

# Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration & Automated Transit Bus Maintenance and Yard Operations Demonstration Compostitive Eupding Oppostunity

# Competitive Funding Opportunity Webinar

Opportunity ID: FTA-2022-015-TRI-STAR
October 6, 2022



Welcome! We will begin shortly.

# Housekeeping

- Please use the Q&A feature to submit questions
  - Questions will be addressed after the final presentation, as time permits
  - Additional questions may be submitted to <u>transitautomation@dot.gov</u> after the webinar
- Presentation materials and FAQs will be posted on FTA's website at <a href="https://www.transit.dot.gov/grant-programs/advanced-driver-assistance-systems-adas-transit-buses-demonstration-and-automated">https://www.transit.dot.gov/grant-programs/advanced-driver-assistance-systems-adas-transit-buses-demonstration-and-automated</a>
- The webinar is being recorded

# **Agenda**

1

Provide introduction and context

2

Discuss Transit
Bus Automation
Demonstrations
Funding
Opportunity

3

Discuss how to apply for funding opportunity

4

Address questions

# **Today's Speakers**



#### **Justin John**

Program Analyst
Office of Research, Demonstration
and Innovation



#### **Steve Mortensen**

Senior ITS Engineer

Fede Admi
Office of Research, Demonstration
and Innovation



## **Danyell Diggs**

Senior Transportation Program
Analyst
Office of Research, Demonstration
and Innovation



#### **Johnita Glover**

Transportation Program Analyst
Office of Grants Management and
Guidance

ADAS for Transit Buses Demonstration & Automated Transit Bus Maintenance and Yard Operations Demonstration

# **CONTEXT**

# Strategic Transit Automation Research (STAR) Plan



 $\frac{https://www.transit.dot.gov/research-innovation/strategic-transit-automation-research-plan-report-0116}{}$ 



# **Technology Packages**

FTA's STAR Plan identifies 14 use cases that fit into the five technology packages shown below.

#### **Transit Bus ADAS**

- Smooth Acceleration and Deceleration
- Automated Emergency Braking and Pedestrian Collision Avoidance
- Curb Avoidance
- Precision Docking
- Narrow Lane/Shoulder
   Operations
- Platooning



# Automated Shuttles

- Circulator Bus Service
- Feeder Bus Service



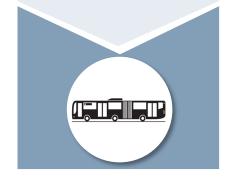
#### Maintenance, Yard, Parking Operations

- Precision Movement for Fueling/Recharging, Maintenance, Disinfection, and/or Bus Wash
- Automated Parking and Recall



#### Automated Bus Rapid Transit (BRT

Automated BRT



#### Mobility-on-Demand Service

- Automated First/Last Mile
- Automated Americans with Disabilities Act (ADA) Paratransit
- On-Demand Shared Ride



*Image Credits: Adobe Stock* 



ADAS for Transit Buses Demonstration & Automated Transit Bus Maintenance and Yard Operations Demonstration

# **COMPETITIVE FUNDING OPPORTUNITY**

# **Notice of Funding Opportunity (NOFO)**

The FTA recently issued a competitive Notice of Funding Opportunity (NOFO) for transit bus automation demonstration projects.

The NOFO for transit bus automation demonstration projects under the Public Transportation Innovation Program (49) U.S.C. 5312) was published on September 22, 2022. Applications are due by **November 21, 2022.** 

### AVAILABLE FUNDING

**\$6.5 million** is available for demonstration projects in **2 areas**:

- \$5 million for ADAS for Transit Buses
- \$1.5 million for an initial phase of Automated Transit Bus Maintenance and Yard Operations

Note: No minimum or maximum project size



Federal Register / Vol. 87, No. 183 / Thursday, September 22, 2022 / Notices

FY 2022 Competitive Funding Opportunity: Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration and Automated Transit Bus Maintenance and Yard

AGENCY: Federal Transit Administration

opportunity to apply for funding for transit bus automation demonstration projects under the Public Transportation vation Program. FTA is exploring technologies in bus transit operations as described in the Strategic Transit Automation Research (STAR) Plan. As part of this research agenda, FTA is inding a number of demonstrations create a testbed for study of technical maintenance costs, workforce training nd transition, and institutional iss and will further assess the needs for

DATES: Complete applications must be submitted electronically through the GRANTS.GOV "APPLY" function by 11:59 p.m. Eastern time on November FOR FURTHER INFORMATION CONTACT:

Steve Mortensen, Senior ITS Engineer 202-493-0459, or transitautom

#### SUPPLEMENTARY INFORMATION: Table of Contents

standards development.

