TriTech Small Business Development Center Presentations

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Center Overview

NASA Armstrong Flight Research Center

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THE BEST PLACES TO WORK in the Federal Government®

NASA rated #1 Large Agency four years running!
Edwards AFB, California, main campus:

- Year-round flying weather
- 301,000 acres remote area
- Varied topography
- 350 testable days per year
- Extensive range airspace
- 29,000 feet of concrete runways
- 68 miles of lakebed runways
- Supersonic corridor
- U.S. Air Force Alliance

Workforce:
- 550 civil servants
- 565 contractors
- 103 student interns
NASA Armstrong Science Operations Building 703
Palmdale, California

Home to
- Stratospheric Observatory for Infrared Astronomy (SOFIA) – Astrophysics
- Earth Science – Airborne Science
2016 Armstrong Budget Distribution

- Aeronautics: 32%
- Exploration: 2%
- Education: 4%
- Science: 27%
- Space Technology: 6%
- CMO: 24%
- Reimbursables: 5%
Sources of Non-NASA Funding

- DoD: $4,680,327 (54%)
- Industry: $2,000,922 (23%)
- OGA: $1,875,939 (22%)
- Foreign: $108,182 (1%)

Total: $8,665,389
Capabilities and Core Competencies

Research Engineering
Enabling New Operational Concepts

- Airframe and power-plant maintenance, avionic technicians, experimental modification and fabrication, flight systems qualification, experimental test pilots, test operations planning
- Systems engineering and integration (SE&I), aerodynamics, propulsion, structures, flight controls, sub-systems, instrumentation

Range and Test Facilities

- Dryden Aeronautical Test Range (DATR)
- Research Aircraft Integration Facility (RAIF)
- Flight Loads Lab (FLL) aerothermal/mechanical loads testing
- Building 703 SOFIA and Airborne Science Operations

Atmospheric Flight Research

- Partnership, program and project development
- Mission, research, flight test objectives development
- Airworthiness certification, ground, flight and range safety
- Technology and systems development, integration, test
- Mission control and range operations

Facility Capability

- Experimental and testbed aircraft
- Unmanned air systems
- Earth science and infrared astronomy platforms
- Real-time engineering simulation
Facility Capabilities

Support Aircraft and Maintenance Organization (SAMO)

Support aeronautics research and science missions; provide versatile aircraft to meet requirements for pilot proficiency, safety chase, photography, video, and research flights in dual-capacity roles.

Simulation Laboratory

Test simulation-supported software and hardware to develop, integrate, and validate highly complex aeronautics research and low Earth orbit vehicles.

Dryden Aeronautical Test Range Capabilities

Safely monitor and control aeronautics research and science flight activities; provide real-time acquisition and reduction of flight research telemetry and radar data, video tracking, and effective voice communications to flight and ground crews (including ISS/Soyuz VHF support).

Flight Loads Laboratory (FLL)

Provide structural testing – mechanical, thermal, structural dynamic, mass properties – of large-scale structures to simulate subsonic through hypersonic flight conditions.
Doing Business with NASA

- Mechanisms for doing business with NASA:
  - Space Act Agreements
  - Cooperative Research & Development Agreements
  - Cooperative Agreements
  - SBIRs/STTRs
  - Technology Licenses

NASA Resources:
- Facilities
- Technology
- Expertise

Business Needs:
- Access to facilities
- Access to technology and technical experts

On what basis?
- Common Interest
- Cost Reimbursement
- Keeps competencies sharp
- Keeps facilities in a state of readiness

https://www.nasa.gov/centers/armstrong/business/index.html
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NASA Center Locations

ARC – Ames Research Center. Information technology, biotechnology, nanotechnology, aerospace operations systems, rotorcraft, and thermal protection systems.

AFRC – Armstrong Flight Research Center. Aerodynamics, aeronautics flight testing, aero propulsion, flight systems, thermal testing, sensors, integrated systems test and validation.

GRC – Glenn Research Center. Aeropropulsion, communications, energy technology, high-temperature materials research.

GSFC – Goddard Space Flight Center. Planetary science, LIDAR, cryogenic systems, tracking, telemetry, remote sensing, command.

HQ – NASA Headquarters.

JPL – Jet Propulsion Laboratory. Near- and deep-space mission engineering, microspacecraft, space communications, information systems, remote sensing, robotics.


KSC – Kennedy Space Center. Fluids and fluid systems, materials evaluation, process engineering, command/control/monitor systems, range systems, environmental engineering and management.

LaRC – Langley Research Center. Aerodynamics, flight systems, materials, structures, sensors, measurements, information sciences.


SSC – Stennis Space Center. Propulsion systems, remote sensing, nonintrusive instrumentation.
NASA Technology Transfer Spinoffs

Some of the best of over 2,000 recorded Spinoffs

CMOS camera-on-a-chip technology used in nearly all digital cameras, including smartphones

International search-and-rescue system has saved 40k lives worldwide since 1982

Memory foam

Nutritional supplement used in over 90% of infant formulas

Ubiquitous aerodynamic innovations in airplanes and trucks

Voltage controller saves energy in nearly all load-bearing electrical machines

Precision GPS enabled self-driving tractors that are now used to work the majority of the world’s farmland.
Patent Portfolio

The NASA patent portfolio is available to benefit US citizens. Through partnerships and licensing agreements with industry, these patents ensure that NASA investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life. Click on each of the category icons for a list of patents in that category or use the search below to explore NASA’s patent portfolio.

