

National Aeronautics and Space Administration

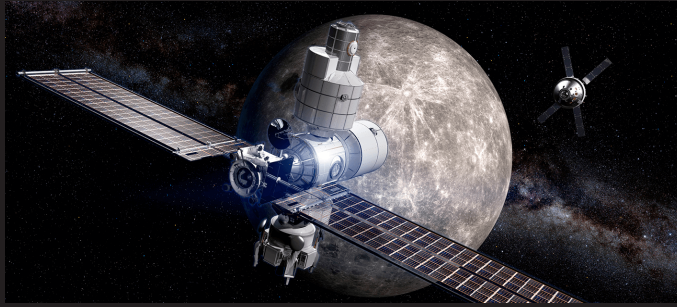


EXPLORE NASA PARTNERSHIPS

NASA AMES RESEARCH CENTER



www.nasa.gov



Ames Strategic Partnerships Office

NASA engages in partnerships with international, intergovernmental, academia, industrial, and entrepreneurial communities, recognizing them as important contributors of skill and creativity to NASA's missions and strategic objectives. NASA Ames Strategic Partnerships Office provides Center-level strategic policy and procedural guidance for all unclassified partnerships.

The three branches of the Ames Strategic Partnership Office are:

- Office of Strategic Agreements at Ames
- Technology Transfer Program
- Small Business Innovation Research/ Small Business Technology Transfer (SBIR/STTR) Programs

Each branch is designed to meet specific needs for our partners. The **Office of Strategic Agreements at Ames** facilitates partnerships that advance aerospace research, technology, and development through reimbursable or nonreimbursable agreements. This includes supporting the NASA HQ Office of International and Intergovernmental Relations (OIIR) Office with facilitating the exchange and engagement with International Partners. The **Technology Transfer Program** allows NASA-owned technology and software developed for space exploration and aeronautics missions to be licensed commercially for innovations to create new products, stimulate job growth and increase U.S. competitiveness. The **SBIR/STTR Programs** fund Small Businesses for the research, development, and demonstration of innovative technologies that fulfill NASA needs and have significant potential for successful commercialization.

More information on the Ames Strategic Partnerships Office at
www.nasa.gov/ames/partnerships

Ames Core Capabilities

Entry systems

Advanced Computing and IT Systems

Aerosciences

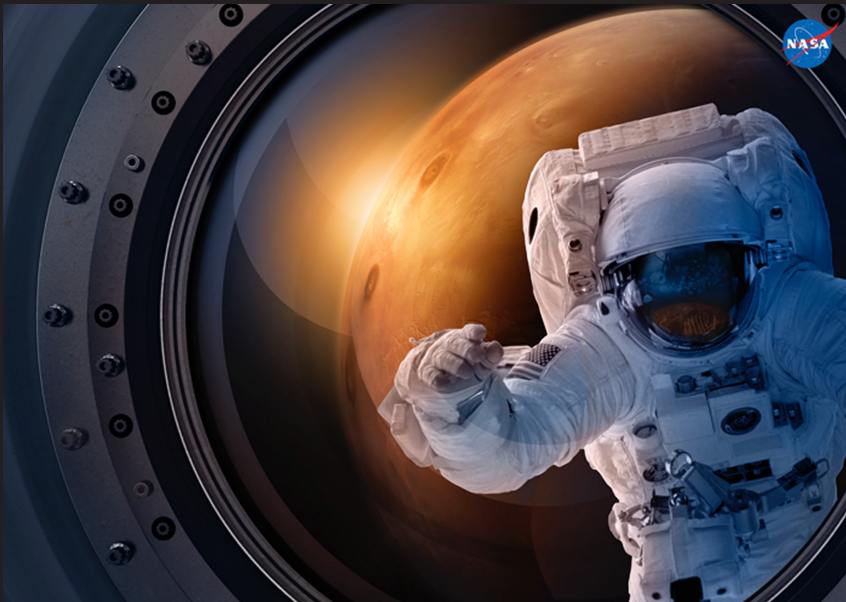
Air Traffic Management

Astrobiology and Space Biology

Cost-Effective Space Missions

Intelligent/Adaptive Systems

Space and Earth Science



Office of Strategic Agreements at Ames

Vision

To advance innovative research in aerospace, technology, and science.