#### A. Program Description

- L. Federal Award Information L. Eligibility Information D. Application and Submission Information E. Application Review Information F. Federal Award Administration

#### A. Program Description

This Notice (Federal Assistance Listing: 20.530) seeks to fund Program (49 U.S.C. 5312): (1) Advanced Driver Assistance Systems (ADAS) for Fransit Buses and (2) Automated Transit Operations—identified as in the STAR Plan (available at https://

research-plan). These demonstrations address one of the primary goals of the STAR Plan, which is to demonstrate ransit bus automation technologies in eal-world settings. The demonstrations will help establish the feasibility of Maintenance and Yard Operations use impacts. A total of up to \$6.5 million is 1. \$5 million for ADAS for Transit

2 \$1.5 million for an initial phase of Automated Transit Bus Maintenance and Yard Operations and, subject to availability, additional funding may be provided to implement a second phase Maintenance and Yard Operations

1. Program Overview Automation capabilities have grown rapidly in recent years and have hanged the dialogue around all aspects of the surface transportation system. many potential benefits, but transit s need additional rese practical information to make informed eployment decisions. To support the development and deployment of automated bus transit services and to vance transit readiness for automation and help move the transit industry to outline FTA's research agenda on transit bus automation technologies. FTA's efforts aim to help determine the otential benefits and costs of transit us automation, and to provide transit agencies with the resources, guidance and tools they need to make informed deployment decisions. See FTA's Transit Automation Research website for more information (https:// www.transit.dot.gov/automation-The demonstrations align with the

Department's Innovation Principles and trategic Goals: Safety, Economic Strength and Global Competitivenes Equity, Climate and Sustainability, ransformation, and Organizational Excellence, ADAS has the potential to increase safety, provide a more ccessible service, and/or improve friving and operational performance i terms of fuel economy, network efficiency, or other metrics. Automated maintenance and vard operations have transit agency facilities and improve

collisions, and increase safety, including safety for vulnerable road users, and has the potential to provide a more accessible service (e.g., precision docking) and improve driving and operational performance in terms of fuel economy and network efficiency (e.e. platooning, narrow lane/shoulder and vard operations can increase efficiency in transit agency maintenan and yard facilities (e.g., precision novement of fueling, service bays, and ous washing; automated parking and recall) and improve safety of operations within these facilities for the transit agency workforce (e.g., bus disinfection njury reduction)

#### 2. Research Scope

Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration: FTA is seeking nnovative projects to demonstra market-ready or near market-ready ADAS technologies for use in revenue ervice to assess technology readiness and effectiveness, address technical ssues, identify benefits and costs, and measure impacts. Demonstrations should be conducted with technologies and vehicles that are currently on the market and can be adapted or retrofitted to the purpose relatively quickly. Use cases may include smooth acceleration and deceleration; automatic emergency braking and pedestrian collision avoidance; curb avoidance; precision docking; narrow lane/shoulder perations; and platooning. Eligible activities include applicable system engineering activities leading to the onstration of ADAS use cases, such as requirements, architecture, and design development; equipment installation and integration; and pre demonstration testing. Workforce engagement, training, and skills development activities related to the demonstration are also eligible. Projects will consist of a minimum 12-month operational demonstration in revenue service. Eligible projects must propose to demonstrate at least one ADAS use

Automation for Maintenance and Yard Operations Demonstration: FTA is seeking innovative projects to execute the first phase and, if funding becomes available, the second phase of Automation for Maintenance and Yard Operations demonstrations Demonstrations should be conducted with vehicles that are broadly representative of those currently



# **Demonstration Goals**

The FTA aims to better understand the needs and feasibility of automation technologies and supports the development of these technologies to increase transit safety and efficiency.