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
Sensors

Information Technology and Software

NETMARK
An advanced XML-based indexing technique for managing and retrieving documents

Benefits
- Provides improved searching and indexing of large documents
- Enables efficient retrieval of documents
- Supports advanced search features

Applications
- Enterprise search applications
- Document management systems
- Information retrieval systems
- Digital libraries

PUBLICATIONS
U.S. Patent 6,424,441
"Managing Document Data with XML-Based Indexing Technology" (2002, Conference on Information and Knowledge Management)

technology.nasa.gov/patents
The Startup NASA initiative offers startup companies 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]
Software Catalog

The NASA Software Catalog offers an extensive portfolio of free software products for a wide variety of technical applications. You may browse the catalog online or download the catalog in PDF format.

software.nasa.gov
The NASA Public Domain technologies are available for anyone to freely develop products without a license agreement or NASA involvement.

[Visit technology.nasa.gov/publicdomain for more information]
NASA offers a specially selected portfolio of technologies available for commercial nonexclusive licensing with set license terms. With QuickLaunch licensing, the goal is to quickly grant a license.
NASA technologies save lives, create jobs, and increase revenue
Background

**AFRC Technology Transfer Office**
Janeya Griffin - Technology Transfer Specialist
Technology Management, Partnerships, Patents, Licensing

**Federal Laboratory Consortium**
Executive board member – Member at Large

**Integrated Technology Transfer Network**
Certificate – *Entrepreneurial Technology Commercialization*
California State University San Bernardino

**Grambling State University**
B.S. Forensic Chemistry
B.S. Criminal Justice

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How to license NASA Technology
Types of Licenses

Exclusivity:

The categories of exclusive licenses include exclusive in all fields of use, co-exclusive, and partially exclusive with a limited field of use.

Note: All prospective grants of exclusive licenses must be published in the Federal Register for 15 days before the license is granted.

Non-exclusivity:

The categories of non-exclusive licenses include evaluation/research, start-up, end-user, "Quick-Launch," and a traditional non-exclusive commercial license.
Bringing NASA Technology Down to Earth

Space Act Agreements

Unique authority that enables NASA to collaborate with industry, non-profits, universities, etc. that have common goals aligning with NASA missions

Types of Space Act Agreements

Reimbursable:
NASA has a unique resource that is not available on marketplace and will receive reimbursable funds

Non-Reimbursable:
Achieve a common goal with industry with no exchange of funds
NASA Policy and U.S. Law

- Top-down agency commitment to technology transfer
- National Aeronautics and Space Act of 1958 (as amended)
  - “To provide for the widest practicable and appropriate dissemination of information concerning its activities and results thereof.”
- Stevenson-Wydler Technology Innovation Act of 1980 (P.L. 96-480)
  - Requires federal agencies to have a formal technology transfer program
- Bayh-Dole Act of 1980 (P.L. 96-517)
  - Permits universities, not-for-profits, and small businesses to obtain title to inventions developed with federal funding
  - Makes technology transfer a responsibility of every federal laboratory scientist and engineer
  - Establishes CRADAs
Small Business Innovation Research
Small Business Technology Transfer

Nov. 10, 2016

Mark Davis

www.nasa.gov
Purpose of SBIR/STTR Programs

- Stimulate technological innovation
- Foster technology transfer through cooperative R&D between small businesses and research institutions
- Use small businesses to meet federal research and development needs
- Increase private-sector commercialization of innovations derived from Federal research and development funding
- Encourage participation in innovation and entrepreneurship by minority and disadvantaged persons
• Every technology development investment dollar is critical to the ultimate success of NASA’s mission
  • Ensure alignment and integration with Mission Directorates’ priorities
  • Ensure alignment and integration with the Office of the Chief Technology priorities
  • Investments are complementary with technologies being pursued by
    • other NASA programs and projects
    • prime contractors
    • other agency SBIR/STTR investments

• Ultimate objective is to achieve infusion of critical technologies into NASA
  • flight programs/projects
  • ground or test systems
  • or other uses to advance NASA’s mission

• Mission Directorates and the Chief Technologist establish high priority needs and existing gaps
  • High priority needs are developed into topics for the annual solicitation
  • Subtopics may be clustered to support the development and maturation of critical technologies for infusion
• SBIRs are led by the Mission Directorates
  – There are 4 mission directorates
    • Science (SMD), Human Exploration and Operation (HEOMD), Aeronautical Research (ARMD), and Space Technology (STMD)

• STTRs are led by the Office Chief Technology
  – Each NASA center (10 in total) has a chief technologist
  – Each chief technologist sits on the Chief Technologist Council

• The awards are always to a small business
  – In SBIR, a research institution, e.g. a university may participate with the small business
  – In STTR, a research institute must participate with the small business
3-Phase Program

• **Phase 1**
  – The Program starts with the Phase I proposals
  – Feasibility study, 6 months duration (SBIR) or 12 months (STTR)
  – $125K (maximum allowable $150K)
  – Proposer uses funds to mature this concept to the next level

• **Phase 2**
  – Technology or Prototype Development/Demonstration, 2-Year Contract Award
  – $750K (SBIR & STTR – maximum allowable $1 million)
  – The concept may still require additional work
    • May need help to integrate into a system
    • May need help showing operation in a relevant environment

• **Phase 2 Extended, or Phase 2-E**
  – Funding to “bridge the gap” to a Phase 3 opportunity
  – Requires non-SBIR/STTR matching funding

• **Phase 3**
  – Technology Infusion/Commercialization Stage