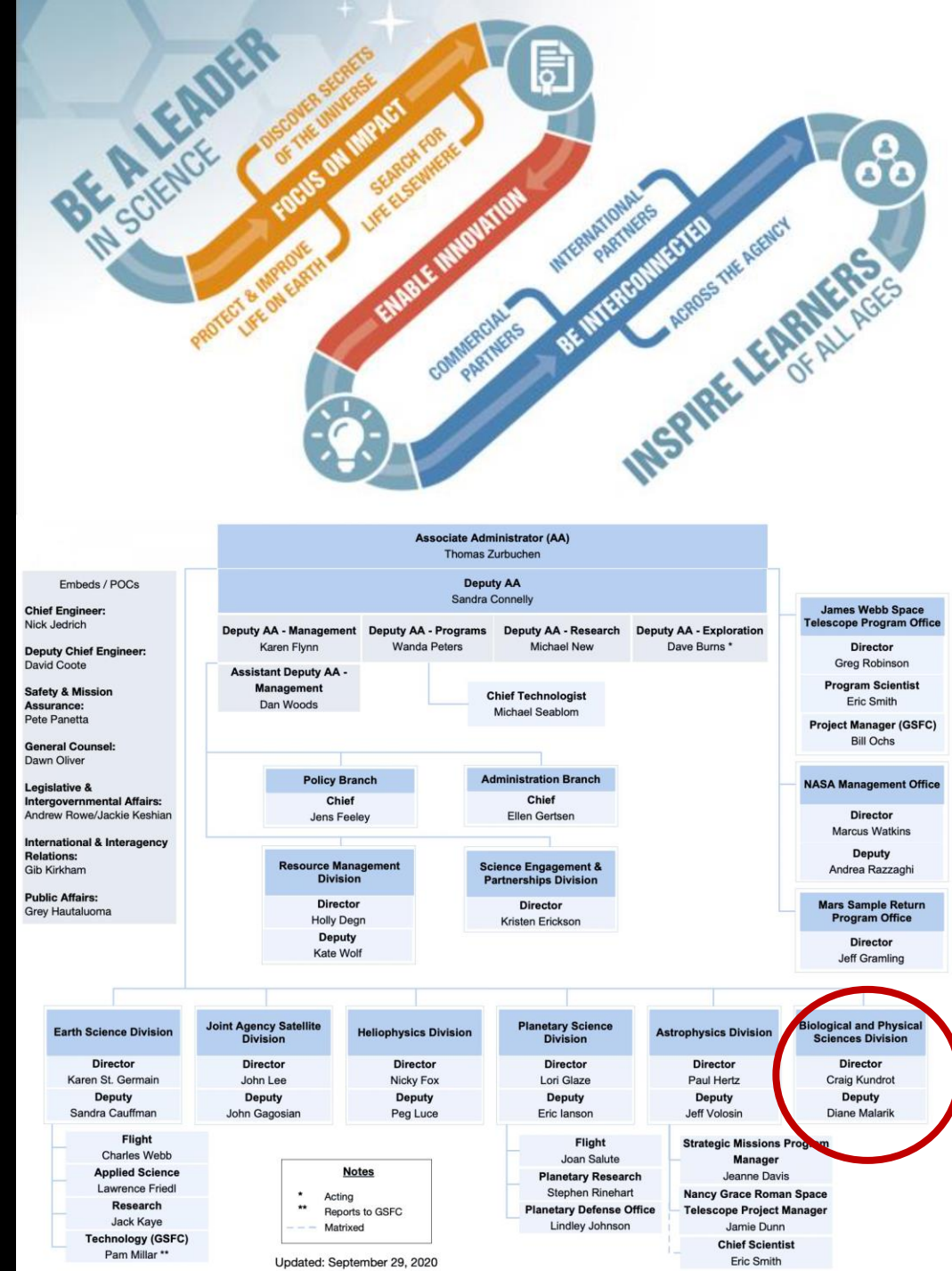
Jana Stoudemire  
Commercial Innovation  
Officer

November 5, 2020  
Space Studies Board Review

# Evolving Landscape

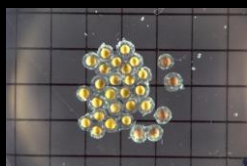
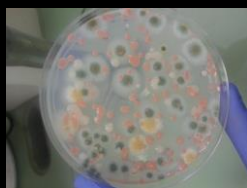
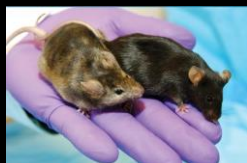
- BPS now part of SMD – Science Leadership  
BPS Mission & Goals
  - Pioneer Scientific Discovery
    - Proactively seek out new ways to expand fundamental scientific knowledge
    - Provide expertise and support to others seeking to utilize space
  - Enable Exploration
- CASIS (ISS-NL) IRT Review Complete
  - Implementation of recommendations in progress
  - CASIS (ISS-NL) – BPS Coordination

## Commercialization Opportunities and Challenges

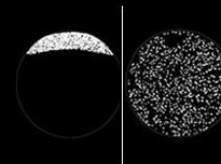
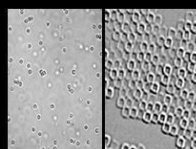
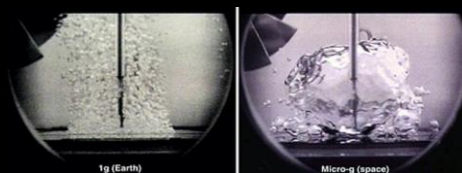


# BPS Decadal Focus

## Space Biology Program



## Physical Sciences Program



## Commercialization

???????