# **Transit Bus Automation Demonstration Goals** Demonstrate automation technologies in real-world settings to understand feasibility and impacts ☐ Create a testbed for study of: Technical issues User acceptance Operational and maintenance costs Workforce training and transition Institutional issues ☐ Further assess needs for standards development Spur technology development Grow confidence for transit agencies Increase safety and efficiency

# **ADAS for Transit Buses Demonstration**

- \$5 million funding available
- Demonstrate market-ready or near market-ready ADAS technologies for one or more use cases:
  - Smooth acceleration and deceleration
  - Automatic emergency braking and pedestrian collision avoidance
  - Curb avoidance
  - Precision docking
  - Narrow lane/shoulder operations
  - Platooning
  - Others
- Conducted with vehicles that are currently on the market and can be adapted or retrofitted



Image: Partners for Advanced Transportation Technology, Lane Transit District



Image: Virginia Tech Transportation Institute, Pierce Transit

# **ADAS for Transit Buses Demonstration (cont.)**

- Assess technology readiness and effectiveness, address technical issues, identify benefits and costs, and measure impacts
- Project eligible activities:
  - Requirements, architecture, and design development
  - Equipment installation and integration
  - Pre-demonstration testing
  - Workforce engagement, training, and skills development
- 12-month operational demonstration in revenue service

# Automated Transit Bus Maintenance and Yard Operations Demonstration

- \$1.5 million for initial phase; additional funding may be available for a second phase
- Demonstrate one or more use cases:
  - Precision movement for fueling/recharging, maintenance, disinfection, and/or bus wash
  - Automated parking and recall
  - Others
- Conducted with vehicles broadly representative of current agency's fleet in terms of size and passenger capacity
- Assess technology readiness and effectiveness, address technical issues, identify benefits and costs, and measure impacts



Image: Machek et al. (2018)

# Automated Transit Bus Maintenance and Yard Operations Demonstration (cont.)

- Project eligible activities:
  - Requirements, architecture, and design development
  - Equipment installation and integration
  - Testing
  - Workforce engagement, training, and skills development
- Phase 1:
  - Will result in one or more concepts of operations and limited proof-of-concept demonstration
  - Be conducted within 12 months of project award
- Phase 2 (pending funding) includes:
  - Longer-term (12-24 months) operational demonstration on a transit property
  - Additional functionality (e.g., expand number of equipped vehicles, locations within the yard, and/or automation of functions)



# **Eligible Applicants**

The following groups are eligible to apply for funding through Grants.gov.

# Who can apply:

- Public transit agencies
- State/local government entities
- Metropolitan planning organizations (MPOs)
- Federally recognized Indian tribes
- ☐ Institutions of higher education, particularly those with Minority Serving Institution status

# **Project Partners**

Teaming partners may include the following groups.

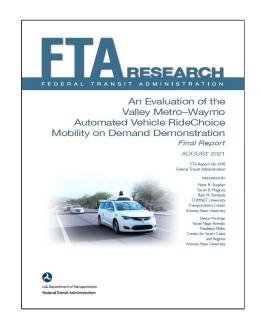
# Partners could include:

- Bus manufacturers
- Technology system suppliers, developers, and integrators
- Operators of transportation services, such as employee shuttle services, airport connector services, university transportation systems, or parking and tolling authorities
- State or local government entities
- ☐ Labor unions and other workforce representatives
- Other organizations, including consultants, research consortia, and notfor-profit industry organizations



# **Project Structure**

- 20% local cost-share minimum
- FTA will award cooperative agreements to lead applicant
- Projects structured on **cost reimbursable** basis
- Required to work with an FTA-selected independent evaluator
- Provide knowledge transfer throughout project
- Produce project report for publication at end of project
- FTA Research Circular 6100.1E will help guide project implementation



# **Project Requirements**

Transit bus automation demonstration projects must meet the following compliance requirements.

# Projects must comply with:

### **Safety Requirements**

- NHTSA Federal Motor Vehicle Safety Standards
- FMCSA Federal Motor Carrier Safety Regulations

#### **Made in America**

- Buy America
- Build America

#### **Americans With Disabilities Act**

# Other requirements include:

 Communications with FTA project manager prior to external communications engagement Data access and sharing

# **Application Evaluation Criteria**

Applicants will be evaluated against the following criteria while under review.



