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PSF RAPID MARKET INTELLIGENCE SPRINT

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Colorado Space Tech Ecosystem – Sprint Lite

Innosphere

TECH. SCIENCE. ACCELERATED.

Prepared for Innosphere

April 2025

This Report is part of the Market Intelligence Sprint undertaken to address subject market. Other "online" tools with custom/validated data and insights for this analysis, including Interactive Dashboard, AskPSF™ Chat and Organization data, are available online and can be accessed through your account.

Please NOTE: A 1-day Lite Rapid Market Intelligence SPRINT is a fast, limited scope project (8-12 hours approx.), leveraging AI and Analyst-based research, to provide a list of validated companies, solutions, programs, investors or other ecosystem element.

The goal of the 1-day Sprint is to a comprehensive list or analysis validated by PSF Analysts. 2-Week Full Sprints can also be executed for deeper market/supply chain analysis.

The results of the 1-day Sprint, accessible via PSF's online platform, include:

- Summary overview of results
- Validated dataset in an Excel file
- Online access (optional) including interactive dashboard and AskPSF™ to ask deeper questions of the list/analysis resulting from the sprint

What are space technologies?

Technology Breakdown - Space Technologies

Space Exploration and Resource Utilization

Communication, Navigation & Positioning

Satellite Systems and Spacecraft

On-Orbit Servicing and Space Robotics

Launch Systems and Propulsion

In-Space Manufacturing and Assembly (ISAM/OSAM)

Space Power and Energy

Space Suit Technologies

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Source: PSF Analysis; OntologyMatch™

What are space technologies?

Technology Breakdown - Space Technologies

Space Exploration and Resource Utilization

- Planetary/Lunar Rovers and Landers
- Human & Robotic Exploration Technologies
- Surface Mobility Systems
- In-situ Material Processing
- Asteroid and Lunar Mining

Communication, Navigation & Positioning

- Satellite Communication Systems
- Optical (Laser) Communication
- Quantum Communication
- GNSS (GPS, Galileo, etc.)
- Inertial Navigation

Satellite Systems and Spacecraft

- Satellite Bus & Payload Technologies
- Small Satellite Platforms
- Modular/Software-Defined Satellites
- Constellation Deployment

On-Orbit Servicing and Space Robotics

- Robotic Arms and autonomous Rovers
- Satellite Refueling and Repair
- Active Debris Removal
- Teleportation and AI-driven Control

Launch Systems and Propulsion

- Launch Vehicles (Reusable, Small-Sat Launchers, Heavy-Lift)
- Propulsion Systems
- Launch Infrastructure

In-Space Manufacturing and Assembly (ISAM/OSAM)

- On-Orbit Additive Manufacturing (3D Printing)
- Microgravity Materials Research
- Modular Space Structures Assembly

Space Power and Energy

- Space-Based Energy System
- Solar Arrays and Wireless Power Transfer
- Energy Storage

Space Suit Technology

- Extravehicular Mobility Units (EMUs)
- Advanced Spacesuit Designs

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Source: PSF Analysis; OntologyMatch™

Space technologies address a broad set of use cases, including those focused on climate resilience, monitoring, and environmental management

Market Verticals	Aerospace & Defense	Climate and Environmental Monitoring	Materials Science	Telecommunications	Disaster Response & Security
Use Case Examples	• Space Exploration and Satellite Deployment • Navigation and Positioning (GPS, GNSS) • Weather Forecasting & Tracking • Microgravity Experiments • ISR (Intelligence, Surveillance, Reconnaissance)	• **Deforestation Monitoring** • Habitat Preservation • Environmental Impact Assessments • **Carbon Sequestration Tracking** • **Natural Disaster Early Warning** • Agriculture and Resource Management	• Microgravity Experiments • Radiation Shielding Materials • Spacecraft Construction • Heat-Resistant Coatings	• Broadcasting Digital Audio Content • Earth-to-Spacecraft Links • Space Debris Tracking • Inter-Satellite Links • Low-Latency Broadband Services • Ultra-Secure Communication Networks	• Environmental Intelligence • **Situational Awareness during Crises** • Infrastructure Monitoring • National Security & Border Surveillance
Technologies Applied	• Earth Observation Satellites • Space Telescopes • Space-based Telemetry • Space-based Navigation Systems • Remote Sensing Technology • Space Launch Systems • GNSS & Inertial Navigation	• **Remote Sensing Systems** • Satellite Imaging • **LIDAR, SAR, Hyperspectral Sensors** • Oceanographic Satellites • **Earth Observation Constellations** • **Geographic Information Systems (GIS)**	• In-space Manufacturing • Advanced Ceramics • Space Suits and Wearables • Advanced Polymers • Biomedical Materials • Lightweight Alloys • Radiation Shielding Materials	• Deep Space Communication • Satellite Constellations • Earth Observation Satellites • Global Positioning System • Optical Communication	• **High-Resolution Imaging** • Rapid Data Downlink Systems • AI-enabled Data Analytics • Multispectral Satellites

