

Toward a Florida Automated, Connected, Electric, and Shared (ACES) Transportation System Roadmap: Phase II

PROJECT NO.
BDV25-977-80

Final Report

PREPARED FOR



Florida Department of Transportation

March 2023

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**UNIVERSITY of
SOUTH FLORIDA**

Toward a Florida Automated, Connected, Electric, and Shared (ACES) Transportation System Roadmap, Phase II

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Final Report

Prepared for:



Florida Department of Transportation

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March 2023



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The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the State of Florida Department of Transportation.

Metric Conversion

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	M
yd	yards	0.914	meters	M
mi	miles	1.61	kilometers	km
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft³	cubic feet	0.028	cubic meters	m ³
yd³	cubic yards	0.765	cubic meters	m ³
NOTE: volumes greater than 1000 L shall be shown in m ³				
MASS				
oz	ounces	28.35	grams	G
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C

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16. Abstract Automated, connected, electric, and shared (ACES) technologies are rapidly evolving and will continue to impact the development of vehicles, infrastructure, communities, commerce, and the economy. Based on the Florida ACES transportation system roadmap for Florida developed in Phase I, this project aimed to engage with private industries to leverage Florida's ACES expertise and promote the Florida ACES program, manage and maintain the Florida ACES roadmap, continue outreach to transportation professionals, and transfer the Florida ACES Database and Activity Viewer to FDOT. To achieve the project objectives, the research team reached out to 37 private companies, conducted 14 stakeholder meetings to showcase the ACES initiative, and gauged the interest of industry partners to provide ACES projects. The research team also engaged with private industry during the 2021 Florida Automated Vehicles Summit and the 7th Annual UTC Conference for the Southeastern Region. A total of 24 new ACES projects were collected and added to the Florida ACES Database and Activity Viewer during the project period. The technical transfer to migrate the ACES roadmap from USF to FDOT was conducted, including (1) Florida ACES technical manual, (2) ACES deployment items and environment, (3) cloud service accounts, (4) source codes, and (5) ACES training materials and videos. This project successfully planned, coordinated, and transferred the Florida ACES Database and Activity Viewer and associated management, operations, and maintenance from CUTR to FDOT. The results, products, and tools developed from this project will support FDOT for the rapid development, implementation, and evaluation of ACES technologies and the collaboration among research, development, testing, deployment, demonstration, evaluation, and educational initiatives in the ACES area.					
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Executive Summary

Automated, connected, electric, and shared (ACES) technologies are evolving rapidly and will continue to impact the development of vehicles, infrastructure, communities, commerce, and the economy. With rapidly evolving technology, it is a challenge to maintain coordination and increase collaboration among research, development, testing, deployment, demonstration, evaluation, and educational initiatives in the ACES area. A previous study, *“Toward a Florida Automated, Connected, Electric, and Shared (ACES) Transportation System Roadmap, Phase I,”* developed the database of the Florida Transportation System Roadmap to create an inventory of past, present, and future ACES projects and initiatives in Florida. The Florida ACES Database and Activity Viewer served as a forum to engage in knowledge and technology transfer using the graphical interface as a medium to share data, findings, and best practices among transportation agencies, other public agencies, the private sector, and university communities.

Based on the Phase I outcomes, this project (Phase II) aimed to successfully complete the Florida ACES Transportation System Roadmap and to transfer the Florida ACES Database and Activity Viewer from the Center for Urban Transportation Research (CUTR) to the Florida Department of Transportation (FDOT). More specifically, the research objectives include:

- Engage with private industries to leverage Florida’s ACES expertise and promote the Florida ACES program.
- Manage and maintain the Florida ACES Transportation System Roadmap via further engagement of stakeholders, increased number of Florida ACES projects in the database, and continued outreach to transportation professionals, as well as university faculty and students.
- Successful planning, coordination, and transfer of the Florida ACES Database and Activity Viewer, and associated management, operations, and maintenance from CUTR to FDOT.

To achieve the research objectives, the research team reached out to 37 private companies with the goal of scheduling one-on-one meetings, and 14 meetings were successfully hosted. Meeting objectives included introducing the ACES initiative and demonstrating the Activity Viewer, gauging the interest of industry stakeholders in providing data, discussing relevant ACES projects, and collecting suggestions for enhancing industry engagement in Florida. In addition to the email outreach campaign, the CUTR team also engaged with potential private industry stakeholders during two conferences, including the 2021 Florida Automated Vehicles Summit in Orlando in September 2021 and the 7th Annual UTC Conference for the Southeastern Region in Boca Raton, Florida, in March 2022, by distributing Florida ACES informational flyers and discussing the initiative with participants. The CUTR project team obtained valuable feedback from private industries with the outreach efforts during this project.



The research team collected 10 new ACES projects through the survey form powered by Google Forms. The 10 ACES projects were activated on the Activity Viewer with FDOT's review and approval. The CUTR team also updated the projects on the ACES roadmap database and Activity Viewer with information from the Florida's Connected and Automated Vehicle (CAV) Initiative website. As of July 2022, a total of 14 new projects were added to ACES and five existing projects were updated with new information or images. At the time of this report, there are 47 projects on the project list and Activity Viewer.

To transfer the ACES database and Activity Viewer to FDOT, the research team developed a technical manual that guided the operations for project query on the Activity Viewer, ACES project update in the ACES database, user management, and survey form to collect new ACES projects. Based on the technical manual, training videos were developed to provide step-by-step operation guidelines for ACES operators and managers. In addition to training materials, the research team provided source codes, service accounts for powering the ACES database and Activity Viewer, and platform migration procedures.

This project successfully planned, coordinated, and transferred the Florida ACES Database and Activity Viewer and associated management, operations, and maintenance from CUTR to FDOT. The results, products, and tools developed from this project will support FDOT for the rapid development, implementation, and evaluation of ACES technologies and the collaboration among research, development, testing, deployment, demonstration, evaluation, and educational initiatives in the ACES area.

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Abbreviations and Acronyms

ACES	Automated, Connected, Electric, and Shared
AFDC	Alternative Fuels Data Center
AVA	Autonomous Vehicle Advantage
AWS	Amazon Web Services
CATS	Connected and Autonomous Transportation Systems
CAV	Connected and Automated Vehicle
CCTV	Closed-Circuit Television
CTIS	Connected Traveler Information System
CUTR	Urban Transportation Research
CVPP	Connected Vehicle Priority and Preemption
DTI	Downtown Interchange
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FDOT	Florida Department of Transportation
FPL	Florida Power & Light
GM	General Motors
IAM	Identity and Access Management
iCASP	Intersection Collision Avoidance Safety Program
IOUs	Investor-Owned Utilities
NEVI	National Electric Vehicle Infrastructure
NOCoe	National Operations Center of Excellence
OBUs	On-Board Units
OEMs	Original Equipment Manufacturers
PSTA	Pinellas Suncoast Transit Authority
RSUs	Roadside Units
SPaT	Signal Phase and Timing
UI	User Interface
V2I	Vehicle-to-Infrastructure
V2V	Vehicle-to-Vehicle

1 Introduction

1.1 Project Overview

Automated, connected, electric, and shared (ACES) technologies have become popular and essential, and will continue to impact the development of vehicles, infrastructure, communities, commerce, and the economy. Significant progress was made in the FDOT BDV25-977-64 project, “Toward a Florida Automated, Connected, Electric, and Shared (ACES) Transportation System Roadmap: Phase I”. In Phase I, the focus was on the development of the Florida ACES Roadmap Database and Activity Viewer, statewide outreach and promotion of the Florida ACES program, and initial engagement of Florida ACES stakeholders on project data input. The research team successfully accomplished the following five major milestones:

- Form a leadership group and establish an initial Florida ACES Roadmap structure.
- Design and pilot collaboration platforms.
- Design and pilot a Florida ACES Roadmap Database and Activity Viewer.
- Design and conduct Florida ACES Roadmap outreach.
- Plan and conduct a Florida ACES Roadmap kickoff and a university initiative.

The Florida ACES Database and Activity Viewer served as a forum to engage in knowledge and technology transfer using the graphical interface as a medium to share data, findings, and best practices among transportation agencies, other public agencies, the private sector, and university communities. The Phase II project continued support of the products and momentum of Phase I and has placed Florida in an advanced stage for facilitating, deploying, and implementing ACES technologies and transferred the Florida ACES Database and Activity Viewer and associated management and operations from CUTR to FDOT.

1.2 Project Objectives

The major objectives of the Phase II project were to (1) engage with private Industries to leverage Florida’s ACES expertise and promote the Florida ACES program, (2) continue management and maintenance of the Florida ACES transportation system roadmap, and (3) plan, coordinate, and transfer the Florida ACES Database and Activity Viewer, and associated management, operations, and maintenance, from CUTR to FDOT.

1.3 Report Organization

The rest of this report is organized as follows. Chapter 2 describes the engagement with private industries and promotion of the Florida ACES program. Chapter 3 presents managing and maintaining the Florida ACES transportation system roadmap. The technical transfer efforts are summarized in Chapter 4. Chapter 5 provides the summary of project findings and conclusions. The detailed operation guidelines and supplementary documents are included in appendices.

2 Engagement with Private Industries and Promotion of the Florida ACES Program

To maximize collaboration and develop greater cooperation among entities that are conducting research, testing, deployment, demonstration, and educational Automated, Connected, Electric, and Shared (ACES) initiatives in Florida, this project focused on engaging with private industry stakeholders to promote coordination and collaboration to advance the implementation of ACES technologies in Florida. The CUTR team performed outreach to these stakeholders via email and virtual one-to-one meetings to promote the Florida ACES initiative and encourage stakeholders to submit data on ACES projects for consideration for display on the Florida ACES Activity Viewer. The CUTR team also participated in conferences to promote Florida ACES by discussing the initiative with participants, distributing flyers, and presenting on ACES topics.

This chapter describes the ACES outreach plan, presents updated outreach materials, identifies private industry stakeholders contacted during outreach efforts, details outreach activities via stakeholder meetings and conference participation, provides information on interest and feedback from interviewed private industry stakeholders, and reports on new ACES projects obtained.

2.1 ACES Outreach to Private Industries

This section covers the ACES outreach plan; provides updated outreach materials and a private industry stakeholder contacts list; and describes outreach activities including stakeholder meetings and conference participation.

2.1.1 Outreach Plan

The major objective of ACES outreach was to engage ACES stakeholders and transportation professionals through the Florida ACES Transportation Roadmap Initiative to facilitate information exchange; connect key public, private, and academic players; establish partnerships; and foster collaborative technology and data-sharing practices. In Task 1, the research team focused on engaging with private industry stakeholders, including companies that are deploying vehicle and technology pilots, conducting field deployments, performing research, and developing planning and policy guidelines.

The outreach plan for the Phase II project details the process the CUTR team employed to engage and collaborate with private industry stakeholders. Underscoring this outreach plan is the recognition that (1) inter-sectoral collaboration and data-sharing are critically important and (2) collaboration among academic research institutions, public agencies, and industry is key to stimulating innovation, facilitating knowledge exchange, and supporting ACES-related project developments in the state. The CUTR team focused on two outreach approaches: (1) hosting

virtual stakeholder meetings and demonstrating the ACES webpage and Activity Viewer, and (2) participating in conferences, distributing Florida ACES flyers, and presenting ACES topics.

Revision of Outreach Materials

An email template was created to send to private industry stakeholders to solicit their input (see Appendix A). The CUTR team revised the Florida ACES digital and printed flyer developed in the Phase I project for outreach events in Phase II by adding a QR code to provide event participants with a quick view of the ACES website via their smartphones. The website includes information about ACES and a viewing option of the Activity Viewer, as shown in Figure 2-1.

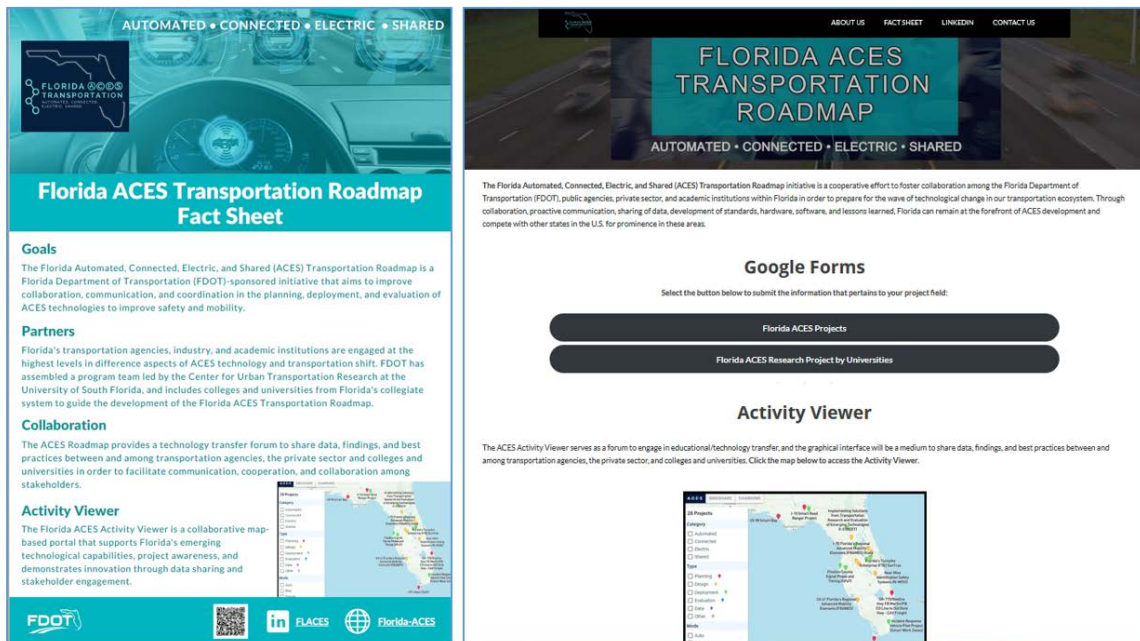


Figure 2-1 ACES outreach materials

2.1.2 Addition of Stakeholder Contacts List

A private industry stakeholder contacts list was developed that includes, but is not limited to, Original Equipment Manufacturers (OEMs), software providers, infrastructure/equipment providers, mobility share companies, and bikeshare vendors. There were only four private industry stakeholder contacts on the initial list. Because of the outreach efforts from Task 1 of this project, 50 new contacts were added. The list is a living document, with stakeholders continuously added through engagement activities, mailing list updates, social media collaborations, and other opportunities to reach a broad audience. As of June 2022, there were 54 private industry contacts (from 37 companies), including 19 from the automated and connected industry, 19 from the electric industry, and 16 from the shared industry (Figure 2-2).

Industry Contacts - Automated & Connected			
Monica Laufer	Public Policy and Government Relations	Argo AI	mлаufer@argo.ai
Terrel Smith	Commercial Director, North America	Arrival	terrel.smith@arrival.com
Racquel Asa	Chief Marketing Officer	Beep	Racquel.Asa@go-beep.com
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Figure 2-2 Florida ACES stakeholders contact list from private industry stakeholders

2.1.3 Stakeholder Meetings

CUTR prepared and sent customized outreach emails to potential stakeholders of private companies. The outreach email included (1) an introduction to Florida ACES, (2) the stakeholder meeting agenda, (3) the potential benefits of participating in the Florida ACES initiative, and (4) meeting availability. By June 2022, the CUTR team reached out to 37 private companies (54 contacts), with the goal of scheduling one-on-one meetings to provide individual in-depth outreach, obtain interest and feedback, and encourage submission of information on ACES projects.

The CUTR team successfully hosted 14 one-on-one stakeholder meetings with private companies. A brief introduction to these companies is provided in Appendix B. Meeting objectives included introducing the ACES initiative and demonstrating the Activity Viewer, gauging the interest of industry stakeholders in providing data, discussing relevant ACES projects, and collecting suggestions for enhancing industry engagement in Florida. Some private companies have indicated that they will provide information on their ACES-related projects in Florida.

Other private companies do not have ACES-related projects in Florida now for a variety of reasons, such as legislation concerns, and some were considering deploying projects in Florida but did not have specific information to share with the CUTR team at this stage; however, they demonstrated an interest in the Florida ACES program and will contribute once projects are ready. Stakeholder feedback, CUTR suggestions, and information on their ACES projects are provided in Section 2.2.

2.1.4 Conference Participation

2021 Florida Automated Vehicles Summit

The CUTR team participated in the Florida Automated Vehicles Summit in Orlando in September 2021 by hosting a demonstration with the Connected and Autonomous Transportation Systems (CATS) Lab at the conference. The CUTR team distributed ACES flyers that introduced the initiative to private companies (see Figure 2-3), and collected business cards from private companies, which comprised part of the contacts list noted in Section 2.1.2.



Figure 2-3 ACES outreach, 2021 Florida Automated Vehicles Summit

7th Annual UTC Conference for the Southeastern Region

The CUTR team participated in the 7th Annual UTC Conference for the Southeastern Region in Boca Raton, Florida in March 2022. Dr. Pei-Sung Lin, the project PI, chaired a workshop about ACES-related research at the conference and promoted the Florida ACES initiative (see Figure 2-4). The CUTR team distributed ACES flyers, promoted the initiative, and discussed Florida ACES with conference attendees.



Figure 2-4 ACES outreach, 7th Annual UTC Conference for the Southeastern Region

2.2 Feedback from Private Industries and Suggestions

This section provides information on the interest and feedback obtained from interviewed private industry stakeholders and suggestions from the CUTR team, which could be valuable for Florida to further promote coordination and collaboration to advance the implementation of ACES technologies in Florida. This section also describes new ACES projects obtained in June 2022.

2.2.1 Interest and Feedback

Most private companies showed support and demonstrated great interest in participating in the Florida ACES initiative. Some companies currently did not have ACES projects in Florida to share but were considering deploying some in Florida (e.g., General Motors, Locomotion, Cruise, ChargePoint). They expressed interest in providing information once they have solid content to share. Some companies currently do not have ACES projects in Florida because of legislation issues and the business climate; others have conducted or are conducting ACES projects in Florida and were willing to provide information; most projects are still in the information preparation stage. ACES projects submitted by private companies by July 2022 are provided in Section 2.3.

Key feedback acquired during stakeholder meetings is summarized below:

- Some autonomous companies stated that Florida requires a driver in each autonomous vehicle; however, they conducted platooning tests with only one driver in the lead vehicle. Some companies were nearing completion of road testing and were seeking commercialization, which currently cannot be supported in Florida. They would like to see changes in the future on regulations or policies so they can have ACES projects in Florida. The CUTR team provided them with the 2021 Florida Statutes regarding operations of autonomous vehicles for their reference.
- The National Electric Vehicle Infrastructure (NEVI) Formula Program and Discretionary Grant Program for Charging and Fueling Infrastructure are anticipated to accelerate EV infrastructure growth in Florida. Given this federal investment, it is anticipated that electric vehicle supply equipment (EVSE) suppliers (such as ChargePoint) will have more robust projects to share with the Florida ACES initiative in the coming years as private, public, and utility sectors ramp up EVSE projects.
- Some stakeholders believe that Florida has a weak business climate for EVs in terms of providing state incentives, which limits the number of EV projects in Florida.
- Several interviewees expressed concern about problems with the reliability of the charging layer from the Alternative Fuels Data Center (AFDC), and charging data not always being up to date. One interviewee suggested creating an attribute layer that differentiates between public and private charging and establishing parameters for a significant EVSE project (e.g., based on number of ports, number of stations, etc.). Adding the Justice40 communities as a layer could help Florida stakeholders identify potential locations for community charging sites.
- In some cities in Florida, several shared mobility companies house their bicycles at rental shops rather than through a true docking/dockless bikeshare program. This may be due to reasons such as theft and vandalism, supply and demand, lack of locations to provide docking stations, etc. There are several regional bikeshare managers throughout Florida.

- Several companies interviewed were happy to provide private industry connections for various ACES projects in Florida. Some electric scooter company key contacts are contracted out to multiple e-scooter companies as contact liaisons.
- Some private companies interviewed did not feel comfortable providing their budgets on the ACES Google form. The CUTR team assured them that the Activity Viewer is seeking more abstract, high-level information to list with other companies.
- Given that some of the projects discussed in the interviews were in the early planning stage, some interviewees asked how project information in the ACES database would be updated, including how data will be requested, who is responsible for providing the updated information, and what degree of involvement this would require of the entity supplying the data.

2.2.2 Findings and Suggestions

Given the feedback noted, key findings and suggestions were drawn to benefit FDOT on ACES program development and provide an attractive environment for companies to invest in ACES projects in Florida:

- To embrace more autonomous projects, the State may consider revising relevant regulations, e.g., allowing driverless cars in certain situations/environments. Otherwise, a good number of autonomous projects cannot take place because of legislative hurdles.
- State incentives can be provided to private companies to build a better business climate to attract more ACES projects. Florida is a big market with enormous potential for deploying more ACES projects.
- The recent influx of federal investment in EV charging will accelerate EV infrastructure development in Florida. Florida's NEVI share is substantial (\$198 million) and is third of all states in terms of the number of dollars available (behind Texas at \$407,774,759 and California at \$383,673,792). The Bipartisan Infrastructure Law also provides \$2.5 billion for competitive grants for EVSE installation, further providing an incentive to accelerate corridor and community charging.
- Companies, along with State and local governments, need to identify and allocate funding and resources to maintain publicly accessible web pages/information regarding ACES projects, such as charging station and bike docking station information, and keep them up to date. To achieve this, multiple data resources can be used. Some private companies expressed willingness to assist.
- FDOT may consider hosting quarterly, biannual, or annual webinars with Florida ACES stakeholders to update them on the Florida ACES Program and remind stakeholders to update their information on the Activity Viewer and share new developments/projects.

- Staff turnover was observed at many of the private agencies with which CUTR engaged, therefore multiple staff contacts from each company should be included to ensure that partnership efforts can continue.

2.3 ACES Projects

As of July 2022, private companies had submitted the following ACES projects via the Google Form:

Vision-Based Communication for Connected and Autonomous Vehicles


This deployment project in Orlando involves automation and connectivity and is led by Connected Wise (contact: Enes Karaaslan, Ph.D., CEO, enes@connected-wise.com). It is funded by the U.S. Department of Transportation’s Small Business Innovation Research (SBIR) program with a total budget of \$1M. The project start date was 2/25/2019, and the end date was scheduled for 12/31/2022. Connected Wise is collaborating with the CATS Lab at the University of South Florida (USF), led by Dr. Xiaopeng Li. Using unique message identifiers placed on road signs, connected and autonomous vehicles (CAVs) can recognize the identifier with an onboard machine vision to activate the associated infrastructure-to-vehicle (I2V) message in the vehicle. Connected Wise has completed its R&D phases and recently started pilot projects.

Lake Nona

This deployment project in Lake Nona, Florida, involves automation, connectivity, electrification, and shared mobility and is led by Beep Inc. (contact: Racquel Asa, racquel.asa@ridebeep.com). The project is funded by the Tavistock Development and had a project start date of 9/1/2019 and end date of 6/21/2022. Within a 17-square-mile development, Lake Nona (also called Move Nona) has created a highly efficient mobility network within a planned community that connects residential, commercial, retail, recreational, and medical services. The autonomous vehicle service is currently the largest and longest autonomous vehicle network at one location in North America and consists of 5 routes and eight shuttles connecting nearly 10 key destinations within the community.

Mayo Clinic

This deployment project in Jacksonville, Florida, involved automation, connectivity, electrification, and shared mobility and was led by Beep Inc. (contact: Racquel Asa, racquel.asa@ridebeep.com). Beep collaborated on the project with the Jacksonville Transportation Authority (JTA), Mayo Clinic, and NAVYA. The project start date was 3/1/2020, and the end date was 7/31/2020. Beep and JTA launched autonomous vehicles to transport COVID-19 tests at the Mayo Clinic in Jacksonville. The self-driving shuttles with no attendant onboard served two primary objectives—freeing up Mayo Clinic staff who would have otherwise transported samples, thus enabling them to focus on other important tasks, and



moving the samples autonomously to remove a level of human interaction with the tests and help reduce exposure to the virus.

JTA Test Program

This deployment project in Jacksonville, Florida, involves automation, connectivity, electrification, and shared mobility and is led by Beep Inc. (contact: Racquel Asa, racquel.asa@ridebeep.com). Beep collaborates with the JTA on this project, which started on 11/1/2020 and will end on 1/29/2027. Beep is participating in the test program by providing autonomous shuttles and expert services to support technical and operational requirements. Beep is working with JTA to train and certify operational staff, test various features and functions of the shuttles, and support key events that promote community and industry awareness for JTA's forthcoming U2C Project.

Tradition


This deployment project in Port St. Lucie, Florida, involves automation, connectivity, electrification, and shared mobility and is led by Beep Inc. (contact: Racquel Asa, racquel.asa@ridebeep.com). The project is funded by the Mattamy Homes with a start date of 11/30/2020 and an end date of 1/1/2030. Beep created an autonomous vehicle network with Mattamy Homes, the largest privately-owned home builder in North America, in southeast Florida at Tradition in Port Saint Lucie. The service, known as Tradition in Motion (TIM), consists of two routes and two shuttles operating in mixed traffic on public roads.

HART – Tampa

This deployment project in Tampa involved automation, connectivity, electrification, and shared mobility and was led by Beep Inc. (contact: Racquel Asa, racquel.asa@ridebeep.com). It was funded by the FDOT and had a start date of 1/1/2020 and ended on 12/21/2021. The HART SMART AV program launched with Hillsborough Area Regional Transit (HART) in Tampa and was the first fully electric automated vehicle pilot in the Tampa Bay region. This program was funded by FDOT. Beep partnered with HART to test self-driving shuttles in various environments, including the Marion Street transitway and the scenic Tampa Riverwalk.

PSTA – St. Petersburg

This deployment project in Pinellas County, Florida, involved automation, connectivity, electrification, and shared mobility and was led by Beep Inc. (contact: Racquel Asa, racquel.asa@ridebeep.com). It was funded by the FDOT, Tampa Bay Area Regional Transit Authority (TBARTA), and Pinellas Suncoast Transit Authority (PSTA) and ran from 11/1/2020 to 1/21/2021. Autonomous Vehicle Advantage (AVA) was launched on Bayshore Drive in St. Petersburg with Beep and PSTA as the first fully electric AV fleet launched by a transit agency in mixed traffic. As an FDOT-funded project, Beep partnered with PSTA to provide a first/last-mile



solution along Bayshore Drive with four stops connecting a hotel, museums, the Pier, a yacht club, and the Cross Bay ferry service. The free shuttle service operated alongside a bi-directional bike path, cars, buses, and other modes of transportation. The vehicle was equipped with an ADA-compliant ramp and a Q'Straint system deployed by the onboard co-pilot to assist passengers. During the four-month pilot, the service safely operated for nearly 860 hours and transported nearly 5,000 passengers across more than 2,800 miles.

PSTA – Clearwater

This deployment project in Pinellas County, Florida, involved automation, connectivity, electrification, and shared mobility and was led by Beep Inc. (contact: Racquel Asa, racquel.asa@ridebeep.com). It was funded by the PSTA and ran from 2/23/2022 to 3/31/2022. This was the second test site for Autonomous Vehicle Advantage (AVA) and was located on Clearwater Beach along Gulfview Boulevard. Beep partnered with PSTA to provide a first/last-mile solution along the beach with six stops connecting hotels, the Clearwater Beach pier, and parking lots. The five-week pilot safely traveled nearly 770 miles and transported nearly 2,800 passengers.

PSTA – Dunedin

This deployment project in Pinellas County, Florida, involved automation, connectivity, electrification, and shared mobility and was led by Beep Inc. (contact: Racquel Asa, racquel.asa@ridebeep.com). It was funded by the PSTA and ran from 4/28/2022 to 6/30/2022. This was the third test city for AVA, located in the City of Dunedin within the Downtown area along Douglas Avenue. Beep partnered with PSTA to provide a first-mile and last-mile solution along Douglas Avenue with four stops connecting the business district, the library, a spring training facility, and parking lots.

Coast Bike Share

Inspired by the success of shared bicycles in Chicago, CycleHop deployed smart bikes in over 15 locations throughout the U.S. and Canada. In Florida, the HOPR application is a complete micro-mobility solution, providing easy and quick access to shared-use vehicles. Coast Bike Share (hosted through HOPR) is listed on the Activity Viewer website. There are several Coast Bike Share programs in Florida including Tampa, St. Petersburg, University of South Florida, and Central Florida. Coast Bike Share is currently managed by Ruben Figueredo, who is deeply knowledgeable on shared transportation programs. He also manages a bike share rental shop in Southeast Florida, as the demand for micro-mobility ownership has created an opportunity for bikes, electric bikes, and electric scooter maintenance.

3 Management and Maintenance of Florida ACES Transportation System Roadmap

In this Phase II project, CUTR continued to manage and maintain the Florida ACES Roadmap. The actions included using a Google Form to collect high-quality past, existing, and planned ACES projects from existing and new stakeholders, submitting collected new ACES projects to the FDOT Project Manager for review and approval, updating the Florida ACES Database and Activity Viewer, identifying existing and new projects on FDOT Florida's Connected and Automated Vehicle (CAV) Initiative website, and updating the Florida ACES Database.

3.1 Collection of High-quality Past, Existing, and Planned ACES Projects from Stakeholders

3.1.1 Continued Outreach and Engagement Activities

For seamless ACES data collection, the research team conducted the following activities: (1) identified and selected private industries for engagement via customized emails, meetings, conferences, and presentations, (2) used the updated Phase I outreach plan and materials for reaching existing stakeholders and providing updates, (3) collected ACES project information from private industries and existing stakeholders, and (4) collected ACES project information from the Florida CAV Initiative website (FDOT, 2022), <https://www.fdot.gov/traffic/teo-divisions.shtm/cav-ml-stamp/connected-vehicles>.

