



Federal Railroad Administration (FRA) Funding for Research Programs

Presented by:

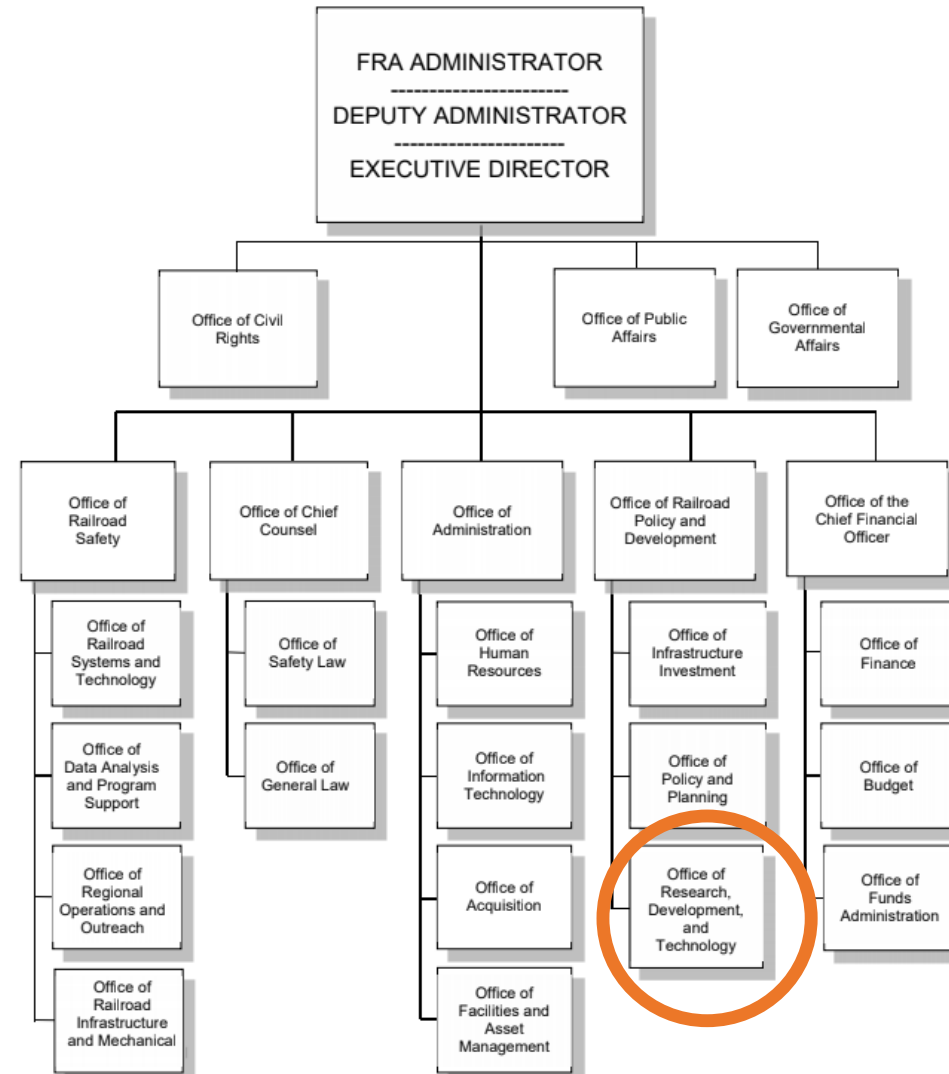
Dr. Maryam Allahyar, Director of FRA's Office of Research, Development, and Technology

Cam Stuart • Jeff Gordon • Melissa Wong • Doug Gascon

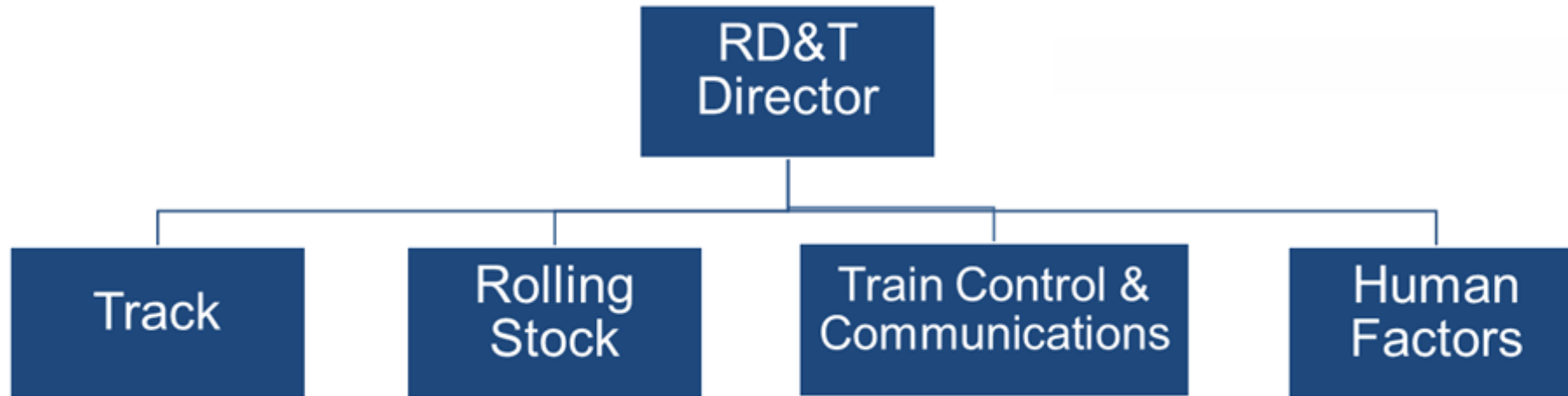
Federal Railroad Administration – Overview

FRA statistics:

- <1000 employees
- ~75% field/25% HQ
- Regulates over 700 railroads
- Annual research and development budget ~\$40 million



FRA Office of Research, Development, and Technology (RD&T)



Mission: To ensure the safe, efficient, and reliable movement of people and goods by rail through applied research.

