CONNECTED DMV

THE COMMERCIALIZATION OF SPACE:

BUILDING A NEXT-GENERATION INDUSTRY

SPONSORED BY: FFX Fairfax County Economic Development Authority

WELCOME & SUMMIT INTRODUCTION

GEORGE THOMAS

President & CEO

Connected DMV

SPONSORED BY:

Fairfax County
Economic Development Authority

CONNECTED DMV

AGENDA

- **Plenary Sessions** *10:30AM-12:00PM*
  - **Summit Kickoff**
    - *George D Thomas (President & CEO, Connected DMV)*
  - **Welcome**
    - *Nicolas Maubert (CNES Representative to the US and Space Counselor, Embassy of France in the US)*
  - **Keynote Address**
    - *A.C. Charania (Chief Technologist, NASA)*
  - **Fireside Chat**
    - *John Serafini (CEO, HawkEye 360)*
    - *Preston Dunlap (Founder & CEO, Arkenstone Ventures)*
  - **The DMV's Role**
    - *Victor Hoskins (CEO, Fairfax County EDA)*
- **Lunch** *12:00PM-12:45PM*
- **Visioning Workshop** *12:45PM-2:00PM*
- **Risks & Actions Workshop** *2:00PM-2:50PM*
- **Summit Close & Networking** *2:50PM-3:00PM*

WELCOME

NICOLAS MAUBERT

CNES Representative to the US and Space Counselor

Embassy of France in the US

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SUMMIT REGISTRANTS

CONNECTED DMV

SUMMIT INTERNATIONAL PRESENCE

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GLOBAL MARKET OVERVIEW

The global space market has a **current valuation of $600 billion**, estimated **to grow to $1 trillion by 2040**. The U.S. space industry has experienced significant growth in recent years. When adjusted for inflation, the **space economy grew by 11.4% between 2012 and 2021**. [1]

Highlights:

- 77% commercial share of the space sector vs. Government programmes.
- 60,000 - 100,000 satellites estimated by 2030 vs. 11,000 launched in the past 60 years.
- $47.8bn private investment since 2015 across over 600 companies.
- 95% of space sector companies were revenue-generative that received investment in 2022 vs. 56% in 2015.
- 63% of investors were 'first-timers' in the sector during the investment peak in 2021.
- 80% of space investment driven by VC firms in 2022, who have made over 1,000 deals since 2015.
- 163 disclosed exits from private space investments since 2015. [2]

[1] McKinsey [2] UK Government

THE SPACE ECONOMY

EIU RANKING OF THE SPACE ECONOMY BY COUNTRY

CURRENT KEY FUNCTIONS

Heat map	Overall	Activity	Funding	Trade
US	1	1	1	3
China	2	2	2	8
France	3	7	5	1
UK	4	5	7	4
Germany	5	10	7	2
Canada	6	8	13	7
Italy	7	13	9	9
South Korea	8	12	10	10
Spain	8	14	12	6
India	10	6	6	21
Japan	11	4	4	30
Israel	12	16	18	5
Brazil	13	9	26	11
Turkey	14	18	19	15
Australia	15	10	27	22
Switzerland	16	28	21	11
Russia	17	3	3	57
Netherlands	18	33	19	13

Source: EIU

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EXPLORATION

Source: ISECG

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FRANCE'S LEADERSHIP IN SPACE

France is as a leader in space trade, driven by strong exports of satellites, spacecraft, and launch services.

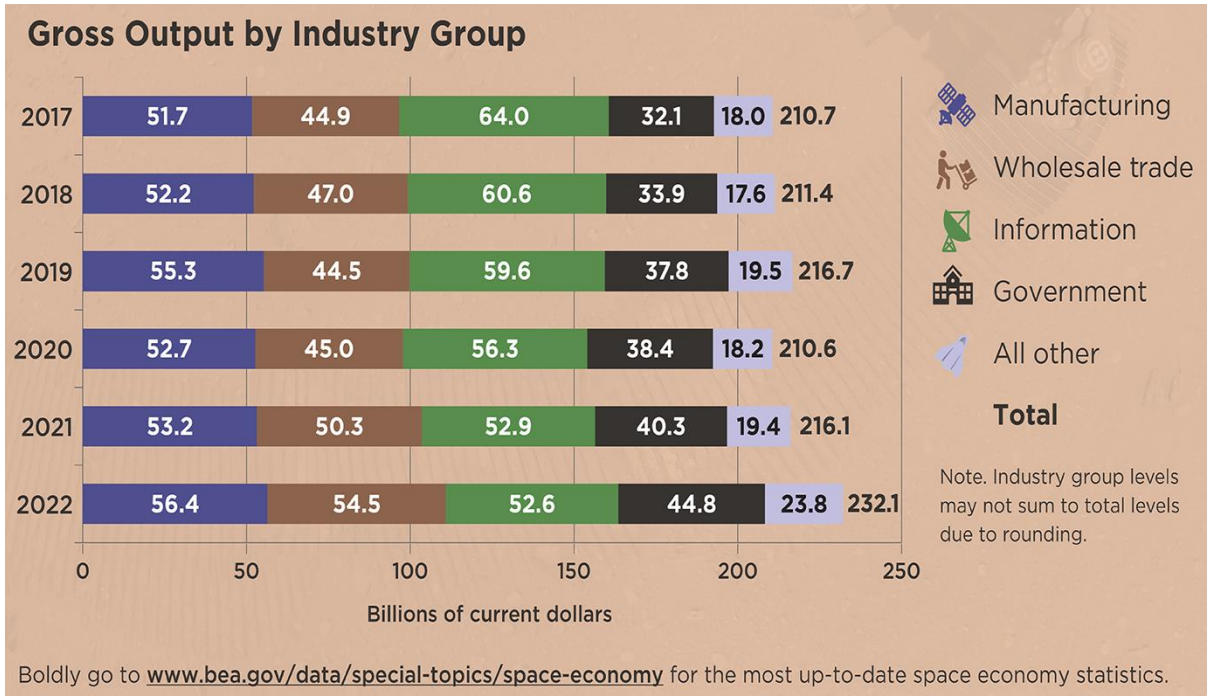
In 2023, France's space exports reached $2.2 billion, outpacing other nations.

The European Space Agency's projects, including the Ariane 6 launch vehicle, have played a pivotal role in this success.

Credit: ESA/CNES/Arianespace – Photo Optique Video du CSG – P. Piron

US OVERVIEW

- Including both public and private spending, the $546 billion space economy is expected to grow more than 40 percent by 2027[1]
- Fiscal Year (FY) 2025 budget proposes $75.6 million for the Office of Space Commerce (OSC), a $10.6 million increase above the FY2024 enacted level[2]
- Private market firms invested $12.5 billion into space companies in 2023, a 30 percent jump from the prior year[3]



$232.1 billion
in U.S. gross output

In **private industry**,
the space economy supports
347,000
full- and part-time jobs

[1] Fortune [2] NOAA [3] Space Capital

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A HISTORIC SHIFT

In 2019, **95% of the estimated revenue** earned in the space sector was from the ***space-for-earth*** economy, including goods or services produced in space for use on Earth, such as GPS, internet and telecommunication infrastructure, and weather prediction.

This economy is booming and is projected to grow despite overcrowding and monopolization.

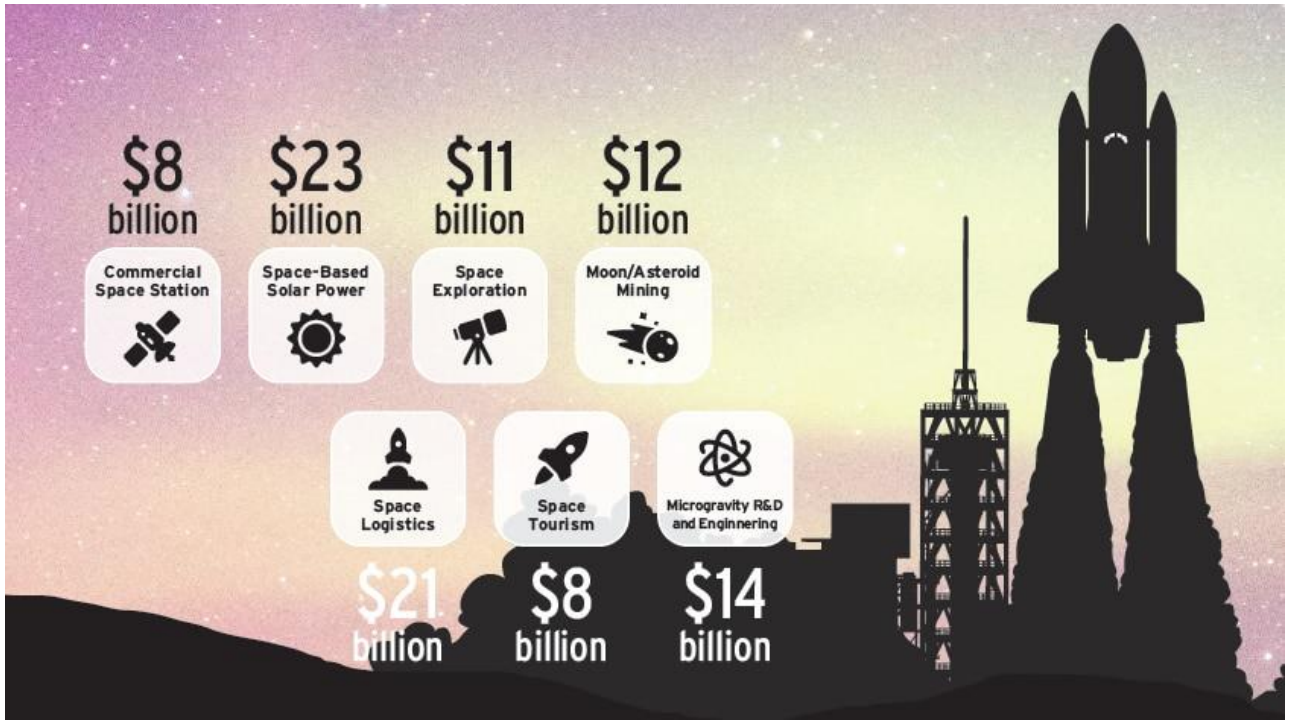
In contrast, the ***space-for-space*** economy has been dormant since the 1970s but is now poised for rampant growth with the achievement of a key milestone. **The cost cost per kilogram of payload significantly decreased.** This opens incredible opportunities for industry, society, and science. The economy for goods and services produced in space for use in space includes space infrastructure, space-based research, mining, and exploration.

Finally, the ***earth-for-space*** economy is also poised for significant growth to support the space-for-space economy as adjacent industries and sectors, including information technology, telecommunications, data/AI/ML, and quantum, are all going to **scale and drive new capabilities across sectors**, including life sciences, energy, defense, and many others.