# Redefining 'Commercial Partner'

- Providers
  - SpaceX Northrop Grumman, Boeing, Axiom, etc.
- Implementation Partner/Facility Providers
  - Space Tango, Bioserve, Alpha Space, TechShot, etc.

- Industry
  - Pharma, biotech, medical device
  - Technology, advanced materials
- What is industry looking for?
  - Innovation to address roadblocks
- What does industry bring?
  - Research & Development – STRONG science
  - Leading tools for scientific discovery
  - Investment
- What does industry need?
  - Access
  - State of the art systems
  - Short time to repeated answers
  - PROOF OF CONCEPT DATA

*Industry R&D process generating IP is no different than university tech transfer – both are driven by science.*

*Most industry R&D groups collaborate with leading academic research teams.*

# Public-Private Partnerships

- SpaceX – Commercial Resupply & Commercial Crew
- Axiom Space – Commercial Space Station
- NASA – Gateway Logistics Services and other Industry Partnerships to Advance Moon, Mars Technology

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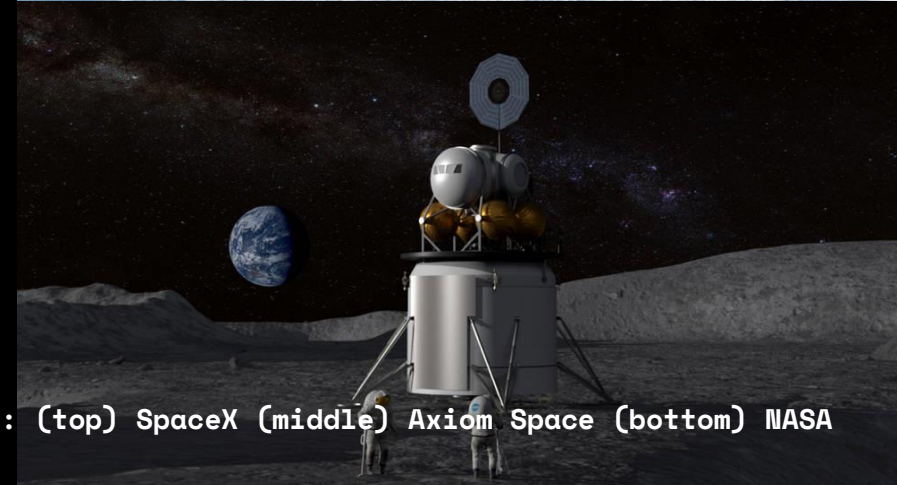
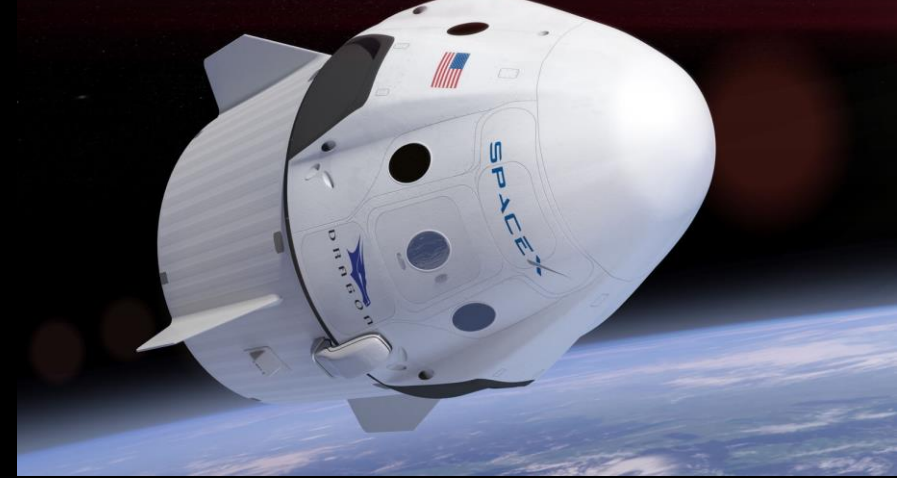


Photo Credit: (top) SpaceX (middle) Axiom Space (bottom) NASA

# Stimulating Sustainable Demand



NASA is providing seed money to enable selected companies to mature their concepts and stimulate demand to develop their future markets

Projects announced on April 7, 2020:

- **Apsidal:** Universal glass optics manufacturing module
- **DSTAR Communications:** Thin metal-coated optical fiber manufacturing
- **Made in Space:** Glass alloy manufacturing machine
- **Made in Space:** Semiconductor chip facility
- **Space Tango and Cedars Sinai:** Production of stem cells for personalized medicine applications
- **Space Tango and LambdaVision:** Protein-based retinal implant manufacturing
- **Space Tango and UC San Diego/Sanford Consortium:** Regenerative medicine laboratory
- **Bryce Space and Technology:** Action plan for barriers to entry to the low-earth orbit market



# Renewed Public Interest



**Commercial Crew Program**

**LIFTOFF! NASA's SpaceX Demo-2  
Launches the Commercial Crew Era**

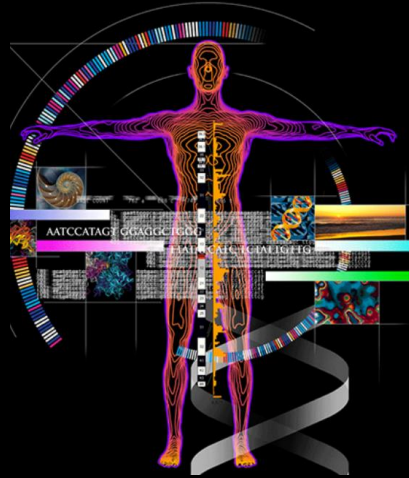
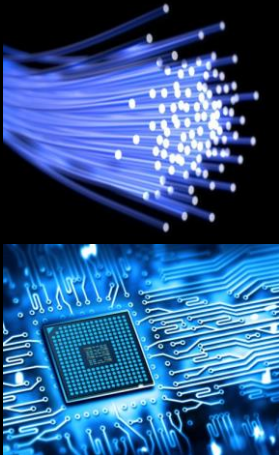
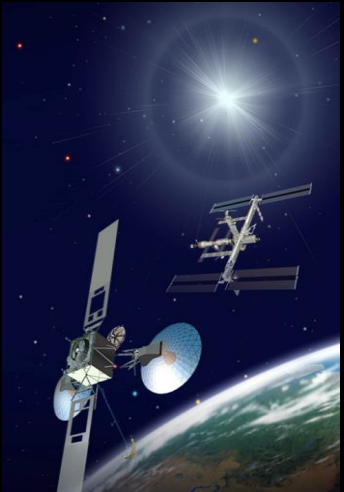
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Photo Credit: NASA

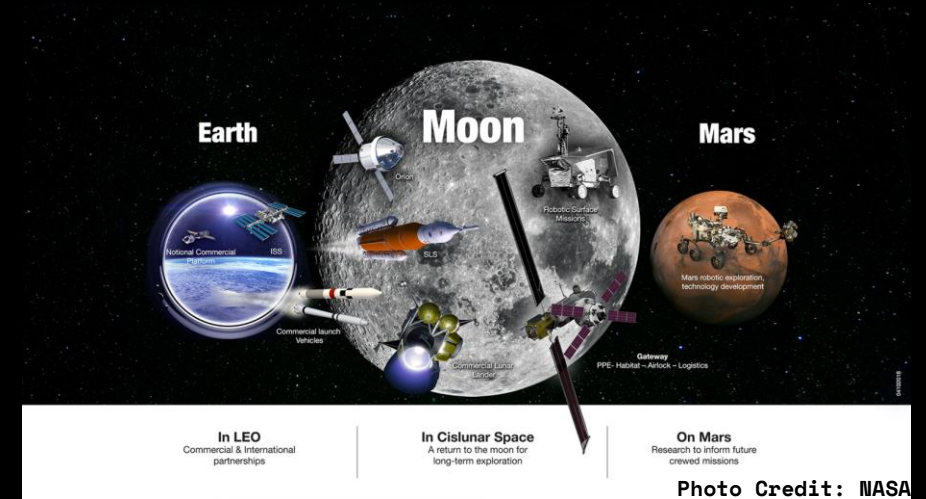
# Commercial Partnerships

Continued Creation of a Robust Space Economy in LEO



*Expands the definition of 'global' for health and technology companies*

Accelerate NASA Science Exploration Goals



*Improved capabilities, faster pace of research, leading science collaborations*

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**Commercialization Opportunities and Challenges**

# Considerations

- Add industry voices to ongoing and future decadal discussions
- Leverage existing government/university/industry roundtables (e.g., NASEM GUIRR); NASA Space Technology Research Institute (STRI) models for pharma and tech industry participation
- Evaluate examples of existing manufacturing institute best practices for driving on-orbit manufacturing (e.g., NIMBLE, ARMI/BioFabUSA, NSF/CMaT, RMMG)
- Support for continuing to expand access and infrastructure
  - Commercial Crew Missions
  - Private Astronaut Missions
  - Free-flyers – crewed and un-crewed
- Develop state-of-the-art tools and capabilities that support iterative science on existing and future platforms
- Continue to support public-private partnerships to accelerate both creation of a robust, sustainable space economy and science related to NASA exploration goals



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