How to Partner with NASA

Initiating the Partnerships process is as easy as matching your organization's needs to Ames' capabilities and contacting the Strategic Agreements at Ames office to explore your needs with an Agreements Manager.

Agreements

Agreements formalize mutually-beneficial collaborations, as well as reimbursable arrangements with industry, academia, non-profit organizations, and other government agencies. The Office of Strategic Agreements at Ames office helps form these agreements.

Types of Agreements

Nonreimbursable:

Mutually-beneficial, no funds exchanged, & each partner bears the cost of its participation.

Reimbursable:

Partner pays NASA to provide a unique service or access to a unique facility.

For more information on agreement types, visit:

www.nasa.gov/ames/strategicagreements



Interested in entering a collaborative partnership with NASA?

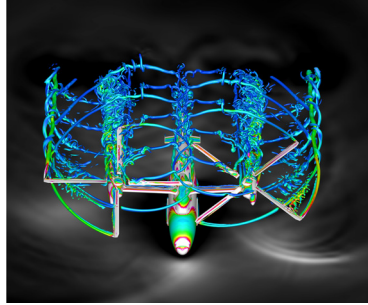
Contact us at ARC-Partnerships@mail.nasa.gov

Examples of Agreements

Recent examples of how Ames uses partnerships to support the Agency's missions and programs, include:

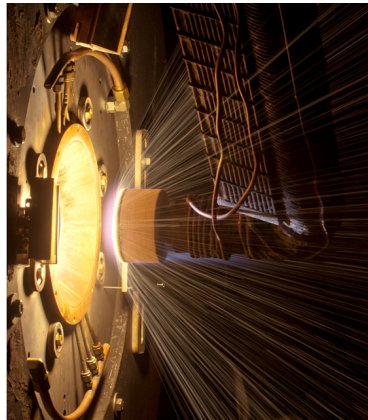
Address critical problems such as air traffic capacity and the environmental effects of air traffic to safely enable the next generation of air transportation.

Ames partnered with Uber Technologies Inc. to develop an Urban Air Mobility (UAM) system that could revolutionize the way people and cargo move in our cities. This could take the flying cars concept to the next level!



Encourage a robust commercial space industry by leveraging partnerships with the U.S. commercial space sector to lower launch costs and create more opportunities for commercial space flight.

Ames partnered with Stratolaunch to support development of their low cost, reusable space transportation systems specifically in the areas of aerothermal analysis and thermal protection systems. Ames has provided similar support to nearly all of the commercial space companies currently designing cargo and crew reentry vehicles to support ISS and other near-Earth exploration.



Exchange mutually beneficial knowledge and information to spur innovation and incentivize the creation of new markets while supporting NASA science and technology goals.

Ames partnered with Google to test a new quantum processor on real-world problems that cannot be solved by classic supercomputers. Solving these complex computing challenges with novel approaches will prove quantum proficiency.



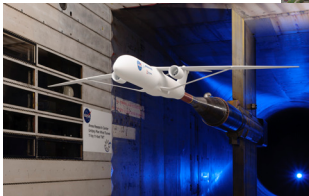
More research capabilities at www.nasa.gov/ames/partnerships/capabilities

Examples of NASA Ames Facilities

Contact the Strategic Agreements Office at ARC-Partnerships@mail.nasa.gov

Wind Tunnel Testing

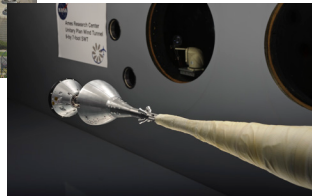
Agreements for Wind tunnel testing can give access to NASA Ames's technical and analytical capabilities including: engineering, fabrication, CFD support, consulting, and troubleshooting with aerodynamic and acoustic experts.



11x11 Transonic Leg



Unitary Plan
Wind Tunnel



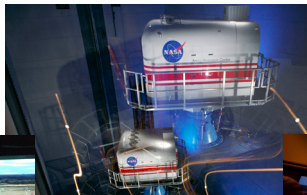
9x7 Supersonic Leg

Flight Simulation

Our customizable state-of-the-art simulation supports a wide range of research in aerospace systems and operations, human factors, and aviation safety by providing researchers with exceptional tools to explore, define, and solve issues in both aircraft and spacecraft design.