Source: ISECG

PRIVATE INVESTMENT

- Government agencies traditionally led space. Now, private companies are driving critical innovation
- Declining launch costs, technological advancements, and growing investor interest have fueled this commercial space revolution
- Private funding is starting to drive the new space landscape



Estimated Private Funding Levels by 2040, Citi

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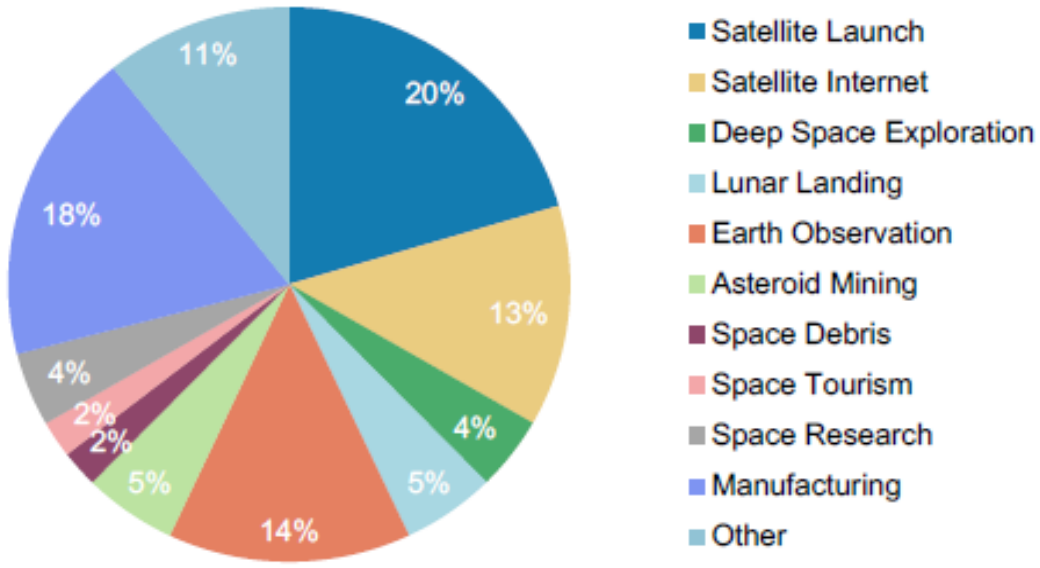
THE NEW SPACE LANDSCAPE



Source: Morgan Stanley Research
Universe includes 93 companies, 90 of which are discrete (SpaceX and Blue Origin appear in multiple sub-industries)

- ***Diverse applications***: Growing range of applications
- ***Commercialization & privatization***: Companies are leading innovation
- ***Reduced costs & increased access***: Advancements make space more accessible and affordable
- ***Increased competition & innovations:*** Dynamic environment driving innovation
- ***Global participation:*** A growing number of nations and companies are joining the space race

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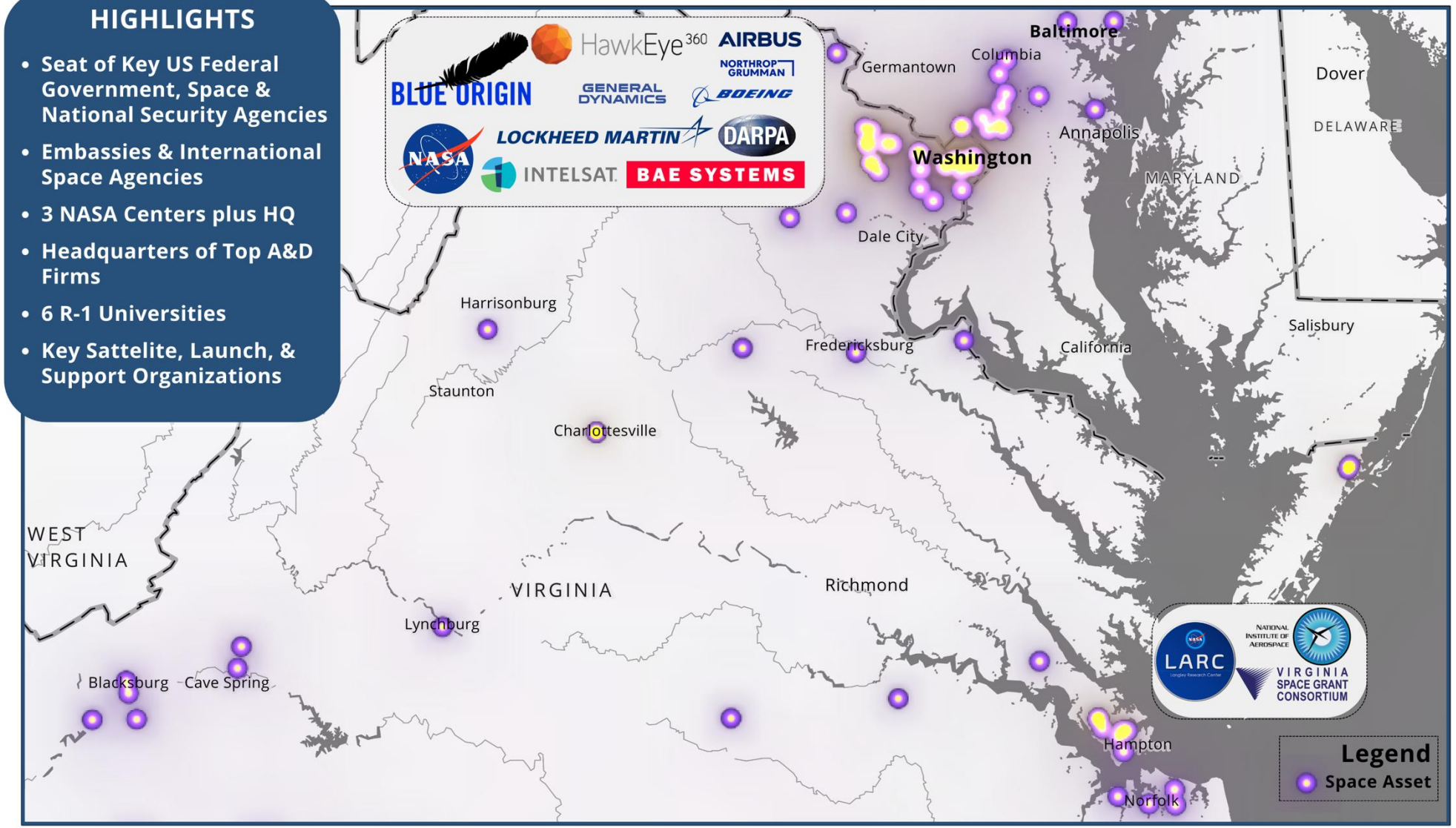
GREATER WASHINGTON SELECT SPACE ASSETS

HIGHLIGHTS

- Seat of Key US Federal Government, Space & National Security Agencies
- Embassies & International Space Agencies
- 3 NASA Centers plus HQ
- Headquarters of Top A&D Firms
- 6 R-1 Universities
- Key Sattelite, Launch, & Support Organizations