The following outreach activities were completed:

- CUTR conducted tailored, individualized, one-on-one engagement with private sector entities and utilities. Based on prior experience, the CUTR team determined that a one-on-one approach would be more effective, given the hesitancy of private sector contacts to share information on projects in a group setting.
- For leveraging outreach opportunities at conferences, the CUTR team participated in the Florida Automated Vehicles Summit in September 2021 and the 7th Annual UTC Conference for the Southeastern Region in March 2022. Project PI, Dr. Pei-Sung Lin, presented “Vision and Introduction of the Florida ACES Program, and Efforts Undertaken towards the Florida ACES Transportation Roadmap Initiative” at the UTC Conference (see Figure 3-1). This presentation highlighted the Florida ACES initiative and key FDOT-led programs in the ACES fields. This presentation, along with several others delivered by the CUTR team, reached a broad and diverse audience at the conference.

To maintain communications with new and existing Florida ACES stakeholders, the project team developed an email in Mailchimp that included key updates and engagement efforts related to the Florida ACES Initiative, including a summary of ACES presentations at recent conferences

and links to those presentations. The email also contained a brief overview of ongoing FDOT efforts related to the National Electric Vehicle Infrastructure (NEVI) funding program, including a link to the draft version of Florida’s Electric Vehicle Infrastructure Deployment Plan. In addition to these updates, the email contained information on the upcoming 2022 FAV Summit (see Figure 3-2) and a reminder for stakeholders on how to engage with the Florida ACES Initiative and how to submit their ACES projects via Google Forms (see Figure 3-3). During Phase II, some existing stakeholders either changed employers or retired, so the number of stakeholders was reduced from 120 to 78. In total, 55 new stakeholders were added to the Mailchimp contact list as of July 2022, bringing the total stakeholder count to 133 contacts.



Florida ACES

Automated, connected electric, and shared (ACES) transportation technologies are advancing. The Florida ACES initiative is a cooperative effort to foster collaboration among the Florida Department of Transportation (FDOT), public agencies, private sector, and academia within the state of Florida. Collaboration, proactive communication, data sharing, and lessons learned will help to keep Florida at the forefront of ACES development.

ACES at the 7th Annual UTC Southeastern Conference

This year's [UTC Conference for the Southeastern Region](#) focused on how emerging technologies support smart and sustainable cities, and highlight innovation in the future of transportation and logistics.

Check out the presentations from the conference that demonstrate how Florida is leading at the forefront of cutting-edge research and deployment of ACES technologies.



Figure 3-1 ACES at the 7th Annual UTC Southeastern Conference

Upcoming Events

Save the Date for the 2022 FAV Summit

The 10th Annual Florida Automated Vehicle Summit will be hosted by the Jacksonville Transportation Authority December 14 - 16, 2022 at the Omni Amelia Island Resort.



Figure 3-2 Upcoming events about ACES



Get involved

The ACES Activity Viewer is a collaborative map-based portal that supports Florida's emerging technological capabilities, project awareness, and demonstrates innovation through data sharing and stakeholder engagement.

To submit data on a current, planned, or future ACES project, [access the Activity Viewer](#).

[Visit the Florida ACES website](#)

Contributing ACES Project Information

To submit your project information for consideration of inclusion in the Florida ACES Activity Viewer and Database, please use the forms below to input your project details. The upcoming webinar will provide more information on this process.

If you do not have a Google ID to access the form, please use the following login information:

Email: flaces123@gmail.com

Password: [floridaaces](#)

[Google Form for Inputting Florida-based ACES Projects](#)

[Google Form for Inputting Florida-based ACES Projects Conducted by Universities](#)

Figure 3-3 Outreach information for Florida ACES stakeholders

The CUTR team used the above-mentioned methods to promote data-sharing to collect information on high-quality past, existing, and planned ACES projects from existing and new stakeholders, including those from the private sector.

3.1.2 New Florida ACES Projects Obtained from Private Industries

Details on new ACES projects were collected via Google Forms on the Florida ACES website, <https://florida-aces.org/>, as shown in Figure 3-4. CUTR created a custom Google email address and password to be shared with users and private companies without a Gmail account—flaces123@gmail.com, password *floridaaces*.

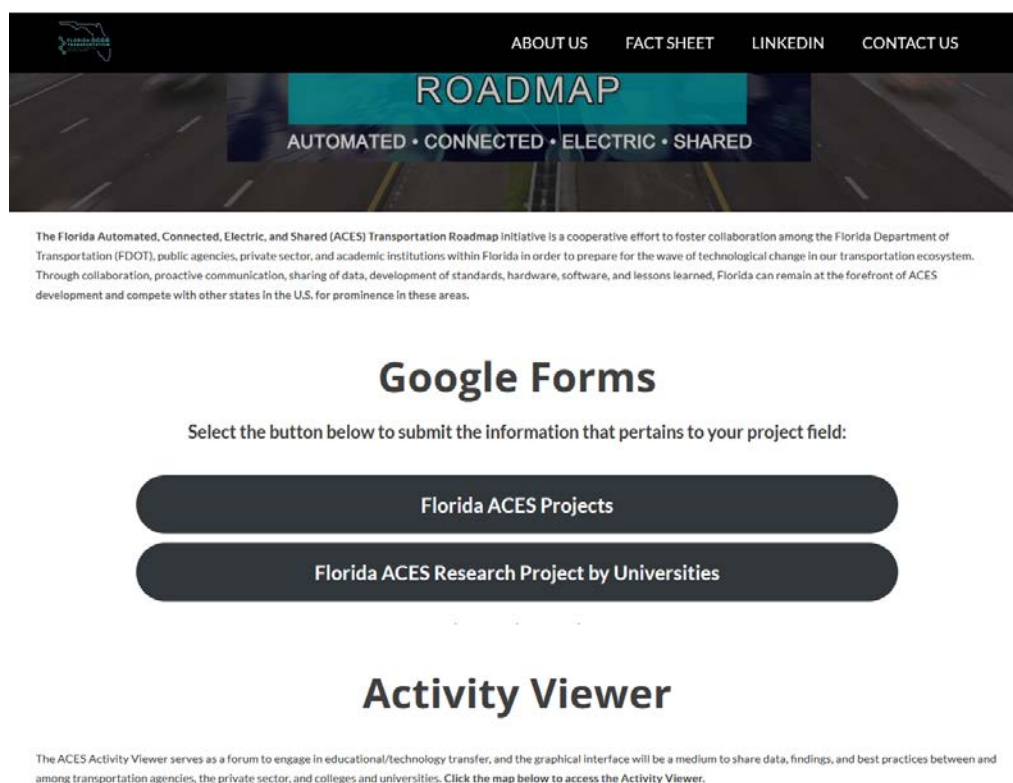


Figure 3-4 Google forms for collecting ACES project data

As a result of outreach efforts focusing on private industries in Task 1 and general outreach in Task 2, a total of 10 new ACES projects were added to the list in July 2022. This project list is a living document, with projects continuously added and updated via the outreach plan. Available project data are shown Table 3-1. The 10 new ACES projects that were submitted by private industry stakeholders through Google Forms were subsequently submitted by CUTR to the FDOT Research Center for review and approval. Upon FDOT approval, these projects were integrated and displayed on the Florida Activity Viewer and available to the public.

Table 3-1 New Florida ACES Projects from Private Industries

No	Project Details	
1	Project Title	Vision-based Communication for Connected and Autonomous Vehicles
	Organization	Connected Wise, https://connectedwise.com/
	Start–End	2/15/19–12/31/22
	Project Lead	Enes Karaaslan, enes@connected-wise.com
	Status	Deployment
	Category	Automated, connected
	Mode	Connected autonomous vehicles (CAV), infrastructure-to-vehicle (I2V), machine vision, smart signs, smart work zones
	Description	Using unique message identifiers placed on road signs, CAVs can recognize the identifier with onboard machine vision to activate the associated I2V message in the vehicle. Connected Wise has completed its research and development phases and recently started pilot projects.
	Location	Orlando, FL
2	Project Title	Lake Nona
	Organization	Beep Inc.
	Start–End	9/1/19–6/21/22
	Project Lead	Racquel Asa, racquel.asa@ridebeep.com
	Status	Deployment
	Category	Automated; Connected; Electric; Shared
	Mode	Auto
	Description	Within a 17-square-mile development, Lake Nona has created a highly efficient mobility network called Move Nona within a planned community that connects residential, commercial, retail, recreational, and medical services. The autonomous vehicle service is currently the largest and longest autonomous vehicle network at one location in North America and consists of five routes and eight shuttles, connecting nearly 10 key destinations within the community.
Location	Lake Nona, FL, https://ridebeep.com/location/move-nona/	
3	Project Title	Mayo Clinic
	Organization	Beep Inc.
	Start–End	3/1/20–7/31/20
	Project Lead	Racquel Asa, racquel.asa@ridebeep.com
	Status	Deployment
	Category	Automated; connected; electric; shared
	Mode	Auto
	Description	Beep and the Jacksonville Transportation Authority (JTA) launched autonomous vehicles to transport COVID-19 tests at the Mayo Clinic in Jacksonville. The self-driving shuttles with no attendant on board served two primary objectives—freeing up Mayo Clinic staff who would have otherwise transported samples, thus enabling them to focus on other important tasks, and moving the samples autonomously to remove a level of human interaction with the tests and help reduce exposure to the virus.
Location	Jacksonville, FL, https://ridebeep.com/location/mayo-clinic-jta-jacksonville/	

Table 3-1 New Florida ACES Projects from Private Industries, continued

No	Project Details	
4	Project Title	JTA Test Program
	Organization	Beep Inc.
	Start–End	11/1/20–1/29/27
	Project Lead	Racquel Asa, racquel.asa@ridebeep.com
	Status	Deployment
	Category	Automated; connected; electric; shared
	Mode	Auto
	Description	Beep is participating in a test program to provide autonomous shuttles and expert services supporting technical and operational requirements. Beep is working with JTA to train and certify operational staff, test various features and functions of the shuttles, and support key events that promote community and industry awareness for JTA’s forthcoming Ultimate Urban Circulator (U2C) Project.
	Location	Jacksonville, FL, https://ridebeep.com/location/jacksonville-transportation-authority/
5	Project Title	Tradition
	Organization	Beep Inc.
	Start–End	11/30/20–1/1/30
	Project Lead	Racquel Asa, racquel.asa@ridebeep.com
	Status	Deployment
	Category	Automated; Connected; Electric; Shared
	Mode	Auto
	Description	Beep created an autonomous vehicle network with Mattamy Homes, the largest privately-owned home builder in North America, in southeast Florida at Tradition in Port Saint Lucie. The service, known as TIM (Tradition in Motion), consists of two routes and two shuttles operating in mixed traffic on public roads.
	Location	Port St. Lucie, FL, https://ridebeep.com/location/tradition-in-motion/
6	Project Title	HART – Tampa
	Organization	Beep Inc.
	Start–End	1/1/2020–12/21/21
	Project Lead	Racquel Asa, racquel.asa@ridebeep.com
	Status	Deployment
	Category	Automated; Connected; Electric; Shared
	Mode	Auto
	Description	The HART SMART AV program, launched with Hillsborough Area Regional Transit (HART) in Tampa, is the first fully electric automated vehicle pilot in the Tampa Bay region funded by FDOT. Beep partnered with HART to test self-driving shuttles in various environments, including the Marion Street transitway and the Tampa Riverwalk.
	Location	Tampa, FL, https://ridebeep.com/location/hart-hillsborough-area-regional-transit/

Table 3-1 New Florida ACES Projects from Private Industries, continued

No	Project Details	
7	Project Title	PSTA – St. Petersburg
	Organization	Beep Inc.
	Start–End	11/1/20–1/21/21
	Project Lead	Racquel Asa, racquel.asa@ridebeep.com
	Status	Deployment
	Category	Automated; Connected; Electric; Shared
	Mode	Auto
	Description	Autonomous Vehicle Advantage (AVA) was launched on Bayshore Drive with Beep and PSTA (Pinellas Suncoast Transit Authority) as the first fully electric AV fleet launched by a transit agency in mixed traffic. As an FDOT-funded project, Beep partnered with PSTA to provide a first/last-mile solution along Bayshore Drive with four stops connecting a hotel, museums, the Pier, a yacht club, and the Cross Bay ferry service. The free shuttle service operated alongside a bi-directional bike path, cars, buses, and other modes of transportation. The vehicle was equipped with an ADA-compliant ramp and a Q'Straint system deployed by the onboard co-pilot to assist passengers. During the four-month pilot, the service safely operated for nearly 860 hours and transported nearly 5,000 passengers across more than 2,800 miles.
	Location	Pinellas County, FL, https://ridebeep.com/location/psta/
8	Project Title	PSTA – Clearwater
	Organization	Beep Inc.
	Start–End	2/23/22–3/31/22
	Project Lead	Racquel Asa, racquel.asa@ridebeep.com
	Status	Deployment
	Category	Automated; Connected; Electric; Shared
	Mode	Auto
	Description	The second AVA test was in Clearwater Beach along Gulfview Blvd. Beep partnered with PSTA to provide a first/last-mile solution along the beach with six stops connecting hotels, the Clearwater Beach pier, and parking lots. The five-week pilot safely traveled nearly 770 miles and transported nearly 2,800 passengers.
	Location	Pinellas County, FL, https://ridebeep.com/location/psta/
9	Project Title	PSTA – Dunedin
	Organization	Beep Inc.
	Start–End	4/28/22–6/30/22
	Project Lead	Racquel Asa, racquel.asa@ridebeep.com
	Status	Deployment
	Category	Automated; Connected; Electric; Shared
	Mode	Auto
	Description	The third test city for AVA was Dunedin in the Downtown area. Beep partnered with PSTA to provide a first/last-mile solution along Douglas Avenue with four stops connecting the business district, the library, a spring training facility, and parking lots.
	Location	Dunedin, FL, https://www.psta.net/programs/ava/

Table 3-1 New Florida ACES Projects from Private Industries, continued

No	Project Details	
10	Project Title	Coast Bike Share
	Organization	HOPR
	Start–End	1/1/17–7/6/22
	Project Lead	Ruben Figueredo, ruben.figueredo@gohopr.com
	Status	Deployment
	Category	Electric; Shared
	Mode	Bike
	Description	Inspired by the success of shared bicycles in Chicago, CycleHop deployed smart bikes in over 15 locations throughout the U.S. and Canada. In Florida, the HOPR application is a complete micro-mobility solution, providing easy and quick access to shared-use vehicles. Coast Bike Share (hosted through HOPR) is listed on the Activity Viewer website. There are several Coast Bike Share programs in Florida including Tampa, St. Petersburg, University of South Florida, and Central Florida. Coast Bike Share is currently managed by Ruben Figueredo, who is knowledgeable on shared transportation programs. He also manages a bike share rental shop in Southeast Florida, as the demand for micro-mobility ownership has created an opportunity for bikes, electric bikes, and electric scooter maintenance.
	Location	Tampa, FL

3.1.3 Update of ACES Projects in Florida ACES Database and Activity Viewer

The detailed procedure for collecting and updating project information obtained via Google Forms is illustrated in Figure 3-5. Multi-layered authentication enabled on the ACES Roadmap Database and Activity Viewer allowed for seamless data-sharing with project stakeholders and FDOT.

The first step is to collect project information via Google Forms. The second step is for an authorized user to access the interactive portal Administration Webpage to update ACES projects in the ACES Database after approval of submitted ACES projects from the FDOT Project Manager. Project information is made available with a summary, a description of project objectives, and the main outcomes expected. The third step is for the administrator to use back-end Amazon Web Services (AWS) to activate the projects to make them available on the ACES Activity Viewer to create a graphical interface that will serve as a hub for collaboration and coordination among existing and potential ACES stakeholders and the public.

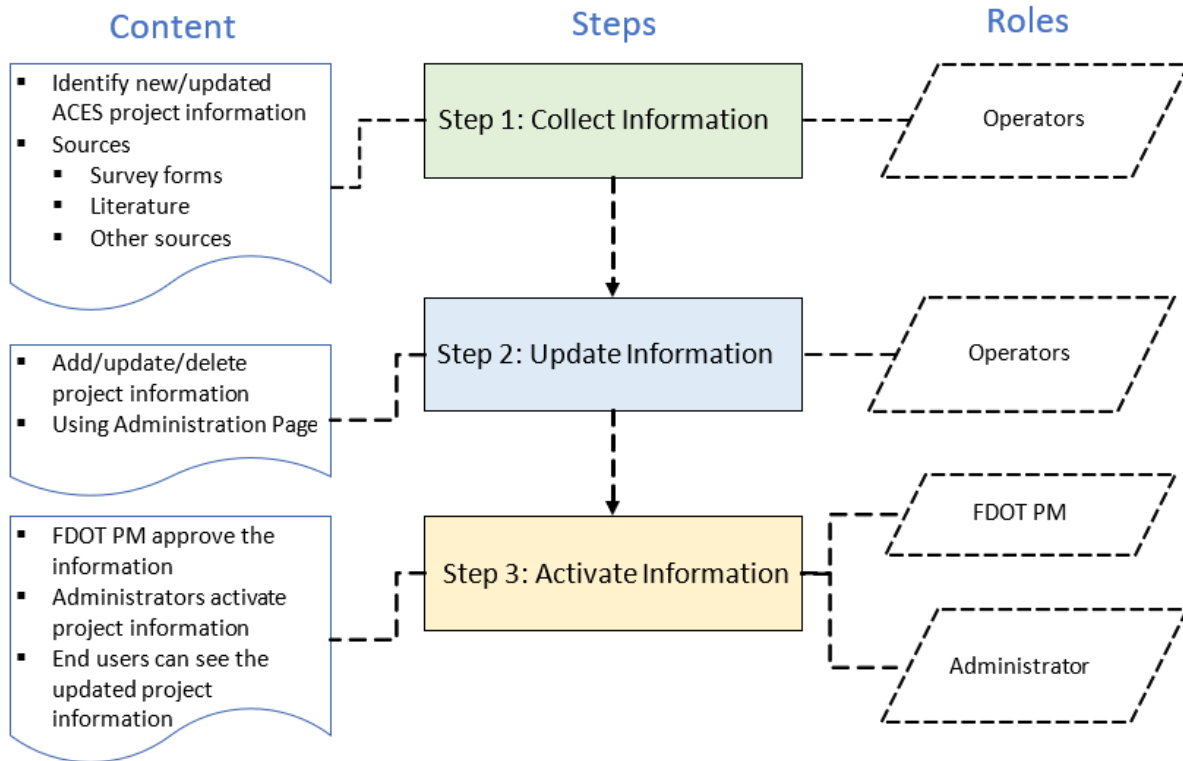


Figure 3-5 Procedure for ACES project update in Florida ACES Database and Activity Viewer

3.2 Collection and Update of ACES Projects in Activity Viewer with Information Obtained from FDOT

The CUTR team updated the projects on the Florida ACES Database and Activity Viewer with information obtained from the Florida CAV Initiative website, <https://www.fdot.gov/traffic/teo-divisions.shtm/cav-ml-stamp/connected-vehicles>. Information is provided on this website because CV and AV applications provide opportunities to improve safety and mobility for all modes of travel. CV and AV on the website cited on December 25, 2022, are provided below:

- “Connected vehicles (CV) use vehicle-to-vehicle, vehicle-to-infrastructure, and infrastructure-to-vehicle communication to exchange information between vehicles, drivers, the roadside, bicyclists and pedestrians.”
- “Autonomous vehicles (AV) are vehicles equipped with advanced sensors (radar, LIDAR, cameras, etc.) and computing abilities to perceive surroundings and activate steering, braking, and acceleration actions without operator input.”

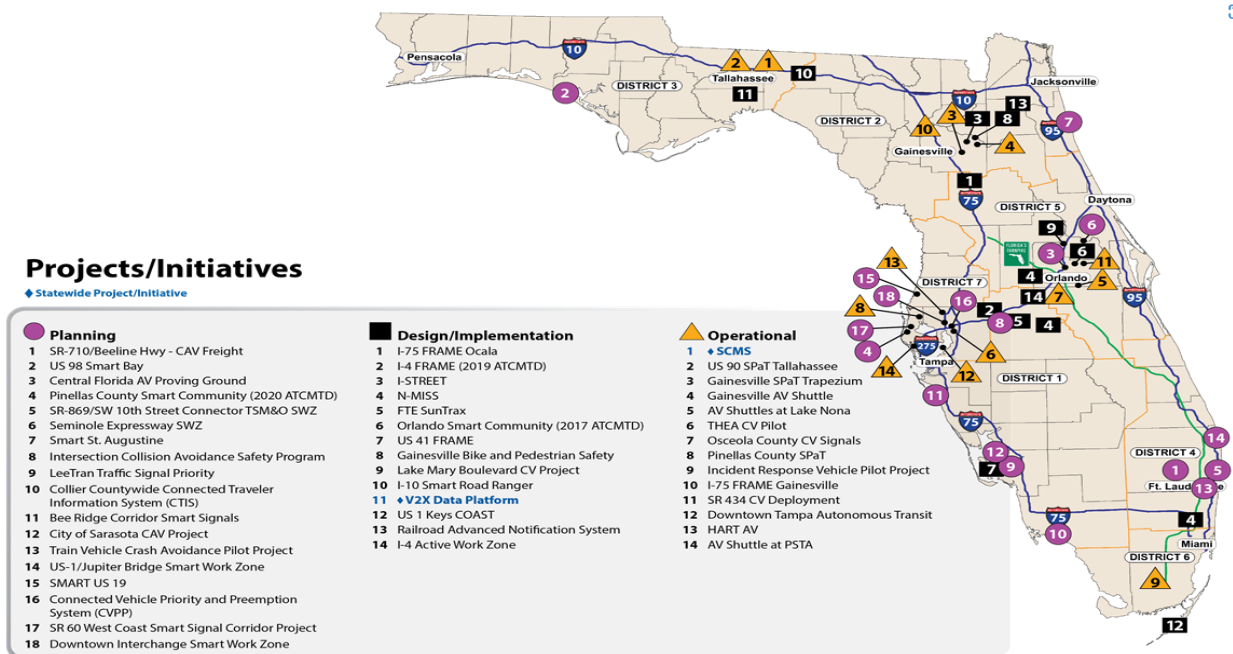
The Florida CAV Initiative uses innovative technologies to rapidly detect roadway hazards and alert drivers, including:

- Wireless communications
- Signal phase and timing (SPaT)
- Transit Signal Priority
- Emergency vehicle preemption

- Roadside units (RSUs)
- On-board units (OBUs)
- Freight signal priority
- Vehicle sensors
- Global positioning system navigation

Several pioneer projects are listed and included in three categories on the website—Planning, Design/Implementation, and Operational. Figure 3-6 shows the Florida CV project map and projects and information about the updates made in the Florida Activity Viewer.

CUTR collected and updated the Florida ACES Database and Activity Viewer in two ways. First, projects available on the Florida CAV initiative website but missing on the ACES Activity Viewer were identified; information and images from those projects were then added to the Florida ACES Database and Activity Viewer. Second, the team checked and updated existing projects on the ACES Activity Viewer with any latest information from Florida CAV Initiative website; projects were updated only if new data or images were added on the Florida CAV Initiative website. As of July 2022, the 14 new ACES projects shown in Table 3-2 were added and five existing projects were updated, resulting in a total of 47 ACES projects on the project list. All 47 ACES projects in the FDOT CAV Initiative website are included in the Florida ACES Database and integrated into the Florida ACES Activity Viewer as shown in Figure 3-7.



Note: Projects highlighted in red—updated, green—unchanged, yellow—added to Florida Activity Viewer:
Planning: 1, 2, 3, 4, 5, 6, 7-18 (12 new projects added)
Design/Implementation: 1-5, 6, 7-11, 12, 13, 14 (2 new projects added)
Operational: 1-3, 4, 5-8, 9, 10-14

Figure 3-6 Florida connected vehicle project map and update in the Florida Activity Viewer

Table 3-2 New ACES Projects Obtained from FDOT CAV Initiative Website

No	Project Details	
1	Project title	Bee Ridge Corridor Smart Signals
	Organization	Sarasota County
	Start–End	-
	Project Lead	Sarasota County, Steven.Davis@dot.state.fl.us
	Status	Planning
	Category	Connected
	Mode	Auto
	Description	<p>The Bee Ridge Rd (SR-758) corridor is located between US-41 and I-75 in Sarasota County. This road is the highest (worst) ranked in Sarasota County for fatal and significant injury crashes. In addition, signal system operators have recognized frequent vehicle detection failure issues at a few signalized intersections in this corridor. This project is intended to apply technology improvements to address both issues. Tasks will include adding advance detection for dilemma zone protection on all major street approaches; replacing stop bar detection on all approaches to accurately detect vehicle presence and to obtain vehicle counts; installing closed-circuit television (CCTV) cameras at intersections that do not presently have this coverage to improve operations monitoring and incident management; and installing CV infrastructure (RSUs) to transmit MAP and SPaT messages and to receive Basic Safety Messages from vehicles equipped with OBUs.</p>
Location	Bee Ridge Rd (SR-758) corridor, Sarasota County, FL	
2	Project Title	City of Sarasota CAV Project
	Organization	City of Sarasota
	Start–End	-
	Project Lead	Steven Davis, Steven.Davis@dot.state.fl.us
	Status	Planning
	Category	Automated, Connected
	Mode	Auto, bike, Transit
	Description	<p>This project proposes to improve road user safety by supporting the vision of the region and the city by deploying CAV technologies. Future deployments to build on this initial CAV project application will include expanding this project to deploy the CV/AV technology platform at the city’s core traffic signal locations, developing a Smart City Traffic and Technology management center, and implementing additional third-party software to improve vulnerable road user safety and traffic management as well as can communicate with CV/AV vehicles.</p>
Location	Sarasota, FL	
3	Project Title	Collier Countywide Connected Traveler Information System (CTIS)
	Organization	Collier County
	Start–End	-
	Project Lead	Steven Davis, Steven.Davis@dot.state.fl.us
	Status	Planning
	Category	Connected
	Mode	Auto, bike, Transit
	Description	<p>Collier County aims to leverage existing funded projects (to maximize CV data) to provide real-time information to travelers to inform decision-making to realize a vision of maximum mobility and safety in trips in and around Collier County. This project will deploy a Connected Traveler Information System (CTIS) that leverages CV data on US-41 in Collier County.</p>
Location	Collier County, FL	

Table 3-2 New ACES Projects Obtained from FDOT CAV Initiative Website, continued

No	Project Details	
4	Project Title	Connected Vehicle Priority and Preemption System (CVPP)
	Organization	Hillsborough County
	Start–End	-
	Project Lead	Megan Arasteh, Megan.Arasteh@dot.state.fl.us
	Status	Planning
	Category	Automated, Connected
	Mode	Auto, Transit
	Description	<p>Hillsborough County desires to use CAV technologies to achieve a fatality free and congestion-free roadway network in Hillsborough County and across Florida. The CVPP project is identified as a priority project to implement. Hillsborough County is partnering with public agencies and private sector organizations. The CVPP will increase mobility for emergency and transit vehicles and all people, improve travel time reliability, enhance multimodal transit operations, and positively affect the economy of Florida by reducing crashes and keeping traffic moving. The CVPP will deploy advanced traveler information systems, advanced public transportation systems, transportation system performance data collection, analysis, and dissemination systems and advanced safety systems including vehicle-to-infrastructure communications technologies over a five-year period.</p>
Location	Hillsborough County, FL	
5	Project Title	Downtown Interchange Smart Work Zone
	Organization	FDOT District 7
	Start date	-
	End date	-
	Project Lead	Megan Arasteh, Megan.Arasteh@dot.state.fl.us
	Status	Planning
	Category	Connected
	Description	<p>FDOT District 7 Traffic Operations Office has included a Smart Work Zone in the first large section of the TBNext Freeway Modernization Project for the Downtown Interchange (DTI). One of the major construction modifications is to widen the existing SB I-275 to I-4 EB elevated off-ramp. SB I-275 already incurs backup due to the ramp being over capacity during various parts of the day. This Smart Work Zone project is expected to minimize delays and reduce rear-end and sideswipe accidents. The concept of the Smart Work Zone includes an end-of-queue warning system that will detect slow and stopped vehicles and automatically post messages on portable changeable message signs to inform the motorists approaching the construction zone where backups are occurring in real time. This information will also be sent to traffic information providers and can be forwarded to motorists via smartphone apps and on-board navigation systems (if available). Real-time data will also be available to the Tampa Bay SunGuide Center via internet access portal.</p>
Location	Downtown Interchange, Tampa, FL	

Table 3-2 New ACES Projects Obtained from FDOT CAV Initiative Website, continued

No	Project Details	
6	Project Title	I-4 Active Work Zone
	Organization	FDOT District 1
	Start–End	-
	Project Lead	Steven Davis, Steven.Davis@dot.state.fl.us
	Status	Deployment
	Category	Connected
	Mode	Auto, Transit
	Description	As part of the Vital Few Action Plan, FDOT District 1 is supporting implementation of Active Work Zone elements within an I-4 resurfacing project from CR-557 to the Polk/Osceola County Line. Two elements will be incorporated into this project: (1) Queue Detection and Warning System to detect queues as they develop in the approach to the work zone and provide advanced warning to motorists to slow traffic as they approach the back of queue; (2) Dynamic Lane Merge System to help create more orderly merging conditions by communicating to drivers through message boards or vehicle on-board units. The messages advise on merging early or late, depending on traffic characteristics. This project will help design and construction staff understand the suitability of this approach and the level of effort required to implement it.
Location	Polk County, FL (I-4 from CR 557 to the Polk/Osceola County Line)	
7	Project Title	Intersection Collision Avoidance Safety Program (iCASP)
	Organization	The City of Lakeland
	Start–End	-
	Project Lead	Steven Davis, Steven.Davis@dot.state.fl.us
	Status	Planning
	Category	Connected
	Mode	Auto
	Description	The City of Lakeland’s City Commission has for more than a year been committed to the development of CAV for the benefit of its citizens, visitors, and freight operations. This project will permanently implement Intersection Collision Avoidance Safety Program (iCASP) at four locations in Lakeland. The project is a V2I CV project that will use existing types of detection and communication for connected vehicles to improve intersection safety. The project consists of three major components, not including the existing signalized infrastructure: 1) sensors to detect approaching vehicles, 2) roadway infrastructure to warn vehicles at a signalized intersection, and 3) in-vehicle driver warning system.
Location	Lakeland, FL	