FutureFlight Central (FFC)
Visualization Tower



Vertical Motion
Simulator (VMS)



Crew-Vehicle Systems
Research Facility (CVSRF)

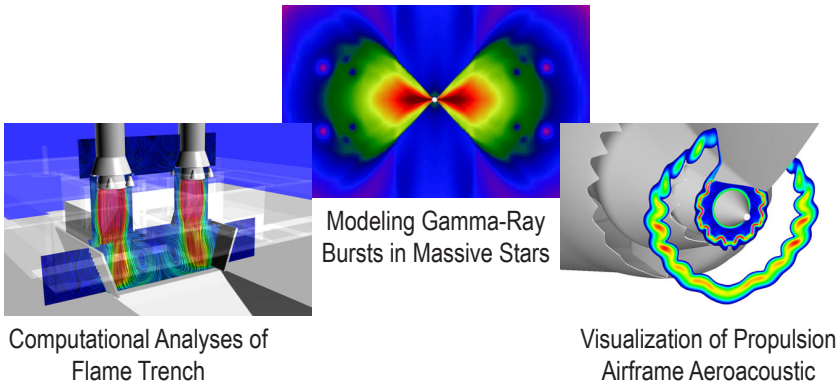
More Facilities and Capabilities at www.nasa.gov/ames/partnerships/capabilities

Strategic Agreements at Ames facilitates access to NASA's unique expertise, facilities, and technologies to help mold a greater future!

Contact the Strategic Agreements Office at ARC-Partnerships@mail.nasa.gov

NASA Advanced Supercomputing (NAS) Facility

The NAS facility provides users with advanced computational technologies, mass storage solutions, network solutions, and other cutting-edge tools and technologies for solving today's science and engineering problems.



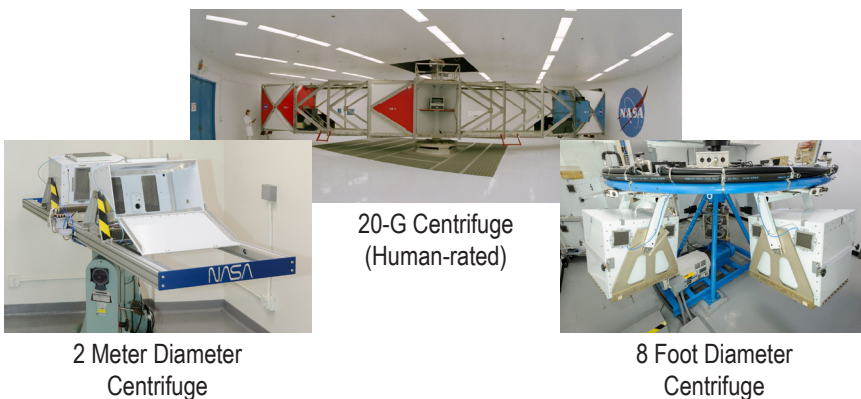
Computational Analyses of
Flame Trench

Modeling Gamma-Ray
Bursts in Massive Stars

Visualization of Propulsion
Airframe Aeroacoustic

Space Biosciences Ground Research Facilities

The centrifuges offer unique, innovative ways for conducting research and training to cope with the effects of acceleration on human and flight hardware systems, allowing researchers to conduct hypergravity studies that cannot be performed in any other NASA facility



2 Meter Diameter
Centrifuge

20-G Centrifuge
(Human-rated)

8 Foot Diameter
Centrifuge

More Facilities and Capabilities at www.nasa.gov/ames/partnerships/capabilities



NASA TECHNOLOGY TRANSFER PROGRAM

NASA's Technology Transfer Program facilitates the creation of new products and services, thereby stimulating job growth, and increasing U.S. competitiveness in the global marketplace. This is done by transferring technology (developed for missions in aeronautics and space exploration) to industry, academia and other government agencies for public benefit.

Technology Transfer is spread between our software and patented technologies. NASA's robust patent portfolio is attractive to newly developing companies because they can create their business plans and develop their technology portfolio structures.

Learn more about technologies available for partnerships and licensing opportunities. NASA is where ideas take flight! <https://technology.nasa.gov>

Patent Licensing

technology.nasa.gov/patents

NASA's Technology Transfer Portal hosts information on all of the NASA-developed technologies. Our patent portfolio contains more than 1,200 patented and patent-pending technologies that are available to license.