Creator: Kieran Collinson, Connected DMV

VGIN, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, NPS, USFWS

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KEYNOTE

A.C. CHARANIA

CHIEF TECHNOLOGIST
NASA

CONNECTED DMV

National Aeronautics and Space Administration

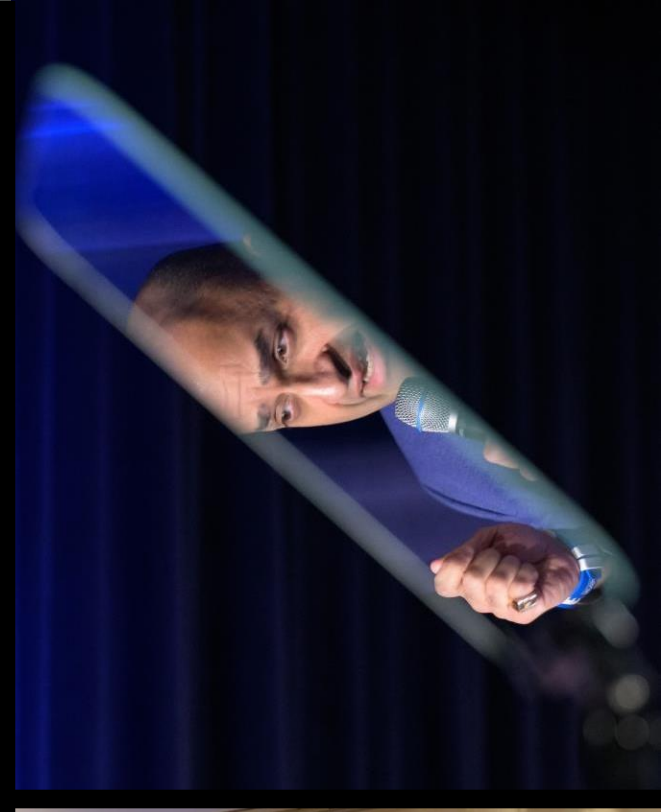
DRIVING INNOVATION

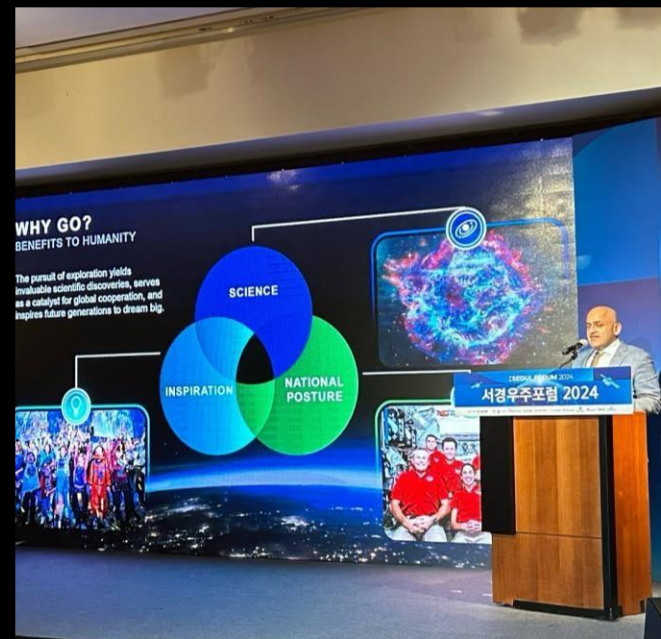
In Partnership

A.C. Charania | NASA Chief Technologist

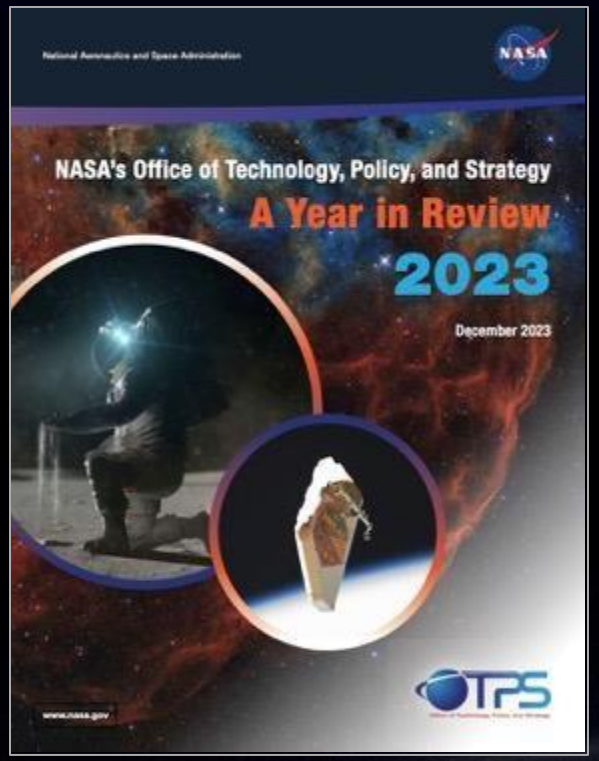
A.C. Charania

NASA CHIEF TECHNOLOGIST

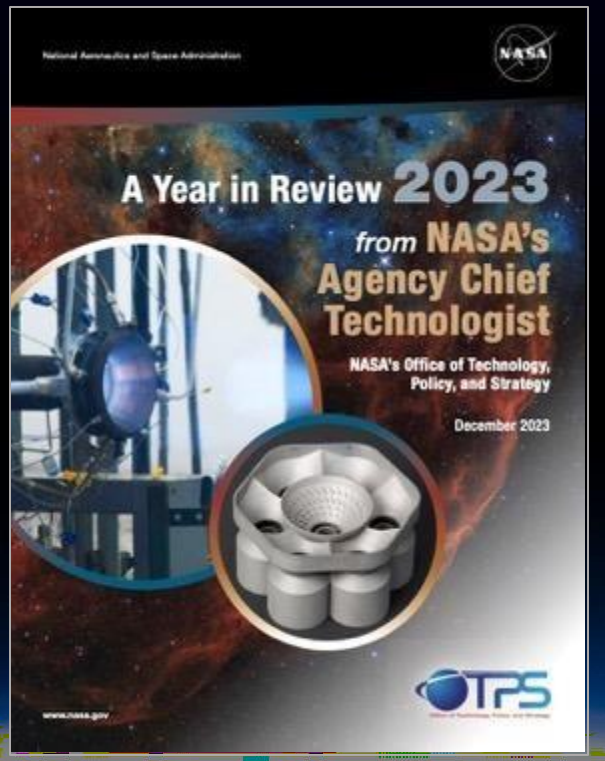




OFFICE OF TECHNOLOGY, POLICY, AND STRATEGY (OTPS) AND AGENCY CHIEF TECHNOLOGIST (ACT) ANNUAL REPORTS



Scan to read the OTPS Year in Review 2023



Scan to read the Agency Chief Technologist Year in Review 2023

View All Public OTPS Reports

Vision

Exploring the secrets of the universe for the benefit of all.

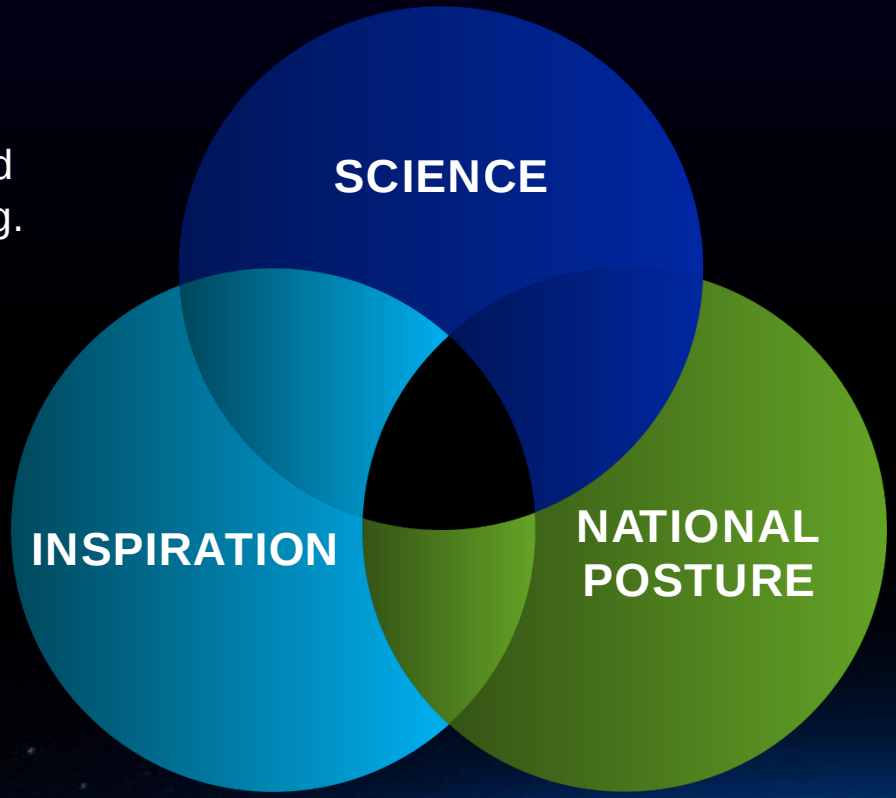
Mission

NASA explores the unknown in air and space, innovates for the benefit of humanity, and inspires the world through discovery.

WHY GO?

BENEFITS TO HUMANITY

The pursuit of exploration yields invaluable scientific discoveries, serves as a catalyst for global cooperation, and inspires future generations to dream big.