Table 3-2 New ACES Projects Obtained from FDOT CAV Initiative Website, continued

No	Project Details	
8	Project Title	LeeTran Traffic Signal Priority
	Organization	LeeTran
	Start–End	-
	Project Lead	Steven Davis, Steven.Davis@dot.state.fl.us
	Status	Planning
	Category	Connected
	Mode	Transit
	Description	<p>This project proposes to procure and install OBUs required to improve LeeTran service on the US-41 Corridor in Fort Myers. The project will also include the integration of TSP elements within the US-41 FRAME project and will include integration of OBUs into LeeTran’s system elements, allowing sharing of bus schedules, locations, and arrival times with the CV infrastructure. The ability to use TSP within major corridors such as US-41 will expedite the movement of transit vehicles at busy intersections, which is particularly critical when the area experiences seasonal traffic increases and during daily peak travel times. TSP will allow buses to stay on schedule and has the potential to attract new riders to public transit which will, in turn, provide the opportunity to reduce congestion by decreasing the number of single occupancy vehicles on the road.</p>
Location	US 41 Corridor, Fort Myers, FL	
9	Project Title	Railroad Advanced Notification System
	Organization	FDOT District 2
	Start–End	-
	Project Lead	Peter Vega, Peter.Vega@dot.state.fl.us
	Status	Deployment
	Category	Automated, Connected
	Mode	Auto, Transit
	Description	<p>FDOT District 2 intends to apply new detection technology (comprehensive CCTV analytics), edge devices, advanced messaging (static sign with flashing beacon or embedded DMS), in conjunction with SunGuide alert capabilities via FL511 and WAZE. The system also will capture data on number of rail cars, speed, and travel time throughout the municipality. The goal of this project is to partner with local agencies and ITS maintenance contractor for installation of the devices, as the major effort is configuration. This project deploys CAV technologies at three corridors—Main Street, Philips Highway, and Roosevelt Blvd.</p>
Location	Jacksonville, FL	

Table 3-2 New ACES Projects Obtained from FDOT CAV Initiative Website, continued

No	Project Details	
10	Project Title	SMART St. Augustine
	Organization	FDOT, City of St. Augustine, North Florida TPO
	Start–End	-
	Project Lead	Peter Vega, Peter.Vega@dot.state.fl.us
	Status	Planning
	Category	Connected
	Mode	Auto, bike, Transit
	Description	St. Augustine’s Historic District is a major regional tourism destination, and its Downtown is the city’s major job center with a high percentage of local jobs supporting the tourism and service industries. The intensity of this travel demand creates major, growing transportation challenges that will be addressed by the SMART St. Augustine project. FDOT, with the City of St. Augustine and the North Florida TPO aims for a citywide deployment of innovative transportation technologies that will manage congestion, improve safety, and enhance environmental sustainability to support the city’s economy. SMART St. Augustine will be accomplished by deploying innovative transportation technologies to enhance mobility, improve safety, reduce environmental impacts, reduce the costs to operate and maintain infrastructure and provide critical connections for underserved groups to reach education, jobs, healthcare, and other social services.
	Location	St. Augustine, FL
11	Project Title	SMART US-19
	Organization	Pasco County
	Start–End	-
	Project Lead	Megan Arasteh, Megan.Arasteh@dot.state.fl.us
	Status	Planning
	Category	Automated, connected
	Mode	Auto, bike, Transit
	Description	The intent of this project entitled “Safety and Mobility with Advanced and Reliable Technologies along US-19” (SMART US-19) is to transform the existing operation of US-19 into SMART US-19 to improve safety and mobility for all travel modes. The SMART US-19 project connects to and extends the current FDOT CAV project in Pinellas County (now complete) into Pasco County to implement the same vision and implementation similar process to the CAV project in Pinellas County. The project will install RSUs at 36 intersections from Pinellas County on the south to Hernando County on the north, providing for 42 miles of connected infrastructure.
	Location	Pasco County, FL

No	Project Details	
12	Project Title	SR-60 West Coast Smart Signal Corridor Project
	Organization	Pinellas County, FDOT District 7, City of Clearwater
	Start–End	-
	Project Lead	Megan Arasteh, Megan.Arasteh@dot.state.fl.us
	Status	Planning
	Category	Connected
	Mode	Auto, bike, Transit
	Description	Pinellas County, in partnership with FDOT District 7 and the City of Clearwater, are proposing a CV project along SR-60 in Pinellas County. The proposed enhancements through the Smart Signal Corridor project include new ATC controller upgrades, improved detection systems for both intersection and mid-block system detection, pedestrian detection systems, additional CCTV cameras to complete coverage, and new field communications equipment upgrades. Through an ATCMTD Grant awarded to Pinellas County, RSUs, cellular OBUs, and additional pedestrian detection and warning systems will be installed. Once completed, the corridor will be a state-of-the-art smart signal corridor on one of the most critical and visible state roadways in Pinellas County.
Location	Pinellas County, FL	
13	Project Title	Train-vehicle Crash Avoidance Pilot Project
	Organization	FDOT District 4
	Start–End	-
	Project Lead	Alexandra Lopez, Alexandra.Lopez@dot.state.fl.us
	Status	Planning
	Category	Connected
	Mode	Auto, Transit
	Description	FDOT District 4 aims to deploy technology solutions to mitigate crashes and hazards at railroad crossings by reducing the number of vehicles stopped on railroad tracks. The system will include queue detection systems, highlighted signs, and CV components to provide drivers with warning alerts of upcoming traffic queues. Providing advanced warning is likely to reduce secondary crashes and improve mobility and safety. The following five rail crossing locations were identified by FDOT for this pilot project—Okeechobee Blvd (SR-704), Hollywood Blvd (SR-820), Hallandale Beach Blvd (SR-858), Commercial Blvd (SR-870), Forest Hill Blvd (SR-882). Locations are subject to change as design moves forward.
Location	Broward County, FL (SR 704, SR 820, SR 858, SR 870, and SR 882)	
14	Project Title	US-1/Jupiter Bridge Smart Work Zone
	Organization	FDOT District 4
	Start-End	-
	Project Lead	Daniel Smith, Daniel.Smith@dot.state.fl.us
	Status	Planning
	Category	Connected
	Mode	Auto, Bike, Transit
	Description	FDOT District 4 focuses on creating a safer environment for roadway users and workers by using intelligent transportation systems in work zones. This SWZ project for construction at US-1/Jupiter Bridge will process real-time information from ITS technologies and passed to traffic management operators and signal timing engineers rapidly. In addition, real-time monitoring will assist in mitigating unplanned traffic operation problems occurring at the detour route.
Location	US-1/Jupiter Bridge, Jupiter, FL	

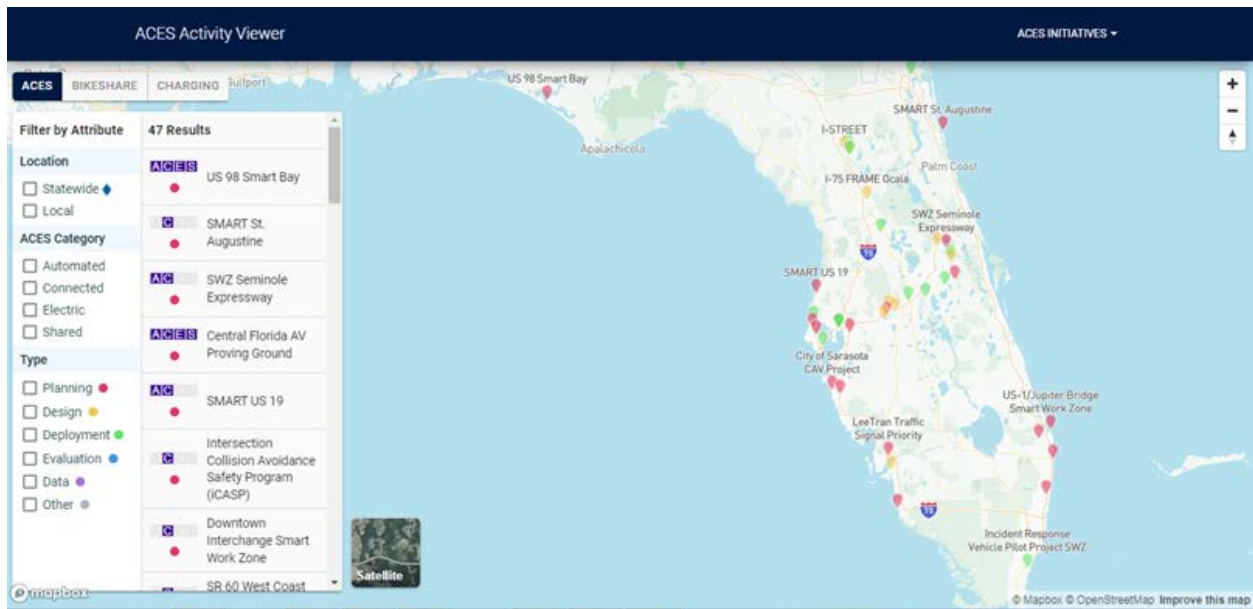


Figure 3-7 Project information on Florida ACES Activity Viewer

4 Transfer of Florida ACES from CUTR to FDOT

One of the most important objectives of the Phase II project is to transfer Florida ACES from CUTR to FDOT. This chapter describes the transfer of the Florida ACES Database, Activity Viewer, and associated management, operations, and maintenance from CUTR to FDOT. It covers development and execution of Florida ACES transfer plan, description of system architecture of Florida ACES, operations of Florida ACES system, and source code structure.

4.1 Development and Execution of Florida ACES Transfer Plan

The project team developed the Florida ACES transfer plan, including the following items:

- **Development of a Florida ACES technical manual**

The project team prepared a Florida ACES technical manual containing two parts: (1) System Architecture of ACES System and (2) Operations of ACES Systems, which are provided in Section 4.2 and Section 4.3, respectively.

- **Identification of items for transfer**

The project team identified the items for transfer from CUTR to FDOT including the ACES database, Activity Viewer, associated service accounts for management and operations of Florida ACES, ACES source code, and training materials including guidelines and videos.

- **Description of ACES deployment environment**

The transfer of the Florida ACES system includes redeploying the ACES system under FDOT administration. The ACES system is a cloud-based application. Several cloud services, providers, and accounts were used to build and operate the application. The deployment environment for ACES, along with the associated fees, is summarized in Table 4-1 for the supporting service accounts to be transferred from CUTR to FDOT.

Table 4-1 Florida ACES Deployment Environment

Service	Provider	Cost	Account
Webpage hosting	Netlify	Free	Netlify account
GIS Map	Mapbox	Charge if >50,000 monthly loads	Mapbox account
File Storage	AWS S3	Charge based on access volume	AWS account
Database	DynamoDB		
Business Logic	Lambda		
Authentication	AWS Cognito		
Survey Form	Google Form	Free	Google account
Source Code Management	GitHub	Free	GitHub account
Domain	GoDaddy	Fixed Price	GoDaddy account

- **Recommendation of service account transfer methods**

Account transfer—this method will fully transfer the existing service accounts (Table 4-1) for development to FDOT. The research team will NOT keep any access privileges to these accounts. This method will not change existing services and will smoothly relocate ACES services to FDOT without any interruption. This method does not require a redeployment of the system and avoids any potential risks during the redeployment.

Redeployment—this method will redeploy the system in the FDOT environment. FDOT needs to create the necessary service accounts with the providers listed in Table 4-1 or other providers providing compliant services. The system would need to be re-configured for the redeployment, and additional efforts may be needed before the system is fully redeployed.

- **Description of ACES source code structure**

The project team prepared the source code of the ACES system and associated folders, subfolders, and files for transfer.

- **Development of Florida ACES training materials and videos**

The project team developed training materials to guide the ACES management and operations, including how to add/update/delete ACES projects and user management. The training materials include operations guidelines and associated training videos. The detailed operations guidelines are provided in the Appendices (Appendix B to Appendix F) of this report. The following are the four training videos that were created:

- Introduction to the Florida ACES Activity Viewer
- Introduction to the Florida ACES Administration Page
- Introduction to the ACES User Management
- Introduction to Activating or Deactivating Projects

- **Coordination and transfer of the Florida ACES system from CUTR to FDOT**

The research team conducted an initial meeting with the FDOT project manager and consultants on June 26, 2022. The meeting minutes are provided in Appendix F. Based on the meeting minutes, the FDOT consultants coordinated with the FDOT Office of Information Technology (OIT) and CUTR on the transfer of the Florida ACES database, Activity Viewer, associated service accounts for management and operations of Florida ACES, ACES source code, and training materials. The project team worked with FDOT and executed the Florida ACES transfer plan to complete the Florida ACES transfer from CUTR and FDOT by the end of the project.

- **FDOT personnel training**

The research team developed and provided detailed training materials and videos to FDOT. The training materials and videos can be used to train existing and future FDOT personnel and consultants to manage, operate, and update the Florida ACES system.

4.2 System Architecture of Florida ACES

4.2.1 Overall System Architecture and Functions

The Florida ACES system created a Florida Automated, Connected, Electric, and Shared (ACES) transportation system roadmap as a medium to share data, findings, and best practices among transportation agencies, other public agencies, the private sector, and university communities. Advanced ACES technologies are impacting, and will continue to impact, the development of vehicles, infrastructure, communities, commerce, and the economy.

The Florida ACES system includes four modules: ACES Activity Viewer, Amazon Web Service (AWS), ACES Administration Page, and Survey Form. The modules and functionalities are shown in Figure 4-1. It is easily accessible, low-cost to operate and maintain, and provides a secure platform to collect, hold/host, share, and manage ACES project-related data.

Core Modules

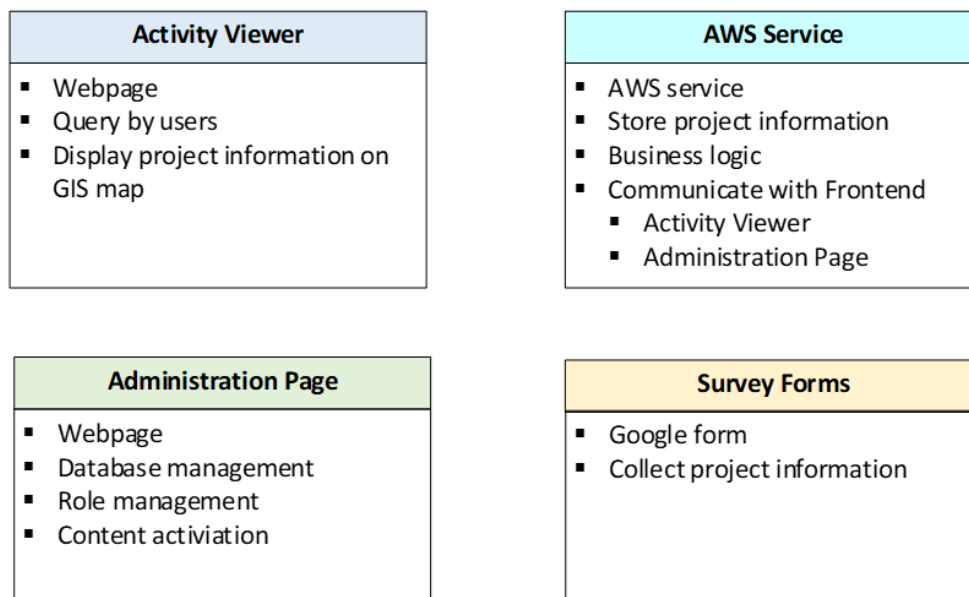


Figure 4-1 Core modules and their functionalities of the Florida ACES system

The multi-layered authentication enabled on the AWS database, the ACES Administration Page, and the Florida ACES Activity Viewer, allows for seamless data sharing among project stakeholders and the FDOT. The Florida ACES system promotes collaboration among ACES research, development, testing, deployment, demonstration, and educational activities.

4.2.2 ACES Activity Viewer

The Florida ACES Activity Viewer is a forum to engage in education and technology transfer related to these modern technologies. It is a Web-based portal to share data, findings, and best practices between and among transportation agencies, the private sector, and colleges and

universities, and features a multi-layered interface of collected past, present, and planned Florida ACES projects, including bikeshare and charging station initiatives across the state. The Federal live and upcoming signal phase and timing (SPaT) deployments and US DOT initiatives can also be queried on the graphical interface.

To make the ACES Activity Viewer more easily and readily available to the public, the design and development of the ACES Activity Viewer focused on creating a user-friendly interface that operates on both Web and mobile devices. Various technologies were selected and configured to increase data security, decrease maintenance costs, and update project information. The ACES Activity Viewer is shown in Figure 4-2.

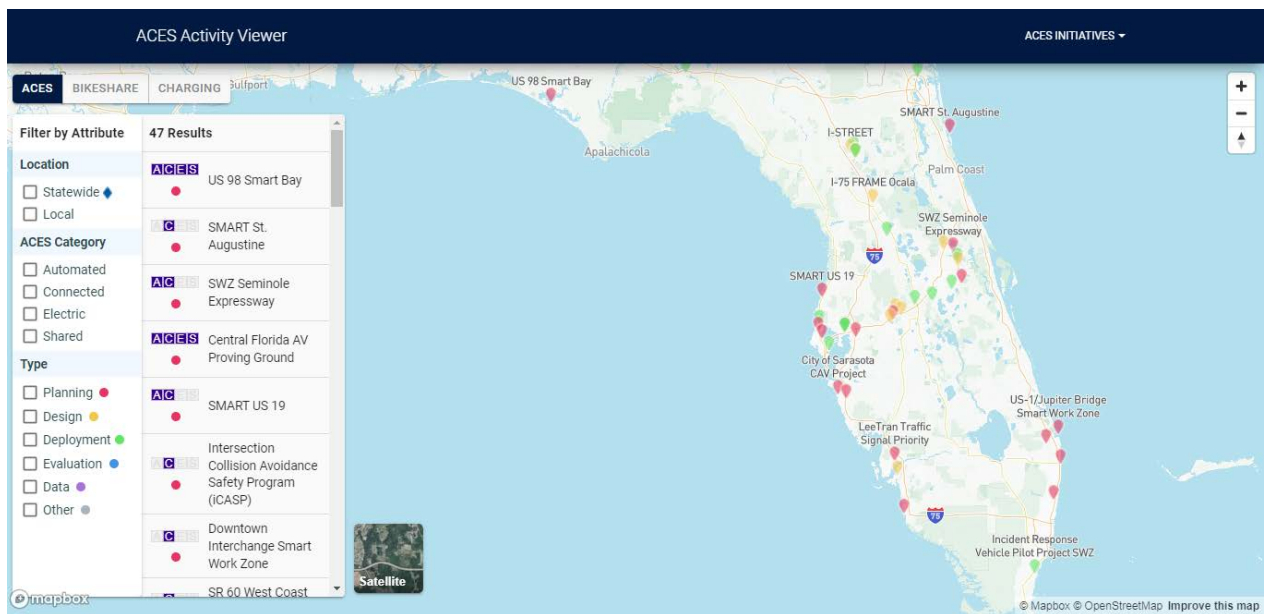


Figure 4-2 Florida ACES Activity Viewer

The ACES Activity Viewer website is hosted on Netlify¹, a platform for the fast and secure delivery of Web content. Bridging the gap between development and deployment, Netlify automated the process of compiling the source code, building the website, and making the content available for public access. The link for accessing the ACES Activity Viewer resides at <https://florida-aces.org>, as shown in Figure 4-3.

¹ <https://www.netlify.com/>

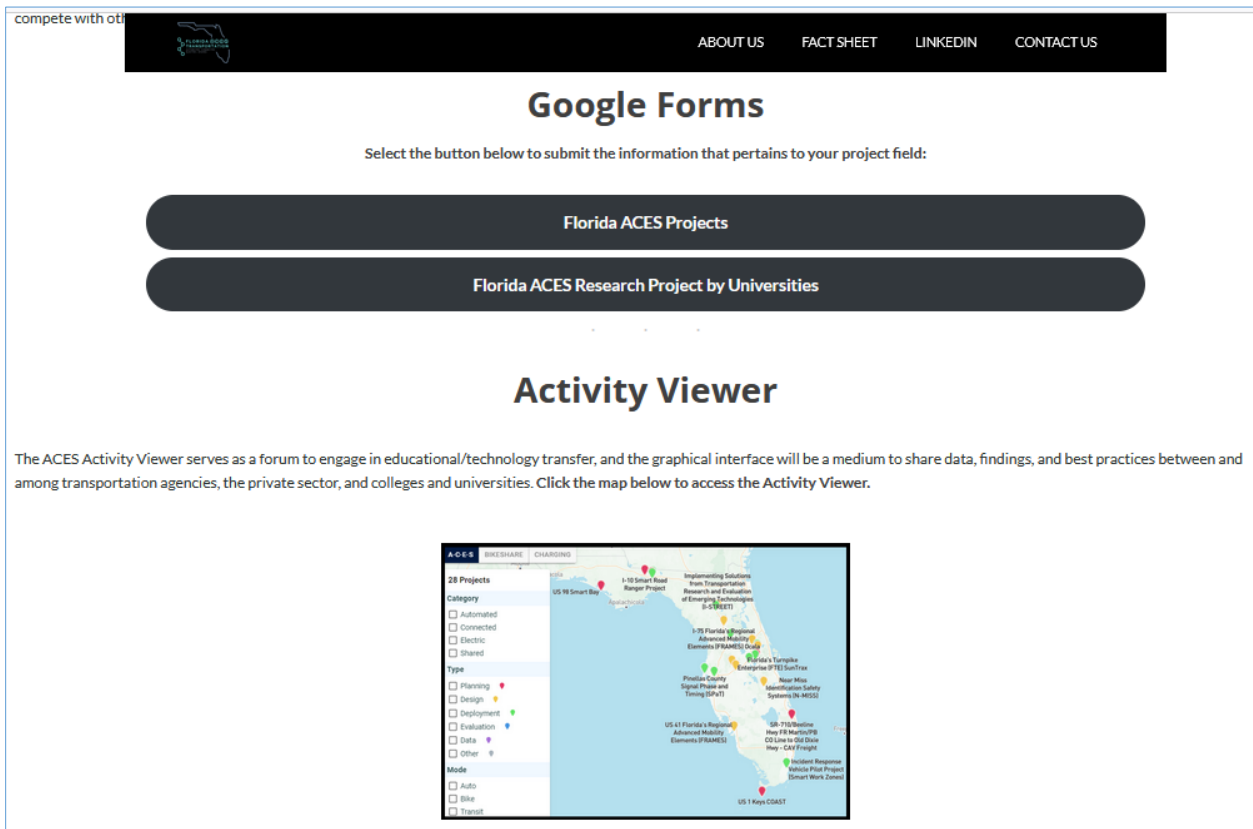


Figure 4-3 Florida ACES Transportation Roadmap Initiative website

The ACES Activity Viewer’s user interface (UI) was implemented using React,² a JavaScript framework. Instead of individual pages, the website was built with components that can be reused and reconfigured in different areas of the UI, an approach that streamlines development and increases the website’s responsiveness. For the UI’s interactive map display, a critical component was that it must be able to render thousands of data points and complex shapes while responding to a myriad of user interactions. Mapbox³ was chosen as the UI’s underlying mapping technology, rather than better-known products from Google and Esri, because of the prominent level of control it affords the developer. The main technologies used for the development of the front-end and back-end of ACES system are illustrated in Figure 4-4.

² <https://reactjs.org/>

³ <https://mapbox.com/>

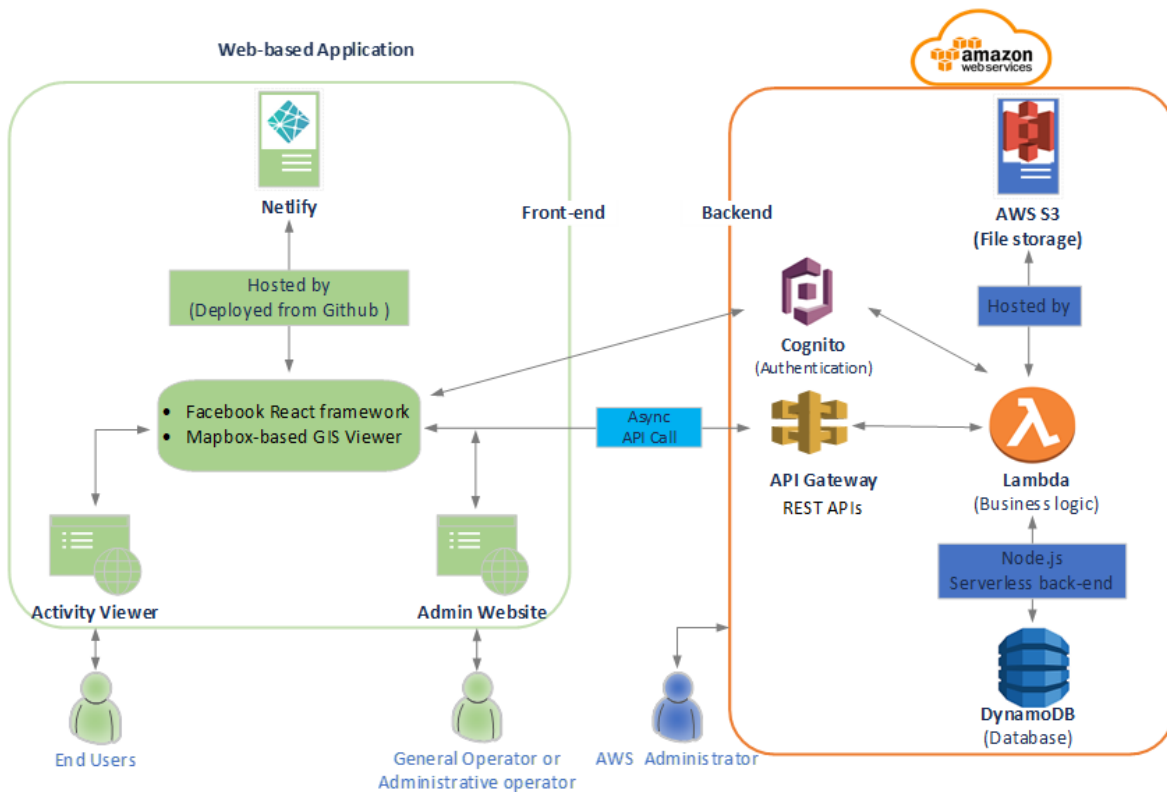


Figure 4-4 Main technologies of the Florida ACES system

To standardize the information that can be displayed by the ACES Activity Viewer, 15 data fields were developed to describe each ACES project (Table 4-2).

Table 4-2 Project Data Fields – Florida ACES Roadmap Database and Activity Viewer

Project Title	ACES Category
Project Short Title (Project Title)	Project Mode
Project Organization	Geographic Location
Project Lead Name	Abstract/Project Description
Project Lead Email	Images
Start Date	Data Sets
End Date	Last Update
Project Status/Type	

These data were stored in an Amazon Web Service (AWS) DynamoDB database. DynamoDB is fast and flexible and accommodates future changes to the project data fields. In the current version, summaries of 47 Florida-based ACES projects outlined by the FDOT Connected Vehicle Initiative⁴ and other resources were used as illustrative examples to develop the ACES Activity

⁴ <https://www.fdot.gov/traffic/its/projects-deploy/cv/connected-vehicles>.

Viewer. As more projects are added to the database or existing data changes, the information shown by the ACES Activity Viewer will be updated accordingly, after approval by the FDOT PM.

In addition to the ACES projects database, the ACES Activity Viewer used data from other sources. Alternative fuel station data were collected from the National Renewable Energy Laboratory (NREL), and Citybikes supplied the bikeshare information developed as part of additional initiatives under the ACES Activity Viewer. Nationwide signal phase and timing deployment (SPaT Challenge) data were extracted from the National Operations Center of Excellence (NOCOe). Because these data are from external sources, effort was required to ensure that they are available for use and are correctly formatted for display.

4.2.3 ACES Administration Page

Using the same technology as the development of the ACES Activity Viewer website, the ACES Administration Page is an administrative section where an authorized user can add/update/delete project information to the ACES database on the AWS DynamoDB. The current version of the ACES Activity Viewer is available at <https://flaces-admin.netlify.app> (Figure 4-5).

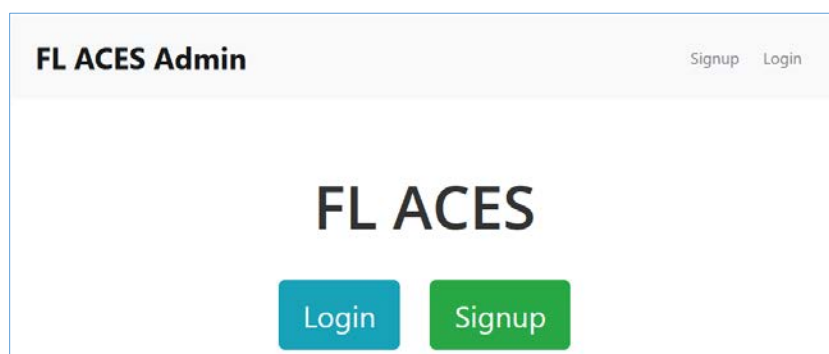


Figure 4-5 ACES Administration Page of the Florida ACES system

The multi-layered authentication enabled on the FL ACES Administration Page provides a secure mechanism to collect and share ACES projects information. Registered users have the most disaggregated level of access and can add/delete/make changes or provide updates only to ACES projects on their own accounts, while authenticated administrators can fully access and manage all projects in the database. The project information input on the FL ACES Admin Page is automatically and simultaneously updated on the AWS database, and a newly created project is, by default, not visible on the Activity Viewer, pending review and approval to be shown on the ACES Activity Viewer. The project approval can only be granted by the FDOT project manager. An authenticated AWS administrator can activate a pending project on the ACES Activity Viewer after FDOT's approval. The project will then be visible on the ACES Activity Viewer. An authenticated AWS administrator can also deactivate projects. Deactivated projects will not be visible on the ACES Activity Viewer.