# **Review and Selection Process**

The technical evaluation committee and the FTA Adminstrator will evaluate and select funding applicants based on the evaluation criteria as well as other relevant factors.

#### **Evaluate**

 Technical evaluation committee made up of Federal staff will evaluate applications based on the evaluation criteria

#### Consider

 FTA may also consider geographic diversity, diversity in size of grantees receiving funding, or the applicant's receipt of other competitive awards

#### Select

 FTA Administrator will determine the final selection based on review of the technical evaluation committee

ADAS for Transit Buses Demonstration & Automated Transit Bus Maintenance and Yard Operations Demonstration

# **HOW TO APPLY**

# **Application Documentation**

Funding applicants are required to submit the following documentation and may also submit additional supporting document.

# **Application Submissions Include**

## **Required** Documents:

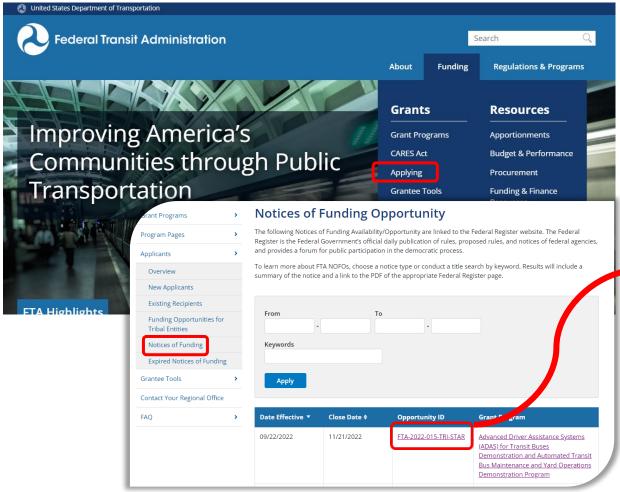
- Standard Form 424
- Supplemental Form
- Project approach and proposed scope of work attachment (15-page limit)

# **Optional Supporting Documentation:**

- Letters of support or partner agreements
- Resumes



# **FTA Notice of Funding Opportunity**



Federal Transit Administration Regulations & Programs Home / Funding / Grants / Applying Fiscal Year 2022 Advanced Driver Assistance Systems **Grant Programs** (ADAS) for Transit Buses Demonstration and Automated Program Pages **Transit Bus Maintenance and Yard Operations** Applicants **Demonstration Notice of Funding** Grantee Tools Date Posted: September 22, 2022 Date Closed: November 21, 2022 Contact Your Regional Office Opportunity ID: FTA-2022-015-TRI-STAR FAO **Grant Program:** Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration and Automated Transit Bus Maintenance and Yard Operations Demonstration Program Opportunity Announcement PDF: **Related Links** https://www.govinfo.gov/content/pkg/FR-2022-09-22/pdf/2022-20511.pdf • Advanced Driver Assistance **Opportunity Announcement TXT:** Systems (ADAS) for Transit https://www.govinfo.gov/content/pkg/FR-2022-09-22/html/2022-20511.htm Buses Demonstration and A... **Related Documents** Details: September 22, 2022. Notice of Funding Opportunity (NOFO): Solicitation of Project Proposals for the FY 2022 Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration and Automated Transit Bus Fiscal Year 2022 Advanced Maintenance and Yard Operations Demonstration. Driver Assistance Systems The Federal Transit Administration (FTA) announces the opportunity to apply for a total up to \$6.5 million for (ADAS) for Transit Buses demonstration projects: \$5 million for ADAS for Transit Buses and \$1.5 million for an initial phase of Automated Demonstration and Transit Bus Maintenance and Yard Operations. Additional funding may be provided to implement a second phase of **Automated Transit Bus** the Automated Transit Bus Maintenance and Yard Operations Demonstration. See the Federal Register Notice. Maintenance and Yard Synopses and a full announcement are posted on Grants. Gov as opportunity FTA-2022-015-TRI-STAR. Operations Demonstration

FTA website:

https://www.transit.dot.gov/

Funding Opportunity Notices:

https://www.transit.dot.gov/funding/grants/notices

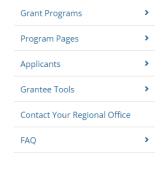


# FTA Notice of Funding Opportunity (cont.)

# **FTA NOFO Page contains:**

- Summary Description
  - Application requirements
  - Eligibility
- Supplemental Form
- Links to Grants.gov
- Links to Program Information
- Other references and links

**Link and Instructions for attaching the supplemental form to the SF-424**: All applicants must complete the attached supplemental form and attach it to their submission in GRANTS.GOV.