NASA Directorates

Aeronautics
Research Mission Directorate - ARMD

Space Technology
Mission Directorate - STMD

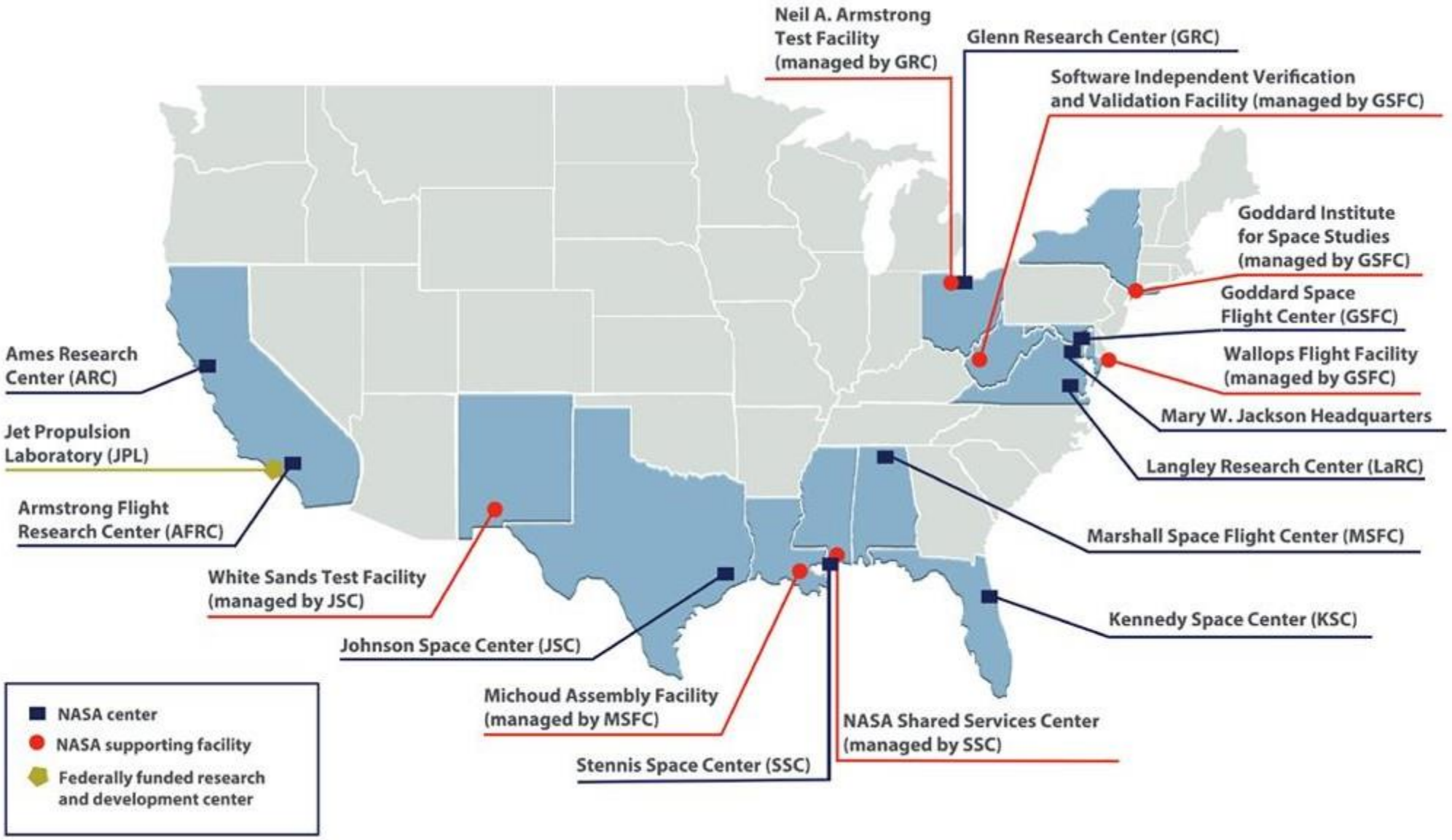
Science
Mission Directorate - SMD

Exploration Systems Development
Mission Directorate - ESDMD

Space Operations
Mission Directorate - SOMD

Mission Support
Directorate – MSD

NASA Centers and Facilities



UNDERSTANDING NASA

A PRELIMINARY TACTICAL STARTING POINT

NASA - Yearly President's Budget Request

NASA SMD – Science Plan, Decadal Surveys

NASA ESDMD - Architecture Definition Document

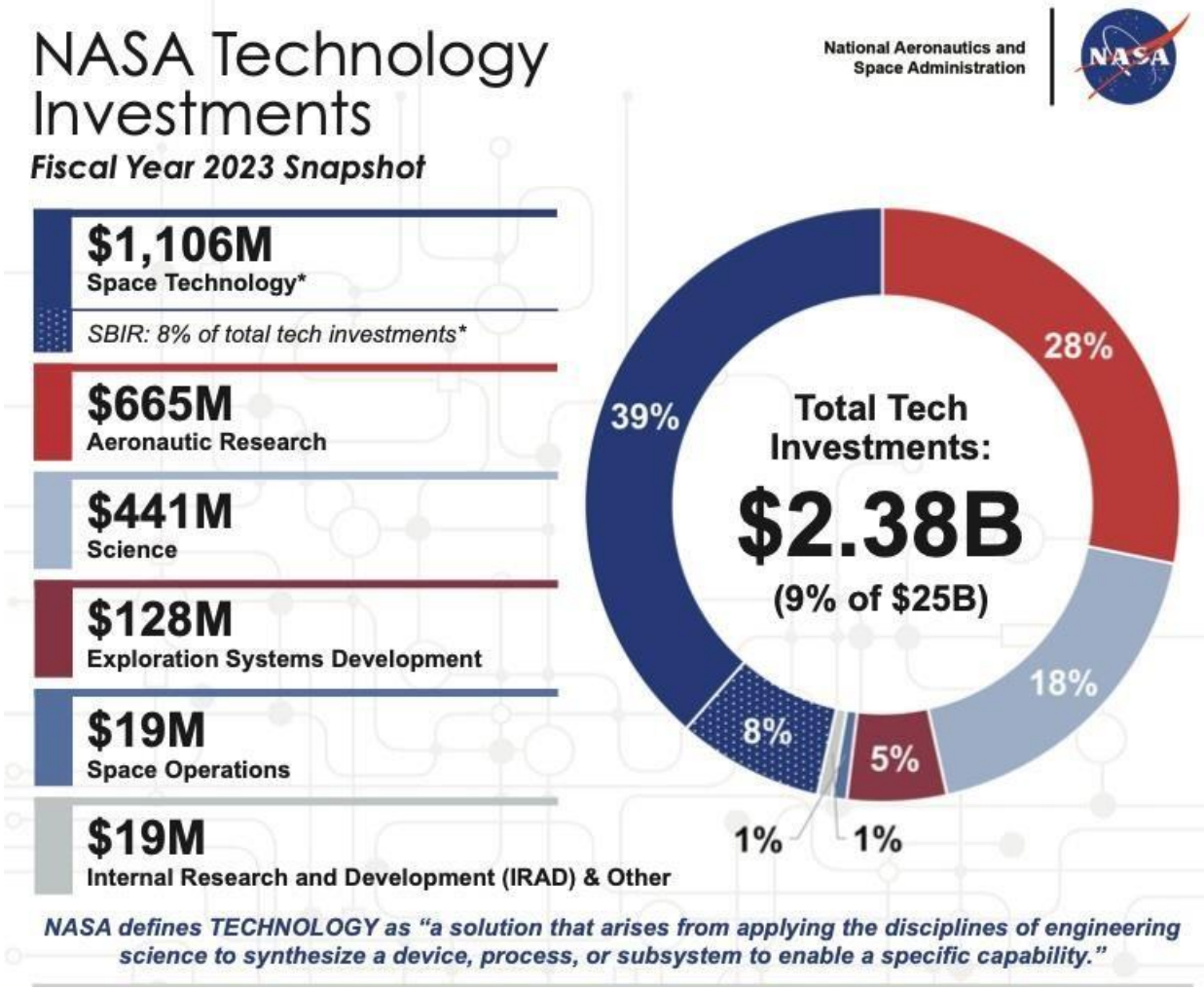
NASA ARMD - Strategic Implementation Plan

NASA STMD - Civil Space Shortfalls

NASA Technology Portfolio Management System (TechPort)

AGENCY CHIEF TECHNOLOGIST TECHNOLOGY ANALYTICS RESEARCH & DEVELOPMENT INVENTORY STUDY (TARDIS)

Technology Analytics Research & Development Inventory Study (TARDIS)



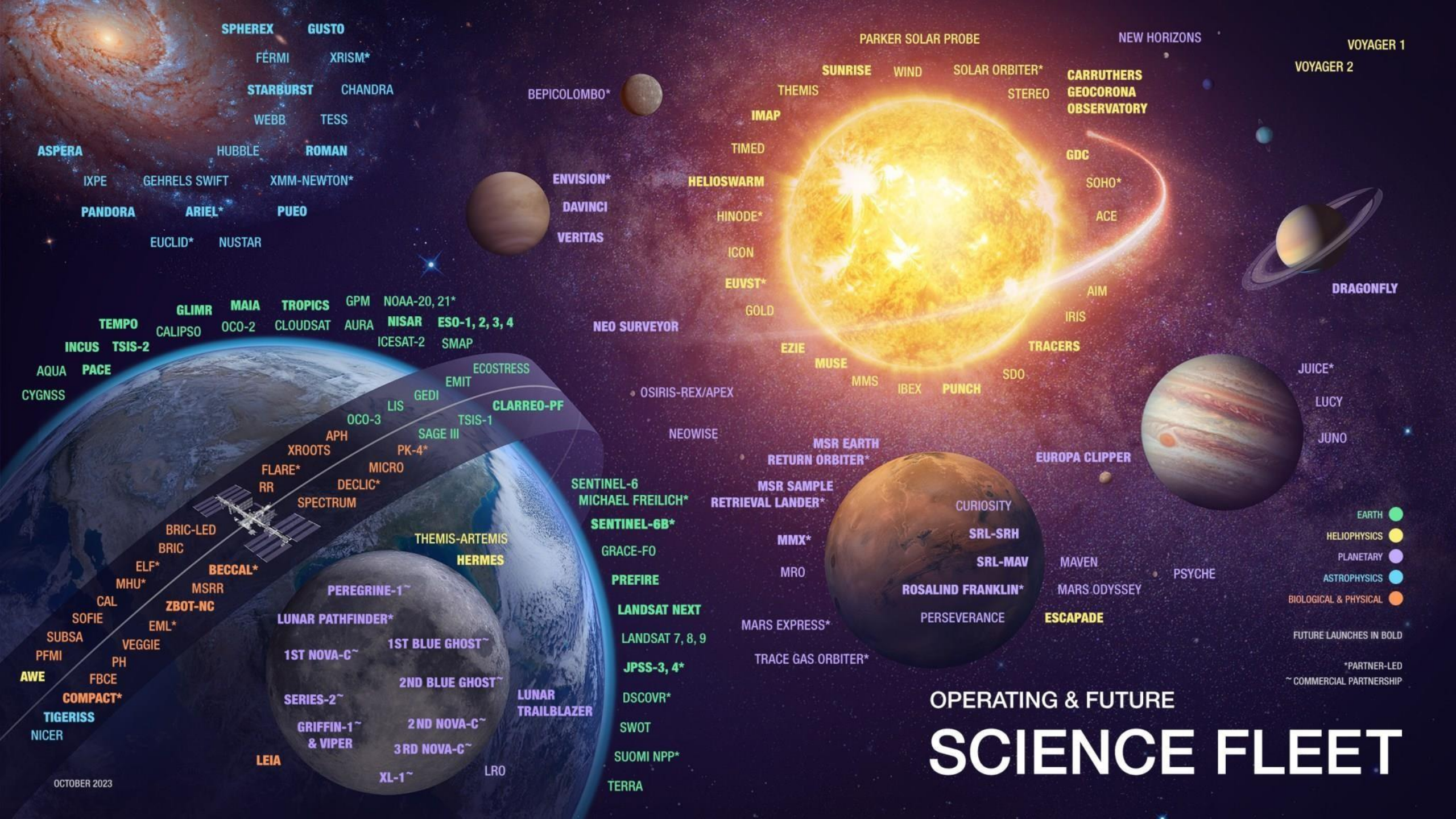
NASA AERONAUTICS VISION

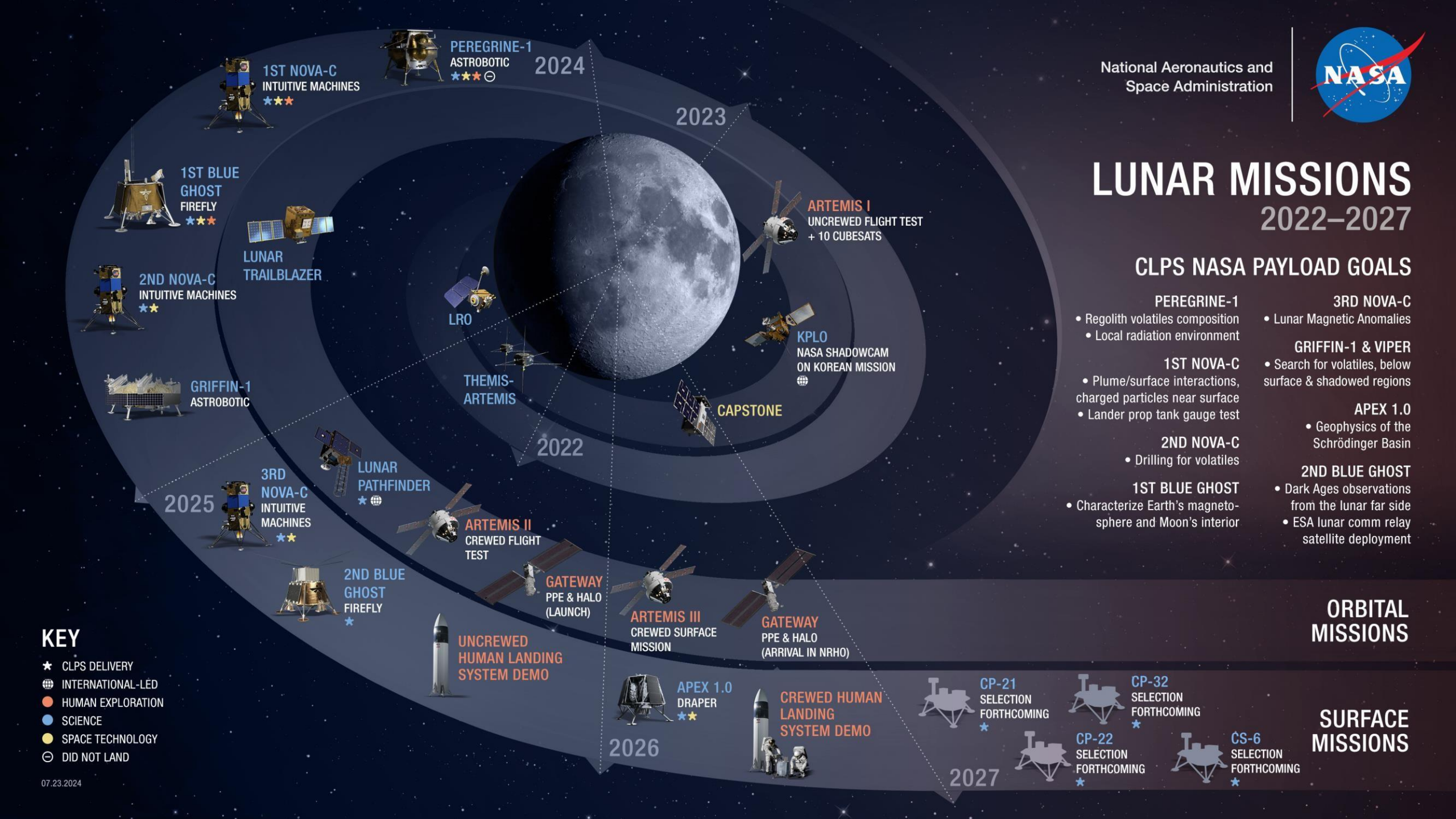
6 Strategic Thrusts

- Safe, Efficient Growth in Global Operations
- Safe, Quiet, and Affordable Vertical Lift Air Vehicles
- Innovation in Commercial High-Speed Aircraft
- In-Time System-Wide Safety Assurance
- Ultra-Efficient Subsonic Transport
- Assured Autonomy for Aviation Transformation