FRA Broad Agency Announcement (BAA) Research Programs

Presented by: *Cam Stuart, BAA Program Manager, Office of Research, Development, and Technology (FRA)*



U.S. Department of Transportation
Federal Railroad Administration

Agenda

- What is a Broad Agency Announcement (BAA)?
- Why does FRA use the BAA process?
- General structure of FRA BAA programs
- Recent BAA program statistics

What Is a Broad Agency Announcement?

- A Broad Agency Announcement is a general announcement of an agency's intent to conduct or support **basic** or **applied** research.
 - Defined by the Federal Acquisition Regulation (FAR)
 - Not for development of specific products or systems
 - Only used when meaningful proposals with varying approaches are anticipated (FAR 35.016)
- A BAA contains:
 - A broad or specific description of research interest (generalized Statement of Work [SOW])
 - Proposal submittal schedule, instructions, and evaluation criteria



What Is a Broad Agency Announcement?

- The BAA is a **competitive**, open procurement process
 - FRA solicits research ideas
 - From the entire technical marketplace
 - That will directly impact the safety and efficiency of freight and passenger rail in the United States
- Awards can be contracts, grants, or co-ops
 - 100% of FRA awards have been contracts (fixed-price or cost type)
- Agency guidance/discussion occurs prior to formal proposal submittal (FAR 15.604)



Image from a BAA-funded bridge scour detection technology project

To see the FRA Technical Report on the bridge scour project, visit:

<https://railroads.dot.gov/elibrary/new-method-detecting-onset-scour-and-managing-scour-critical-bridges>

Why Does FRA Use the BAA Process?

- Efficient method to solicit research
 - No detailed SOW needed
 - Short research topics!
 - Straightforward evaluation process
 - Guaranteed competition
- Targets tough challenges
 - Solutions are unknown
 - Generates creative approaches
 - Encourages new participants in railroad research



U.S. Department of Transportation
Federal Railroad Administration

BROAD AGENCY ANNOUNCEMENT

BAA-2021

Federal Railroad Administration
Office of Research, Development and Technology

Research Initiatives In Support of Rail Safety

April 2021

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General Structure of FRA BAA Programs

- **Documents:**

- BAA – contains strategic objectives and all requirements for participation in the program
- BAA “Appendix C” (most BAA programs) – separate set of specific research topics for response

Announcement to Award:
8 – 12 months

- **Announcement:** beta.sam.gov
- **Eligibility:** open, except for university-only programs
- **Two-phase process**
 - Concept papers – 5 pages, 2-month open period
 - Proposals – by invitation, up to 20 pages
- **Evaluations:** all by federal employees
- **Award size (general):** \$150K – \$500K

FRA BAA 2021 – April 2021

Federal Railroad Administration
Office of Research, Development, and Technology

Broad Agency Announcement – BAA 2020

Appendix C – Research Topics

Note: Concept papers may be submitted at any time, through the closing date of the research topic.

Track Research		
Topic	Title	Closing Date for Concept Papers
FRA-TR-001	Research in Response to Track Division Strategic Priorities (see BAA Section 2.3)	June 4, 2021
FRA-TR-002	Physics-based Predictive Modeling of Rail Failures due to Internal Defects	June 4, 2021
FRA-TR-003	Automated Detection of Track Buckling Indicators Using Change Detection	June 4, 2021
FRA-TR-004	New Methods to Quantify and Manage Lateral Track Resistance or Longitudinal Rail Force for Track Buckling Prevention	June 4, 2021
FRA-TR-005	Improving the performance of rail welds in track through new inspection technologies, stress-reducing support conditions, or improved welding technologies	June 4, 2021
FRA-TR-006	Vibration Measurements for Determining Lateral Track Strength	June 4, 2021
FRA-TR-007	Automated Broken Spike Detection	June 4, 2021
FRA-TR-008	Drone-based Technologies for Railroad Track Inspection	June 4, 2021
FRA-TR-009	Modeling 3-Dimensional Wheel-Rail Contact Geometry	June 4, 2021
FRA-TR-010	Modeling Changes in Rail Profile	June 4, 2021
FRA-TR-011	Improved Freight Car Friction Wedge Model	June 4, 2021