Bold = Focus on Climate Sensing/Monitoring

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Source: PSF Analysis; OntologyMatch™

The U.S. ecosystem for Space Technologies ecosystem is broad and expansive, providing significant opportunities for collaboration

5,500+ Companies

Includes emerging startups as well as companies with mature technologies

550+ Research Institutions/Labs

Universities and Research Centers doing research, development, and prototyping

330+ Investors

VCs, Investors, and Accelerators promoting business development and commercialization

400+ Program Offices

Program offices across federal agencies funding different R&D related efforts

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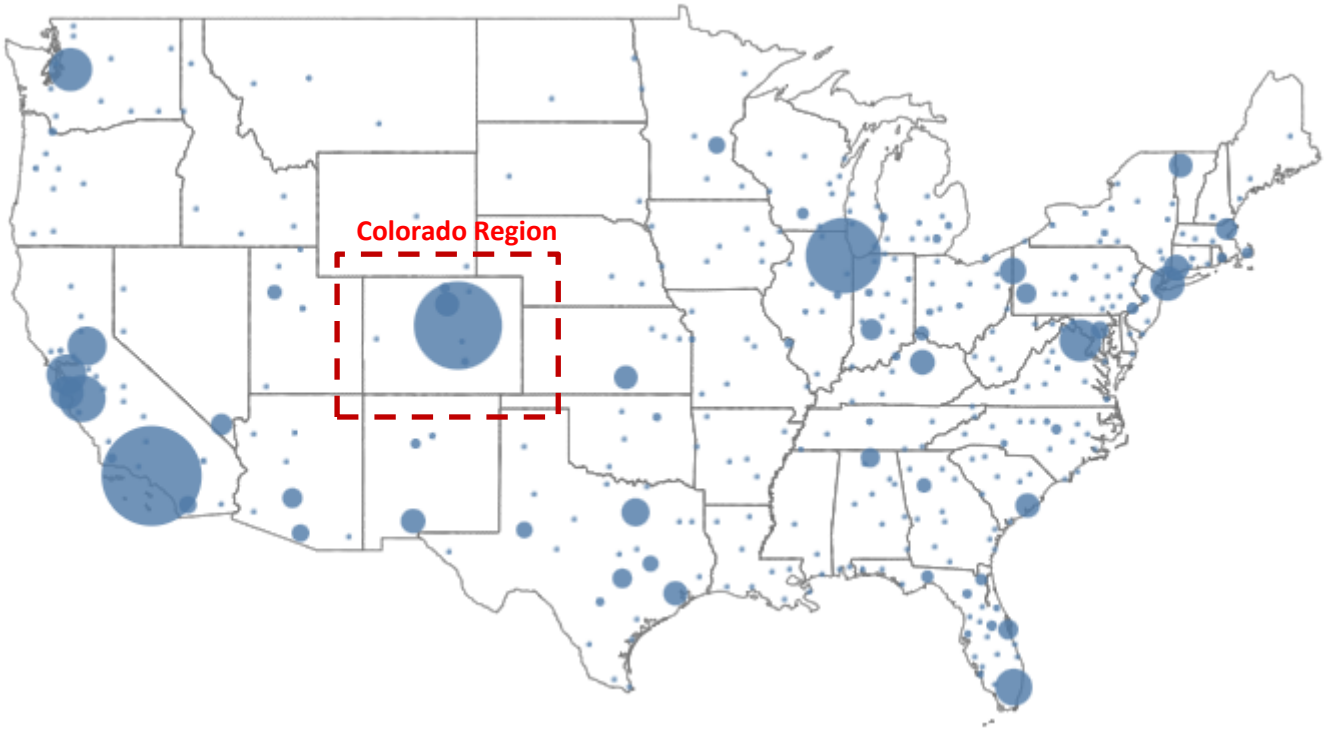
Source: PSF Analysis; AI-MI™ and Market Datasets