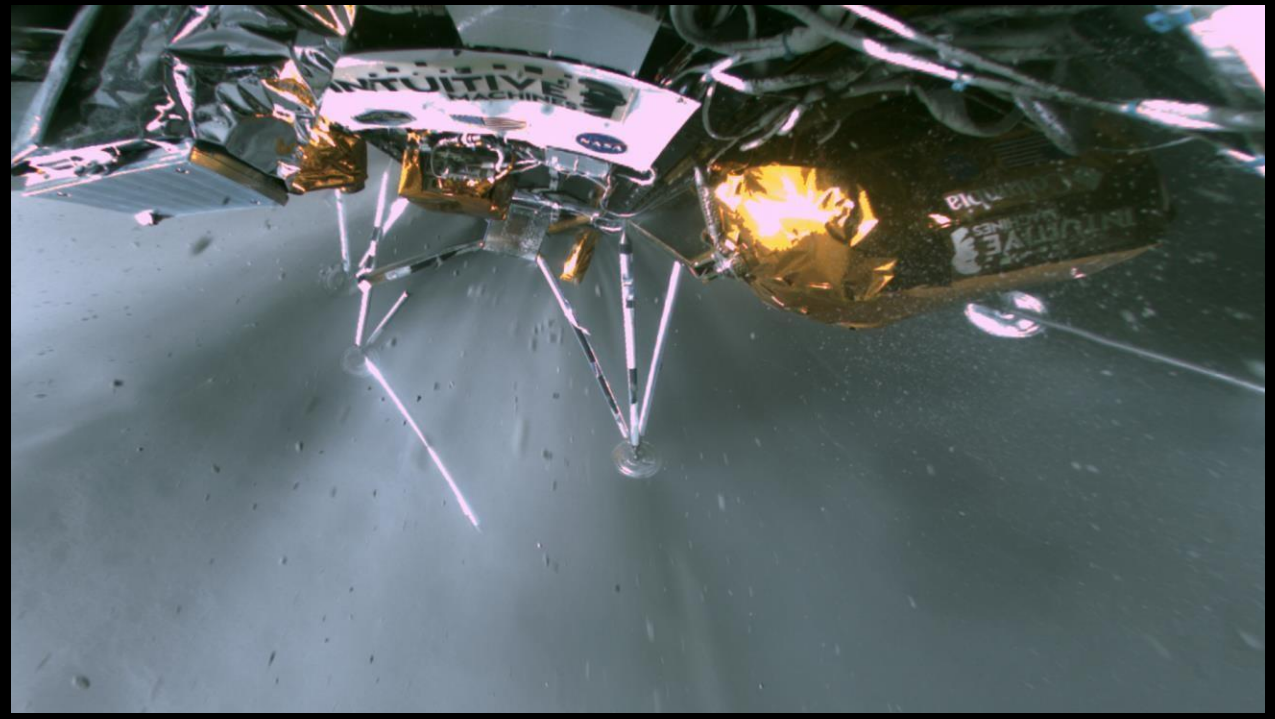
4 Transformations

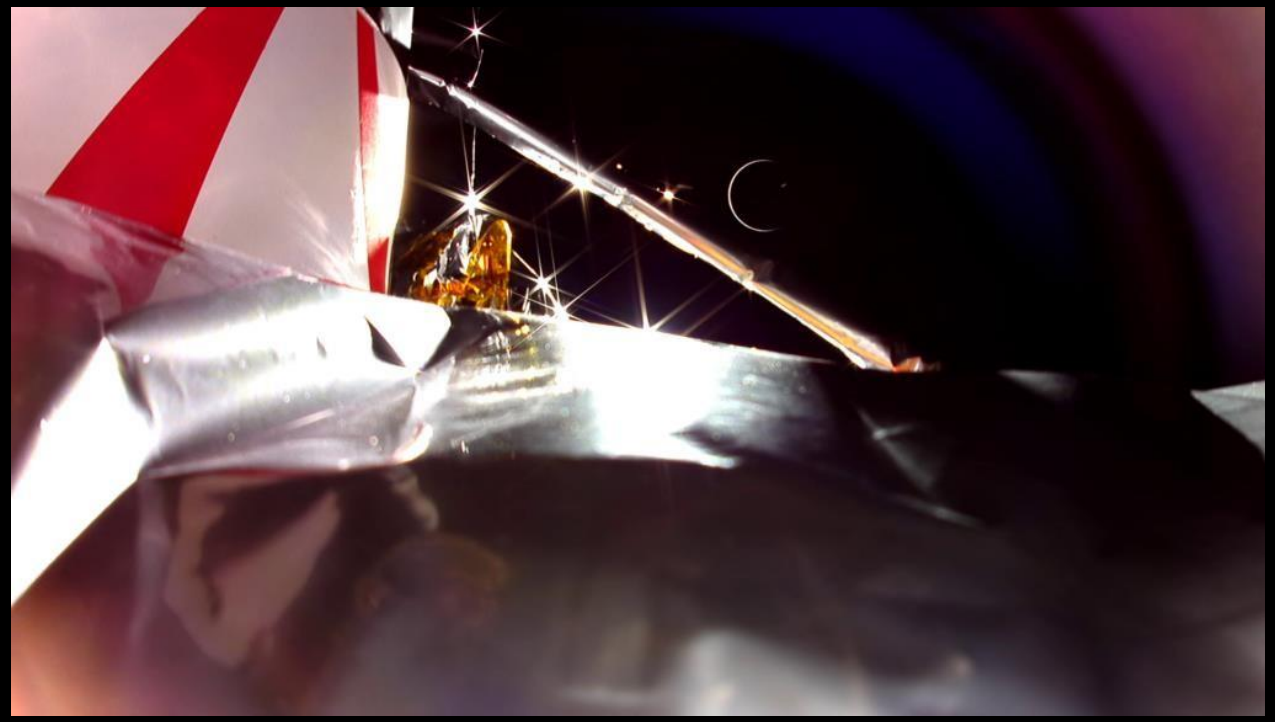
- Ultra-Efficient Transport
- Future Airspace
- High-Speed Commercial Flight
- Advanced Air Mobility


SPHEREX
GUSTO
FERMI
XRISM*
STARBURST
CHANDRA
WEBB
TESS
ASPERA
HUBBLE
ROMAN
IXPE
GEHRELS SWIFT
XMM-NEWTON*
PANDORA
ARIEL*
PUEO
EUCLID*
NUSTAR
BEPICOLOMBO*
ENVISION*
DAVINCI
VERITAS
PARKER SOLAR PROBE
NEW HORIZONS
VOYAGER 1
VOYAGER 2
SUNRISE
WIND
SOLAR ORBITER*
CARRUTHERS GEOCORONA OBSERVATORY
THEMIS
STEREO
IMAP
TIMED
HELIOSWARM
HINODE*
ICON
EUVST*
GOLD
NEO SURVEYOR
GDC
SOHO*
ACE
AIM
IRIS
TRACERS
EZIE
MUSE
MMS
IBEX
PUNCH
SDO
DRAGONFLY
JUICE*
LUCY
JUNO
OSIRIS-REX/APEX
NEOWISE
MSR EARTH RETURN ORBITER*
EUROPA CLIPPER
SENTINEL-6 MICHAEL FREILICH*
MSR SAMPLE RETRIEVAL LANDER*
SENTINEL-6B*
MMX*
GRACE-FO
MRO
PREFIRE
LANDSAT NEXT
MARS EXPRESS*
LANDSAT 7, 8, 9
JPSS-3, 4*
TRACE GAS ORBITER*
DSCOVR*
SWOT
SUOMI NPP*
TERRA
CURIOSITY
SRL-SRH
SRL-MAV
ROSALIND FRANKLIN*
PERSEVERANCE
MAVEN
MARS ODYSSEY
ESCAPADE
PSYCHE
GLIMR
MAIA
TROPICS
GPM
NOAA-20, 21*
TEMPO
CALIPSO
OCO-2
CLOUDSAT
AURA
NISAR
ESO-1, 2, 3, 4
ICESAT-2
SMAP
INCUS
TSIS-2
AQUA
PACE
CYGNSS
ECOSTRESS
EMIT
GEDI
LIS
CLARREO-PF
OCO-3
TSIS-1
APH
SAGE III
XROOTS
PK-4*
FLARE*
MICRO
RR
DECLIC*
SPECTRUM
BRIC-LED
BRIC
ELF*
BECCAL*
MHU*
MSRR
CAL
ZBOT-NC
SOFIE
EML*
SUBSA
VEGGIE
PFMI
PH
AWE
FBCE
COMPACT*
TIGERISS
NICER
THEMIS-ARTEMIS
HERMES
PEREGRINE-1~
LUNAR PATHFINDER*
1ST BLUE GHOST~
1ST NOVA-C~
2ND BLUE GHOST~
SERIES-2~
LUNAR TRAILBLAZER
GRIFFIN-1~ & VIPER
2ND NOVA-C~
3RD NOVA-C~
LEIA
XL-1~
LRO
OCTOBER 2023
EARTH
HELIOPHYSICS
PLANETARY
ASTROPHYSICS
BIOLOGICAL & PHYSICAL
FUTURE LAUNCHES IN BOLD
*PARTNER-LED
~ COMMERCIAL PARTNERSHIP
OPERATING & FUTURE
SCIENCE FLEET


National Aeronautics and Space Administration
NASA
LUNAR MISSIONS
2022–2027
CLPS NASA PAYLOAD GOALS
PEREGRINE-1
• Regolith volatiles composition
• Local radiation environment
1ST NOVA-C
• Plume/surface interactions, charged particles near surface
• Lander prop tank gauge test
2ND NOVA-C
• Drilling for volatiles
1ST BLUE GHOST
• Characterize Earth's magnetosphere and Moon's interior
3RD NOVA-C
• Lunar Magnetic Anomalies
GRIFFIN-1 & VIPER
• Search for volatiles, below surface & shadowed regions
APEX 1.0
• Geophysics of the Schrödinger Basin
2ND BLUE GHOST
• Dark Ages observations from the lunar far side
• ESA lunar comm relay satellite deployment
2024
2023
2022
2025
2026
2027
PEREGRINE-1
ASTROBOTIC
1ST NOVA-C
INTUITIVE MACHINES
1ST BLUE GHOST
FIREFLY
LUNAR TRAILBLAZER
2ND NOVA-C
INTUITIVE MACHINES
GRIFFIN-1
ASTROBOTIC
LRO
THEMIS-ARTEMIS
ARTEMIS I
UNCREWED FLIGHT TEST
+ 10 CUBESATS
KPLO
NASA SHADOWCAM ON KOREAN MISSION
CAPSTONE
LUNAR PATHFINDER
3RD NOVA-C
INTUITIVE MACHINES
ARTEMIS II
CREWED FLIGHT TEST
2ND BLUE GHOST
FIREFLY
GATEWAY
PPE & HALO (LAUNCH)
UNCREWED HUMAN LANDING SYSTEM DEMO
ARTEMIS III
CREWED SURFACE MISSION
GATEWAY
PPE & HALO (ARRIVAL IN NRHO)
APEX 1.0
DRAPER
CREWED HUMAN LANDING SYSTEM DEMO
CP-21
SELECTION FORTHCOMING
CP-32
SELECTION FORTHCOMING
CP-22
SELECTION FORTHCOMING
CS-6
SELECTION FORTHCOMING
ORBITAL MISSIONS
SURFACE MISSIONS
KEY
CLPS DELIVERY
INTERNATIONAL-LED
HUMAN EXPLORATION
SCIENCE
SPACE TECHNOLOGY
DID NOT LAND
07.23.2024


NASA


INTUITIVE
MACHINES



ARTEMIS I

First Mission
(Uncrewed Flight Test)