4.2.4 AWS Service

The ACES system uses an AWS database as its back-end to store the project-related data and the ACES Administration Page operators information. In addition to a database for ACES project data, a file server was required to store project-related data files, and an authentication service was needed to secure the administrative portion of the ACES Activity Viewer and the ACES Administration Page, where project data could be modified. A reliable method of communication between the ACES Activity Viewer and these back-end services was established.

Traditionally, privately-owned servers can handle these tasks, if configured correctly. However, this approach required constant monitoring against security risks, data loss, and hardware integrity. To overcome these challenges, a cloud-computing approach was chosen to minimize server-side maintenance. After comparing multiple well-known providers, including offerings from Google and Microsoft, Amazon Web Services (AWS) was selected based on its broader range of services, more extensive support, and lower costs. ACES resources stored on AWS are also protected by industry-leading security measures. As shown earlier, Figure 4-4 also presents an overview of the interactions between the ACES Activity Viewer and AWS services.

The ACES project database is supported by the DynamoDB⁵ service on AWS. AWS S3⁶ provides nearly unlimited file storage capacity for the ACES Activity Viewer. Cognito⁷ handles authenticating user accounts, so only approved users can make changes to the project database via the ACES Administration Page. Through the API Gateway⁸ service, the ACES Activity Viewer can make requests to view or change project data, and the Lambda⁹ service executes custom logic to fulfill these requests.

4.2.5 Project Survey Form

New ACES project information was collected from private industries and existing stakeholders through Google Forms, in addition to the information obtained from the FDOT CAV Initiative Website. A project survey form can be used to collect information on high-quality past, existing, and planned ACES projects from existing and new stakeholders, including those from the private sector.

To facilitate seamless ACES data collection, a Google Form was created to allow transportation agencies, ACES stakeholders, and other professionals to easily input their ACES project information. Its authentication mechanism makes it secure and convenient to collect the data. An authorized user can visit <https://docs.google.com/forms> to sign-in and access Google Forms.

⁵ <https://aws.amazon.com/dynamodb/>.

⁶ <https://aws.amazon.com/s3/>.

⁷ <https://aws.amazon.com/cognito/>.

⁸ <https://aws.amazon.com/api-gateway/>.

⁹ <https://aws.amazon.com/lambda/>.

The user can click Responses to check the project data and click Downloaded responses (.csv) to download responses from the Google Form as shown in Figure 4-6. The Florida ACES website and Google Forms foster a culture of collaboration to become more involved in ACES efforts undertaken in the state and secure new projects and serves as a medium for information and technology transfer. The Google Form resides at <https://florida-aces.org> (Figure 4-7).

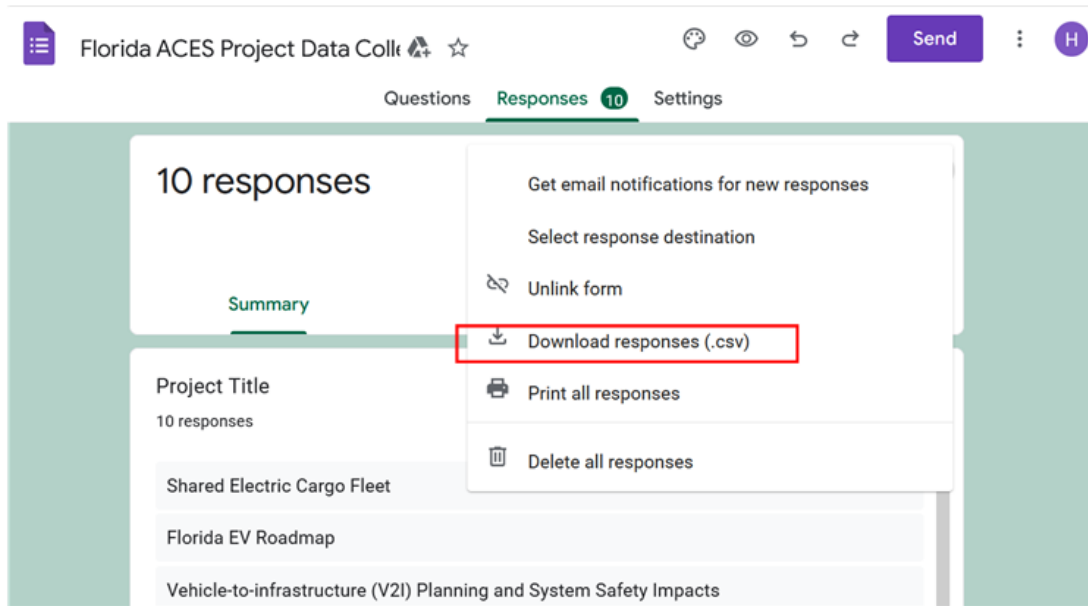


Figure 4-6 Download responses from Google Forms



The Florida Automated, Connected, Electric, and Shared (ACES) Transportation Roadmap initiative is a cooperative effort to foster collaboration among the Florida Department of Transportation (FDOT), public agencies, private sector, and academic institutions within Florida in order to prepare for the wave of technological change in our transportation ecosystem. Through collaboration, proactive communication, sharing of data, development of standards, hardware, software, and lessons learned, Florida can remain at the forefront of ACES development and compete with other states in the U.S. for prominence in these areas.

Google Forms

Select the button below to submit the information that pertains to your project field:

Figure 4-7 Data collection form on the Florida ACES website (Google Form)

4.3 Operations of Florida ACES System

4.3.1 Procedure of ACES Information Process

The procedure of ACES information processing is shown in Figure 4-8.

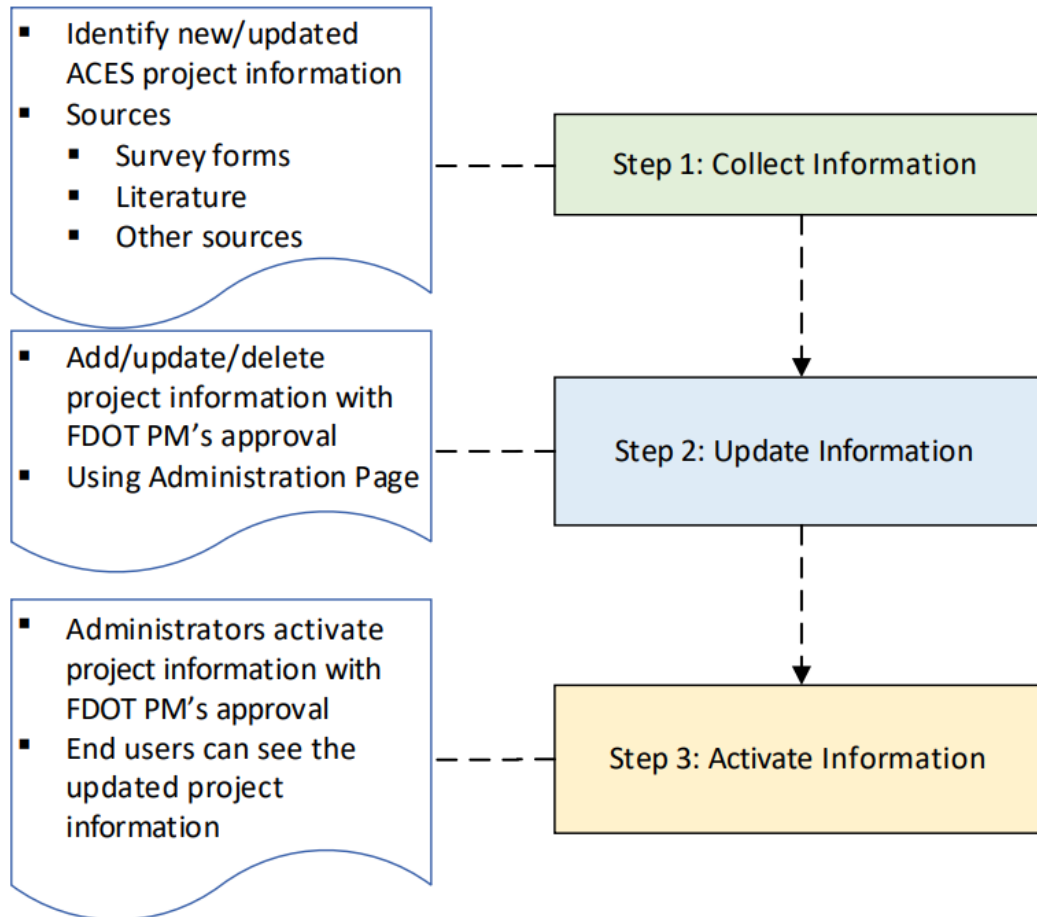


Figure 4-8 Procedure for Florida ACES information processing

The first step is to collect project information via Google Forms, the Florida CAV Initiative website, or other reliable resources. The collected information will be assembled and converted to standard data formats (Table 4-2).

The second step is for an authorized user to access the ACES Administration Page to update ACES projects in the ACES Database after approval of submitted ACES projects from the FDOT PM or authorized personnel. Project information is made available with a summary, a description of project objectives, and the main outcomes expected.

The third step is for the administrator to use back-end Amazon Web Services (AWS) to activate the projects to make them available on the ACES Activity Viewer to create a graphical interface

that will serve as a hub for collaboration and coordination among existing and potential ACES stakeholders and the public.

4.3.2 ACES User Management

There are four user roles in the ACES system to provide a secure platform to collect and share ACES project information. The user roles and the user management are shown in Figure 4-9.

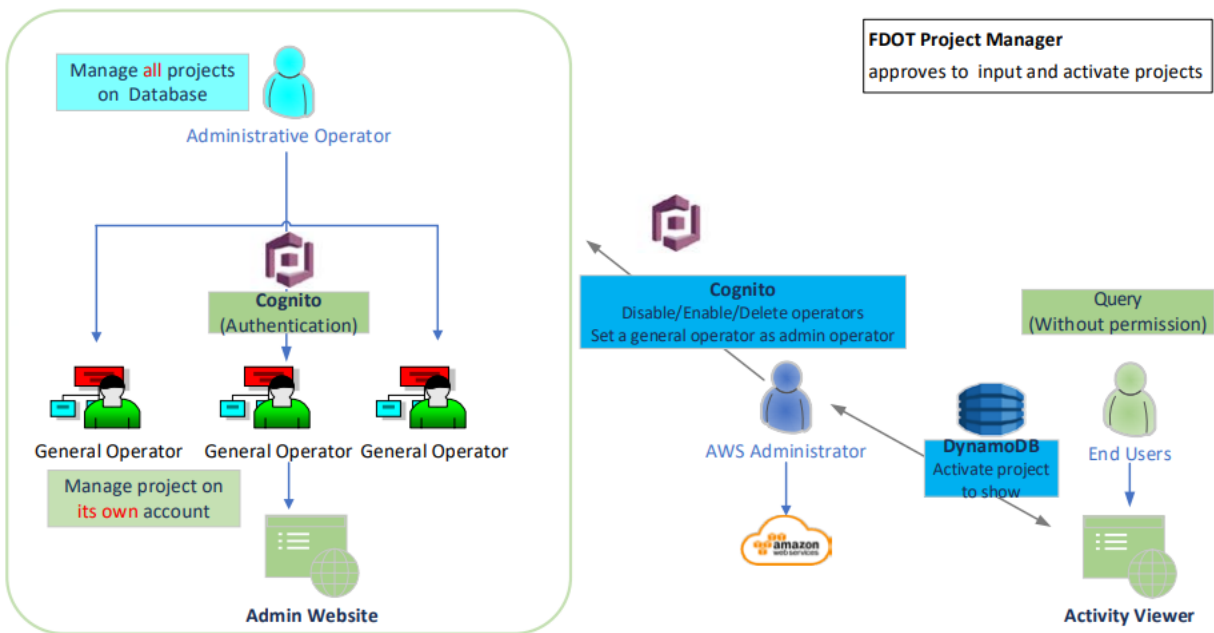


Figure 4-9 User management in the Florida ACES system

- **FDOT Project Manager** is responsible for the approval of the input and choosing projects on the database to be activated on the ACES Activity Viewer.
- **General Operators** can manage ACES projects on the ACES Administration Page. The general operators can add, update, or delete the projects that they are authorized to manage.
- **Administrative Operators** can manage (add/update/delete) all projects on the ACES Administration Page.
- **AWS administrators** can manage operators' privilege, including adding/deleting an operator and changing a general operator to an administrative operator or vice versa. An AWS administrator also activates a new or updated project on the ACES Administration Page.
- **End users** are the public who can access the ACES Activity Viewer without any permission.

The guideline for user management is given in **Appendix D**.

4.3.3 Collection of Project Information

New ACES projects were collected through two resources. The first resource is Google Forms on the Florida ACES website, <https://florida-aces.org/>. Authorized operators on Google Forms could access the collected ACES project information after end users input their ACES projects through their Google accounts or a shared public Gmail account.

The second resource is the Florida CAV Initiative website (FDOT, 2022) (Figure 4-10), <https://www.fdot.gov/traffic/teo-divisions.shtm/cav-ml-stamp/connected-vehicles>. The operators on the ACES Administration Page can update Florida ACES Database and the ACES Activity Viewer in two ways. First, projects available on the Florida CAV initiative website but missing on the ACES Activity Viewer were identified; information and images from those projects were then added to the Florida ACES Database and the ACES Activity Viewer. Second, the operator could check and update existing projects on the ACES Activity Viewer with any new information from Florida CAV Initiative website; projects were updated only if new data or images were added on the project page on Florida CAV Initiative website.

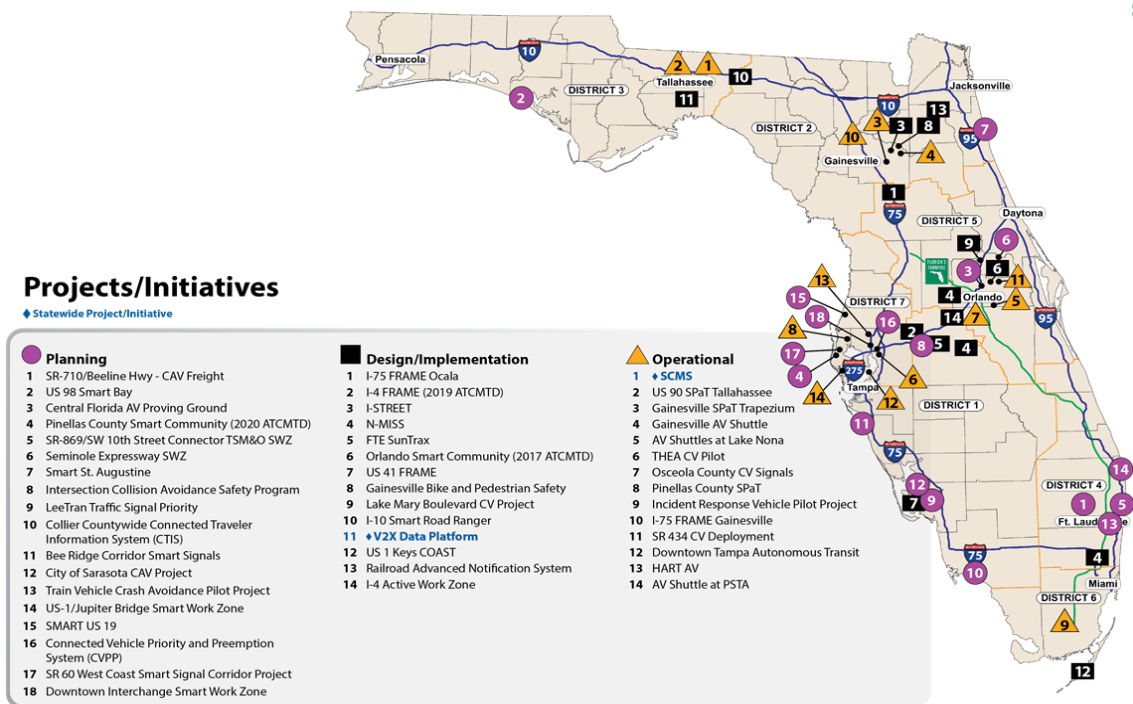


Figure 4-10 Map of Florida CAV projects and initiatives

The procedure for collecting ACES projects information from Google Forms or the Florida CAV Initiative website is presented at **Appendix F**.

4.3.4 Management of Project Information

Authorized operators can add, update, and delete project information on the Administration Page. The imported project information on the Administration Page is simultaneously updated to the ACES project database on AWS.

There are two kinds of users on the Administration page, authenticated general operators and administrative operators. The general operator can only access the project information on its own account. While the authenticated administrative operator can fully access all the project information on the ACES platform.

A newly created project will be pending, by default, and invisible on the ACES Activity Viewer until it is reviewed and approved. Project approval can only be granted by the FDOT project manager or authorized personnel. An authenticated AWS administrator can activate a pending project on the ACES Activity Viewer after FDOT's approval. The project will then be visible on the ACES Activity Viewer. An authenticated AWS administrator can also deactivate projects. Deactivated projects will not be visible on the ACES Activity Viewer.

The procedure of managing ACES projects information is presented at **Appendix C**.

4.3.5 Query of Project Information

The public can query ACES project information through the ACES Activity Viewer. There are two ways to access the ACES Activity Viewer. The first way is by visiting <https://flaces.netlify.app> to access the viewer directly. The second way is to access the **Activity Viewer map image** on the Florida ACES website at <https://florida-aces.org>. The [ACES Activity Viewer](#) is open to the public and requires no permission to access. The Florida-specific view features an interactive, location-based display of **Florida-based ACES projects**. End users can:

- View Florida ACES initiatives by filtered attributes
- View the project details
- Query Florida prominent state bike share projects
- Query Florida EV charging infrastructure projects
- Query NOCoE initiatives
- Query US DOT initiatives

The procedure to query ACES projects information through the ACES Activity Viewer is presented at **Appendix B**.

4.3.6 Development of Training Materials

The CUTR team developed training materials to guide the ACES operations, including adding/updating/deleting ACES projects and user management. The training materials include

operations guidelines and training videos. Table 3-1 lists the training contents and associated training videos and guidelines.


Table 4-3 Training Videos about the Florida ACES System Operation

	Training Video	Content	Operation Guideline
1	Introduction to the Florida ACES Activity Viewer	<ul style="list-style-type: none"> Query ACES Project information on the Activity Viewer 	Appendix B: Query Operation
2	Introduction to the Florida ACES Administration Page	<ul style="list-style-type: none"> Manage (add/update/delete) ACES project information through the Florida ACES Admin page 	Appendix C: manage Projects Operation
3	Introduction to the ACES User Management	<ul style="list-style-type: none"> Register a general operator on the FL ACES Admin page Disable/enable operators' access on the FL ACES Administration Page through Amazon Cognito user pools on AWS Set/unset the general operator as the administrative operator 	Appendix D: User Management Operation
4	Introduction to Activating or Deactivating Projects	<ul style="list-style-type: none"> Activate a pending project to be visible on the ACES Activity Viewer after FDOT's approval Deactivate approved projects to be invisible on the ACES Activity Viewer 	Appendix E: Activation Operation

4.4 Source Code Structure

There are three document folders for the ACES system, which are shown in Figure 4-11. The folder **flaces-client-master** is for the ACES Activity Viewer. The public folder includes files that are open to the public. The **src** folder includes files that are not open to the public on the website, which includes the main coded body. The components in the **src** folder include all the components that need to be rendered on the website.

The folder **flaces-admin-master** is for the FL ACES Administration Page. The public folder includes files that are open to the public on the website. The **src** folder includes files that are not open to the public on the website, which includes the main coded body. The components in the **src** folder include all the pages that are created on the website. The container includes authentication files that for the login and signup pages.



The folder **flaces-api-master** includes API gateway services on AWS. The files marked in the red frame coded the API gateway for the data query between AWS database and the front end-the ACES Activity Viewer and the FL ACES Administration Page. The AWS administrator can use the **.yml** document to deploy the API gateway file on AWS.

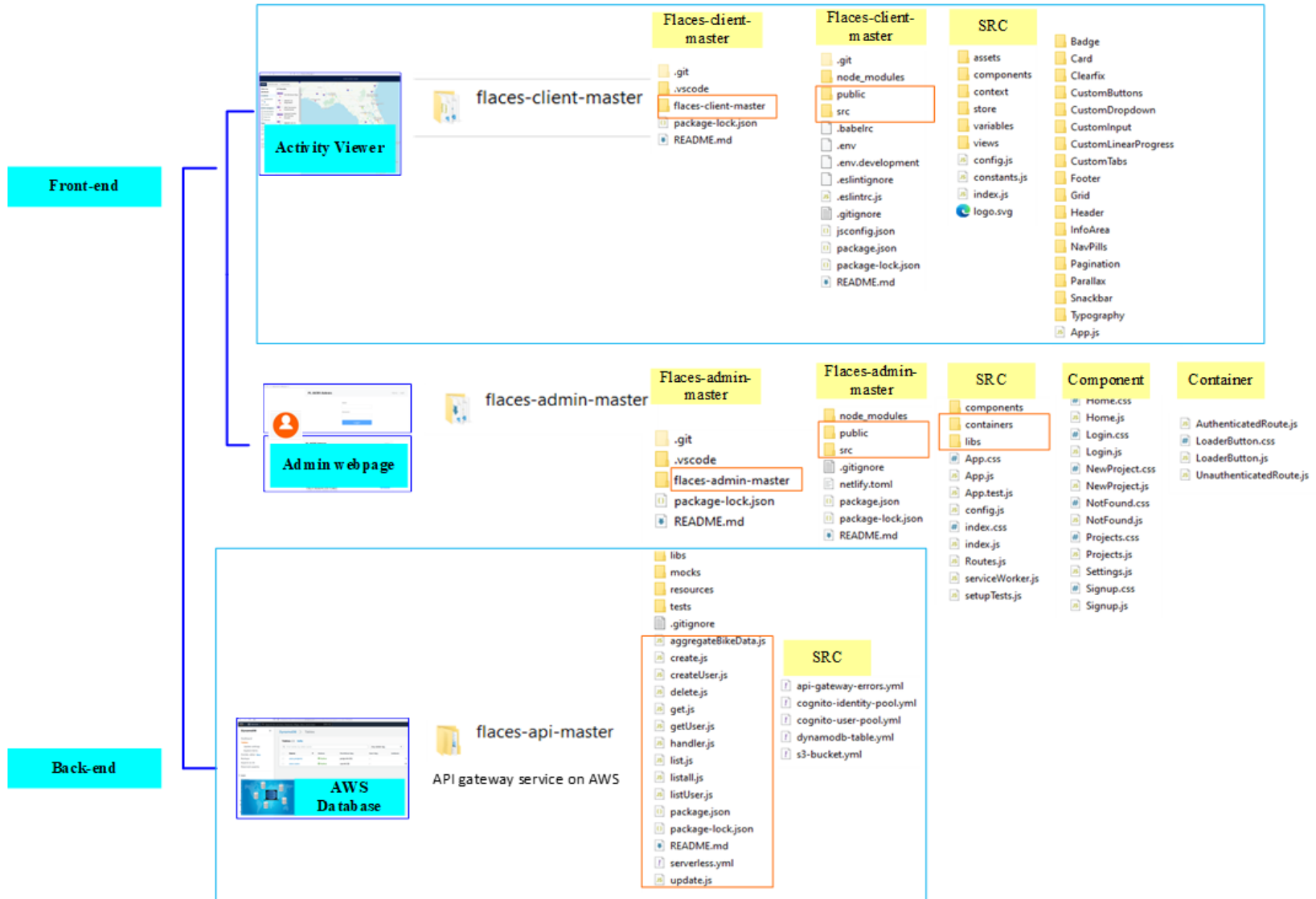


Figure 4-11 Florida ACES source code structure

5 Summary and Conclusions

Automated, Connected, Electric, and Shared (ACES) technologies are rapidly evolving and will continue to impact development of vehicles, infrastructure, communities, commerce, and the economy. Based on the Florida ACES transportation system roadmap for Florida developed in Phase I, this project aimed to engage with private industries to leverage Florida's ACES expertise and promote the Florida ACES program, manage and maintain the Florida ACES roadmap, continue outreach to transportation professionals, and transfer the Florida ACES Database and Activity Viewer to FDOT.

To achieve the project objectives, the research team reached out to 37 private companies, conducted 14 stakeholder meetings to showcase the ACES initiative, and gauged the interest of industry partners to provide ACES projects. The research team also engaged with private industries and university communities during the 2021 Florida Automated Vehicles Summit and the 7th Annual UTC Conference for the Southeastern Region. A total of 24 new ACES projects were collected and added to the Florida ACES project database and Activity Viewer. The technical transfer to migrate the Florida ACES roadmap from USF to FDOT was conducted, including (1) Florida ACES technical manual, (2) ACES deployment items and environment, (3) cloud service accounts, (4) source codes, and (5) ACES training materials and videos.

This project successfully planned, coordinated, and transferred the Florida ACES Database and Activity Viewer, and associated management, operations, and maintenance from CUTR to FDOT. The results, products, and tools developed from this project will support FDOT for the rapid development, implementation, and evaluation of ACES technologies, and the collaboration among research, development, testing, deployment, demonstration, evaluation, and educational initiatives in the ACES area.

Appendix A Private Company and Public Utility

Introduction

Although this report focuses on the private sector, outreach was also conducted to public utilities, including both municipal-owned and investor-owned utilities (IOUs). This appendix provides a high-level introduction to private companies and public utilities that the CUTR team interviewed.

A.1 Argo

Argo AI is an autonomous driving technology company headquartered in Pittsburgh, Pennsylvania that builds the software, hardware, maps, and cloud-support infrastructure to power self-driving vehicles. Argo has two major investors—Ford Motor Co. and the Volkswagen Group. Argo aims to reimagine the human journey by developing self-driving products and services to make the world’s streets and roadways safe, accessible, and useful for all. Argo designs its Argo Autonomy Platform and Solutions to support autonomous ridesharing and goods delivery at scale to benefit communities worldwide.

A.2 Beep

Beep is an autonomous mobility solution company that delivers transportation using driverless, electric, multi-passenger vehicles and is headquartered in Orlando. The company aims to provide intelligence that enables safe, stress-free, eco-friendly, driverless mobility. It specializes in planning, deploying, and managing advanced autonomous shuttles in both public and private communities seeking to more safely connect people, places, and services in first-mile and last-mile mobility networks.

A.3 Bird


Bird is a micro-mobility company based in Miami. Founded in September 2017, it has distributed electric scooters designed for short-term rental to over 400 cities.

A.4 ChargePoint

ChargePoint is a North American EV infrastructure company headquartered in California and is the largest online network operator of independently owned EV charging stations, including both the hardware and software components of the charging systems.

A.5 Coast Autonomous

Coast Autonomous is a self-driving technology company headquartered in Pasadena, California, which designs and develops world-class vehicle automation and monitoring systems that serve as the brain of an autonomous vehicle. It was established to “build community by connecting people with mobility solutions that put pedestrians first and give cities back to people.” It



transforms vehicles into driverless shuttles that provide safe, right-speed transportation—from point-to-point or on-demand—for people or cargo.

A.6 Coast Bike Share/HOPR

Inspired by the success of shared bicycles in Chicago, CycleHop was launched; in a brief period, it has deployed smart bikes in over 15 locations throughout the U.S. and Canada. The HOPR app is a complete micromobility solution, providing easy and quick access to shared-use vehicles.

A.7 Connected Wise

Connected Wise is a young tech start-up company founded in 2018. It is headquartered in Orlando, Florida. Connected Wise focuses on artificial intelligence and blockchains for vehicle to infrastructure (V2I) systems. It aims to “help our country’s infrastructure to become safer, smarter, and more sustainable while getting both our internal and external stakeholders involved in our continuous research and development.”

A.8 Cruise

Cruise LLC is an American self-driving car company headquartered in San Francisco, California that tests and develops autonomous vehicle technology. It is dedicated to improving life in cities by creating an all-electric, self-driving ride service to safely connect people with the places, things, and experiences they care about. It is partnering with Walmart to deliver groceries in the Phoenix metro area.

A.9 FPL


Florida Power & Light (FPL) is a subsidiary of NextEra Energy and is the largest IOU in Florida, serving five million customers and 11 million citizens in the state. Recently, FPL has begun investing in microgrid technology, designing complexes incorporating solar, energy storage, and electric vehicle (EV) charging stations.

A.10 General Motors

The General Motors (GM) Company is an American multinational automotive manufacturing corporation headquartered in Detroit, Michigan. As GM transitions to an all-electric future, it is committed to responsible leadership and a world with zero crashes, zero emissions, and zero congestion. GM believes that autonomous vehicles will have enormous potential benefits for society in the form of increased safety and access to transportation. It also envisions that all autonomous vehicles should be electric to build a more sustainable and accessible world.

A.11 Hexagon

Hexagon AB is a publicly listed global information technology company specializing in hardware and software digital reality; it was founded in 1992 and is headquartered in Stockholm, Sweden. Hexagon envisions a future where data are fully and autonomously leveraged so



business, industry, and humanity sustainably thrive. It is dedicated to putting data to work to enable autonomous, connected ecosystems that boost efficiency, productivity, and quality for future customers.