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Recent BAA Statistics

High-Speed Intercity Passenger Rail (HSIPR) BAA

FY 2011–2013

Funding
\$25
million

60+
awards

Annual Research BAA

FY 2013–Present

Funding is
variable from
annual
allocations to
RD&T divisions

120+
awards

Intelligent Railroad Systems BAA

FY 2018, 2020

University or
university-led
teams only

\$1 million
per year
FY 2017–2020

10+
awards to date

University Research BAA

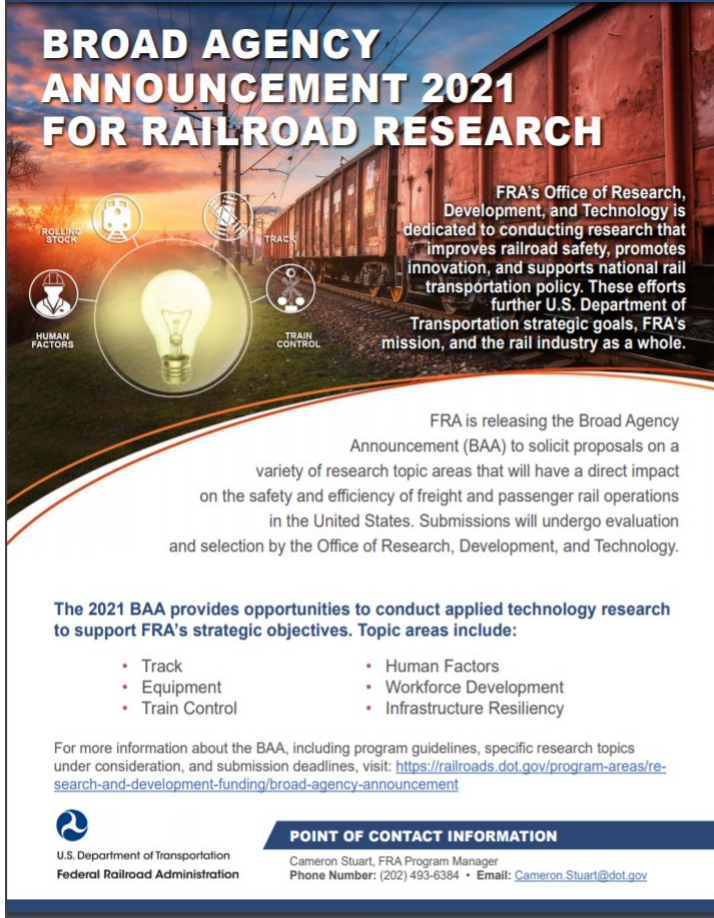
FY 2019

\$2 million
for university/
university-led
teams only

4 awards

Broad Agency Announcement FY21

- General BAA released April 2021
- Topic areas:
 - Track
 - Equipment
 - Train Control
 - Next Generation GX
 - Human Factors
 - Workforce Development
 - Infrastructure Resiliency
- Deadline for concept papers: **June 4, 2021**
- *A possible second FY21 BAA for universities*



BROAD AGENCY ANNOUNCEMENT 2021 FOR RAILROAD RESEARCH

FRA's Office of Research, Development, and Technology is dedicated to conducting research that improves railroad safety, promotes innovation, and supports national rail transportation policy. These efforts further U.S. Department of Transportation strategic goals, FRA's mission, and the rail industry as a whole.

FRA is releasing the Broad Agency Announcement (BAA) to solicit proposals on a variety of research topic areas that will have a direct impact on the safety and efficiency of freight and passenger rail operations in the United States. Submissions will undergo evaluation and selection by the Office of Research, Development, and Technology.

The 2021 BAA provides opportunities to conduct applied technology research to support FRA's strategic objectives. Topic areas include:

- Track
- Equipment
- Train Control
- Human Factors
- Workforce Development
- Infrastructure Resiliency

For more information about the BAA, including program guidelines, specific research topics under consideration, and submission deadlines, visit: <https://railroads.dot.gov/program-areas/research-and-development-funding/broad-agency-announcement>

POINT OF CONTACT INFORMATION
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Small Business Innovation Research (SBIR) Program

Presented by:

Melissa Wong, USDOT SBIR Program Manager, Volpe National Transportation Systems Center

Jeff Gordon, SBIR Program Manager, Office of Research, Development, and Technology (FRA)



U.S. Department of Transportation
Federal Railroad Administration

Agenda

1. What is the Small Business Innovation Research (SBIR) Program?
2. Who is eligible and how is a project selected?
3. How does FRA select its topics?
4. How can I learn more?

SBIR Overview

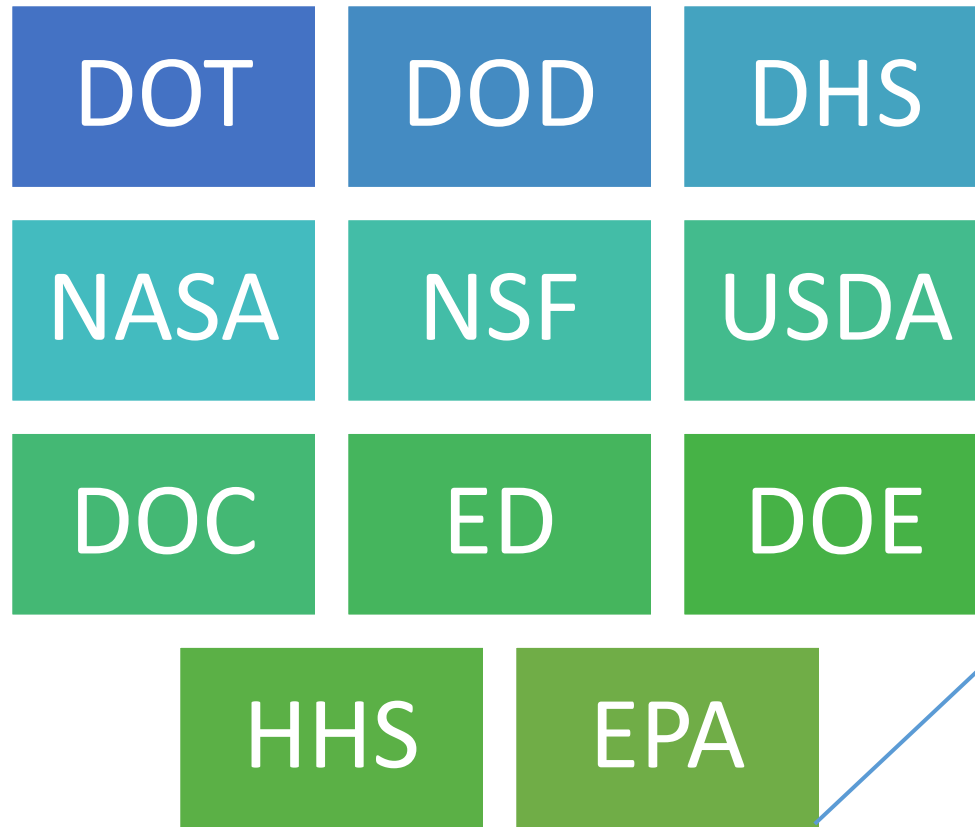
Congress established the SBIR Program* in 1982 to:

- Meet federal **research and development (R&D) needs**
- Increase private-sector **commercialization** of innovation derived from federal research and development funding
- Stimulate technological **innovation**
- Foster and encourage **participation** in innovation and entrepreneurship by women and socially/economically disadvantaged individuals

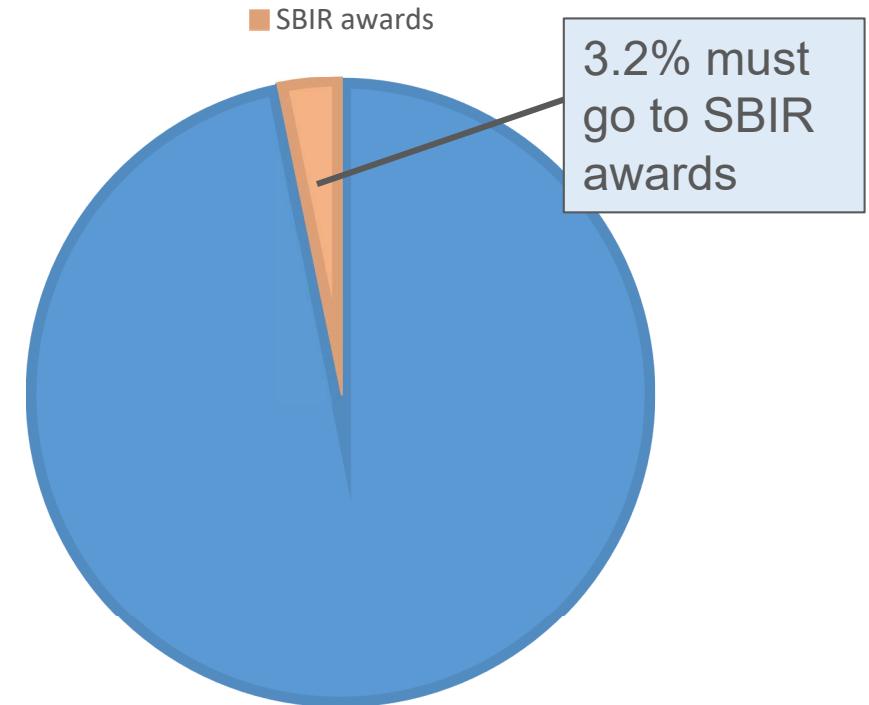
*<https://www.sbir.gov/>

SBIR Overview

Federal Agencies with Extramural
Research Budgets > \$100 Million



EXTRAMURAL RESEARCH BUDGET



U.S. DOT's SBIR Program

- SBIR addresses high-priority research gaps within DOT's R&D program
- SBIR topics are developed to align with the Secretary's strategic priorities, specific modal priorities, and the Small Business Administration (SBA)

DOT Operating Administrations Participating in SBIR

Federal Aviation Administration (voluntary)

Federal Highway Administration / ITS Joint Program Office

Federal Railroad Administration

Federal Transit Administration

Federal Motor Carrier Safety Administration

National Highway Traffic Safety Administration

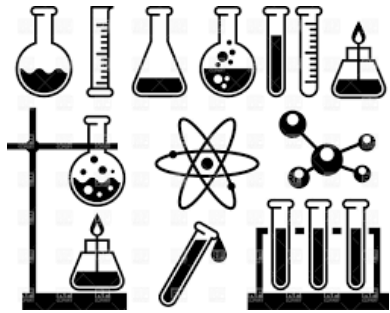
Office of the Secretary

Pipeline and Hazardous Materials Safety Administration

Eligibility

- Applicants from industry must be for-profit, U.S.-owned and -operated companies employing under 500 people
- Focus is on performing R&D, *not* purchasing equipment, or commercializing a technology that has already been developed or one that has very low risk and only needs capital
- For DOT's SBIR program, applicants cannot be majority owned by venture capital operating companies (VCOCs), hedge funds, or private equity firms