The Colorado region ranks 2nd as home for space-based technologies, with almost $15B invested through private capital and federal funding

U.S. Regional Innovation Clusters in Space Technologies, based on Invested Capital



Top Innovation Clusters

LOS ANGELES-LONG BEACH-ANAHEIM, CA
DENVER-AURORA-LAKEWOOD, CO
CHICAGO-NAPERVILLE-ELGIN, IL-IN-WI
SAN JOSE-SUNNYVALE-SANTA CLARA, CA
SEATTLE-TACOMA-BELLEVUE, WA
WASHINGTON-ARLINGTON-ALEXANDRIA, DC-VA-MD-WV
SAN FRANCISCO-OAKLAND-BERKELEY, CA
SACRAMENTO-ROSEVILLE-FOLSOM, CA
MIAMI-FORT LAUDERDALE-POMPANO BEACH, FL
NEW YORK-NEWARK-JERSEY CITY, NY-NJ-PA
SANTA CRUZ-WATSONVILLE, CA
DALLAS-FORT WORTH-ARLINGTON, TX

Denver-Aurora-Lakewood Region within Colorado is **ranked 2nd nationally** with **$14.5B in total capital** dedicated to space technologies.

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Source: PSF Analysis; AI-MI™; PSF Regional Dashboard

Colorado is home to hundreds of active space tech companies and research institutions contributing to U.S. innovation in earth sensing and climate tech

Examples of Companies and Research Institutions/Labs

Companies

AERIS
SpaceNav
Astroscale U.S.
ORION SPACE SOLUTIONS an Arcfield company
ARKA
MAXAR
AUGUSTUS AEROSPACE COMPANY
YORK SPACE SYSTEMS
AGILE SPACE INDUSTRIES
True Anomaly

Research Institutions/ Labs

NCAR
SPACE FOUNDATION DISCOVERY CENTER
SWx TREC
SPACE SCIENCE INSTITUTE
University of Colorado Boulder
Center for Space Resources
BioServe Space Technologies
CCAR

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Source: PSF Analysis; AI-MI™ and Market Datasets

Space technologies are being increasingly applied to measure environmental changes, predict disasters, and support sustainability efforts

Use Cases	Technology Used
Snowpack Monitoring & Water Resource Forecasting: Accurate measurement of snowpack is vital for predicting water availability in the Colorado River Basin, which supplies water to millions across the Western U.S	• NASA's SnowEx campaign utilizes airborne **LiDAR and microwave sensors** to assess snow depth and density. • MODIS satellite data improves hydrologic models by providing land surface temperature and snow cover information.
Wildfire Detection and Monitoring: Advanced remote sensing technologies to detect fire starts early and monitor fire spread, particularly important given Colorado's increasing wildfire activity	• Colorado's Multi-Mission Aircraft (MMA) Program- State-operated aircraft with specialized infrared and color sensors specifically for wildfire detection. • **Unmanned Aerial Vehicles (UAVs)** - Deployed for close monitoring of active fires without risking personnel.
Weather Forecasting & Extreme Events: Colorado's volatile weather and wildfire risks demand precise forecasting using satellites, drones, and sensors to protect lives, agriculture, and infrastructure.	• **Doppler Radar (NEXRAD)**: Detect severe storms, hail, and tornadoes (e.g., Eastern Plains). • **Polar-orbiting satellite (JPSS, MetOp)**: Provide high-resolution atmospheric data for blizzards and droughts.
Vegetation and Ecosystem Health Monitoring: Precision agriculture applications using remote sensing to optimize water use and crop yields in eastern Colorado's farming regions	• **Multispectral/Hyperspectral Imaging** (Landsat 9, Sentinel-2, PlanetScope) - Tracks drought stress, invasive species, and forest health. • **LiDAR-equipped UAVs** - Map forest canopy structure and post-fire recovery.
Climate Research and Sensor Development - Developing advanced sensors enhances the accuracy of climate data collection	• The Climate Absolute Radiance and Refractivity Observatory (CLARREO) Pathfinder sensor, developed by CU Boulder, is designed to measure how sunlight interacts with Earth's surface and atmosphere, providing critical data for climate research.

Examples

BlackSwift

Black Swift Technologies received a SBIR Phase I from NASA in 2022 for the development of S3 UAS with all-weather, long-duration capabilities for autonomous Earth science missions in extreme environments like storms and wildfires.