COMPLETE

ARTEMIS II

First Crew

ARTEMIS III

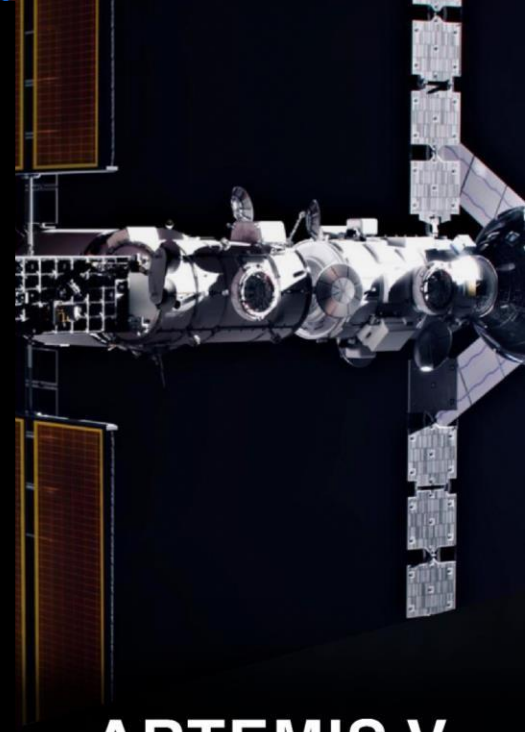
First Human Surface Landing

Artist's Concept

ARTEMIS IV

First Lunar Space Station
Assembly Mission

Artist's Concept



ARTEMIS V

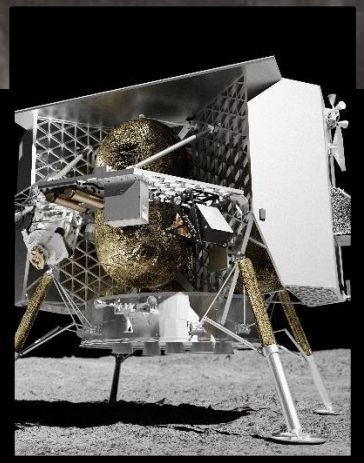
Crewed Mobile Surface Exploration,
Gateway Expansion