#### **Related Links**

 Advanced Driver Assistance Systems (ADAS) for Transit
 Buses Demonstration and A...

#### Related Documents

 Fiscal Year 2022 Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration and Automated Transit Bus Maintenance and Yard Operations Demonstration Notice of Funding Fiscal Year 2022 Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration and Automated Transit Bus Maintenance and Yard Operations Demonstration Notice of Funding

Date Posted: September 22, 2022

Date Closed: November 21, 2022

Opportunity ID: FTA-2022-015-TRI-STAR

#### **Grant Program:**

Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration and Automated Transit Bus Maintenance and Yard Operations Demonstration Program

#### **Opportunity Announcement PDF:**

https://www.govinfo.gov/content/pkg/FR-2022-09-22/pdf/2022-20511.pdf

#### **Opportunity Announcement TXT:**

https://www.govinfo.gov/content/pkg/FR-2022-09-22/html/2022-20511.htm

**Details: September 22, 2022.** Notice of Funding Opportunity (NOFO): Solicitation of Project Proposals for the FY 2022 <u>Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration and Automated Transit Buses Maintenance and Yard Operations Demonstration.</u>

The Federal Transit Administration (FTA) announces the opportunity to apply for a total up to \$6.5 million for demonstration projects: \$5 million for ADAS for Transit Buses and \$1.5 million for an initial phase of Automated Transit Bus Maintenance and Yard Operations. Additional funding may be provided to implement a second phase of the Automated Transit Bus Maintenance and Yard Operations Demonstration, see the Federal Register Notice.

Synopses and a full announcement are posted on Grants.Gov as opportunity FTA-2022-015-TRI-STAR.

Proposals must be submitted electronically through Grants.Gov website by 11:59 PM Eastern Time on November 21, 2022.

FTA NOFO provides hyperlinks to Grants.gov opportunity notice, related documents, and application package.

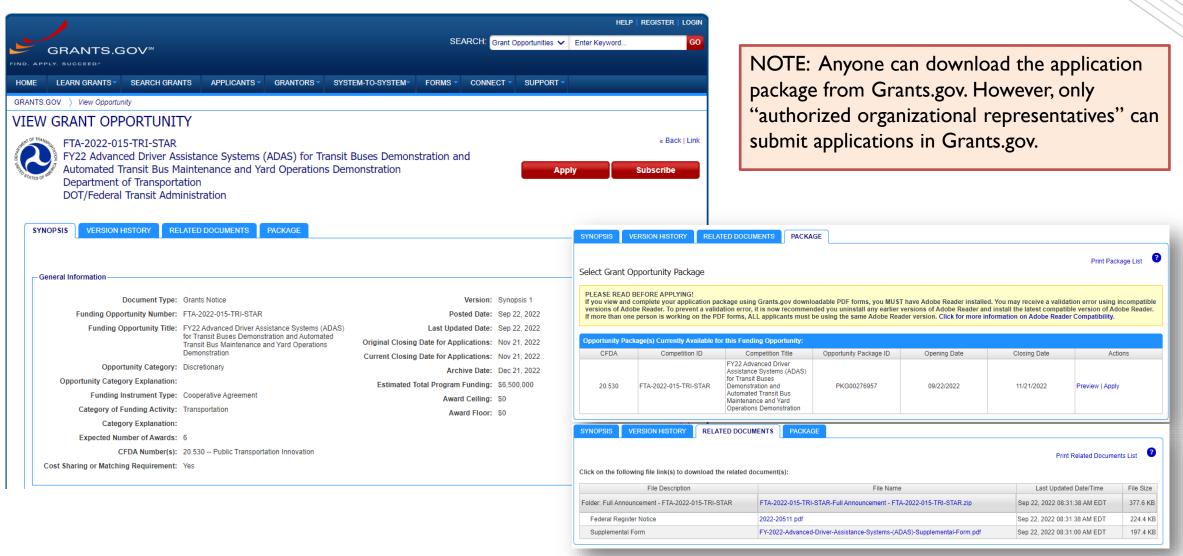
https://www.transit.dot.gov/funding/grants/notices