A.12 Locomation

Locomation is an American autonomous truck company headquartered in Pittsburgh, Pennsylvania, and is dedicated to developing automation for anything that moves. It began the journey with middle-mile freight automation, the most critical link in the supply chain and the one best suited to integrate human-guided autonomous technology. It aims to create capacity in a world that is demanding more, faster every day. Locomation plans to go everywhere autonomous transportation is needed.

A.13 OUC

Although this report focuses on the private sector, outreach was also conducted to public utilities, including both municipal-owned and IOUs. The Orlando Utilities Commission (OUC) is a municipally owned public utility supplying water and electric services to Orlando, Florida and portions of unincorporated areas of Orange and Osceola counties. OUC is the second-largest municipal utility in Florida and recently announced plans to construct an EV charging mobility hub in partnership with public and private entities.

A.14 SemaConnect

Headquartered in Maryland, SemaConnect is an electric vehicle supply equipment (EVSE) provider serving the North American commercial and residential property markets. It develops and produces networked EV charging stations and corresponding software for both station owners and EV drivers, and its ChargePro charging station uses the standard SAEJ1772 connector to supply Level 2 charging that is primarily installed in commercial properties such as government buildings and multifamily unit dwellings, hotels, offices, and retail locations.

A.15 SPIN

Headquartered in San Francisco, California, Spin is a leading micromobility company and currently operates dockless electric scooters on campuses and in cities across North America and Europe. Spin has been recognized for launching the first stationless mobility program in the U.S. and was instrumental in crafting the world's first mobility permit system. As a technology company that powers individual mobility for the benefit of all and strategically collaborates to reshape policy and redesign urban life, SPIN's mission is to create a world full of 15-minute cities and bring those cities to life by moving people freely through their streets.

Appendix B Query Operation

Automated, Connected, Electric, and Shared—referred to as ACES—transportation systems are currently being developed and assessed in the U.S. and around the world. Advanced ACES technologies are impacting, and will continue to impact, the development of vehicles, infrastructure, communities, commerce, and the economy.

The Florida ACES Activity Viewer is a forum to engage in education and technology transfer related to these modern technologies. It is a web-based portal to share data, findings, and best practices between and among transportation agencies, the private sector, and colleges and universities and features a multi-layered interface of collected past, present, and planned Florida ACES projects, including bikeshare and charging station initiatives across the state.

The ACES [Activity Viewer](#) is open to the public and requires no permission to access.

This section describes how to use the Florida ACES Activity Viewer to get information on ACES projects.

Notation: In the following appendices, keywords are highlighted in bold.

B.1 Access the Activity Viewer

There are two ways to access the ACES Activity Viewer. This first is by visiting <https://flaces.netlify.app> to access the viewer directly. Secondly, it can be accessed through the **Activity Viewer map image** on the Florida ACES website at <https://florida-aces.org>. The ACES [Activity Viewer](#) is open to the public and requires no permission to access.

This section describes how to use the ACES Activity Viewer to query project information.

B.2 Query ACES Projects

(1) Map View of Initial Screen

- a. The Florida-specific view features an interactive, location-based display of Florida-based **ACES** projects (currently showing 47 projects at different stages of development), prominent **bikeshare** networks across the state, and electric vehicle **charging** stations (Figure B-1)
- b. The initial screen shows a map view of **ACES** projects in Florida. Each project is represented by a pin on the map. The project title is shown where space permits.
- c. The map can be zoomed, panned, rotated, and tilted according to the user's needs. The map allows zooming (scroll wheel), panning (left mouse drag), tilting (right mouse up-down), and rotating (right mouse left-right). To access the **satellite** view, click the on-screen satellite button at the lower left corner of the screen. To switch back to the map view, click the on-screen map button at the lower left corner of the screen.

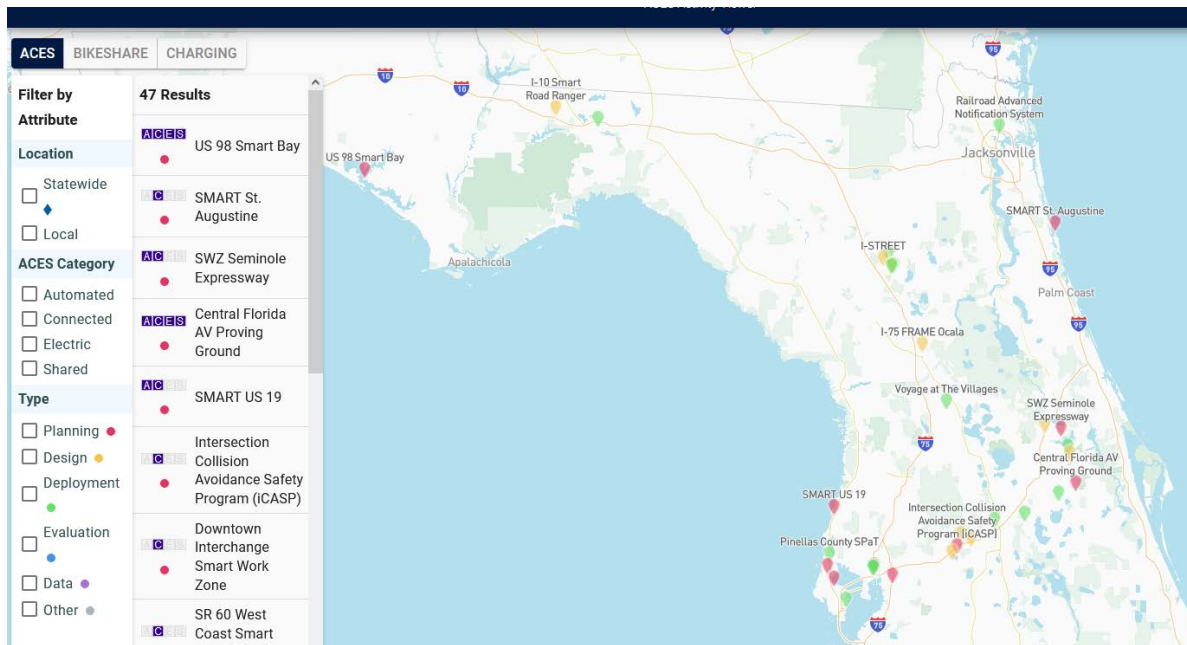


Figure B-1 MapView of initial screen on the Florida ACES Activity Viewer

(2) View Florida ACES Initiatives by Filtered Attributes

- a. The ACES Activity Viewer allows the user to filter queries by location. In **Filter by Attributes** and under Location, the user can select **Statewide** or **Local** to query initiatives.
- b. The results can be further filtered by selecting an **ACES Category**. For example, by selecting **Electric**, local electric initiatives are classified (Figure B-2).The user can select as many categories as desired in the ACES Categories field. The filtering controls provide a quick way to narrow down the projects shown on the interactive display.

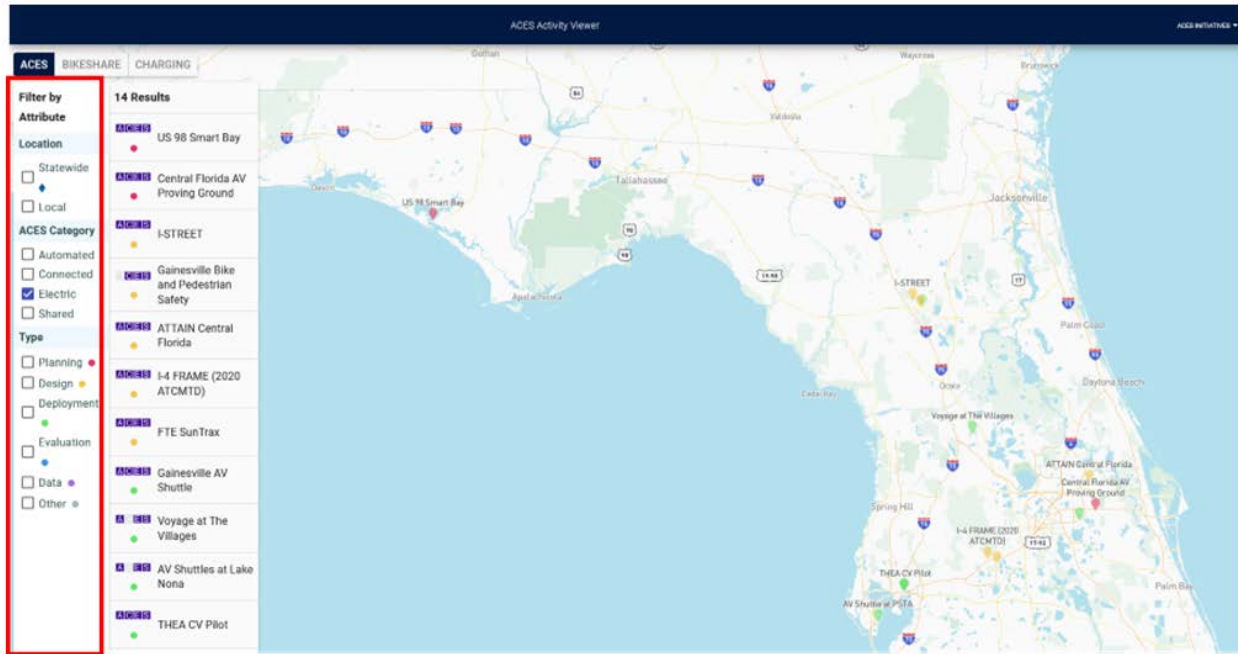


Figure B-2 Filtering control on the Florida ACES Activity Viewer query

c. Filter by project location, **ACES category**, or project **Type**. **Project type is color-coded** with colors that match the colors of the project markers on the map. Green markers indicate projects in deployment, yellow markers are projects in the design stage, and red markers are projects in the planning stage.

d. As the user selects different attribute combinations, the listed projects change as the filter attributes are changed.

(3) Project View with details

a. Hovering the cursor over a particular project on the left side of the map or over a pin on the map reveals its geographic confines, highlighted in blue (Figure B-3). Some projects are located along linear corridors, some fall within a specifically-shaped geographic area, and some may be located at discrete points—the ACES Activity Viewer supports all of these types of geographical descriptions.

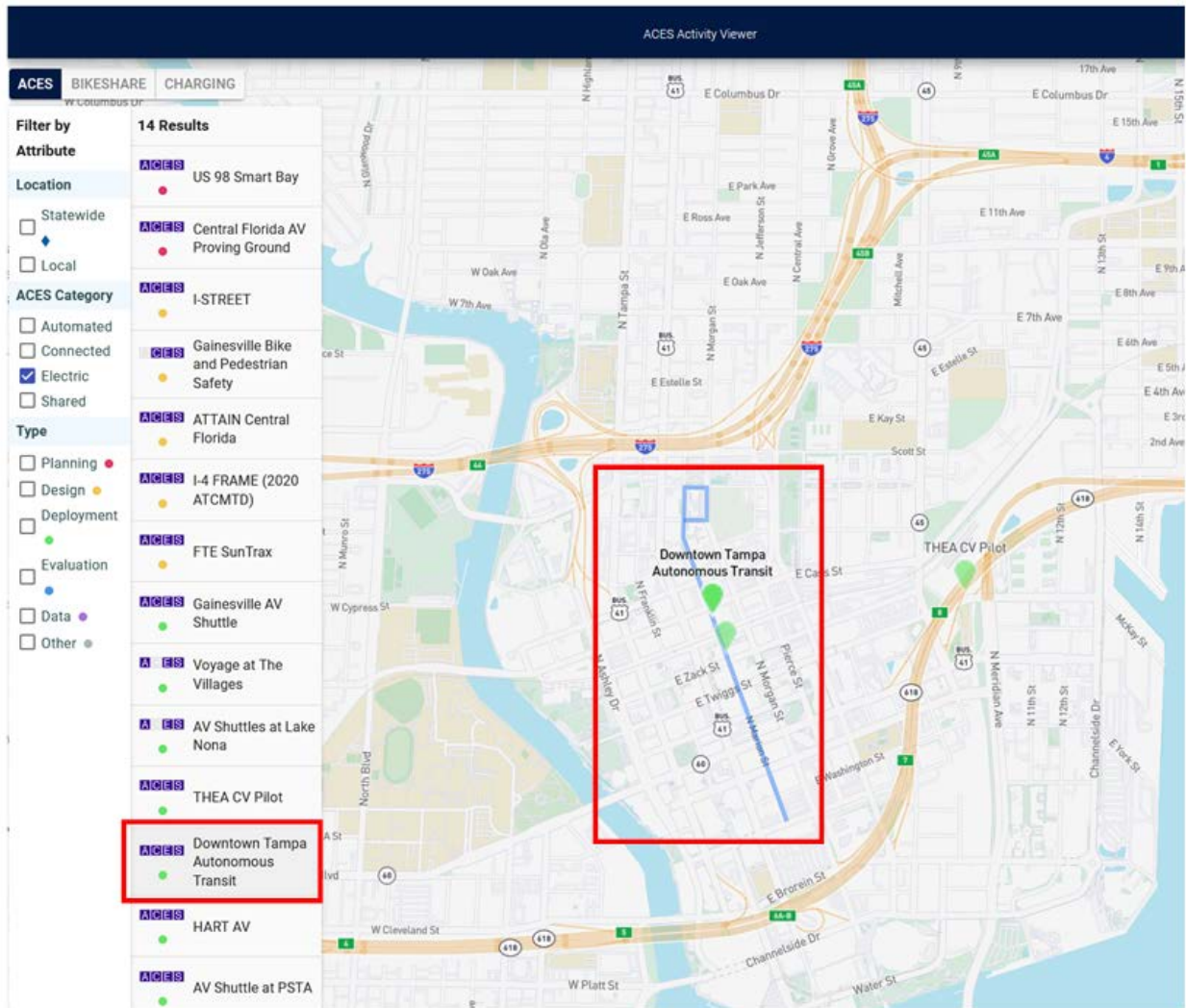


Figure B-3 Project bird view on the Florida ACES Activity Viewer

- b. Click on a project name, either in the results list or on the map, to view the project details. The details screen features a zoomed-in map view, as well as the project’s description and status.
- c. Project details include project scope, development status, managing organizations, and data files, depending on how much project data are available (Figure B-4). It is also worth noting that only available data fields are displayed under each project, thereby creating a clean interface, devoid of any missing information.

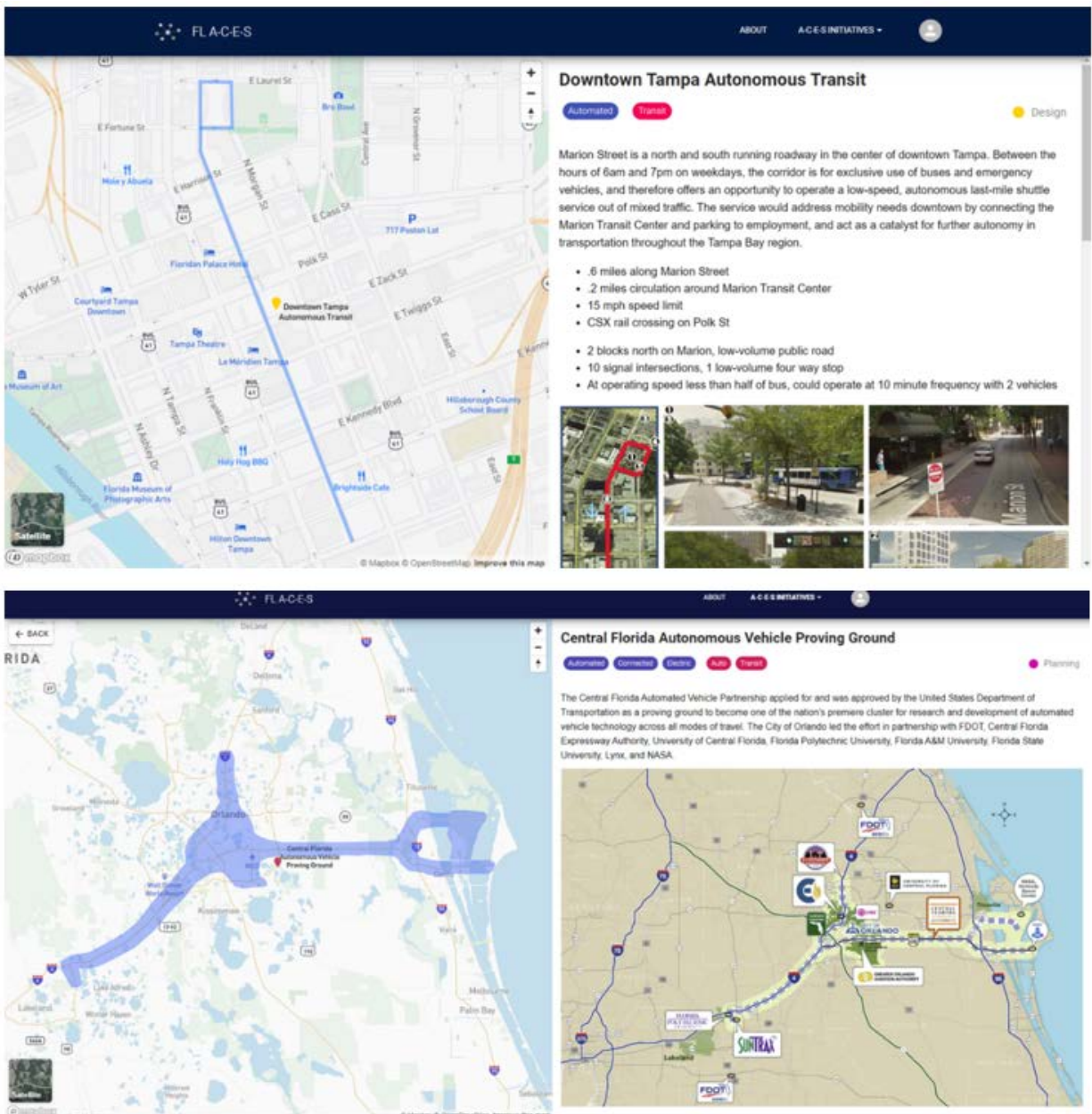


Figure B-4 Project details view on the Florida ACES Activity Viewer

B.3 Query Bikeshare Projects

The **Bikeshare** tab displays bikeshare system activity using near real-time station information from five micromobility networks spread across Florida. The data for this section has been gathered from Bike Share Map¹⁰. Currently, there are five bikesharing networks in Florida—Miami, Fort Lauderdale, Tampa, St. Petersburg, and Aventura—with more than 200 bikes

¹⁰ <https://bikesharemap.com/#/3/-30/30/>

available via station-based systems. Data from these systems are displayed simultaneously, giving the user a clear overview of bikeshare stations across the state.

a. Click on **Bikeshare** to switch to the bikeshare station view. The legend shows the total number of stations, and colors indicating the number of bikes available at each station (Figure B-5).

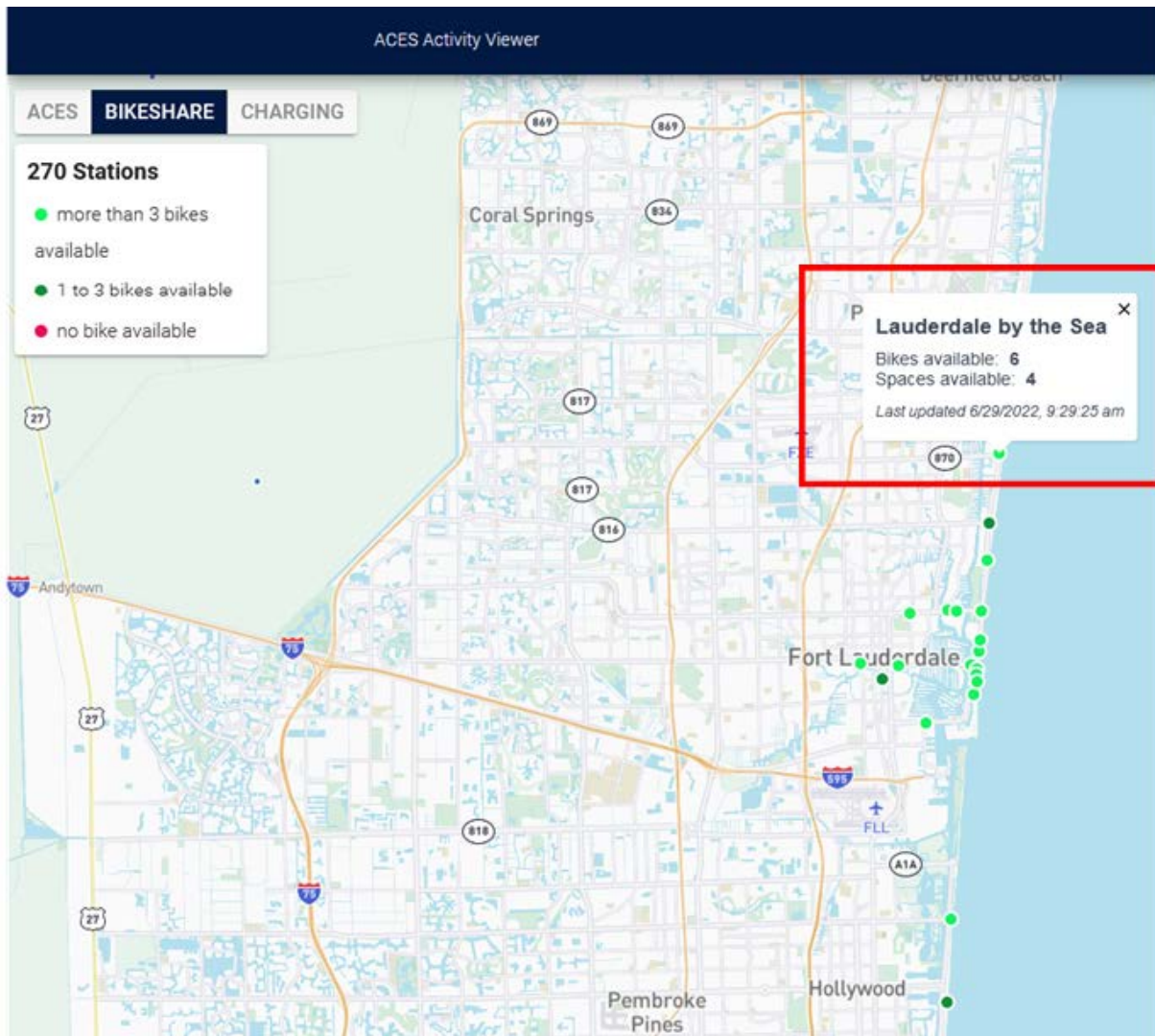


Figure B-5 Bikeshare projects query

b. Along the network, click on colored- station marker to provide details about each bikeshare station, including information on pin a station the number of bikes available in near real-time. Stations labeled in red have no bikes available, those in dark green have 1–3 bikes available, and those in bright green have more than 3 bikes available. An illustrative example of the Lauderdale by the Sea bikeshare system is shown in Figure B-5.

B.4 Query EV Charging Infrastructure Projects

The **Charging** tab shows the locations of all electric vehicle charging stations in Florida (Figure A-6). The data for this section has been gathered from the Alternative Fuels Data Center.

By clicking on a station marker, users can view the station's address and contact information. Zooming into a charging station location further expands the map and shows the various charging points in detail. An illustrative example of the Winn-Dixie-Tesla Supercharger shows the address of the charging station, phone number, and last updated time (Figure B-6).

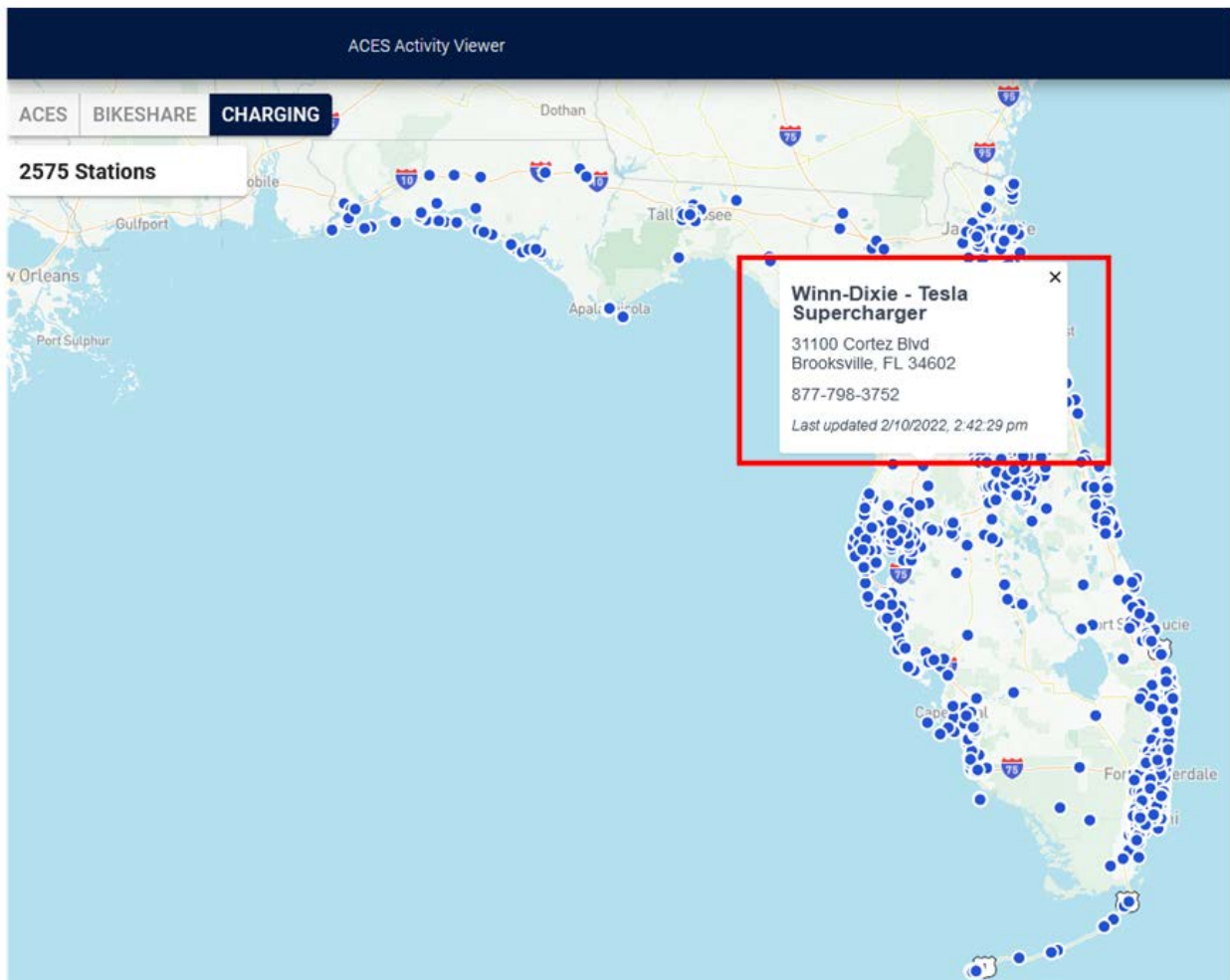


Figure B-6 EV Charging infrastructure projects query

B.5 Query NOCoE Initiatives

Under the **ACES Initiatives** navigation menu, **NOCoE** (National Operations Center of Excellence) under **Federal**, opens an interactive map of live and upcoming signal phase and timing deployments from the SPaT Challenge (Figure B-7). The red pins indicate deployments currently underway, and the green pins highlight those currently in operation.

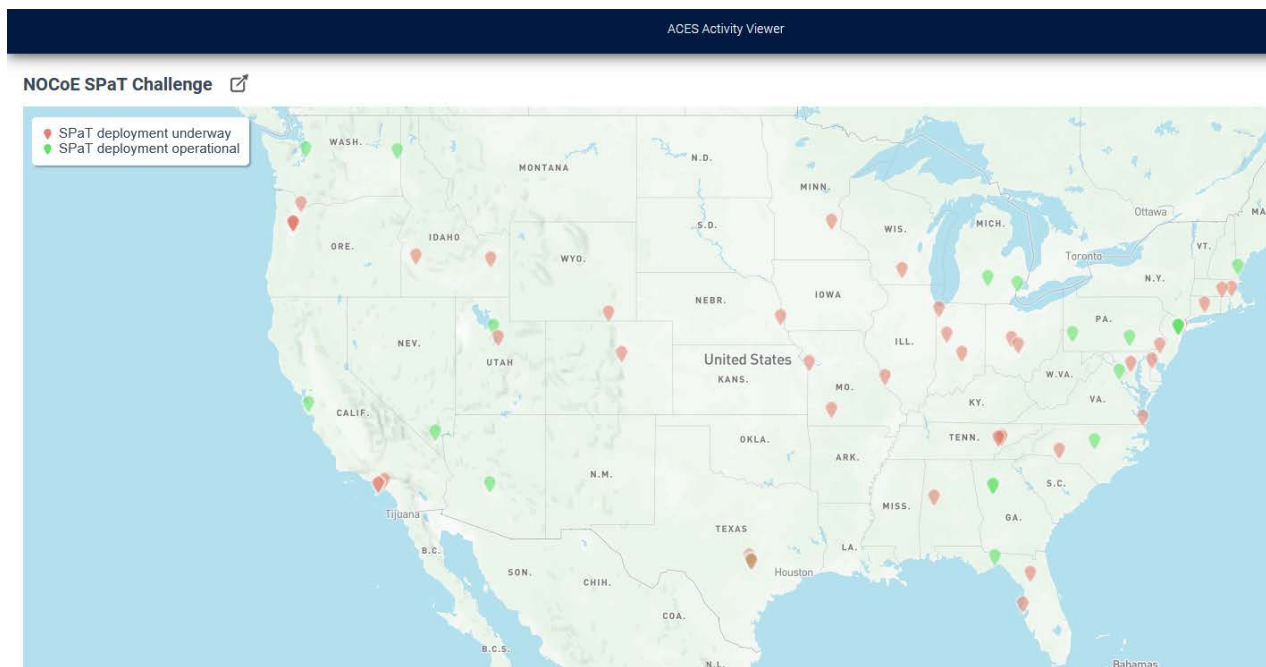


Figure B-7 NOCoE initiatives query

Under the **ACES Initiatives** navigation menu, the **USDOT** brings up an interactive map that displays operational (yellow) and planned (blue) connected vehicle deployment locations across the U.S (Figure B-8). It also contains information on state-by-state crash fatalities and the economic costs (red) that potentially could be mitigated through the deployment of the Safety Band-related technology. The Safety Band is a radio spectrum reserved specifically for transportation safety.