How To License

technology.nasa.gov/license

Applying for a license is simple. With the click of a button, you can begin the online application process using NASA's Automated Technology Licensing Application System (ATLAS).

Evaluation License "Test drive" the commercial viability of NASA technologies with minimal risk and up-front commitment.

Standard Commercial License Allows companies to make and sell products based on NASA technologies and requires detailed commercialization plans and financial documentation.

Startup License By offering a license with no up-front costs for commercial use of our patented technologies, we're letting companies hold onto their cash while securing the intellectual property needed to carve out competitive market space.

technology.nasa.gov/startup

The screenshot shows the NASA Patent Portfolio website interface. At the top, it says "Patent Portfolio" and "NASA Technology Transfer Program is offering you a new opportunity to put NASA technologies to work for you." Below this is a search bar and a grid of category icons: Aeronautics, Communications, Electrical Electronics, Environment, Health, Medicine, and Biotechnology, IT and Software, Instrumentation, Manufacturing, Materials and Coatings, Mechanical and Fluid Systems, Optics, Power Generation and Storage, Propulsion, Robotics, Automation and Control, and Sensors. Below the grid is a call to action: "Calling All High Tech Entrepreneurs!" with a lightbulb icon and a group of diverse people. At the bottom, the "Startup NASA" logo is displayed, followed by the text: "NASA's Technology Transfer Program is offering a new opportunity to put NASA technologies to work for you." and "Our Startup NASA initiative helps address two of the biggest challenges faced by start up companies: raising capital and securing intellectual property rights."

Free Technologies

technology.nasa.gov/publicdomain

These technologies were developed to advance NASA missions but may have non-aerospace applications and be used by commercial space ventures and other companies free of charge, eliminating the time, expense and paperwork often associated with licensing intellectual property.

**** NASA makes no representation, extends no warranties of any kind, either express, implied or statutory, including non-infringement, and assumes no responsibility whatsoever with respect to any matter whatsoever, including, but not limited to, matters relating to any use, sales, or other disposition by anyone of any technology and other information contained on this website, or any products made by the use or incorporation of the same.**

Free Software

software.nasa.gov/

NASA software can be requested through the NASA Software Catalog website.

1. Select a software category.
2. Click the “Request Software” button below the item description for the catalog entry.
3. Complete the software request form. All required fields must be filled in before you can submit your request. Requests will automatically be routed to the appropriate center’s Software Release Authority (SRA) for processing.

Public Domain

NASA TECHNOLOGIES

[Search](#) [Newly Added](#)

To stimulate the innovation economy, NASA makes a portion of its technology portfolio **freely available** for anyone to use.

The technologies in this public domain portfolio do not require a license agreement, and anyone may freely pursue independent product development right away without the need to contact NASA in any way.



Astrobee Robot Software (ARS) v1



Astrobee is a free-flying robot that is designed to operate as a payload inside the International Space Station (ISS). The Astrobee Robot Software (ARS) consists of the embedded (on-board) software and simulator. ARS operates on Astrobees three internal computers and uses the open-source Robot Operating System (ROS) framework to link multiple software modules. ARS performs localization and navigation of Astrobee, supports autonomous docking and perching, manages various sensors and actuators, and supports user interaction (via screen-based displays, light signaling, and sound). ARS enables Astrobee to operate in multiple modes: plan-based task execution (command sequencing), teleoperation, or guest science. The simulator allows software simulation of Astrobee mobility without requiring any robot hardware.

Notes:
For the Android version go to https://github.com/nasa/astrobee_android

[Download Now!](#)

Software Details

Reference Number	ARC-17994-1
Category	Autonomous Systems
Release Type	Open Source
Operating System	Android, Linux

Contact Us About This Software

Ames Research Center
arc-sra-team@mail.nasa.gov

**** Many open source software codes and mobile apps provide a URL link to download the software directly.**

NASA SOFTWARE



Software Release occurs whenever there is a transfer/distribution of software created by or for NASA that develops from work performed by employees of NASA, including contractors and grantees. The software is released outside of the NASA project for use by the public, industry and companies who wish to commercialize it.

NASA SOFTWARE IS AVAILABLE FOR PUBLIC USE!

Software Release Types

General Public Release For codes with a broad release and no nondisclosure or export control restrictions.