Eligibility

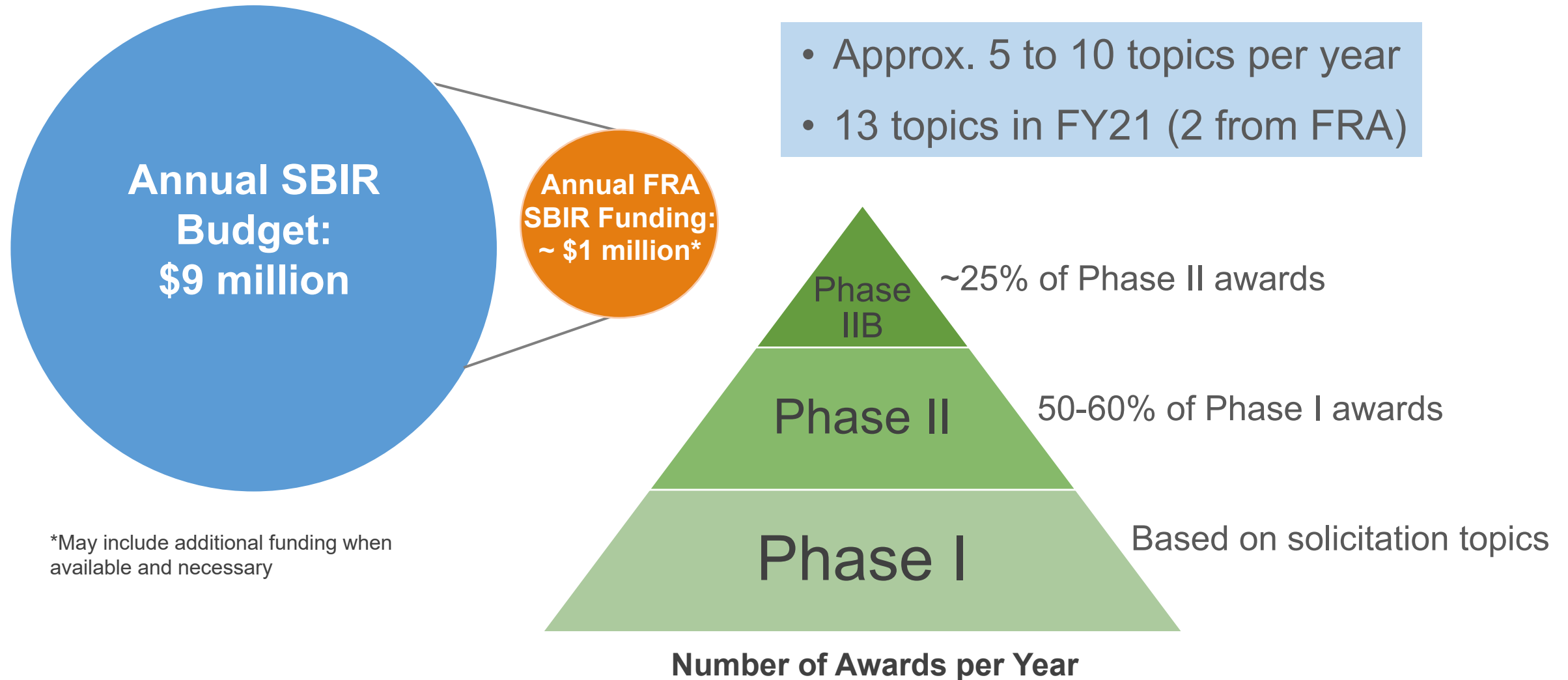


- More than one-half of the principal investigator's employment time is spent working for the small business. This typically precludes full-time employment with another organization.



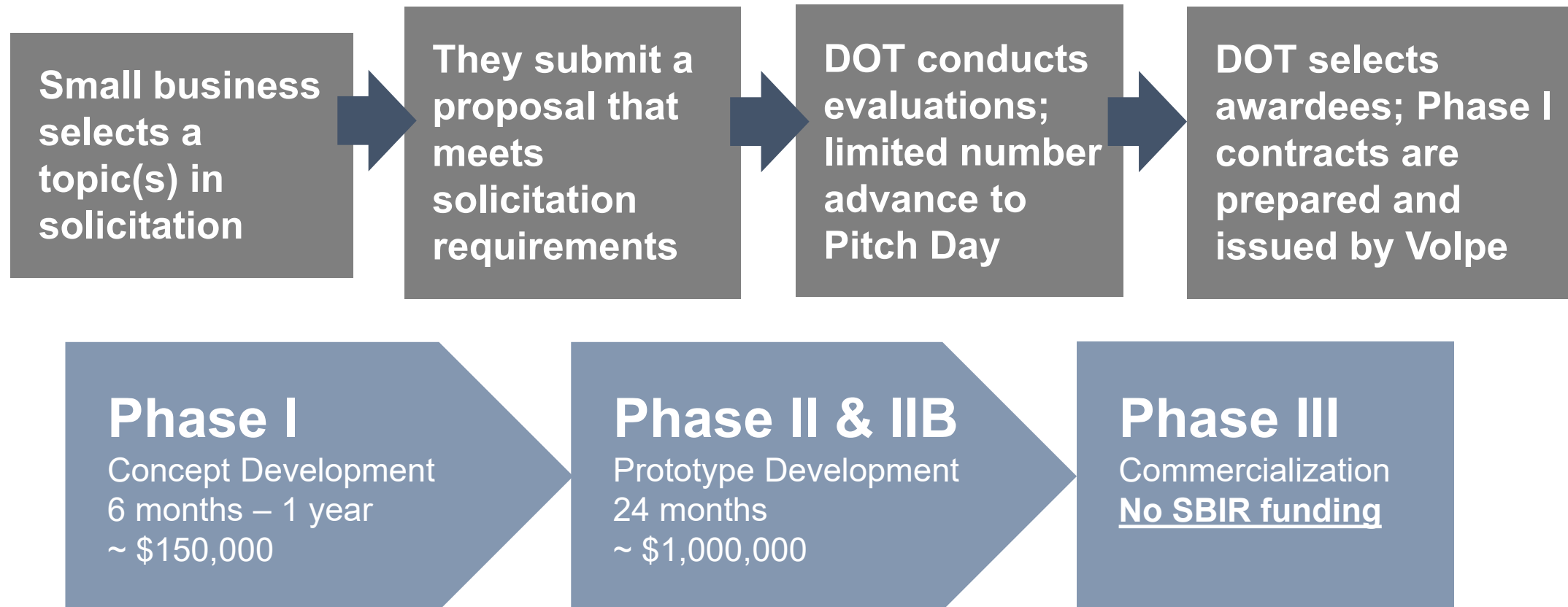
- The research or R&D work must be performed in the United States (with few exceptions) for Phase I, II, and IIB