Connected Vehicle Deployment

Last updated: Monday, July 12, 2021

This interactive map shows operational (yellow) and planned (blue) connected vehicle deployment locations across the U.S. It also contains a state-

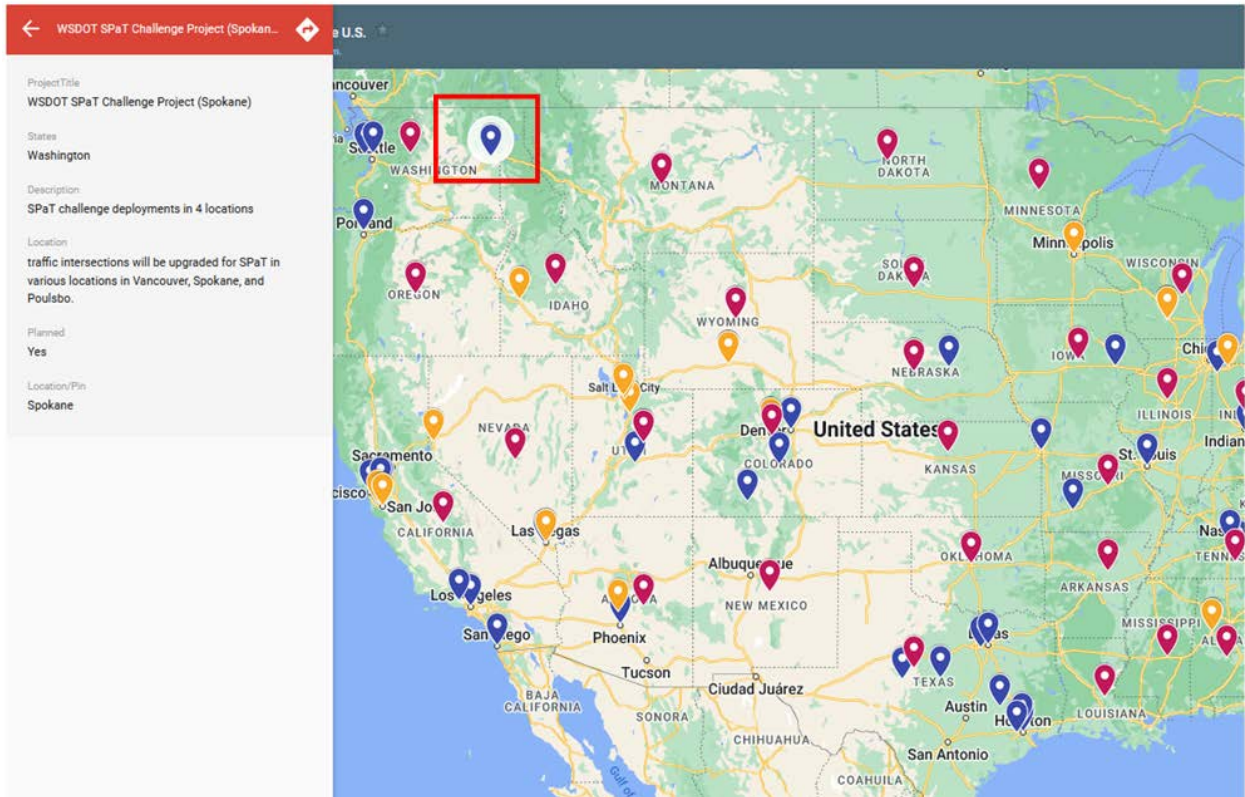


Figure B-8 US DOT initiatives query

Appendix C Manage Projects Operation

The purpose of the Florida ACES Administration Page or ACES Admin page is to provide communication between the front-end ACES Activity Viewer and the back-end ACES database, where authorized registered users can add, update, and delete project information on the FL ACES Administration page and the ACES database on the Amazon Web Service or (AWS) DynamoDB.

This multi-layered authentication enables the **FL ACES Admin Page** to provide a secure platform to collect and share ACES project information. Inputted project information on the FL ACES Admin is automatically and simultaneously updated to the AWS database. A newly-created project, by default, is not visible on **the ACES Activity Viewer** and is displayed as pending until reviewed and approved. The project approval can only be granted by the FDOT project manager or authorized personnel. The AWS administrator can activate the pending project to be shown on the ACES Activity Viewer once the project has been approved.

This section describes how to manage ACES project information through the Florida ACES Admin page. The procedure for activating projects on AWS will be introduced in the Activating ACES Projects on AWS section of this training.

C.1 Create a New Project

(1) Go to <https://flaces-admin.netlify.app>, click on **Login** to next page (Figure C-1).

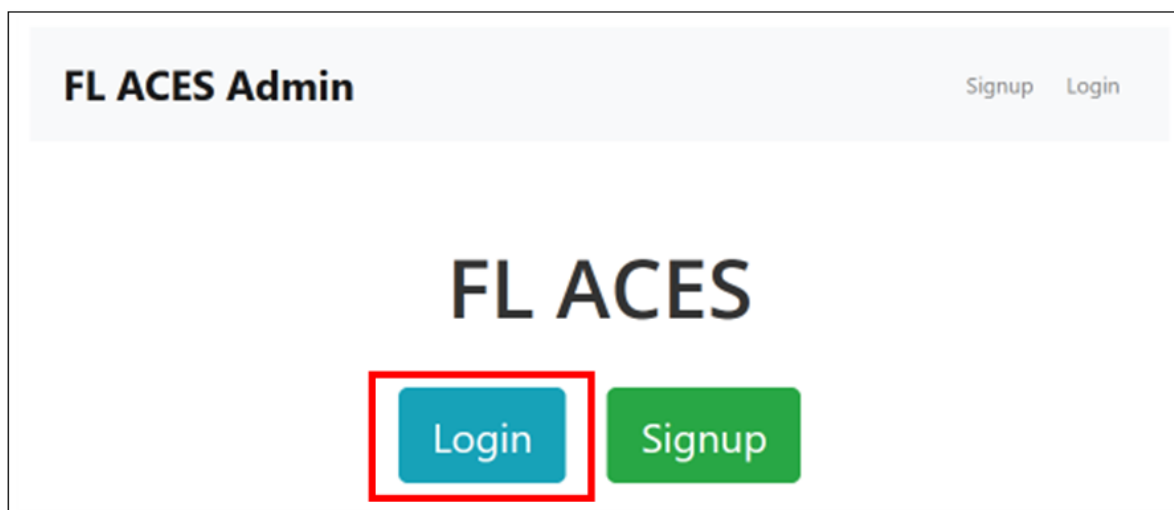


Figure C-1 Home page of the Florida ACES Administration Page

(2) Enter account **email** address and password. Click on **login** to go to the next page (Figure C-2).

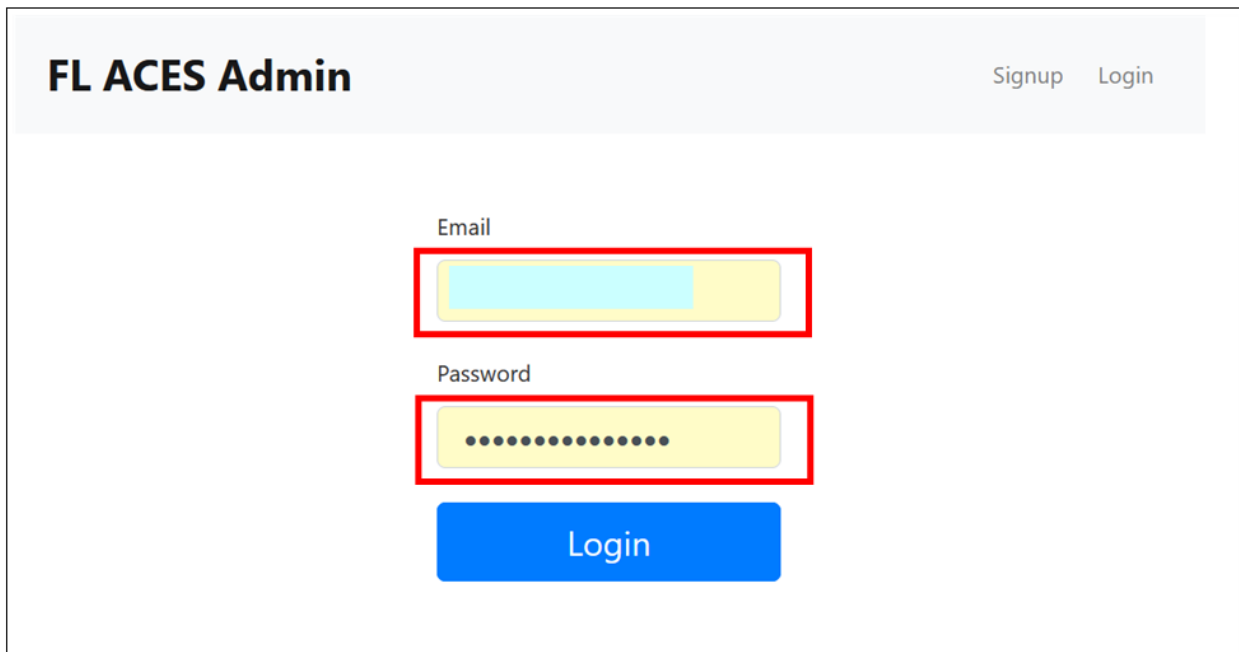


Figure C-2 Login into the Florida ACES Administration Page

(3) Click on **Create New Project** to go to the next page (Figure C-3).



Figure C-3 Create new project on the ACES Administration Page

(4) Enter the project information that is available. **Start Date, End date, and Data** can be left blank (Figure C-4).

FL ACES Admin Logout

Title

Short Title (for display in map view)

Organization

Project Lead Name Email

Start Date End Date

Figure C-4 Input new project information on the ACES Administration Page

(5) If the location is statewide, then no further editing is required. If it is not statewide, then it needs to be edited further. There are four options for editing location: **LineString tool (l)**, **Polygon tool (p)**, **Marker tool (m)**, and **Delete**.

a. **LineString tool**: click at the location where the user wants to mark on the map to add the first point, then move to the next selected location and continue to click at the second point to add the second point. Using the same way to add more point locations, the user will click the right mouse button or tap the Enter key at the last point to finish this line edition. At this point, the location line is created (Figure C-5).

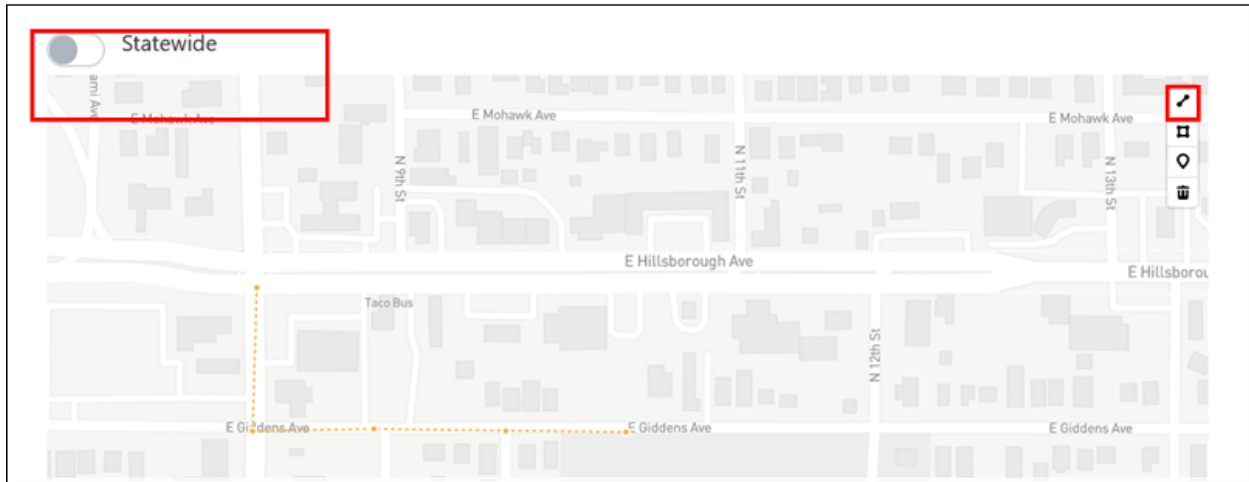


Figure C-5 LineString tool for inputting project region or locations

b. **Polygon tool:** click at the location where the user wants to mark on the map to add the first point, then move the cursor to the next selected location and continue to click at the second point. Using the same way to add more point locations, click **the right mouse button** or tap the **Enter key** at the last point to finish the polygon edit. At this point, the location polygon has been created (Figure C-6).

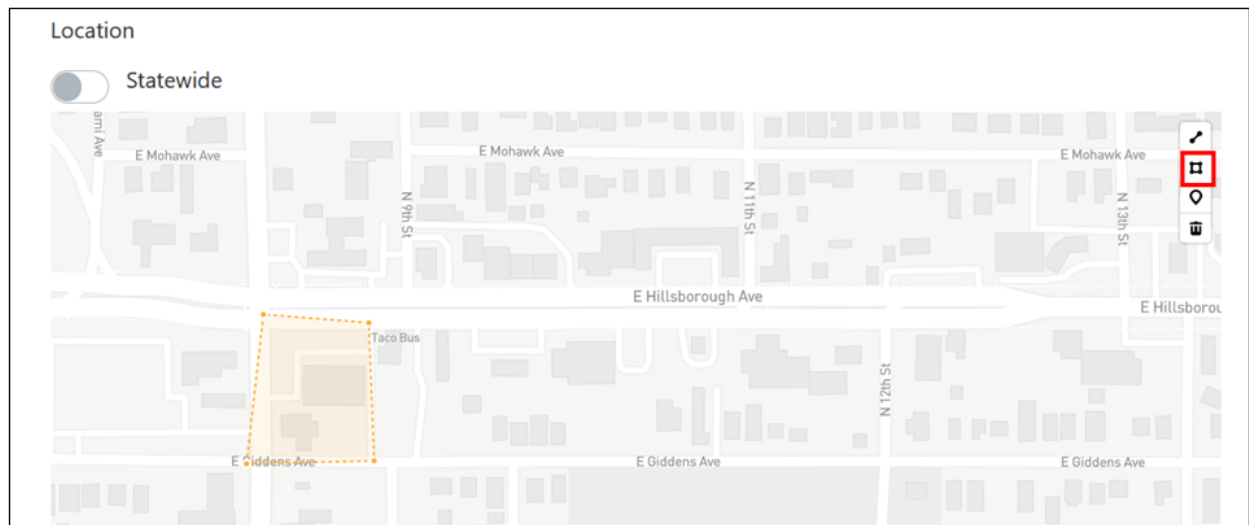


Figure C-6 Polygon tool for inputting project region or locations

c. **Marker tool (m):** click at the location where the user wants to mark on the map to add the first point, and move the next selected location and continue to click at the second point to add the second point. Using the same way to add more point location, click the **right mouse button** or tap the **Enter key** at the last point to finish marker edition. At this point, the markers are created (Figure C-7).

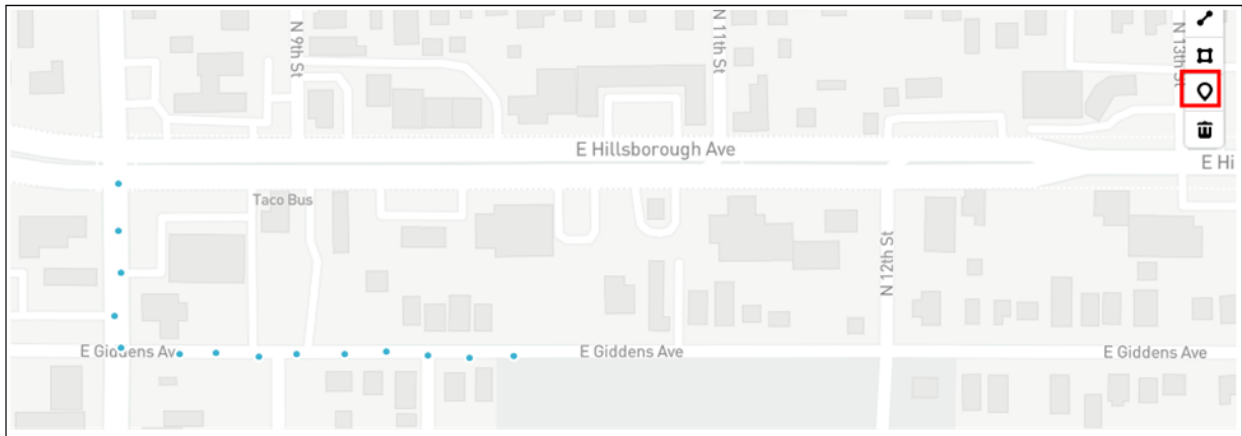


Figure C-7 Marker tool for inputting project region or locations

d. Delete: click on lines, polygons, or markers on map, then click **Delete** to delete the selected objects (Figure C-8).

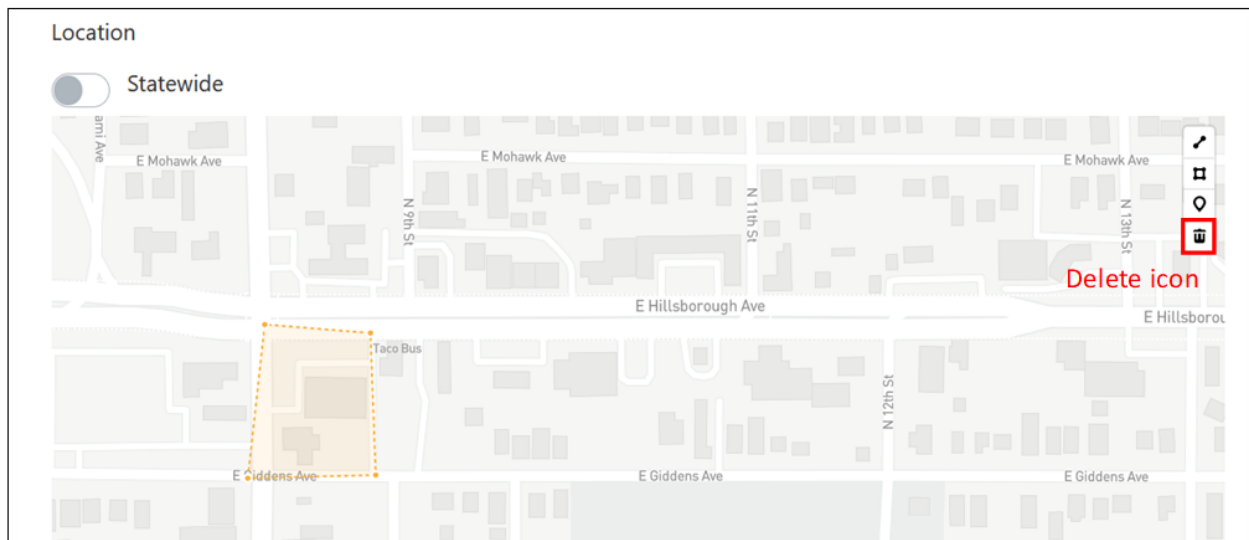


Figure C-8 Delete icon for inputting project region or locations

(6) Enter all available project information, then click on **Create** to add the project information on the FL ACES Administration Page and automatically add it on AWS database.(Figure C-9).

Notation: Make sure that the correction information for the required fields is input, or else it will stay on the “create” page.

A screenshot of a web form for creating a project. It features two sections: 'Image' with an 'Image file' input field and a 'Browse' button, and 'Data' with a 'Data file' input field and a 'Browse' button. Below these is a large blue button labeled 'Create', which is highlighted with a red rectangular border.

Figure C-9 Create to add project information

(7) If the project is created successfully, the project is at **pending** status (Figure C-10). The operator can only access the projects that they created and cannot access other projects that were created by other users. A newly-created project is, by default, not visible on the ACES Activity Viewer, pending review and approval to be shown on the ACES Activity Viewer. Project approval can be granted only by the FDOT PM. An authenticated AWS administrator on the backend AWS can activate the project to be shown on Activity Viewer. The procedure of activating a project on AWS will be described on Activating Projects on AWS section.

 A screenshot of the 'FL ACES Admin' dashboard. At the top left is the title 'FL ACES Admin' and at the top right is a 'Logout' link. Below the title, it says '1 project'. There is a '+ Create New Project' button. A project entry is shown with the identifier 'SS' and the creation date 'Created: 6/29/2022'. To the right of the project entry is a grey button labeled 'Pending', which is highlighted with a red rectangular border.

Figure C-10 Pending project status

C.2 Update a Project

- (1) Go to <https://flaces-admin.netlify.app>, click on **Login** to go to the next page.
- (2) Enter the Administration webpage **account email** address and **password**. Click on **login** to go to the next page.

(3) Click on the title of a created project pending or approved (Figure C-11) to update and go to the next page, enter the fields the user wants to modify then click on **Save** (Figure C-12). The project information is updated on the Administration Page and AWS database simultaneously.

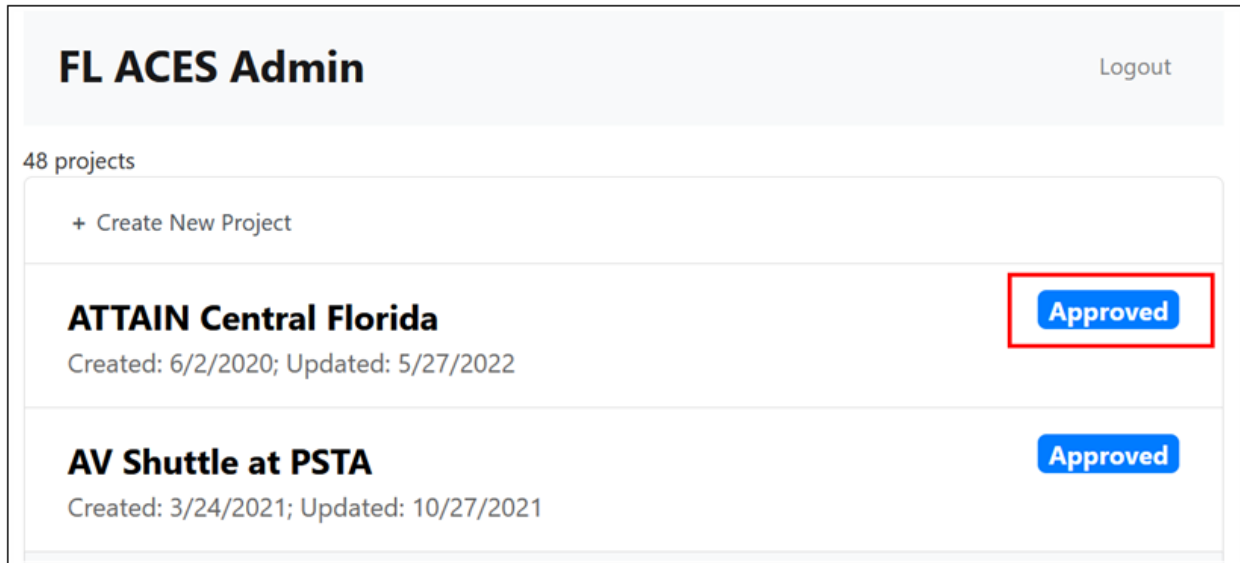


Figure C-11 Select an approved project to update



Figure C-12 Save a project

C.3 Delete a Project

- (1) Go to <https://flaces-admin.netlify.app>, click on **Login** to go to the next page.
- (2) Enter the Administration webpage account email address and password. Click on **Login** to go to the next page.

(3) Click on the title of a created project (pending or approved) to next page.

(4) Click on **Delete** (on the bottom of the page) to delete the project dataset on the ACES System and AWS database simultaneously (Figure C-13). Even if the project is shown on the ACES Activity Viewer, it will also be deleted and will not be shown on it.



The screenshot shows a web form with two sections: 'Image' and 'Data'. The 'Image' section has a text input field containing 'Image file' and a 'Browse' button. The 'Data' section has a text input field containing 'Data file' and a 'Browse' button. Below these sections are two large buttons: a blue 'Save' button and a red 'Delete' button. The 'Delete' button is highlighted with a red rectangular box.

Figure C-13 Delete a project

C.4 Log out Administration Webpage

Click on **logout** to logout of the Administration webpage (Figure C-14).



The screenshot shows the 'FL ACES Admin' webpage. At the top right, there is a 'Logout' button highlighted with a red box. Below the header, there is a section for '1 project' containing a '+ Create New Project' button. Below that, there is a project entry with the identifier 'SS' and the text 'Created: 6/29/2022'. To the right of this entry is a 'Pending' status badge.

Figure C-14 Logout the Administration webpage

Appendix D User Management Operation

The multi-layered authentication enabled on the FL ACES Admin page provides a secure mechanism to collect and share ACES project information. The general operator only has access to project information on their own account, while the authenticated administrative operator has full access to all projects on the ACES platform. An authorized registered user is, by default, a general operator.

The back-end Amazon Web Service or (AWS) administrator can disable or enable an operator's access to the FL ACES Admin page. They also can delete an operator or set the general operator as an administrative operator on the FL ACES Admin page.

This section describes how to register a general operator on the FL ACES Admin page and how to manage the users on the FL ACES Admin page through AWS by the AWS administrator.

D.1 Create a General Operator on the ACES Admin Page

(1) Go to <https://flaces-admin.netlify.app>, click on **Signup** to create an account (Figure D-1).

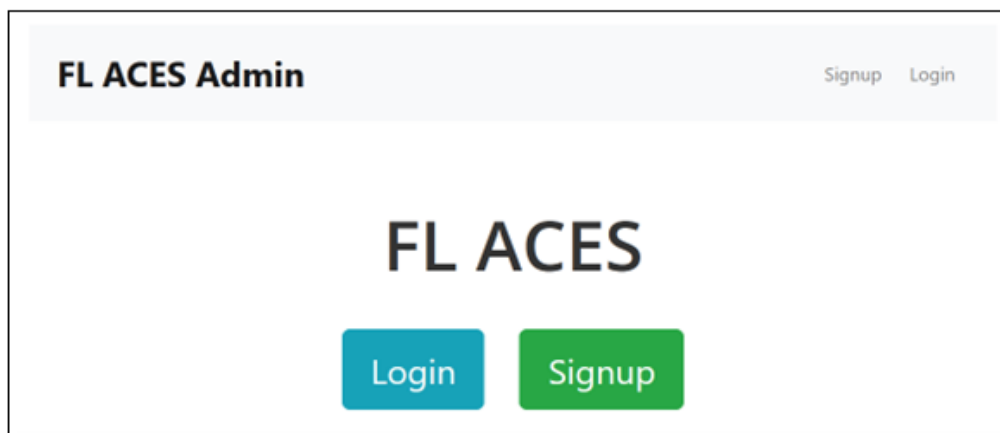


Figure D-1 Home page of the Florida ACES Administration Page

(2) On the next page, enter the required information and click **Signup** to go to the next page (Figure D-2)

FL ACES Admin Signup Login

First Name

Last Name

Email

Password

Confirm Password

Signup

Figure D-2 Input Signup information on the Florida ACES Administration Page

(3) Check the user's email for the confirmation code, enter the code, and then click **Verify** (Figure D-3). After successful verification, the user now has an account on the Administration webpage and can create a new project.

FL ACES Admin Signup Login

Confirmation Code

Please check your email for the code.

Verify

Figure D-3 Confirmation code for signup on the Florida ACES Administration Page

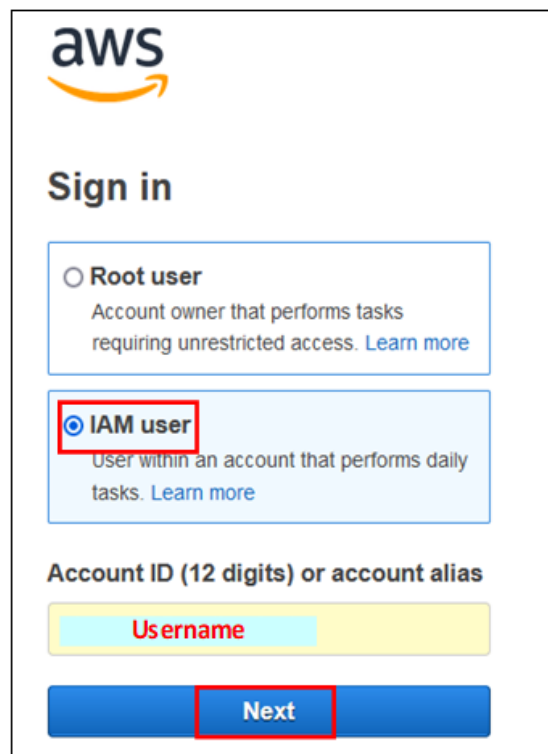
(4) The password cannot be reset. Therefore, make sure to store the password once it has been created.