Link to

Grants.gov

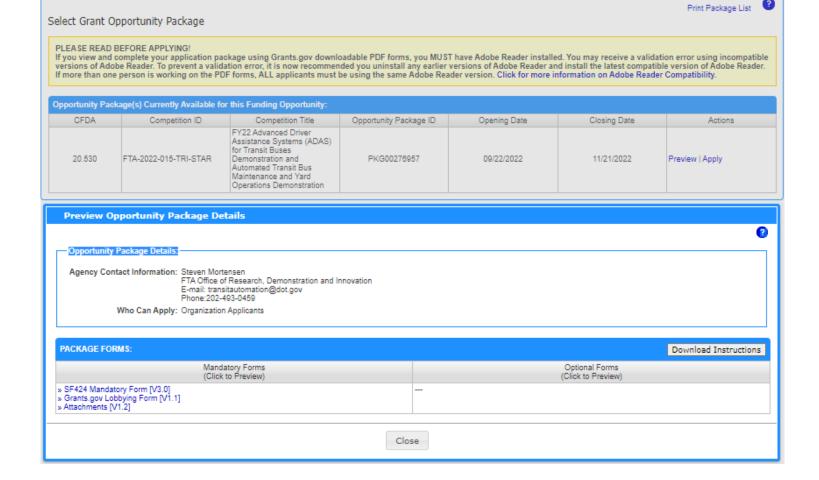
# **Download Application**





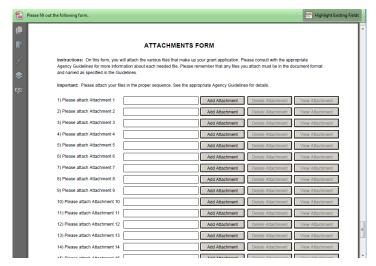
# **Application Package**

PACKAGE



OMB	Nu	mber:	40	40	0	00	2
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APPLICATION FOR FEDERAL ASSISTANCE SF-424 - MANDATORY								
1.a. Type of Submission:  Application Plan Funding Request Other (specify):	1.b. Frequency: Annual Quarterly Other Other (specify):	T.d. Version:						
1.c. Consolidated Application/Plar Yes No Explana		4b. Federal Award Identifier:						
7. APPLICANT INFORMATION:								
a. Legal Name:								
b. Employer/Taxpayer Identification	on Number (EIN/TIN):	c. Organizational DUNS:						
d. Address:								
Street1:		Street2:						
City:		County / Parish:						
State:		Province:						
Country:		Zip / Postal Code:						
USA: UNI	TED STATES							
e. Organizational Unit:		_						



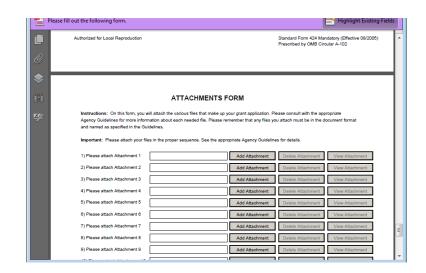
# **Application Package (cont.)**

Buses Demonstration and Yar A	FY22 Advanced Driver Assistance Systems (ADAS) for Transit Buses Demonstration and Automated Transit Bus Maintenance and Yard Operations Demonstration Applicant and Proposal Profile  Is this a resubmission due to an invalid/error message from FTA?  Yes No						
Section I. Applicant Informa	ation						
Organization Legal Name:							
FTA Recipient ID Number: (if applicable)							
Organization Chief Executive Officer: (name and direct phone number)							
Applicant Eligibility:	Public Transit Agency  State/Local Government Entity  Metropolitan Planning Organization (MPO)  Federally Recognized Indian Tribe  Institution of Higher Education						
Project Location:	C Large Urbanized Area Rural						
Is the organization a minority serving institution? O Yes O No							

**CAUTION:** Do not use "**Supplemental Form**" from prior years or create your own form. Please use the file provided on the FTA website.