Open Source Release For collaborative efforts in which programmers improve upon codes originally developed by NASA and share the changes.

U.S. Only Release For codes available to U.S. persons only, with no further transfer of the software allowed without the prior written approval of NASA.

U.S. and Foreign Release For codes that are available to U.S. persons and (under special circumstances) persons outside of the U.S.

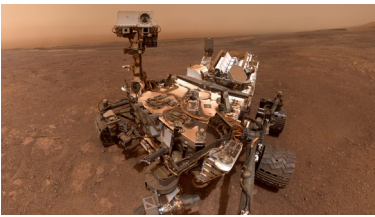
U.S. Government Purpose Release: For codes that are to be used on behalf of the U.S. government:

- Project Release is for use under a contract, grant, or agreement
- Interagency Release is for use by U.S. government agencies
- NASA Release is for use only by NASA personnel and contractors



Spinoff profiles NASA technologies that have transformed into commercial products and services. NASA has a long history of transferring technology to the private sector. (spinoff.nasa.gov/) Here are some examples:

Mineral Analyzer Shakes Answers Out of Soil and Rocks



The CheMin X-Ray powder diffraction (XRD) tool on the Curiosity rover, which was sent to Mars to help identify evidence of life, is now assisting life on Earth by utilizing the technology that allows for on-site detailed mineral analysis.

Sending samples back to the lab is now a hassle of the past! The CheMin technology has now been commercialized into a portable device and is being used for on-site testing for oil and gas exploration and by pharmaceutical companies to identify counterfeit drugs.

Forty-Year-Old Foam Springs Back With New Benefits



Image Credit: Dynamic Systems Inc.

Memory foam is one of the most widespread consumer goods spinoffs. Ames Research Center originally funded the development of this cushion-like material for new airplane seat designs that not only offered better impact protection in the event of an accident, but enhanced passenger comfort on long flights.

Contact Us

Technology Transfer Website: technology.nasa.gov/

NASA Ames Tech Transfer Office: technology-arc.ndc.nasa.gov/

If you work at NASA and want to release your software or technology?
Report your innovation at: invention.nasa.gov/



NASA SBIR/STTR PROGRAMS

Overview

Small Business Concerns (SBCs) should consider SBIR/STTR as a potential source of seed funding for the development of innovations.

The SBIR/STTR programs have three phases:

Phase I is the opportunity to establish the scientific, technical, commercial merit and feasibility of the proposed innovation.

Phase II is focused on the development, demonstration and delivery of the innovation. Only SBCs awarded a Phase I contract are eligible to submit a proposal for Phase II.

Phase III is the commercialization of innovative technologies, products, and services resulting from either a Phase I or Phase II contract. Phase III contracts are funded from sources other than the SBIR and STTR programs

Mission

Create opportunities through SBIR/STTR awards to leverage small business knowledge and technology development for maximum impact and contribution.

Vision

Empower small businesses to deliver technological innovation that contributes to NASA's mission, provides societal benefit, and grows the U.S. economy.

Awards

The annual SBIR and STTR budget is 3% of NASA's overall research budget, about \$200M.

The Program typically awards around 350 SBIR and STTR Phase I contracts annually.

Contact Us

Phone: (301) 937-0888

Email: sbir@reisystems.com



SBIR and STTR Innovations Make NASA Successful

A small business innovation made Juno, shown being assembled here, a lighter and stronger spacecraft. The Juno mission takes place in the strong magnetic fields of the gas giant Jupiter and its moons.

Carbon nanotube sheet and yarns were used to decrease weight and provide protection against electro-static discharge (ESD) as the spacecraft makes its way to Jupiter. The sheets replaced traditional metallic solutions. The sheets were incorporated as a layer directly onto the composite, making it an integral part of the spacecraft's flight protection system.

Learn more about SBIR and STTR successes at <https://sbir.nasa.gov/success-stories>.



NASA's Strategic Goals

Strategic Goal 1

Expand Human Knowledge through
Scientific Discoveries

Strategic Goal 2

Extend Human Presence Deeper into Space and
to the Moon for Sustainable
Long-Term Exploration and Utilization

Strategic Goal 3

Address National Challenges and
Catalyze Economic Growth

Strategic Goal 4

Optimize Capabilities and Operations



www.nasa.gov

SP-2019-05-01-ARC