D.2 Manage Operators on the ACES Administration Page

D.2.1 Sign into AWS

(1) Go to <https://us-east-2.console.aws.amazon.com/console/home?region=us-east-2>, and sign-in as the **AWS Identity and Access Management (IAM) user** (choose “IAM user”), enter the 12-digit AWS account ID or account alias, and click **next** to go to the next page (Figure D-4).

- a. If the user is signing in for the first time, they will need to enter the 12-digit AWS account ID or account alias. Click **Next** to be directed to the Root user sign in page, type in the IAM user password, and then click **Sign-in**.
- b. If the user has previously signed in as the IAM user on their browser, the account ID or account alias may already be saved. In that case, the user will only need to enter their password and click the Sign-in button.
- c. If the user has trouble signing-in to AWS account, see [I'm having trouble signing in to or accessing my AWS account](#).



The screenshot shows the AWS Sign in page. At the top is the AWS logo. Below it is the heading "Sign in". There are two radio button options: "Root user" (unselected) and "IAM user" (selected). The "IAM user" option is highlighted with a red box. Below the options is a text input field labeled "Account ID (12 digits) or account alias" with the placeholder text "Username". At the bottom is a blue button labeled "Next", which is also highlighted with a red box.

Figure D-4 Set IAM user on AWS

(2) Enter password and click on **sign-in** to enter AWS (Figure D-5).



Figure D-5 Input password to sign into AWS

D.2.2 Disable/enable operators' access

With Amazon Cognito identity pools, the AWS administrator can provide users the AWS credentials to access cloud resources. Use the following procedure to manage user attributes on the **Amazon Cognito** console after logging into **AWS -> Services -> Security, Identity, & Compliance-> Cognito -> User pools -> aces-user-pool**. The details are as follows:

(1) Go to <https://us-east-2.console.aws.amazon.com/console/home?region=us-east-2>, and sign-in as the AWS Identity and Access Management (IAM) user, enter the **12-digit AWS account ID** or **account alias**, and choose **next** to go to the next page.

(2) Enter **Password** to sign-in.

(3) On the navigation bar, click on **Services** and scroll down on the second section of left menu to choose **Cognito** to open the **Amazon Cognito console**. Make sure that the region is set to **Ohio** (Figure D-6). The service account is registered to the AWS US East 2 region, which is in Ohio.

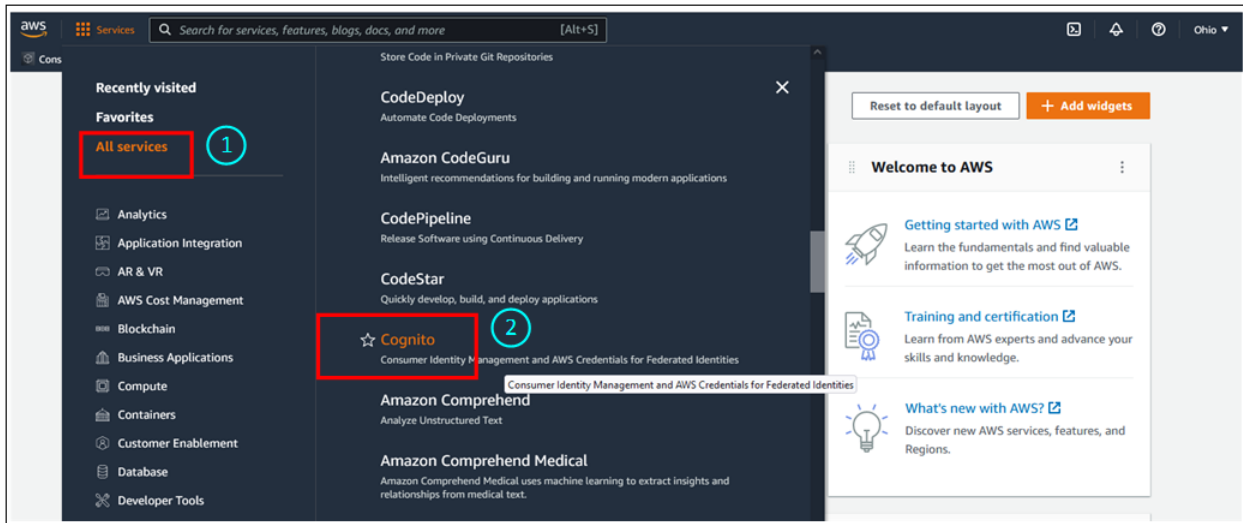


Figure D-6 Open Amazon Cognito console

(4) On next page, click on **aces-user-pool** to go to the next page (Figure D-7).

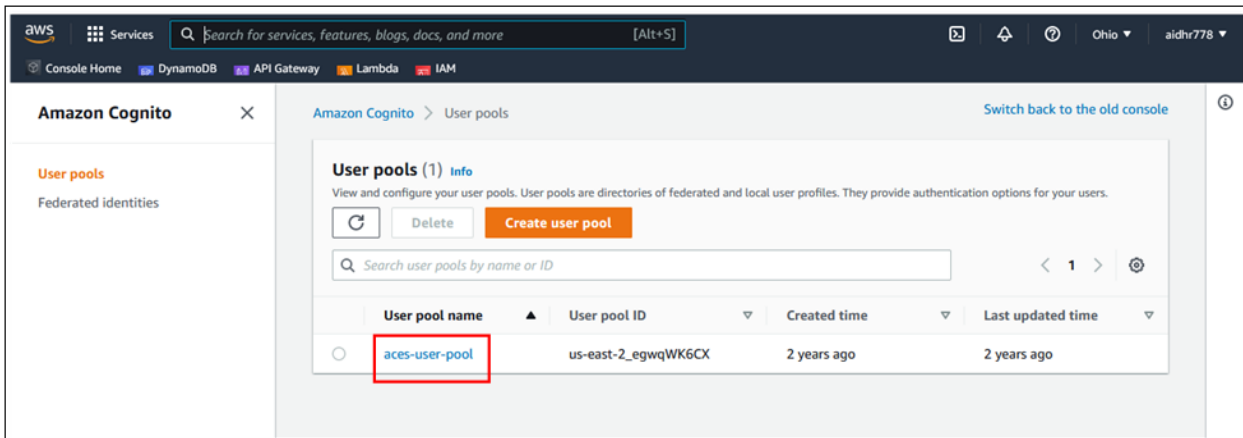


Figure D-7 Manage user pools for on Administration Webpage

(5) Choose a username to show more information about an individual user and click on a selected username to go to the next page (Figure D-8).

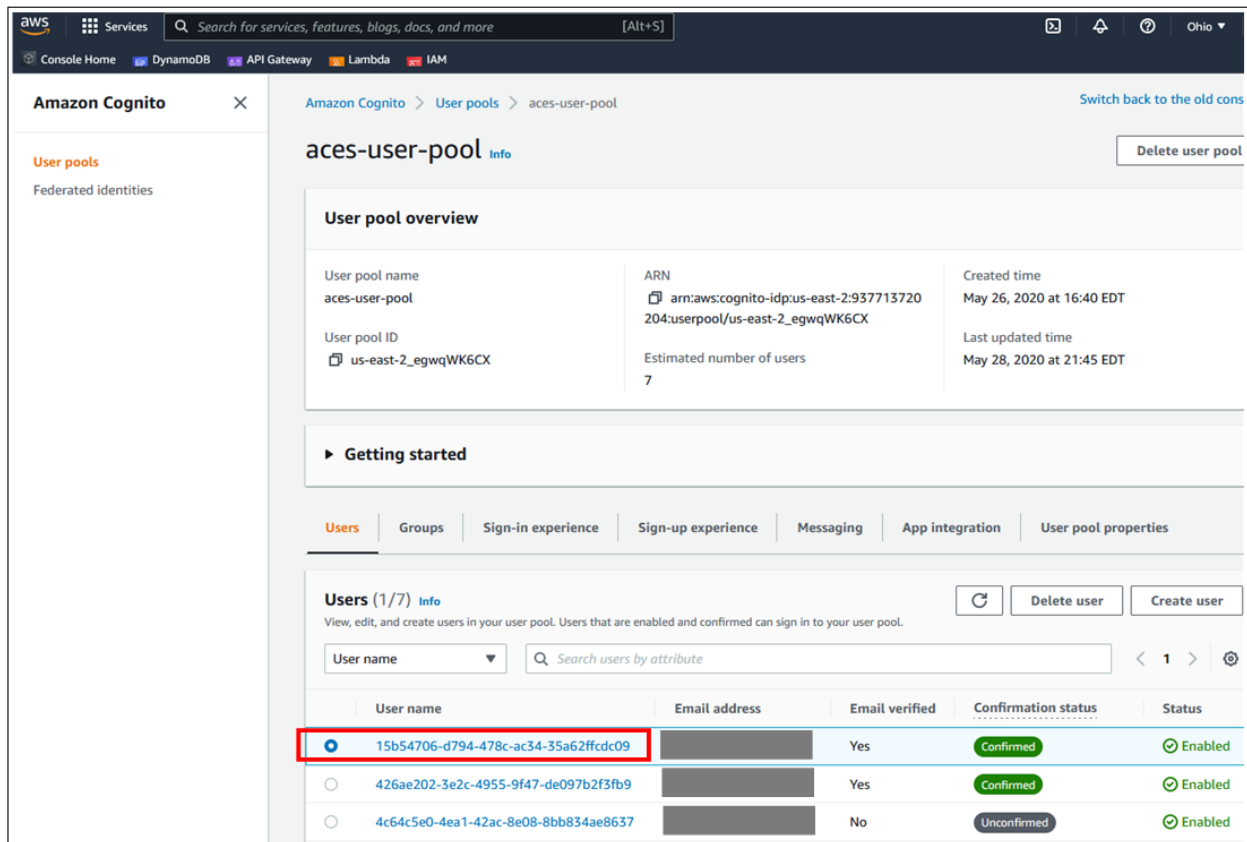


Figure D-8 Select Administration Webpage user on Amazon Cognito

(6) Choose **Actions** from the drop-down menu on the right top of the browser to manage the operator on the Administration Webpage. For the FDOT management purpose, the administrator can **disable user's access, enable user's access, and delete user** (Figure D-9).

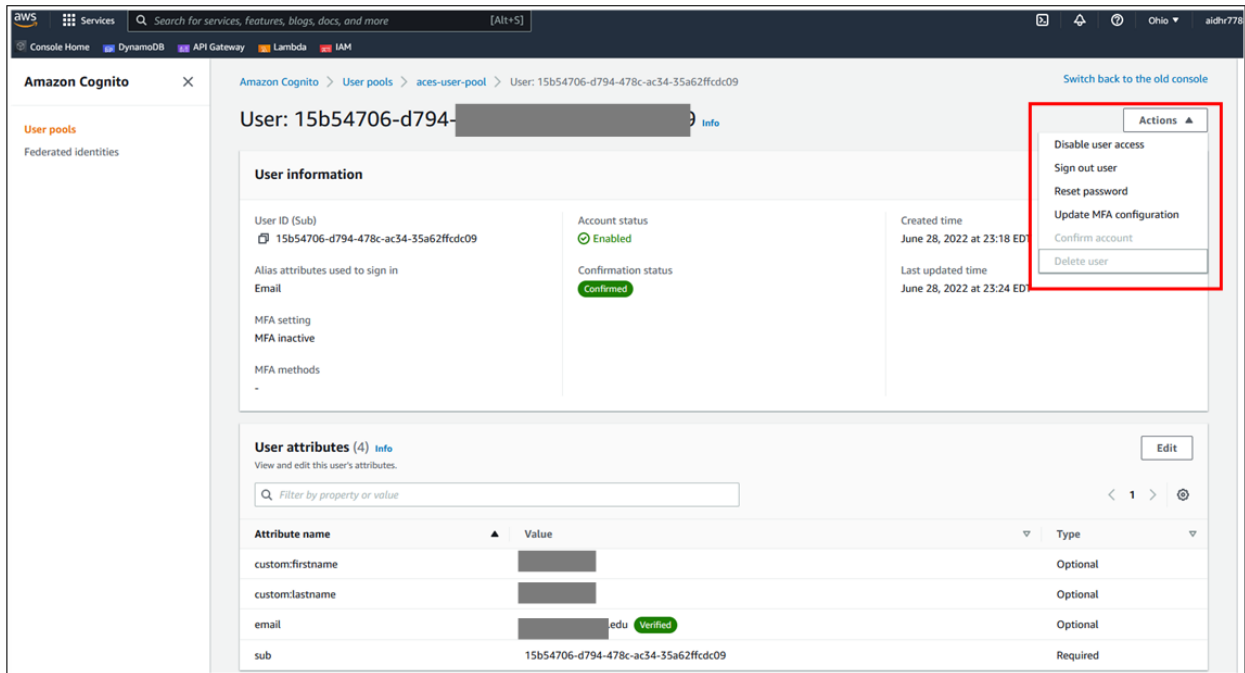


Figure D-9 Manage option for Administration Webpage user on Amazon Cognito

a. **Disable user's access:** This will disable a user's access to the user pool. This user will be unable to sign into this user pool (Figure D-10). The user will not be deleted.

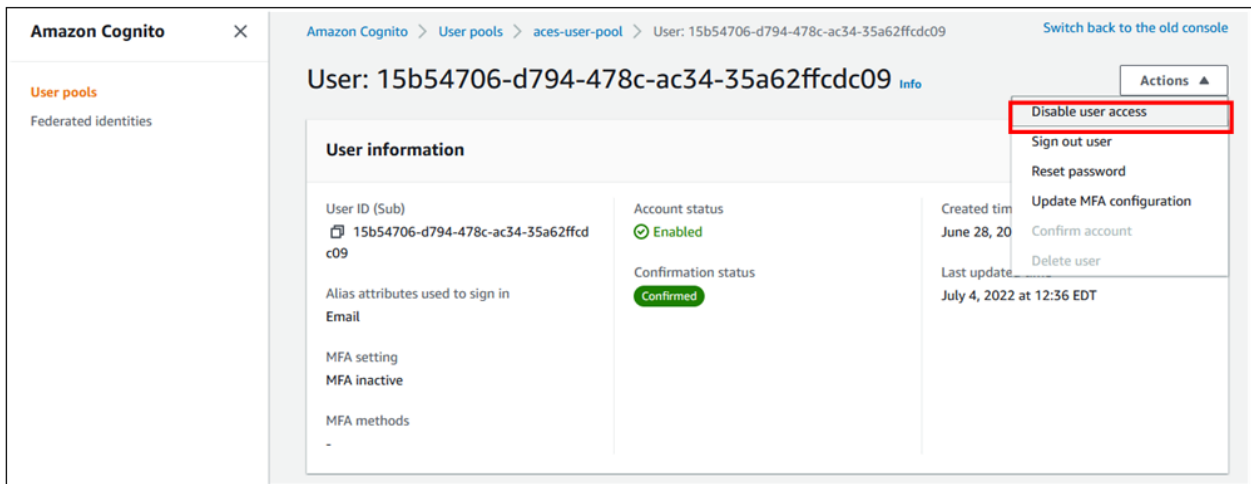


Figure D-10 Disable Administration Webpage user access on Amazon Cognito

b. **Enable user's access:** The administrator on AWS can restore access to sign-in by enabling this user again after the administrator on AWS disable user's access (Figure D-11). [Learn more.](#)

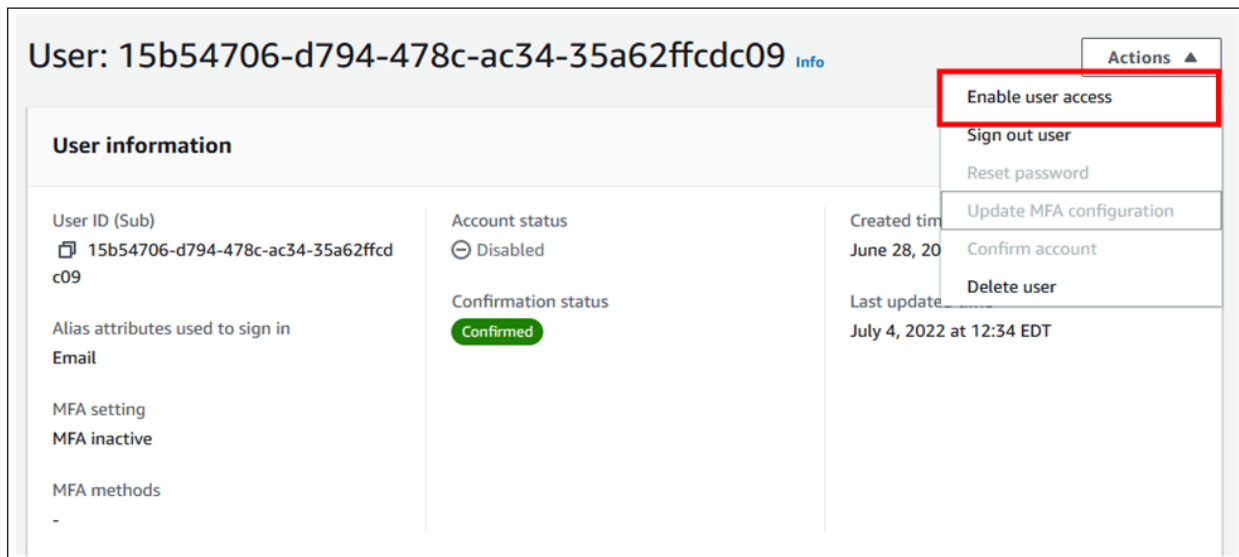


Figure D-11 Enable Administration Webpage user access on Amazon Cognito

c. **Delete user's access:** The administrator on AWS can only delete a user's access after **disabling that user's access first** (Figure D-12). The user will be permanently removed and will no longer be able to sign in. [Learn more.](#)

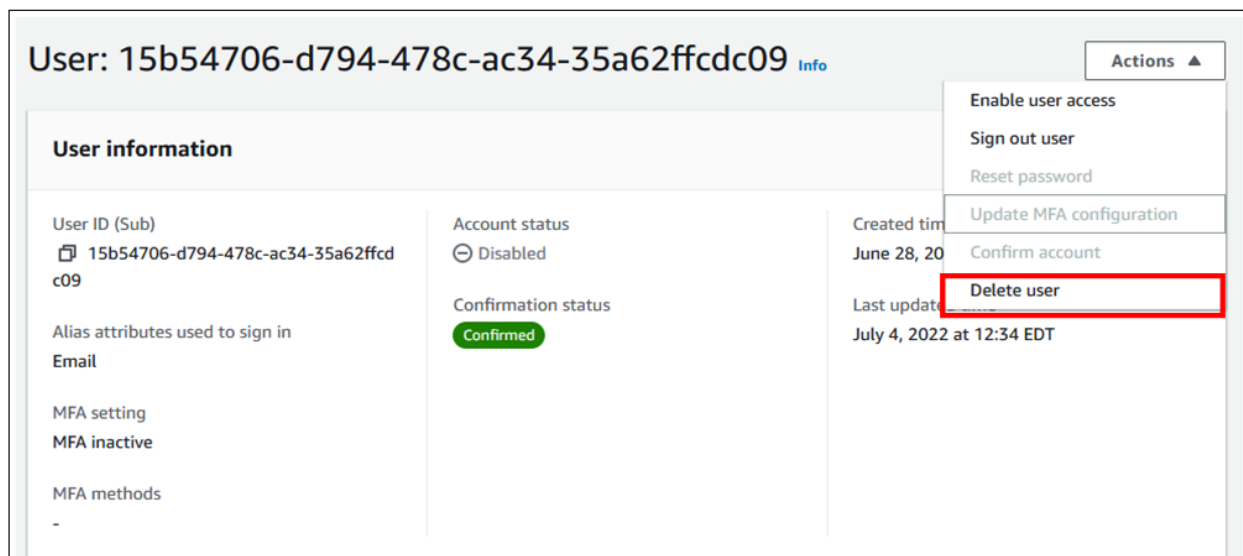


Figure D-12 Delete Administration Webpage user access on Amazon Cognito

D.2.3 Set/unset the general operator as the administrative operator

Amazon Cognito user pools let the administrator on AWS set the general operator as the administrative operator. With Amazon Cognito identity pools, the administrator on AWS can provide AWS credentials for access to the administrator's cloud resources. After logging into AWS as IAM user, the administrator on AWS could set the general operator as the

administrative operator to access on the ACES Administration Page via Amazon Cognito user pools.

The administrative operator on the ACES Administration Page can view, update, and delete all projects in the system, and can create a new project. The user can only operate projects on the user's own account. The procedure is described in the following section.

- (1) Go to <https://us-east-2.console.aws.amazon.com/console/home?region=us-east-2>, and sign-in as the AWS Identity and Access Management or (IAM) user, enter the 12-digit AWS account ID, or account alias, and click Next to be directed to the password sign-in screen.
- (2) Enter your Password and select **Sign-in**.
- (3) On the navigation bar, click on **Services**, scroll down on the second section of left menu to choose **Cognito** to open the **Amazon Cognito console**. Make sure that the region is set to **Ohio** (Figure C-6). The service account is registered to the AWS US East 2 region, which is in Ohio.
- (4) On next page, click on **aces-user-pool** to go to the next page (Figure D-7).
- (5) Choose a username to show more information about an individual user and click on the selected username to go to the next page (Figure D-13).

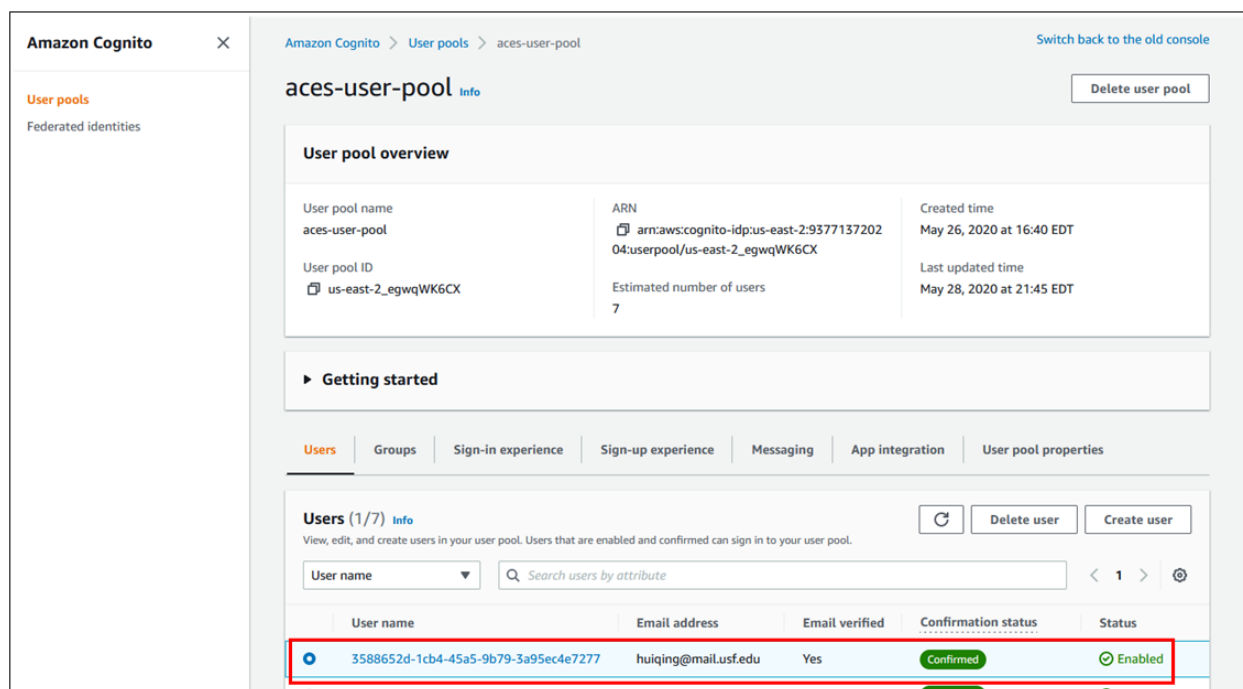


Figure D-13 Select Administration Webpage user on Amazon Cognito

- (6) Click on **Edit** to next page (Figure D-14).

Amazon Cognito > User pools > aces-user-pool > User: 3588652d-1cb4-45a5-9b79-3a95ec4e7277

Switch back to the old console

User: 3588652d-1cb4-45a5-9b79-3a95ec4e7277 [Info](#)

Actions ▾

User information

User ID (Sub) 3588652d-1cb4-45a5-9b79-3a95ec4e7277	Account status Enabled	Created time July 11, 2022 at 11:18 EDT
Alias attributes used to sign in Email	Confirmation status Confirmed	Last updated time July 11, 2022 at 11:18 EDT
MFA setting MFA inactive		
MFA methods -		

User attributes (4) [Info](#) Edit

View and edit this user's attributes.

Filter by property or value

Attribute name ▲	Value	Type ▼
custom:firstname	huiqing	Optional
custom:lastname	Lyu	Optional
email	huiqing@mail.usf.edu Verified	Optional
sub	3588652d-1cb4-45a5-9b79-3a95ec4e7277	Required

Figure D-14 Edit user attributes on Amazon Cognito

(7) Click on **Add attributes** to edit (Figure D-15).

Edit user [Info](#)

A user can sign in to user pool apps and generate tokens. Users have standard and custom attributes that can be passed to your app in the ID token. You can also require specific standard attributes.

Required attributes

Configure this user's required attributes.

sub

You cannot update an immutable attribute.

3588652d-1cb4-45a5-9b79-3a95ec4e7277

Optional attributes

Configure this user's optional attributes. You can change values for existing attributes, or add new attributes.

email

huiqing@mail.usf.edu

Mark email address as verified

phone_number

Enter a phone number, including + and the country code, for example +12065551212.

Mark phone number as verified

custom:firstname

huiqing

custom:lastname

Lyu

Additional attributes

Add more user attributes. You can select from standard Cognito attributes, or assign the custom attributes that you have configured in [Sign-up experience](#).

Add attribute

Figure D-15 Add user attributes on Amazon Cognito

(8) Choose **custom:role** from the drop-down menu on the left bottom of the browser, and set Value as admin, and then click **Save changes** (Figure D-16).

The screenshot shows the 'Edit user' page in the Amazon Cognito console. The breadcrumb navigation is 'Amazon Cognito > User pools > aces-user-pool > User: 3588652d-1cb4-45a5-9b79-3a95ec4e7277 > Edit user'. There is a link to 'Switch back to the old console'. The main heading is 'Edit user' with an 'Info' link. Below this is a descriptive paragraph: 'A user can sign in to user pool apps and generate tokens. Users have standard and custom attributes that can be passed to your app in the ID token. You can also require specific standard attributes.'

The 'Required attributes' section is titled 'Required attributes' and contains a single attribute 'sub' with the value '3588652d-1cb4-45a5-9b79-3a95ec4e7277'. A note states 'You cannot update an immutable attribute.'

The 'Optional attributes' section is titled 'Optional attributes' and contains several attributes: 'email' (value: 'huiqing@mail.usf.edu', checked 'Mark email address as verified'), 'phone_number' (empty, unchecked 'Mark phone number as verified'), 'custom:firstname' (value: 'huiqing'), and 'custom:lastname' (value: 'Lyu').

The 'Additional attributes' section is titled 'Additional attributes' and contains a table with one row highlighted in red:

Attribute name	Value	
custom:role	admin	Remove

Below the table is an 'Add another' button. At the bottom right of the page, there are 'Cancel' and 'Save changes' buttons, with the 'Save changes' button highlighted in red.

Figure D-16 Set custom:role as admin on Amazon Cognito

(9) Go back to **aces-user-pool** and choose the Users to view the change (Figure D-17).

Amazon Cognito > User pools > aces-user-pool > User: 3588652d-1cb4-45a5-9b79-3a95ec4e7277 [Switch back to the old console](#)

User: 3588652d-1cb4-45a5-9b79-3a95ec4e7277 [Info](#)

[Actions](#)

User information

User ID (Sub) 3588652d-1cb4-45a5-9b79-3a95ec4e7277	Account status Enabled	Created time July 11, 2022 at 11:18 EDT
Alias attributes used to sign in Email	Confirmation status Confirmed	Last updated time July 11, 2022 at 11:35 EDT
MFA setting MFA inactive		
MFA methods -		

User attributes (5) [Info](#)

View and edit this user's attributes. [Edit](#)

Filter by property or value

Attribute name	Value	Type
custom:firstname	huiqing	Optional
custom:lastname	Lyu	Optional
custom:role	admin	Optional
email	huiqing@mail.usf.edu Verified	Optional
sub	3588652d-1cb4-45a5-9b79-3a95ec4e7277	Required

Figure D-17 View custom:role as admin on Amazon Cognito

(10) Click on **Edit** to next page to unset the user as administrator (Figure D-18).

The screenshot shows the Amazon Cognito console interface. The breadcrumb navigation at the top reads: Amazon Cognito > User pools > aces-user-pool > User: 3588652d-1cb4-45a5-9b79-3a95ec4e7277. The user ID is displayed as 3588652d-1cb4-45a5-9b79-3a95ec4e7277. The 'User information' section shows account status as 'Enabled', confirmation status as 'Confirmed', and creation/last updated times as July 11, 2022. The 'User attributes (5)' section contains a table with the following data:

Attribute name	Value	Type
custom:firstname	huiqing	Optional
custom:lastname	Lyu	Optional
custom:role	admin	Optional
email	huiqing@mail.usf.edu Verified	Optional
sub	3588652d-1cb4-45a5-9b79-3a95ec4e7277	Required

The 'Edit' button in the top right corner of the 'User attributes' section is highlighted with a red box.

Figure D-18 Edit user attributes to unset custom:role as admin on Amazon Cognito

(11) Delete the value **admin** and **Save changes** to unset the administrator (Figure D-19). Go back to User attributes to view the changes as step 7.

Amazon Cognito > User pools > aces-user-pool > User: 3588652d-1cb4-45a5-9b79-3a95ec4e7277 > Edit user Switch back to the old console

Edit user Info

A user can sign in to user pool apps and generate tokens. Users have standard and custom attributes that can be passed to your app in the ID token. You can also require specific standard attributes.