University of Colorado

The Reagents of the University of Colorado received grants in 2024 via the Denver Federal Center, Bureau of Reclamation (DOI), to develop SWE-Fusion for improved snowpack data and water management.

Boulder Environmental Sciences & Technology

Boulder Environmental Sciences And Technology received SBIR Phase I in 2021 from the Dept. of Air Force for developing a hyperspectral microwave imaging radiometer for enhanced terrestrial weather observation.

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Use Cases	Technology Used	Examples
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Wildfire Detection and Monitoring:	• Colorado's Multi-Mission Aircraft (MMA) Program- State-operated aircraft with specialized infrared and color sensors specifically for wildfire detection. • **Unmanned Aerial Vehicles (UAVs)** - Deployed for close monitoring of active fires without risking personnel.	University of Colorado The Reagents of the University of Colorado received grants in 2024 via the Denver Federal Center, Bureau of Reclamation (DOI), to develop SWE-Fusion for improved snowpack data and water management.
Weather Forecasting & Extreme Events:	• **Doppler Radar (NEXRAD)**: Detect severe storms, hail, and tornadoes (e.g., Eastern Plains). • **Polar-orbiting satellite (JPSS, MetOp)**: Provide high-resolution atmospheric data for blizzards and droughts.	
Vegetation and Ecosystem Health Monitoring:	• **Multispectral/Hyperspectral Imaging** (Landsat 9, Sentinel-2, PlanetScope) - Tracks drought stress, invasive species, and forest health. • **LiDAR-equipped UAVs** - Map forest canopy structure and post-fire recovery.	Boulder Environmental Sciences And Technology received SBIR Phase I in 2021 from the Dept. of Air Force for developing a hyperspectral microwave imaging radiometer for enhanced terrestrial weather observation.
Climate Research and Sensor Development -	• The Climate Absolute Radiance and Refractivity Observatory (CLARREO) Pathfinder sensor, developed by CU Boulder, is designed to measure how sunlight interacts with Earth's surface and atmosphere, providing critical data for climate research.	

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Federal R&D funding has helped support space-powered climate solutions – although the federal funding environment going forward is more uncertain

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Funding Channel

SBIR/STTR

Urban Sky
Reusable balloon system delivering high-res wildfire data for air quality
National Aeronautics and Space Administration
SBIR – Phase I | $0.1M

Saber Astronautics
Sandbox software simulates deep-space threats to enhance space domain awareness.
Department of Defense
SBIR – Phase II | $1.2M

Space Lab Technologies, LLC
Environmental health monitoring platform that addresses the need for autonomous technologies
National Aeronautics and Space Administration
STTR – Phase I | $0.1M

Grants

Space Science Institute
Exploring solar wind strahl as seed for Earth's radiation belt electrons
National Science Foundation
Grants | $1M

University Corporation for Atmospheric Research
Advanced airborne radar for severe weather prediction and microphysical analysis.
Department of Commerce
Grants | $11M

Colorado State University
CIRA advances satellite algorithms, modeling, data assimilation, climate processes, and distribution.
Department of Defense
Grants | $1M

OTA

United Launch Services
Launch system prototype for EELV program, enhancing environmental space access
Department of Defense
OTA | $6M

Ball Aerospace & Technologies
R&D- Defense system: Missile/Space Systems (Advanced Development)
Department of Defense
OTA | $28M

Astroscale U.S.
Hyperspectral sensor for spacecraft rendezvous, proximity operations, and environmental inspection
Department of Defense
OTA | $0.7M

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Source: PSF Analysis; AI-MI™; SpendMatch™; VendorMatch™

Colorado stands at the intersection of aerospace excellence and climate science leadership

Colorado stands at the forefront of climate innovation, leveraging its deep aerospace expertise to advance Earth observation and environmental resilience.