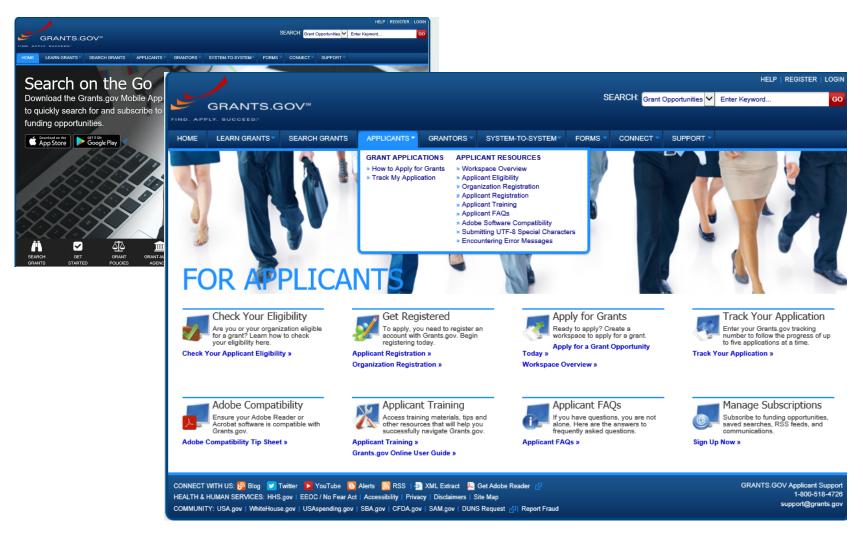
The "Attachment Form" shown below is included in the SF-424 Grant Application Package in Grants.gov.

Form to the Attachment Form shown below when submitting in Grants.gov.





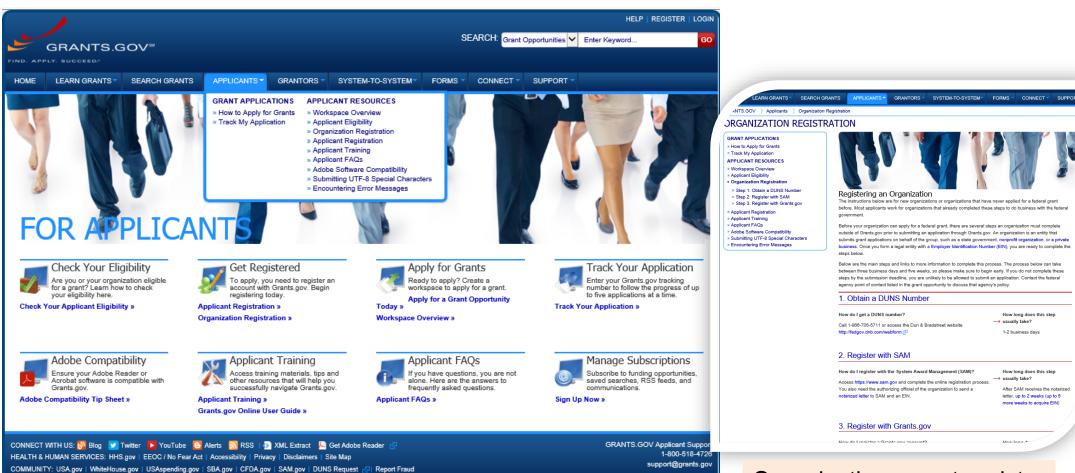
# **Grants.gov – Applicants**



https://www.grants.gov/web/grants/applicants.html



# **Applicant – Organization Registration**



Organizations must register in Grants.gov in order to submit applications



# **Workspace in Grants.gov**

GRANTS.GOV ) Applicants ) Workspace Overview

#### WORKSPACE OVERVIEW

#### **GRANT APPLICATIONS**

- » How to Apply for Grants
- Track My Application

#### APPLICANT RESOURCES

- Workspace Overview
- » Workspace Basic
- Workspace Intermediate
- Workspace Advanced
- » Workspace Process » Workspace Roles
- Custom Roles
- Applicant Eligibility
- Organization Registration
- Applicant Registration
- » Applicant Training
- Applicant FAQs
- Adobe Software Compatibility
- Submitting UTF-8 Special Characters
- Encountering Error Messages

#### Get Started on Your Workspace Application

Workspace is the standard way for organizations or individuals to apply for federal grants in Grants.gov. Workspace allows a grant team to simultaneously access and edit different forms within an application. Plus, the forms can be filled out online or offline-your choice.