Artist's Concept

LUNAR CAPABILITIES AND **TECHNOLOGY**

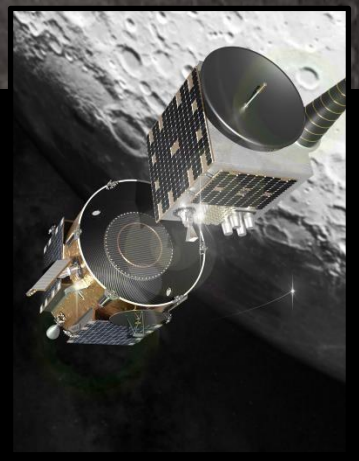
SPACEX

BLUE ORIGIN



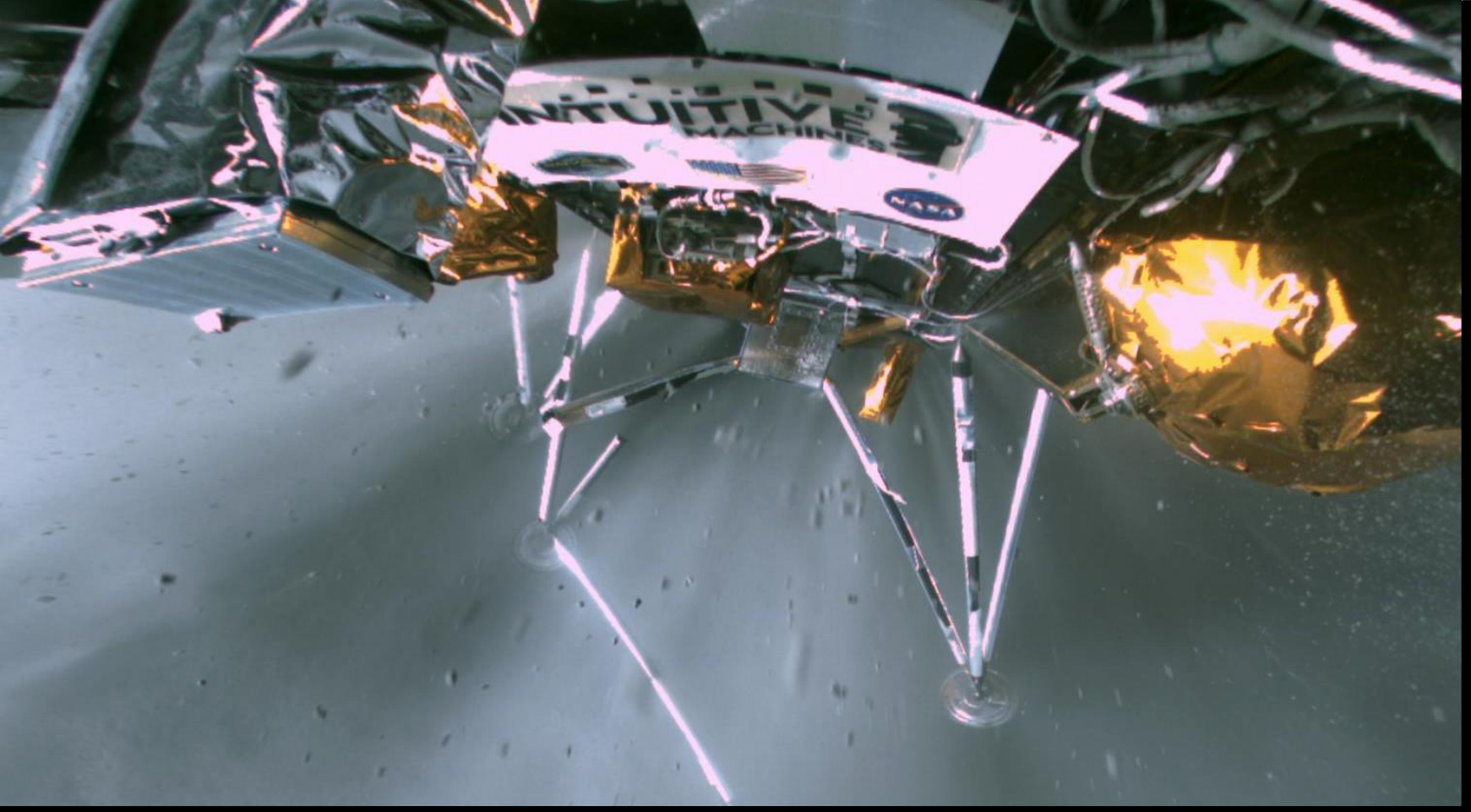
ASTROBOTIC TECHNOLOGY

INTUITIVE MACHINES



FIREFLY AEROSPACE

DRAPER LABORATORY



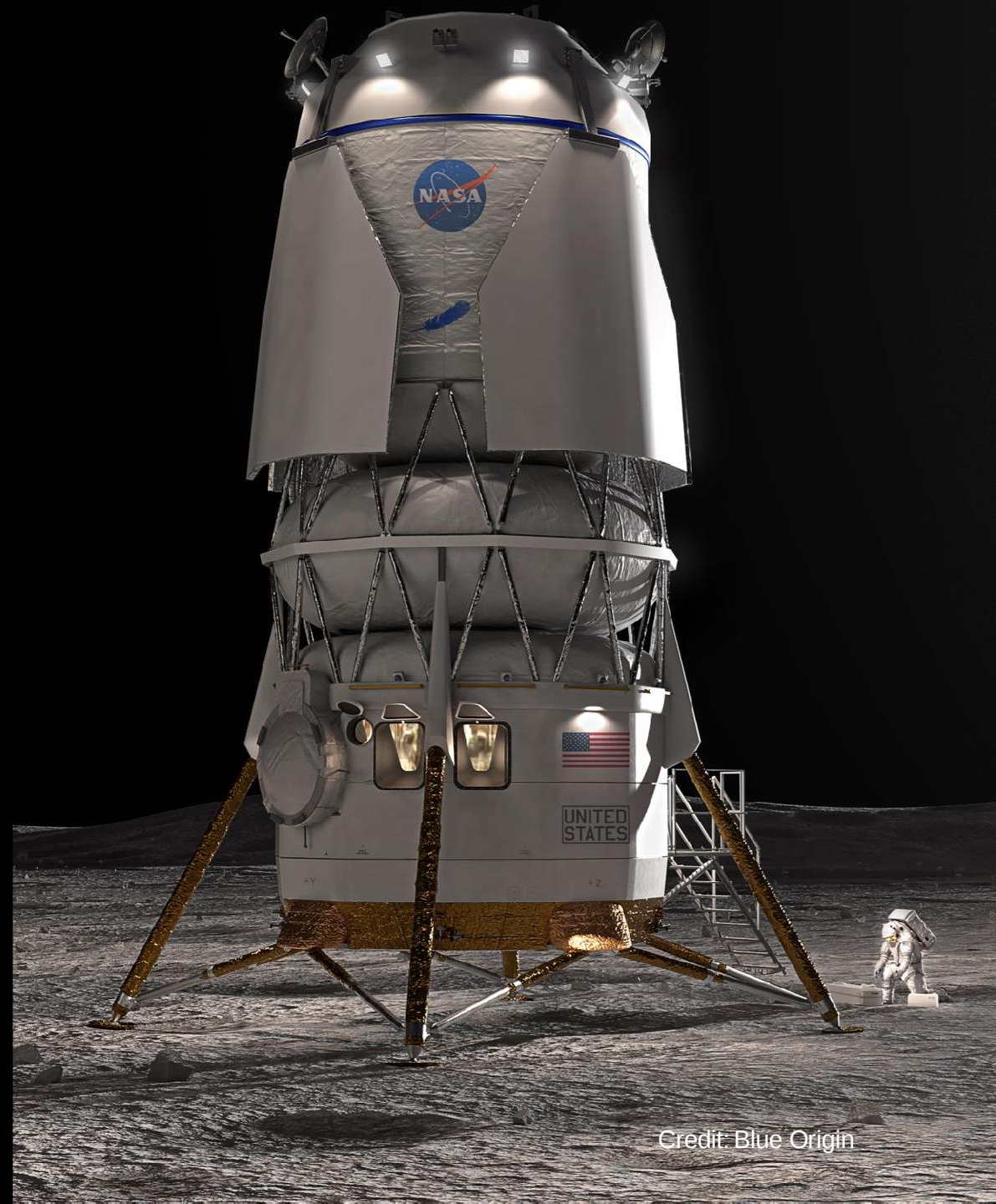
CLPS Landing: Intuitive Machines

IM-1 MISSION

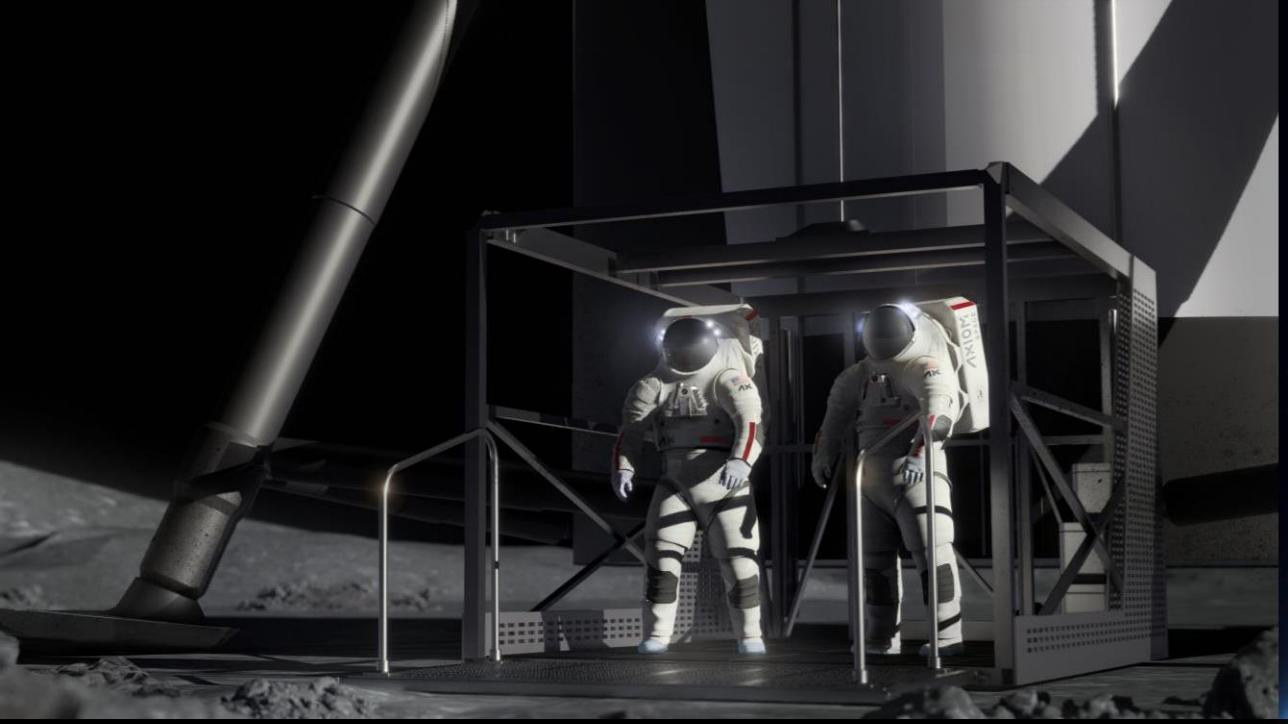
Human Landing System

H L S

Credit: SpaceX



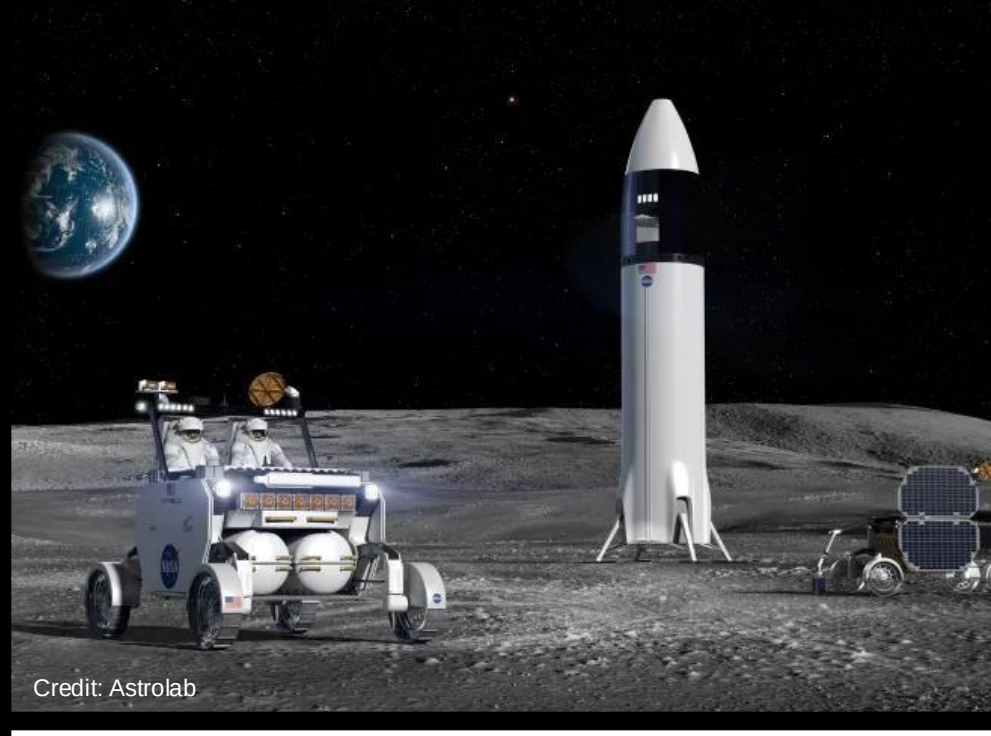
Credit: Blue Origin



Human Landing System

H L S

Credit: SpaceX



Lunar Terrain Vehicle

L T V

Credit: Intuitive Machines

Credit: Lunar Outpost

Moon to Mars Segments

Human Lunar Return

Initial capabilities, systems, and operations necessary to re-establish human presence and initial utilization (science, etc.) on and around the Moon.

Foundational Exploration

Expansion of lunar capabilities, systems, and operations supporting complex orbital and surface missions to conduct utilization (science, etc.) and Mars forward precursor missions.

Sustained Lunar Evolution

Enabling capabilities, systems, and operations to support regional and global utilization (science, etc.), economic opportunity, and a steady cadence of human presence on and around the Moon.

Humans to Mars

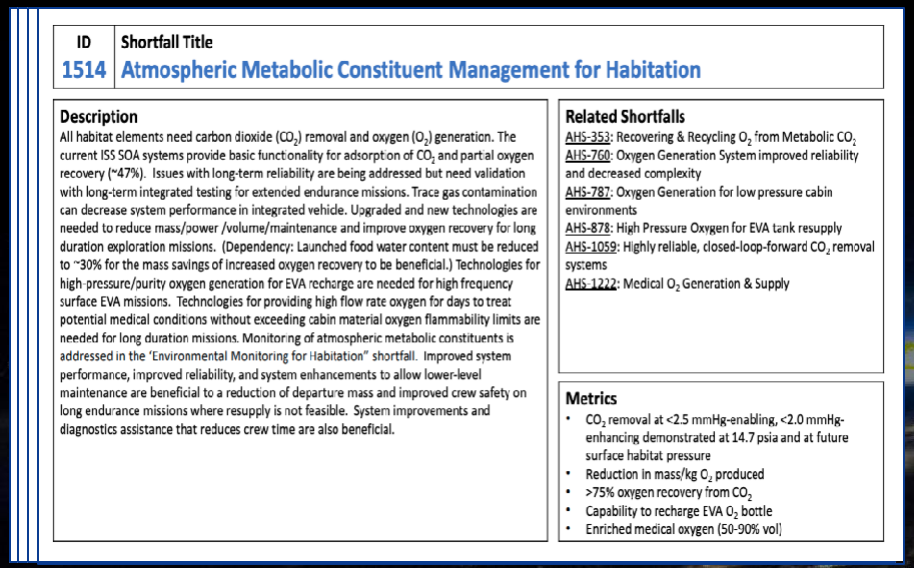
Initial capabilities, systems, and operations necessary to establish human presence and initial utilization (science, etc.) on Mars and continued exploration.

NASA STMD – CIVIL SPACE SHORTFALLS

Shortfall: Identified technology area requiring further developments to meet future exploration, science, and other mission needs

NASA compiled an initial list of 187 shortfalls organized into 20 capability areas

The shortfall description document and feedback form were organized accordingly



ID	Shortfall Title
1514	Atmospheric Metabolic Constituent Management for Habitation

Description

All habitat elements need carbon dioxide (CO_2) removal and oxygen (O_2) generation. The current ISS SOA systems provide basic functionality for adsorption of CO_2 and partial oxygen recovery (~47%). Issues with long-term reliability are being addressed but need validation with long-term integrated testing for extended endurance missions. Trace gas contamination can decrease system performance in integrated vehicle. Upgraded and new technologies are needed to reduce mass/power /volume/maintenance and improve oxygen recovery for long duration exploration missions. (Dependency: Launched food water content must be reduced to ~30% for the mass savings of increased oxygen recovery to be beneficial.) Technologies for high-pressure/purity oxygen generation for EVA recharge are needed for high frequency surface EVA missions. Technologies for providing high flow rate oxygen for days to treat potential medical conditions without exceeding cabin material oxygen flammability limits are needed for long duration missions. Monitoring of atmospheric metabolic constituents is addressed in the 'Environmental Monitoring for Habitation" shortfall. Improved system performance, improved reliability, and system enhancements to allow lower-level maintenance are beneficial to a reduction of departure mass and improved crew safety on long endurance missions where resupply is not feasible. System improvements and diagnostics assistance that reduces crew time are also beneficial.

Related Shortfalls

AHS-353: Recovering & Recycling O_2 from Metabolic CO_2
AHS-760: Oxygen Generation System improved reliability and decreased complexity
AHS-787: Oxygen Generation for low pressure cabin environments
AHS-878: High Pressure Oxygen for EVA tank resupply
AHS-1059: Highly reliable, closed-loop-forward CO_2 removal systems
AHS-1222: Medical O_2 Generation & Supply

Metrics

- CO_2 removal at <2.5 mmHg-enabling, <2.0 mmHg-enhancing demonstrated at 14.7 psia and at future surface habitat pressure
- Reduction in mass/kg O_2 produced
- >75% oxygen recovery from CO_2
- Capability to recharge EVA O_2 bottle
- Enriched medical oxygen (50-90% vol)

Capability Area	# of Shortfalls
Advanced Habitation Systems	16
Advanced Manufacturing	12
Advanced Materials & Structures	4
Autonomous Systems & Robotics	23
Avionics	7
Communication & Navigation	4
Cryogenic Fluid Management	5
Dust Mitigation	3
Entry, Descent & Landing	13
Excavation, Construction & Outfitting	9
In-Situ Resource Utilization	10
In-Space Servicing, Assembly & Manufacturing	9
Orbital Debris	3
Power	8
Propulsion	18
Sensors & Instruments	12
Small Spacecraft	8
Surface Systems	10
Thermal Management Systems	8
Miscellaneous	5

NATIONAL TECH BASE PRIORITIES

Publicly-transparent, rigorously-developed process by which we establish our priorities based on comprehensive prioritized needs of our stakeholders

Idea Generation

OGAs

Industry

Academia

EOP

Hill

Mission Directorates

Centers

DARPA

Investments/Projects

Mission Directorates

Centers

Industry

Academia

EOP

Hill

OGAs

Prioritized Shortfalls (Gaps)

Prioritized Shortfalls (Gaps)

Projects

Project 2	1525
Project 1	1219
Project 21	1213
Project 13	1135
Project 9	1101
Project 18	1050
Project 20	974
Project 11	535
Project 4	905
Project 24	836
Project 8	393
Project 23	757
Project 17	658
Project 16	601
Project 10	570
Project 15	568
Project 6	829
Project 5	523
Project 19	507
Project 14	490
Project 22	393
Project 3	340
Project 12	329
Project 7	225

$$$

Roadmaps

Initial Tech Status

Capability Goals

NASA STMD - INTEGRATED SHORTFALL RANKING (1-30)