Leading Climate Science & Earth Observation Research

- CU Boulder's Earth and Atmospheric Sciences programs have been recognized for their excellence.
  - Hosts Laboratory for Atmospheric and Space Physics (LASP), Cooperative Institute for Research in Environmental Sciences (CIRES), and Integrated Remote and In-Situ Sensing (IRISS)
- HQ for NEON (National Ecological Observatory Network)
- Contributions to missions like CLARREO Pathfinder, Libera, HySICS
- NOAA's Earth System Research Laboratory (ESRL): Atmospheric monitoring and modeling

Research & Development Powerhouses

- Colorado hosts world-class research institutions driving breakthroughs in climate and Earth science:
- NCAR (National Center for Atmospheric Research) – global climate modeling, wildfire prediction
- CIRES (Cooperative Institute for Research in Environmental Sciences) – Earth systems research
- NREL (National Renewable Energy Laboratory) – climate and clean energy integration
- NSIDC (National Snow & Ice Data Center) – cryosphere and climate data stewardship

Commercial Innovation & Dual-Use Tech

- A thriving aerospace industry is advancing Earth sensing for both defense and environmental use:
- Maxar Technologies – high-resolution Earth imagery and geospatial intelligence
- Blue Canyon Technologies – small satellite platforms for NASA, DoD, and NOAA missions
- Ball Aerospace – satellite instruments for weather, climate, and space science
- Sierra Space & Lockheed Martin – next-gen spacecraft with climate sensing payloads

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Opportunities and Implications for Researchers, Funders and Companies

For Startups & Tech Developers

- **Bridge to Climate Applications**: Position space tech products (e.g., sensors, UAVs, data platforms) to address environmental monitoring, resource optimization, or disaster response.
- **Pursue Funding Pathways in Collaboration with US Partners**: Highlight climate resilience use-cases in space-tech proposals; Colorado's federal awards ($1.8B FY20–FY24) suggest strong receptivity.

For Researchers & Academics

- **Leverage Colorado's Space-Tech Ecosystem**: Tap into collaborations for dual-use missions in climate and Earth systems.
- **Prioritize Applied Research**: Focus proposals on wildfire forecasting, water monitoring, and hyperspectral imaging — areas of high potential high interest and funding momentum

For Investors & Ecosystem Builders

- **Invest in Dual-Use Ventures**: Back startups that can serve both climate and defense missions (e.g., wildfire sensors, satellite-enabled forecasting).
- **Support Tech Translation**: Accelerate commercialization by funding pathways from lab prototypes to field-deployable systems, especially those using space assets for terrestrial impact.

For Policymakers & Agencies

- **Sustain Funding in Critical Earth-Sensing Missions**: Projects like CLARREO Pathfinder, MMA, and NASA SnowEx are foundational for resilience-focused decision-making.
- **Promote Regional Collaboration**: Connect Colorado's aerospace leadership with national climate strategies to support innovation at the intersection of space and sustainability.

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Appendix

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Colorado companies are advancing mission-critical capabilities for defense, earth sensing, and beyond

Vendor Information				Experience				
Company	HQ (City/State)	Underserved Status	Specialties & Expertise	Private Capital Investor Name	SBIR/STTR Awards	Other Federal Contracts	OTAs	Grants
Space Lab Technologies	Boulder, CO	Asian-Pacific;;Minority Owned Business;; SDB	Habitation Systems, Space Systems, Space Science	-	$1.6M	$1M	-	-
Orbit Fab, Inc.	Lafayette, CO	Self-Certified Small Disadvantaged Business (SDB)	Space Refueling;; Fuel Delivery;; Satellite Refueling Interface	-	$14M	$4M	$6M	$0.2M
Opterus Research and Development	Loveland, CO	-	Spaceflight and high-strain composite (HSC) booms, hinges, solar array structures, antennas, reflectors	-	$4M	$4M	-	-
Lunar Outpost	Arvada, CO	-	Exploration-class Mobile Autonomous Prospecting Platform (MAPP), LTV, Space, Robotics, Aerospace	Industrious Ventures, Type One Ventures	$2M	$19M	-	-
Orion Space Solutions	Louisville, CO	-	Aerospace Research & Development, Operations, Small Satellite AI&T, Sensor & Payload Production	-	$5M	$4M	$10M	$5M
Space Hazards Applications	Boulder, CO	Asian-Pacific American Owned;;Minority Owned Business	Space Radiation Hazards Analysis;; Consulting Services	-	$0.7M	$1M	-	$0.8M
Neutron Star Systems	Colorado Springs, CO	Self-Certified Small Disadvantaged Business (SDB)	Automated Transfer Vehicles for spacecraft servicing, Cis-lunar transportation, and Mars cargo missions.	-	$0.2M	$0.2M	-	-
York Space Systems	Denver, CO	-	Small Spacecraft and Large Spacecraft, spacecraft affordability and reliability	-	-	$115M	$82M	-

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Source: PSF Analysis; AI-MI™; SpendMatch™; VendorMatch™