U.S. DOT's SBIR Program Details



Three-Phase Process

Solicitation to Award Process



FRA's RD&T Program and SBIR Topic Areas

As mentioned, FRA's RD&T Office is organized into four divisions:

Track

- **Track and Structures**
- **Track and Train Interaction**
- **Facilities and Equipment**

Rolling Stock

- **Passenger & Freight Equipment and Components**
- **Hazardous Materials**
- **Train Occupant Protection**

Train Control & Communications

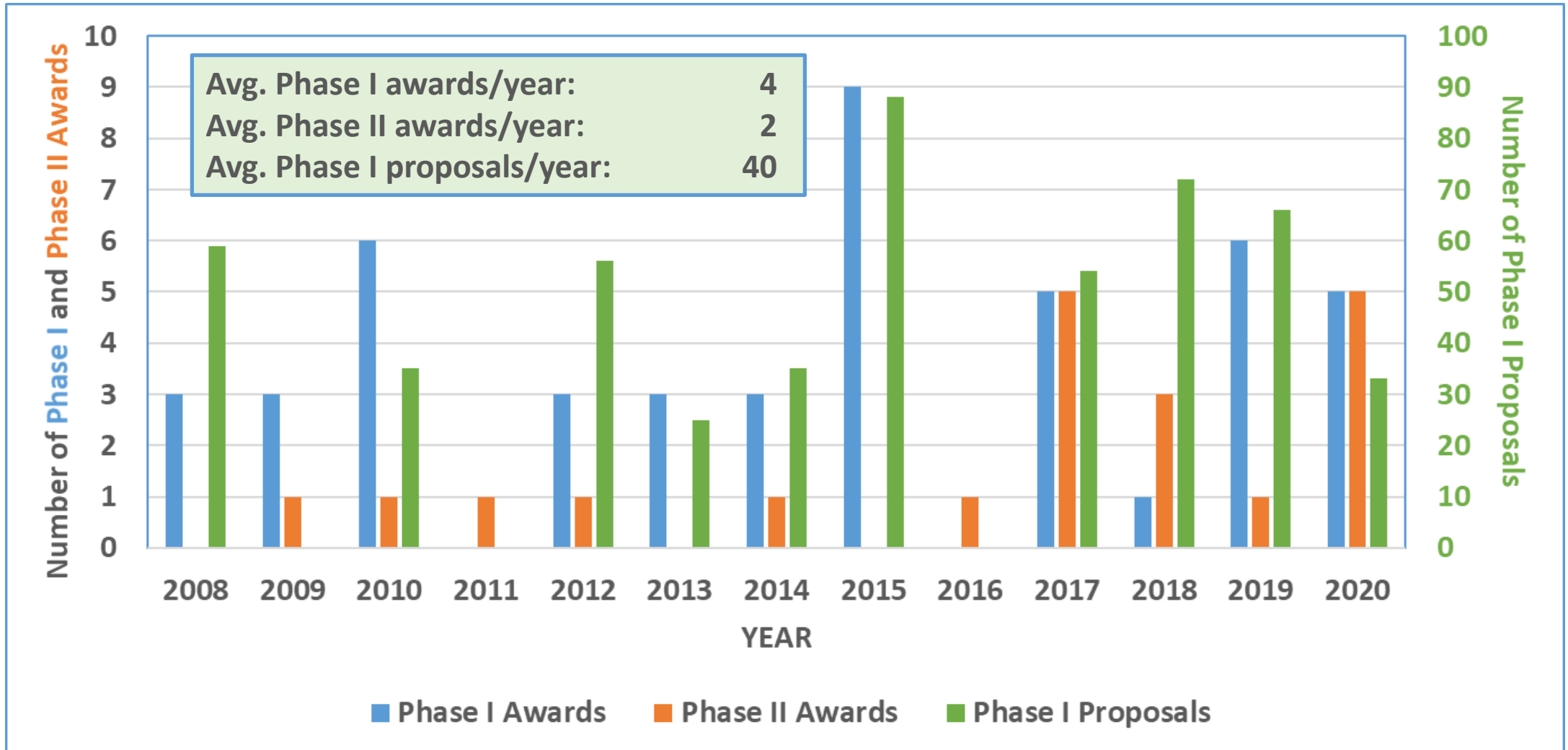
- **Train Control & Communications (e.g., PTC)**
- **Grade Crossing and Trespasser Accident Prevention**

Human Factors

- **Improve organizational safety culture in railroad organizations**
- **Conduct research on fatigue, distraction and ergonomics**
- **Develop technology, automation and systems design to minimize human error**

See: <https://railroads.dot.gov/research-development/research-development-technology>

FRA's SBIR Participation History



FY21 FRA SBIR Topics

- 21-FR1: Passenger Train Exterior Side Door Safety



Photo credit: [Wikimedia](#), [CC BY-2.0](#)