Grants.gov Workspace also allows applicants and organizations to tailor their application workflow. Here are three approaches that applicants can take when completing a Workspace application:

## Intermediate

- + Best for organizations with 1-2 registered Grants.gov
- + Application forms are downloaded and emailed to collaborators before being uploaded back to the workspace

Using Custom Roles in Workspace

LEARN MORE >

organization.

LEARN MORE >

Basic

- + Best for organizations with 3-5 registered Grants.gov
- + Applicant teams are typically comprised of an AOR who submits, as well as a Workspace Owner who oversees form completion

LEARN MORE >

Organizations are also able to create custom roles and assign these roles to the users affiliate

#### Advanced

- + Best for organizations with external Grants.gov use such as consultants
- + Workspace Owne manages form acce
- + Workspace Owne subforms

LEARN MORE >

#### Grants.gov Roles & Privileges

**GRANT APPLICATIONS** How to Apply for Grants Track My Application

WORKSPACE ROLES

GRANTS.GOV<sup>™</sup>

HOME LEARN GRANTS▼ SEARCH GRANTS

GRANTS.GOV ) Applicants ) Workspace Overview

#### APPLICANT RESOURCES Workspace Overview

- Workspace Basic
- » Workspace Intermediate
- Workspace Advanced
- » Workspace Process
- » Workspace Roles Custom Roles
- Applicant Eligibility
- Organization Registration
- Applicant Registration
- Applicant Training Applicant FAQs
- Adobe Software Compatibility
- Submitting UTF-8 Special Characters Encountering Error Messages

#### Administrator Core Role Core Role Expanded AOR Standard AOR Point of Contact

Core Role

When an applicant organization user registers with Grants.gov, the organization E-Business Point of Contact (EBiz

POC) -- or a user with the Expanded AOR role -- can assign the user a core role, a custom role, or no role

GRANTORS▼ SYSTEM-TO-SYSTEM▼ FORMS▼ CONNECT▼ SUPPORT▼



SEARCH: Grant Opportunities V Enter Keyword...

Custom Role

E-Business Point of Contact

The E-Business Point of Contact (EBiz POC) works primarily at the administrative level to (among other tasks) assign roles to organization users once they register with Grants gov



# Web Addresses

## FTA Funding Opportunities:



https://www.transit.dot.gov/funding/grants/notices

### Grants.gov:



http://www.grants.gov/

http://www.grants.gov/web/grants/applicants.html

**GRANTS.GOV Applicant Support** 1-800-518-4726

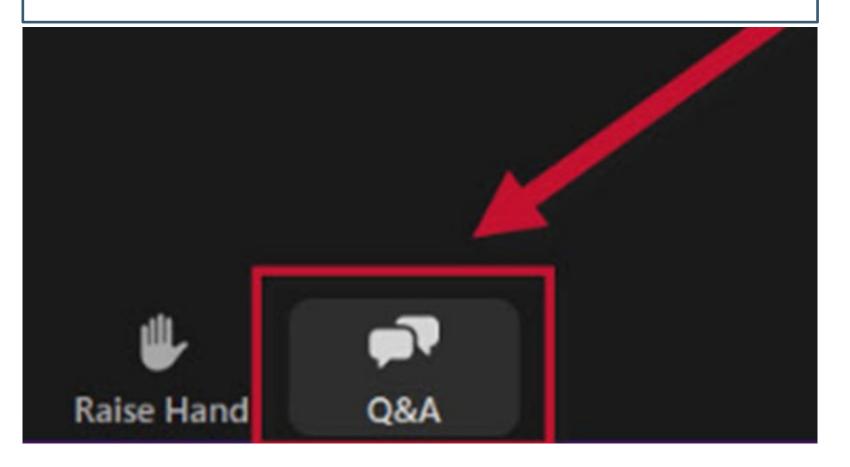
support@grants.gov

ADAS for Transit Buses Demonstration & Automated Transit Bus Maintenance and Yard Operations Demonstration

# **QUESTIONS AND ANSWERS**

# Questions

Please submit your questions using the Q&A button below.





TRANSIT.DOT.GOV