During FY20-FY24, the U.S. federal government invested more than $15B in Space Technologies through R&D Awards (SBIR/STTR, OTA, Grants)

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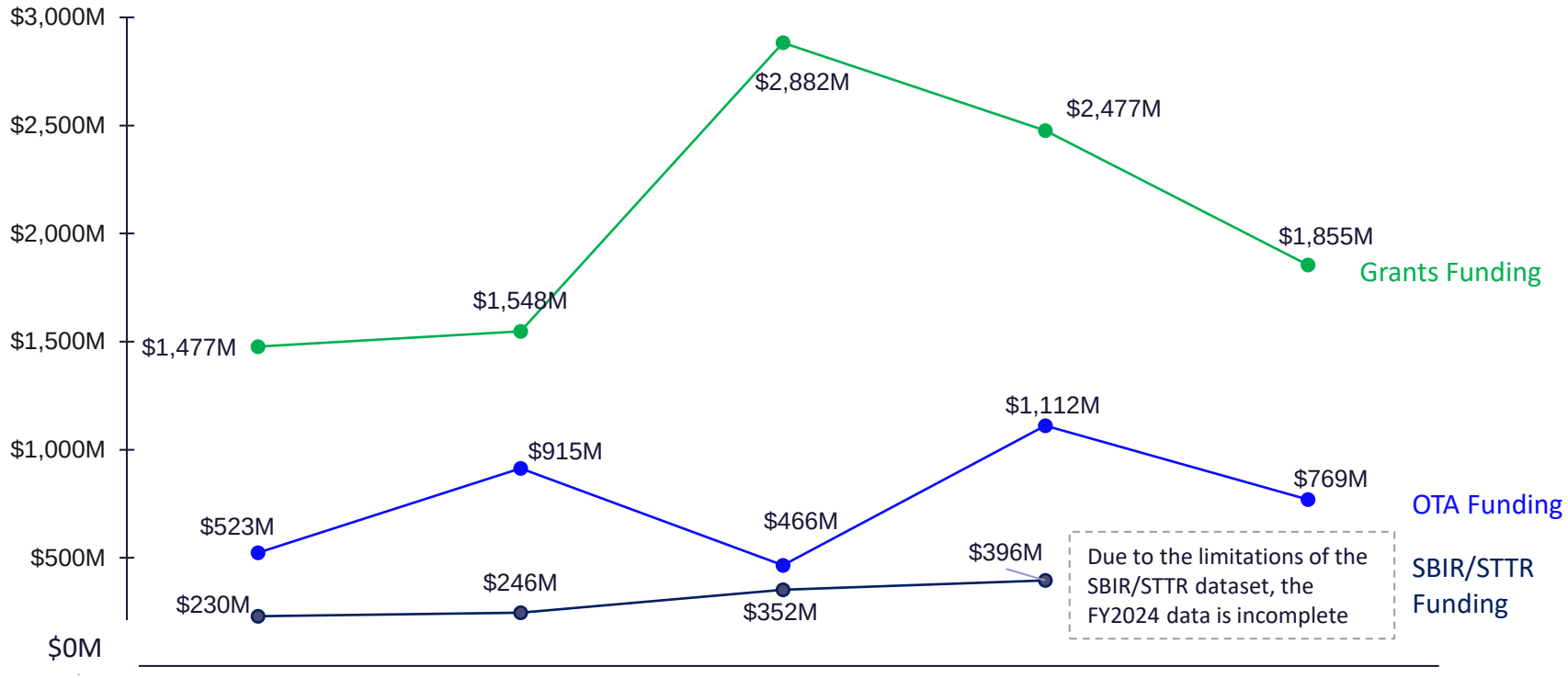
Preliminary

Version 1

R&D Awards by Year and Funding Source

Colorado ranks among top states for per-capita federal space R&D investment

Total R&D Amount Invested - $15B+ for FY2020-FY2024, with Colorado's R&D share being $1.8B*



	2020	2021	2022	2023	2024
Total Award Amount	$2,230M	$2,709M	$3,701M	$3,984M	$2,625M
Total Unique Vendors	1,209	1,228	1,596	1,526	801
Total Award Amount for CO	$215M	$439M	$453M	$362M	$387M
Total Unique Vendors for CO	77	74	83	72	36

*: The federal RDT&E contracts data is not part of the federal R&D data sets analyzed so far. The data is continuously being updated and classified against critical tech spending.

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Source: PSF Analysis; AI-MI™; SpendMatch™

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