- 21-FR2: Wheel Measuring Device

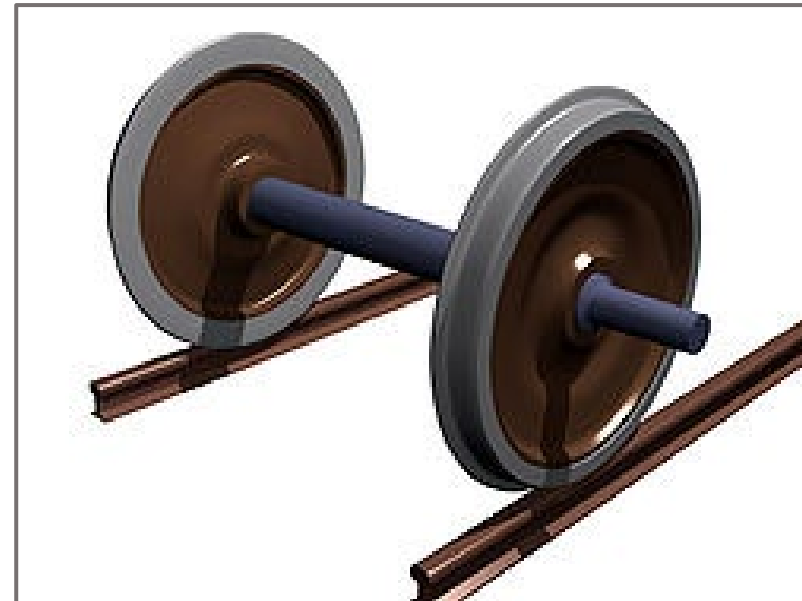


Photo credit: [Wikipedia](#), [CC BY-2.5](#)

For more information on FY21 award recommendations:

<https://www.volpe.dot.gov/work-with-us/small-business-innovation-research/fy21-awards>

Current FRA SBIR Topics with Awards

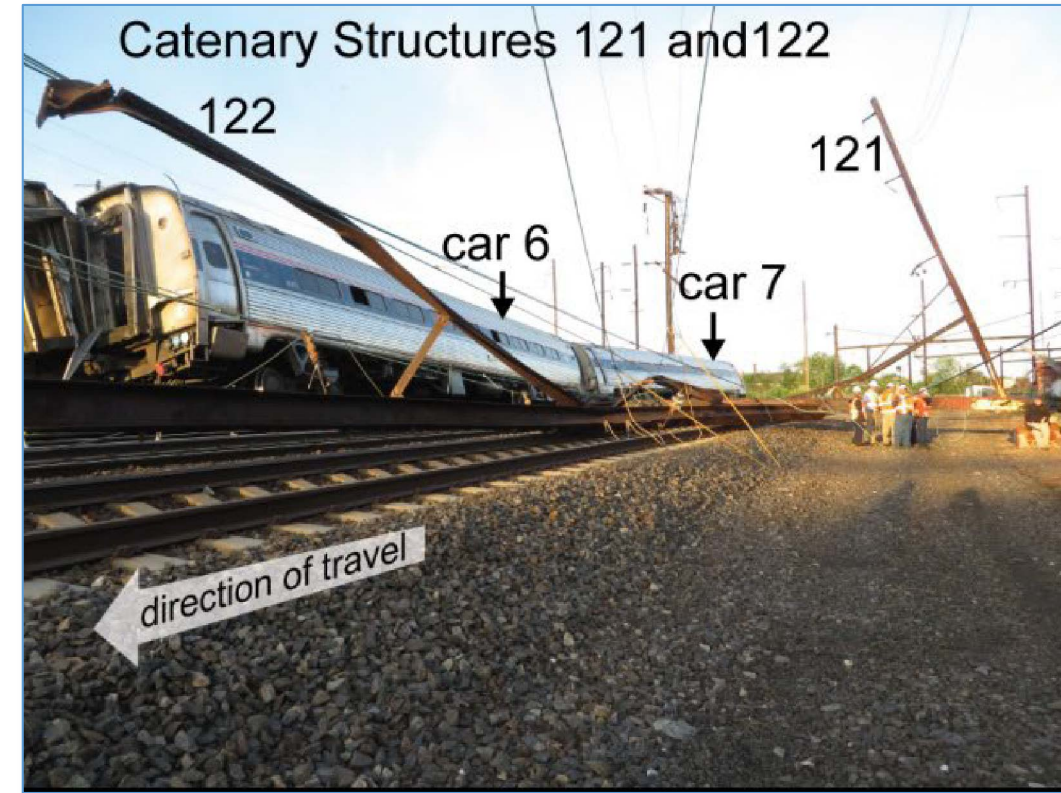


Sample of Active Contracts

- Broken Rail Detection from Flashing Rear End Device
- Drone-Based Track Safety Inspection System
- Portable Stiffness/Elastic Modulus Measurement System
- Improved Condition Monitoring of Traction Motors
- Resilient Wayside Structures to Reduce Severity of Passenger Equipment Collisions and Derailments

Ongoing Phase IIB SBIR Related to Train Occupant Protection

Resilient Wayside Structures and Passenger Car Survivability



SBIR Success Story

A Safer Way to Access Freight Locomotives



Agency: **Federal Railroad Administration**

Company: **GS Engineering, Inc.**

Product: **Easy Access to Freight Locomotives**

With support from the U.S. DOT SBIR program and the Federal Railroad Administration (FRA), GS Engineering, Inc. developed and tested a system that makes accessing freight locomotives easier and safer for railroad engineers and workers...continue

reading.