Integrated Rank	Average Integrated Score	Shortfall ID	Category
1	8.1035	**1618: Survive and operate through the lunar night**	Thermal Management Systems
2	7.6118	**1596: High Power Energy Generation on Moon and Mars Surfaces**	Power
3	7.4345	**1554: High Performance Onboard Computing to Enable Increasingly Complex Operations**	Avionics
4	7.3831	**1557: Position, Navigation, and Timing (PNT) for In-Orbit and Surface Applications**	Communication and Navigation
5	7.2473	**1545: Robotic Actuation, Subsystem Components, and System Architectures for Long-Duration and Extreme Environment Operation**	Autonomous Systems and Robotics
6	7.2076	**1552: Extreme Environment Avionics**	Avionics
7	7.1961	**1519: Environmental Monitoring for Habitation**	Advanced Habitation Systems
8	7.1679	**709: Nuclear Electric Propulsion for Human Exploration**	Propulsion: Nuclear
9	7.1145	**1304: Robust, High-Progress-Rate, and Long-Distance Autonomous Surface Mobility**	Autonomous Systems and Robotics
10	7.0946	**1520: Fire Safety for Habitation**	Advanced Habitation Systems
11	7.0517	**1531: Autonomous Guidance and Navigation for Deep Space Missions**	Autonomous Systems and Robotics
12	7.0449	**1591: Power Management Systems for Long Duration Lunar and Martian Missions**	Power
13	7.0341	**702: Nuclear Thermal Propulsion for Human Exploration**	Propulsion: Nuclear
14	7.0315	**1559: Deep Space Autonomous Navigation**	Communication and Navigation
15	6.9684	**1527: Radiation Countermeasures (Crew and Habitat)**	Advanced Habitation Systems
16	6.9478	1526: Radiation Monitoring and Modeling (Crew and Habitat)	Advanced Habitation Systems
17	6.9465	**879: In-space and On-surface, Long-duration Storage of Cryogenic Propellant**	Cryogenic Fluid Management
18	6.8425	1548: Sensing for Autonomous Robotic Operations in Challenging Environmental Conditions	Autonomous Systems and Robotics
19	6.8039	**1558: High-Rate Communications Across The Lunar Surface**	Communication and Navigation
20	6.7919	**1626: Advanced Sensor Components: Imaging**	Sensors and Instruments
21	6.7837	**792: In-space and On-surface Transfer of Cryogenic Fluids**	Cryogenic Fluid Management
22	6.7199	**1569: High-Mass Mars Entry and Descent Systems**	Entry Descent and Landing
23	6.7110	1525: Food and Nutrition for Mars and Sustained Lunar	Advanced Habitation Systems
24	6.6953	**1571: Navigation Sensors for Precision Landing**	Entry Descent and Landing
25	6.6892	**1573: Terrain Mapping Capabilities for Precision Landing and Hazard Avoidance**	Entry Descent and Landing
26	6.6618	1562: Advanced Algorithms and Computing for Precision Landing	Entry Descent and Landing
27	6.5927	**1597: Power for Non-Solar-Illuminated Small Systems**	Power
28	6.5922	1568: Entry Modeling and Simulation for EDL Missions	Entry Descent and Landing
29	6.5842	1516: Water and Dormancy Management for Habitation	Advanced Habitation Systems
30	6.5694	1524: Crew Medical Care for Mars and Sustained Lunar	Advanced Habitation Systems

NASA'S NATIONAL ECONOMIC IMPACT

FY 2023

FY23 NASA's Efforts

Impacted all 50 states and the District of Columbia.

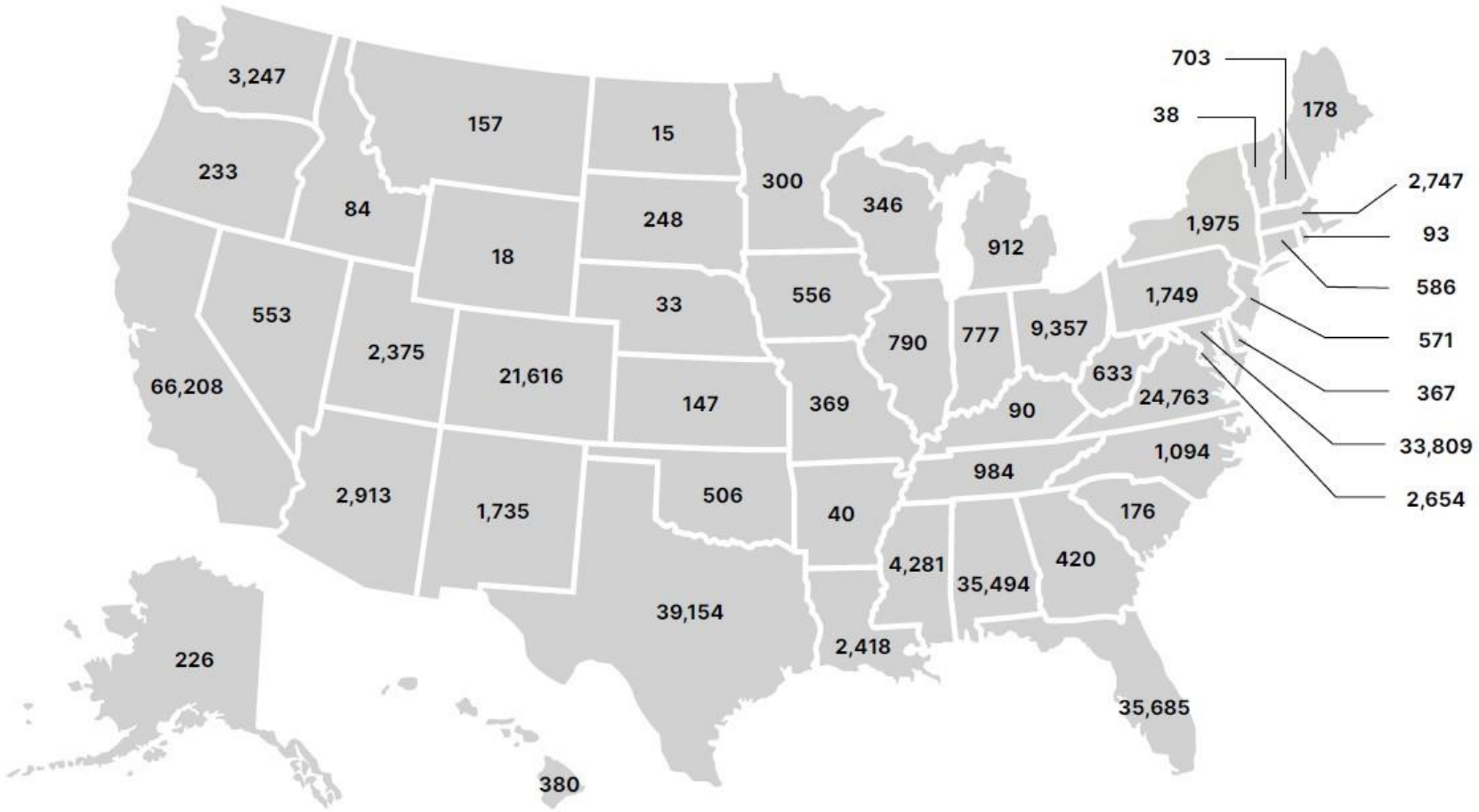
$75.6B Generated a total economic output of mor $75.6 billion.

304,803 Supported an estimated 304,803 jobs.

$9.5 B Resulted in more than $9.5 billion in feder state, and local tax revenues.

Report: NASA Economic Impact Report

NASA Employment Impact by State



AGREEMENT TYPES/LEGAL AUTHORITIES AVAILABLE FOR PARTNERSHIPS

Activity Type	Partner Type						
	Domestic Commercial	Federal Agency (as customer of NASA)	Federal Agency (as supplier to NASA)	State and Local Government	Foreign Non-Government	Foreign Government or Agency	Non- Profits/ Universities
NASA Provides Reimbursable Services[9]	Space Act authority (SAA) CSLA CRADA	Interagency Agreement (31 U.S.C. § 1535) or other appropriate relevant authority[10]	N/A	SAA CSLA	SAA	SAA and 51 U.S.C. §§ 20102(d)(7) and 20115	SAA CRADA
Joint Activity (No Funds Exchanged) – Nonreimbursable[11]	SAA CRADA (with cost waiver)	Typically 51 U.S.C. § 20113 or other appropriate relevant authority	Typically 51 U.S.C. § 20113 or other appropriate relevant authority	SAA	SAA and 51 U.S.C. §§ 20102(d)(7) and 20115	SAA and 51 U.S.C. §§ 20102(d)(7) and 20115	SAA CRADA
NASA Provides funding (Non-acquisition)	SAA[12] Cooperative Agreement	N/A	N/A	Grant Cooperative Agreement	N/A	N/A	Grant Cooperative Agreement
NASA Provides In-Kind Support Primarily for Benefit of Partner	SAA (Unfunded)	N/A	N/A	SAA (Unfunded)	N/A	N/A	SAA (Unfunded)
Loan of Equipment[13]	Equipment Loan Form – NF 893	Equipment Loan Form – NF 893	Equipment Loan Form – NF 893	Equipment Loan Form – NF 893	SAA and Equipment Loan Form – NF 893	SAA and Equipment Loan Form NF 893	Equipment Loan Form – NF 893

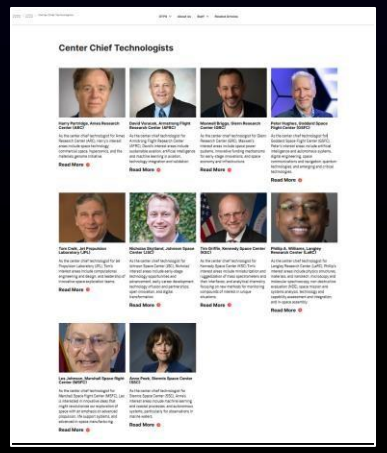
FY23 NASA Non-Procurement Partnership highlights include:

- **2,628** active domestic and international partnership Agreements
- **629** new domestic and **109** new international agreements
- Active partnerships with **587** different non-Federal partners across the U.S.
- Partnerships in **47** of **50** states

PARTNERING WITH NASA

Scan for the NASA Partnerships Page

Scan for the NASA Center Chief Technologists



Scan for the NASA Chief Technologist Panel at the 2024 Aviation Forum and ASCEND Conference

FIRESIDE CHAT

JOHN SERAFINI

CEO, HAWKEYE 360

PRESTON DUNLAP

CEO, ARKENSTONE VENTURES

CONNECTED DMV

THE ROLE OF THE DMV

VICTOR HOSKINS

PRESIDENT & CEO

FAIRFAX COUNTY ECONOMIC DEVELOPMENT AUTHORITY

CONNECTED DMV

CONNECTED DMV

THE COMMERCIALIZATION OF SPACE:

BUILDING A NEXT-GENERATION INDUSTRY

SPONSORED BY: FFX Fairfax County Economic Development Authority

VISIONING WORKSHOP

RISKS & ACTIONS WORKSHOP

CONNECT WITH US & GET INVOLVED

CONTACT US AT SPACE@CONNECTEDDMV.ORG
OR SCAN THE QR CODE TO JOIN THE CONVERSATION & EXPLORE OPPORTUNITIES

CONNECTED DMV