For more SBIR success stories, visit:

<https://www.volpe.dot.gov/work-with-us/small-business-innovation-research/sbir-success-stories>



Photo credit: GS Engineering, Inc.

Other Things to Know about SBIR

- **One solicitation** per year
- Next solicitation expected **winter 2021-2022**
 - Sign up to receive notifications when topics are posted, as well as solicitation open and close dates at www.volpe.dot.gov/sbir
- SBIR administers **contracts**, not grants
- SBIR Program Office does not accept **unsolicited proposals**

Contact

- For more information about FRA's Research, Development and Technology Program, contact:

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- For more information about the DOT's SBIR Program, visit www.volpe.dot.gov/sbir or contact:

DOT SBIR Program Office

617-494-2051

DOTSBIR@dot.gov

Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program

Presented by: *Doug Gascon, Acting Chief, Program and Policy Development Division, Office of Railroad Policy and Development (FRA)*



U.S. Department of Transportation
Federal Railroad Administration

CRISI Program Overview

Grant Purpose

- To fund projects that improve the safety, efficiency, and/or reliability of intercity passenger and freight rail systems

CRISI – Recent & Upcoming Funding Opportunities

Authorization & Appropriations (M)

	FY18	FY19	FY20	FY21
Authorization	\$230	\$255	\$330	\$330
Appropriation	\$592.5	\$255	\$325	\$375

Status of Funding Opportunities

Year	Available Funding (M)	Status	
FY18 (PTC)	\$250	<input checked="" type="checkbox"/>	Awards announced August and December 2018
FY18	\$318	<input checked="" type="checkbox"/>	Awards announced June 2019
FY19	\$244	<input checked="" type="checkbox"/>	Awards announced March 12, 2020
FY20	\$311	<input checked="" type="checkbox"/>	Awards announced September 23, 2020
FY21	TBD	<input type="checkbox"/>	NOFO expected spring 2021

CRISI Program Overview

Eligible Applicants

- State entities
- Public agencies or publicly chartered authorities
- Local governments
- Amtrak or other intercity passenger rail carrier
- Class II or III railroads
- Any rail carrier or equipment manufacturer in partnership with at least one state entity, public agency, and/or local government
- The Transportation Research Board (TRB) together with any entity with which it contracts in the development of rail-related research, including cooperative research programs
- A university transportation center engaged in rail-related research
- A non-profit labor organization

CRISI Program Overview

Eligible Project Criteria

- **Wide Range of Rail Capital Projects**
 - Congestion mitigation
 - Ridership growth facilitation
 - Enhancements to multimodal connections
 - Improvements to short-line or regional railroad infrastructure
- **Railroad Safety Technology**
- **Track, Station, and Equipment Improvements for Intercity Passenger Rail**
- **Grade Crossing Improvements**
- **Rail Line Relocation and Improvement**
- **Regional, State, Corridor Planning and Environmental Analyses**
- **Safety Programs and Institutes**

- **Workforce Development and Training**
- **Research to advance rail-related capital, operations, and safety improvements**

At least 25% of funds is reserved for rural projects

New in FY 2021

- **\$75M** set aside for capital projects to support new intercity passenger rail service routes including alignments for existing routes
- **\$25M** set aside for capital projects and engineering solutions targeting trespassing
- **\$2.3M** set aside for trespass prevention projects related to enforcement and outreach (from Non-CRISI funding included in NOFO)

CRISI Program Overview

- Primarily a capital project improvement program
- Required match
 - Non-federal match: 20% minimum; preference for 50% or more
- Four tracks
 - **Track 1:** Planning
 - **Track 2:** Preliminary Engineering / National Environmental Policy Act review
 - **Track 3:** Final Design/Construction
 - **Track 4: Research, Safety Programs, and Institutes**
- Active 2017 – current

iv. Track 4—Research, Safety Programs and Institutes (Non-Railroad Infrastructure)

Track 4 consists of projects not falling within Tracks 1–3 and for the development and implementation of workforce development activities, research, safety programs or institutes designed to improve rail safety that clearly demonstrate the expected positive impact on rail safety. Sufficient detail must be provided on what the project will accomplish, as well as the applicant's capability to achieve the proposed outcomes. Examples include: Initiatives for improving rail safety, training, public outreach, and education.

Recent Grant Selections

Rural Railroad Safety Center

Kansas State University

Award: Up to \$2,574,365

Project Description:

- Develops Rural Railroad Safety Center with partner institutions:
 - University of Nebraska, Lincoln
 - University of Florida
 - Pennsylvania State University, Altoona
 - California State University, Chico
- Project will provide railroad industry workforce development and safety research

Rail Pulse: The Realization of Railcar Location, Condition, Health, and Telematics Sensors on the North American Railcar Fleet

Pennsylvania Department of Transportation

Award: Up to \$7,895,000

Project Description:

- Develops a railcar onboard **GPS sensor system** to provide real-time information on railcar movements and condition to shippers, car owners, and railroads
- Proposed concept could offer safety benefits as well as increased visibility regarding shipments

Improving the Safety At Grade Crossings in Rural Areas Using UAV-CRP Data Analysis

Texas A&M Engineering Experiment Station

Award: Up to \$241,546

Project Description:

- Will demonstrate the feasibility of using drones to collect site conditions data at grade crossings in rural areas in order to improve safety for vehicle traffic and trains



CONTACT US

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For more information visit us at
www.fra.dot.gov



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