Required attributes

Configure this user's required attributes.

sub
You cannot update an immutable attribute.
3588652d-1cb4-45a5-9b79-3a95ec4e7277

Optional attributes

Configure this user's optional attributes. You can change values for existing attributes, or add new attributes.

email
huiqing@mail.usf.edu
 Mark email address as verified

phone_number
Enter a phone number, including + and the country code, for example +12065551212.

 Mark phone number as verified

custom:firstname
huiqing

custom:lastname
Lyu

custom:role
admin

Additional attributes
Add more user attributes. You can select from standard Cognito attributes, or assign the custom attributes that you have configured in [Sign-up experience](#).

Figure D-19 Unset custom:role as admin on Amazon Cognito

Appendix E Activation Operation

The inputted project information on the ACES Admin page is simultaneously updated on the Amazon Web Service or (AWS) database. However, a newly-created project is pending, by default, and not visible on the ACES Activity Viewer until it is reviewed and approved. Project approval can only be granted by the FDOT project manager or authorized personnel. An authenticated AWS administrator can activate a pending project on the ACES Activity Viewer after FDOT's approval. The project will then be visible on the ACES Activity Viewer. An authenticated AWS administrator can also deactivate projects. Deactivated projects will not be visible on the ACES Activity Viewer.

This section describe how to activate or deactivate projects.

This procedure describes how to activate pending projects (or deactivate projects) to be shown (or unshown) on the ACES Activity Viewer after FDOT PM's approval.

First, the FDOT PM needs to approve the pending projects to be displayed on ACES Activity Viewer before the activating the project. Only an authorized administrator on AWS can activate projects.

- (1) Go to <https://us-east-2.console.aws.amazon.com/console/home?region=us-east-2>, and sign in as the **AWS Identity and Access Management (IAM) user** (choose "IAM user"), enter the 12-digit AWS account ID or account alias, and click **next** to next page (Figure E-1).
 - a. If the user is signing in for the first time, they will need to enter the 12-digit AWS account ID or account alias. Click **Next** to be directed to the Root user sign in page. Once there, type in the IAM user password, and then click **Sign-in**.
 - b. If the user has previously signed in as the IAM user on their browser, the account ID or account alias may already be saved. In that case, the user will only need to enter their password and click the Sign in button.
 - c. If the user has trouble signing-in to the user's AWS account, see [I'm having trouble signing in to or accessing my AWS account](#).

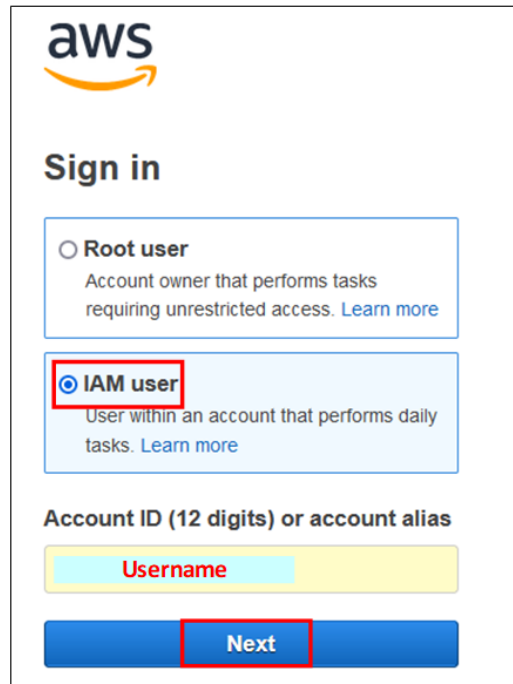


Figure E-1 Set IAM user on AWS

(2) Enter password and click on sign-in to log into AWS (Figure E-2).



Figure E-2 Input password to sign into AWS

(3) On the navigation bar, click **Services >Database>DynamoDB** to enter the next page to work with DynamoDB. Make sure that the region is set **Ohio** (Figure E-3).

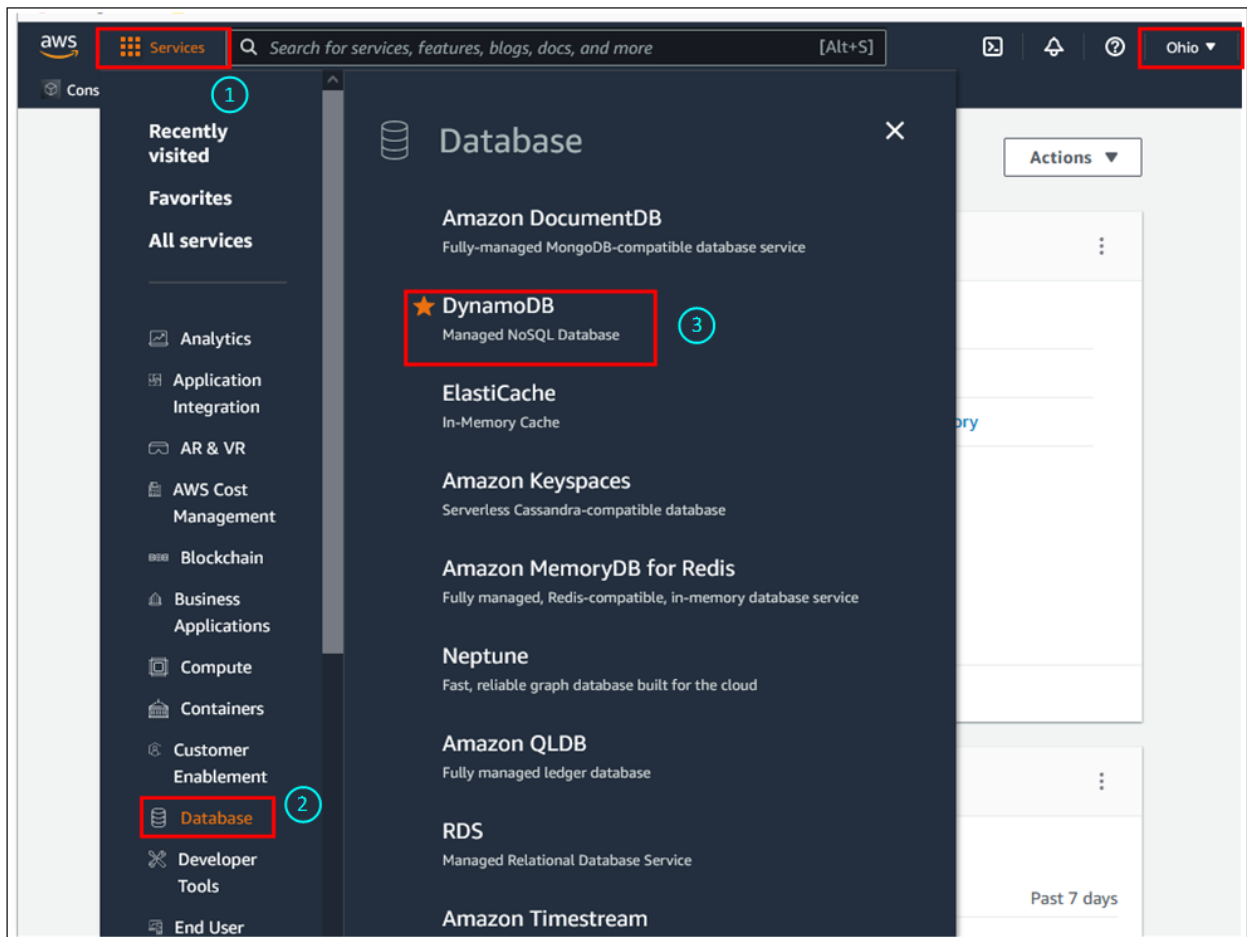


Figure E-3 Working with AWS DynamoDB

(4) Click on **Tables** to work with DynamoDB Tables (Figure E-4).

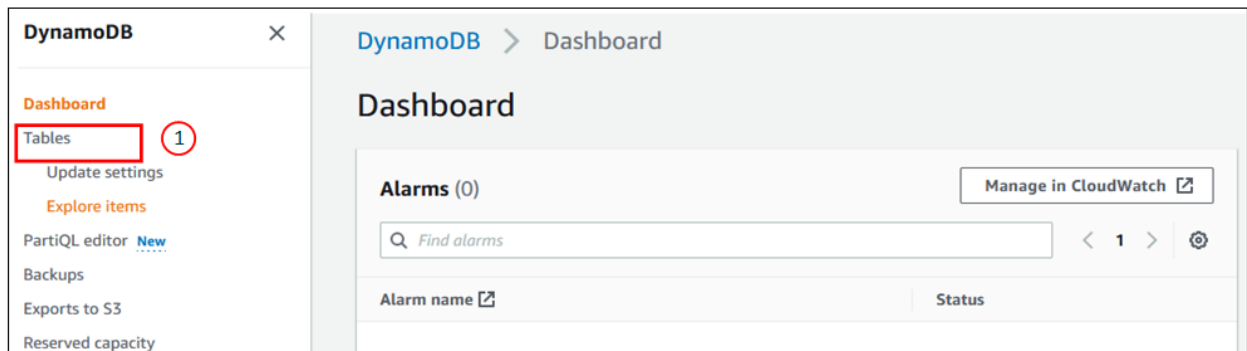


Figure E-4 Working with DynamoDB table ACES project

(5) Click on **aces-projects** to access the next page to manage the selected project (Figure E-5).

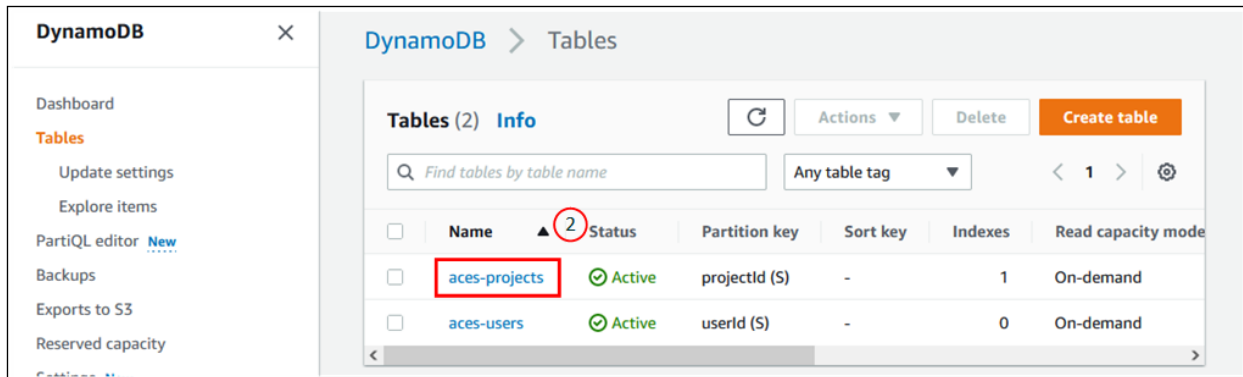


Figure E-5 Select ACES project table on AWS DynamoDB

(6) Select the **check box** for the project the user wants to activate (the project’s active status should be **false**), then click on the selected project to go to the next page to activate the project (Figure E-6).

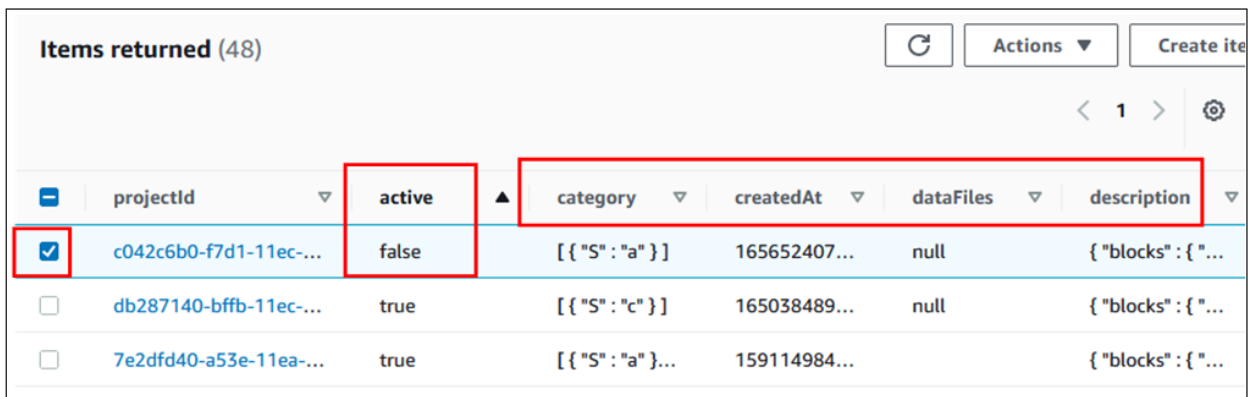


Figure E-6 Select Activating on ACES project table

(7) Select **True** for active to activate the project, then click on **Save changes**. The project is activated and simultaneously displayed on the ACES Activity Viewer automatically. Select “False” to set active option to be deactivated, then click on **Save changes** (Figure E-7). The project is deactivated and then simultaneously disappears on the ACES Activity Viewer, but it is still stored at AWS database. Choose to **reload current page** of the ACES Activity Viewer if the user cannot see the activated project on the ACES Activity Viewer. Also choose to **reload current page** of the ACES Activity Viewer if the user still sees the deactivated project on the ACES Activity Viewer.

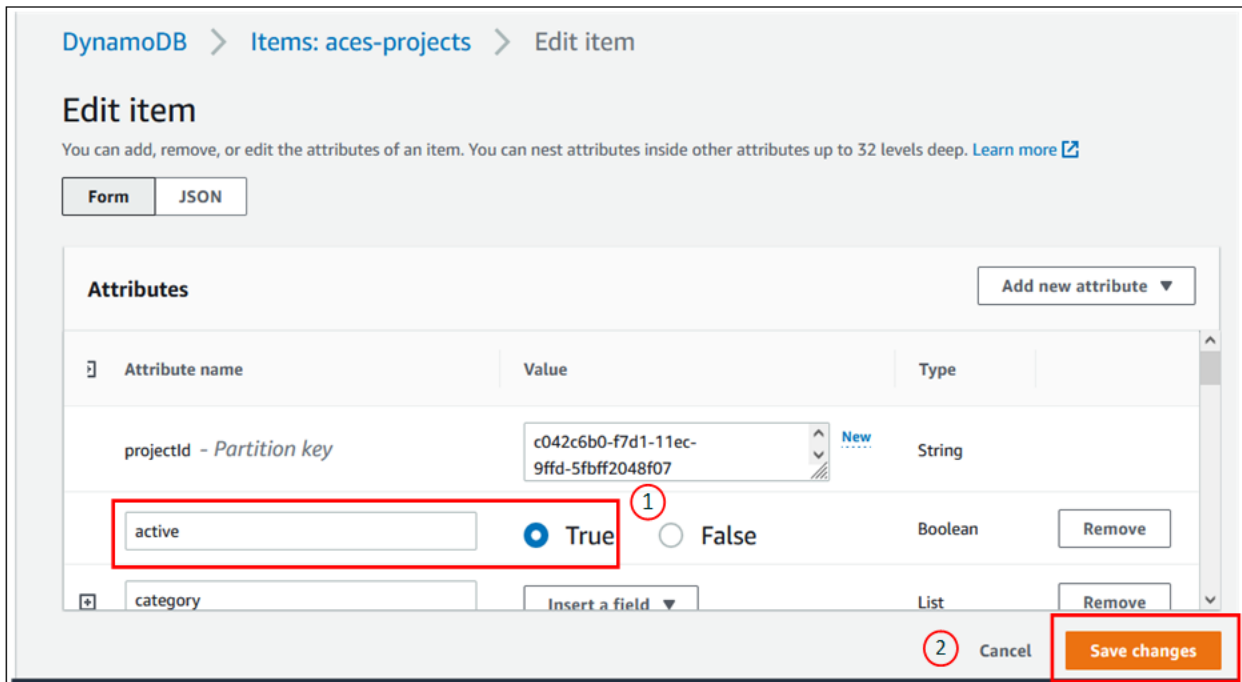


Figure E-7 Activating project on ACES project table to show on the ACES Activity Viewer

(8) Select the **check box** for the project, then click on **Actions** to **Edit item** or **Duplicate item** or **download selected items to CSV** or **Download results to CSV** (Figure E-8).

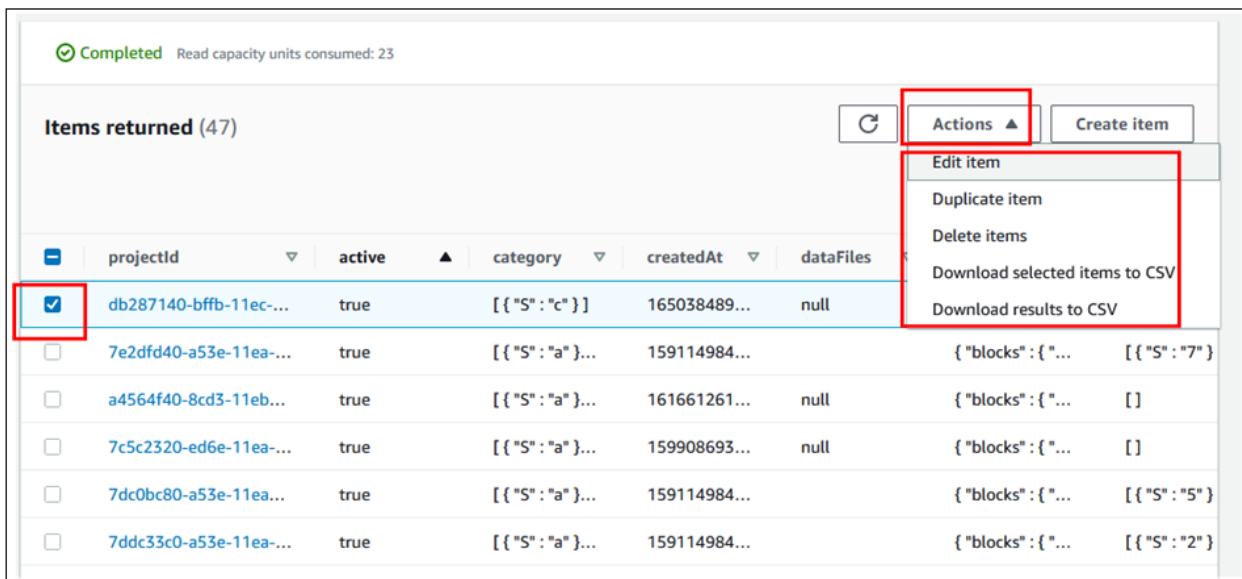


Figure E-8 Manage project information on ACES project table

Appendix F Survey Form Operation

The new ACES projects were collected through two resources. The first resource is Google Forms on the Florida ACES website, <https://florida-aces.org/>, as shown in Figure 2.3. Authorized operators on Google Forms could access the collected initiatives information on Google Forms after end users input ACES initiative information through their Google account or a shared public Gmail account, as in section 2.1 and 2.2. The second public resource is the Florida CAV Initiative website (FDOT, 2022), <https://www.fdot.gov/traffic/teo-divisions.shtm/cav-ml-stamp/connected-vehicles>, as in section 2.3.

F.1 Collect Project Information via Google Forms

The new ACES projects information was collected via Google Forms on the Florida ACES website, <https://florida-aces.org/>, as shown in Figure E-1. A specific email address and password were created to share with end users who do not have a Gmail account to log in to the survey form:

- Email—flaces123@gmail.com
- password—*floridaaces*

If the end user has a google account, they would follow the steps below to input project information on the Google Form.

- (1) Go to <https://florida-aces.org/>, click on the **Florida ACES Project** to go to the next page (Figure F-1).

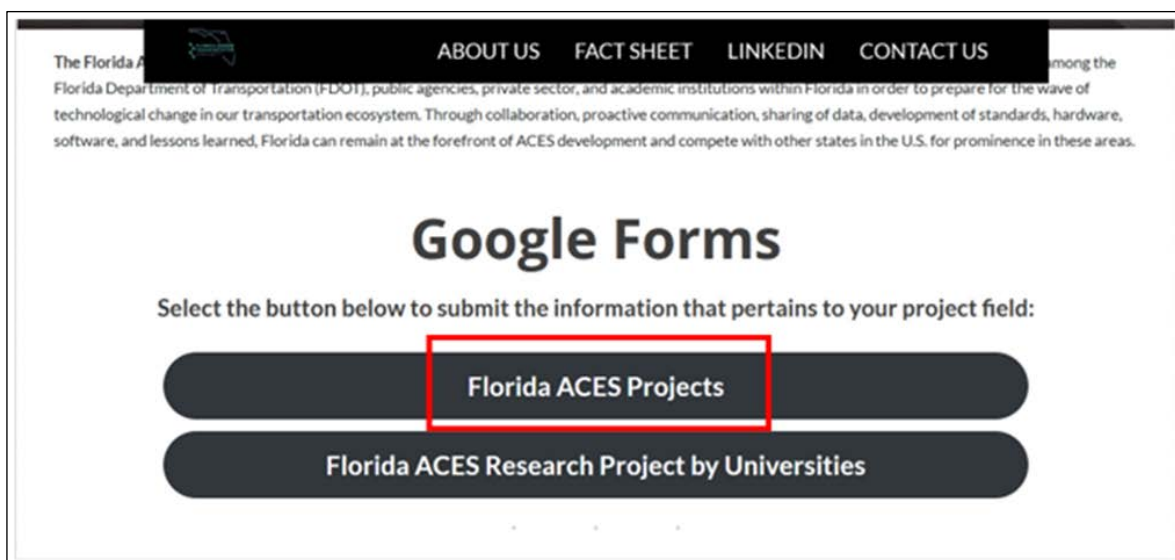


Figure F-1 Google form for Florida ACES Projects data

(2) On the next page, enter user's **Email or phone**, and then click on **next** to proceed to the next page. If the user does not have a Google account, they would click on the **Create account** to create an account and then sign-in (Figure F-2).

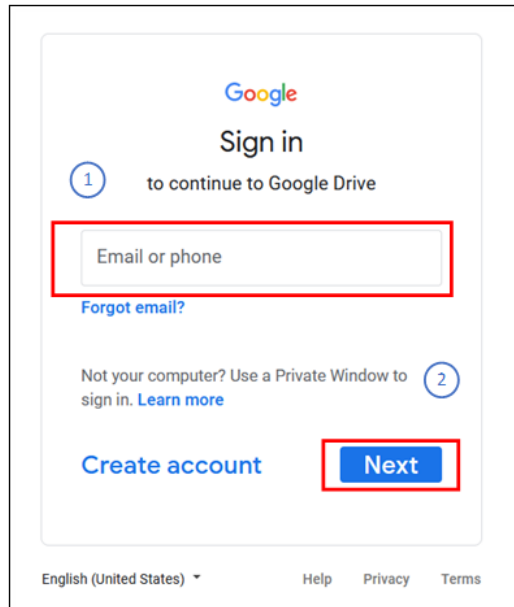


Figure F-2 Sign-in to Google form

(3) Enter user's **password** and then click **next** to sign-in to **Florida ACES Project Information** (Figure F-3).

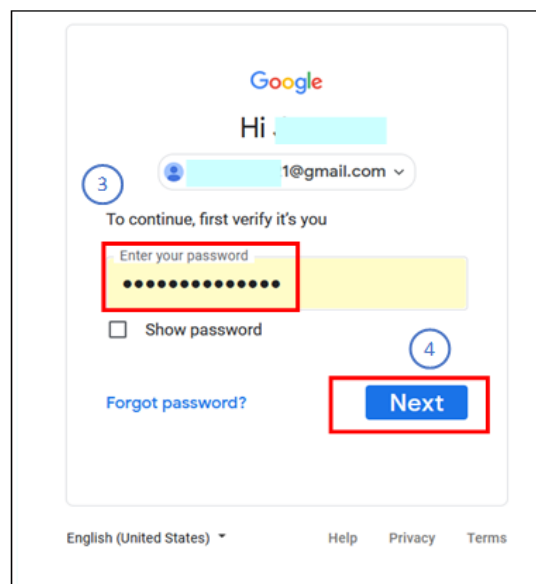
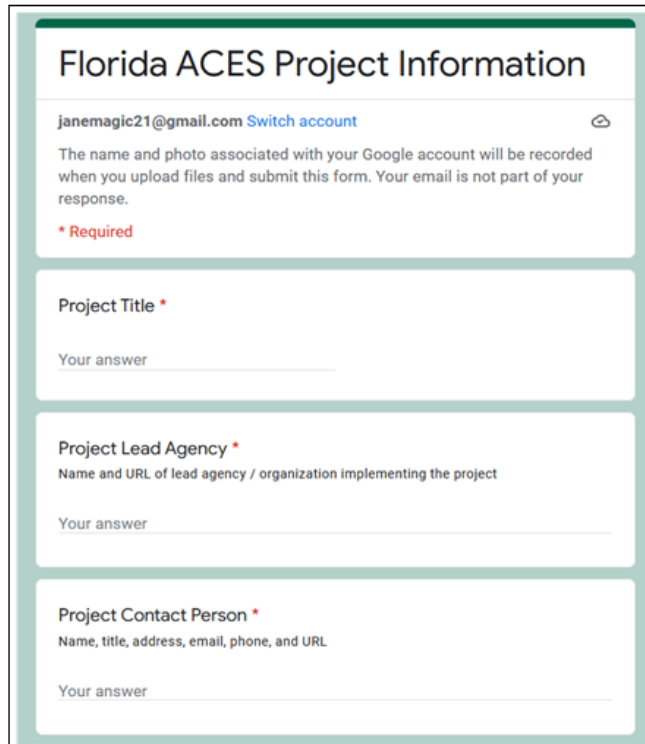


Figure F-3 Enter password for Google form

(4) Enter the required project information on three pages (Figure F-4).

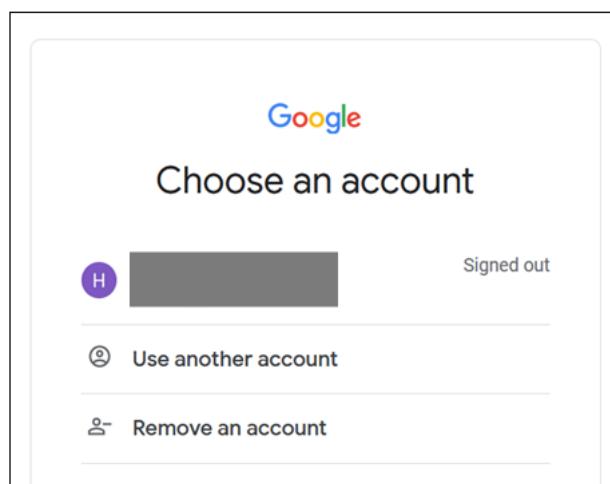


The screenshot shows a Google Form titled "Florida ACES Project Information". At the top, it displays the user's email "janemagic21@gmail.com" with a "Switch account" link and a share icon. Below this is a disclaimer: "The name and photo associated with your Google account will be recorded when you upload files and submit this form. Your email is not part of your response." A red asterisk indicates a required field. The form contains three input sections: "Project Title *", "Project Lead Agency *", and "Project Contact Person *". Each section includes a brief description of the required information and a "Your answer" input field.

Figure F-4 Input project information on Google Form

F.2 Check Project Information on the Google Form

(1) The authorized user can visit <https://docs.google.com/forms> to sign-in and access Google Forms (Figure F-5).



The screenshot shows the Google "Choose an account" sign-in screen. At the top is the Google logo. Below it is the heading "Choose an account". There are three options: 1) A profile picture with the letter 'H' and a greyed-out name, with the text "Signed out" to its right. 2) "Use another account" with a person icon. 3) "Remove an account" with a person icon and a minus sign.

Figure F-5 Sign in Google Form

(2) Click on FL ACES Project Data Collection to go to the next page (Figure F-6).

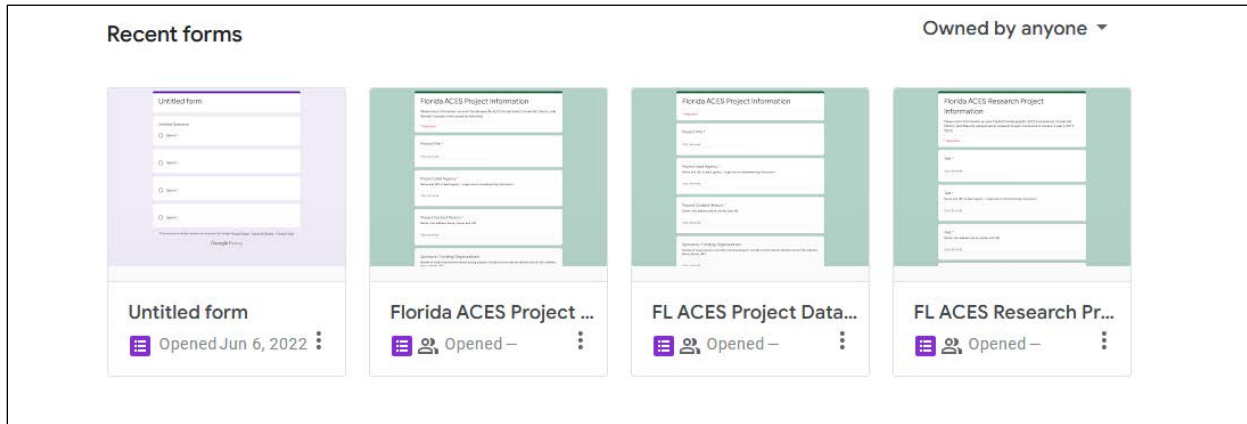


Figure F-6 Documents on Google Form

(3) Click on **Responses** to check Florida ACES Project Information (Figure F-7).

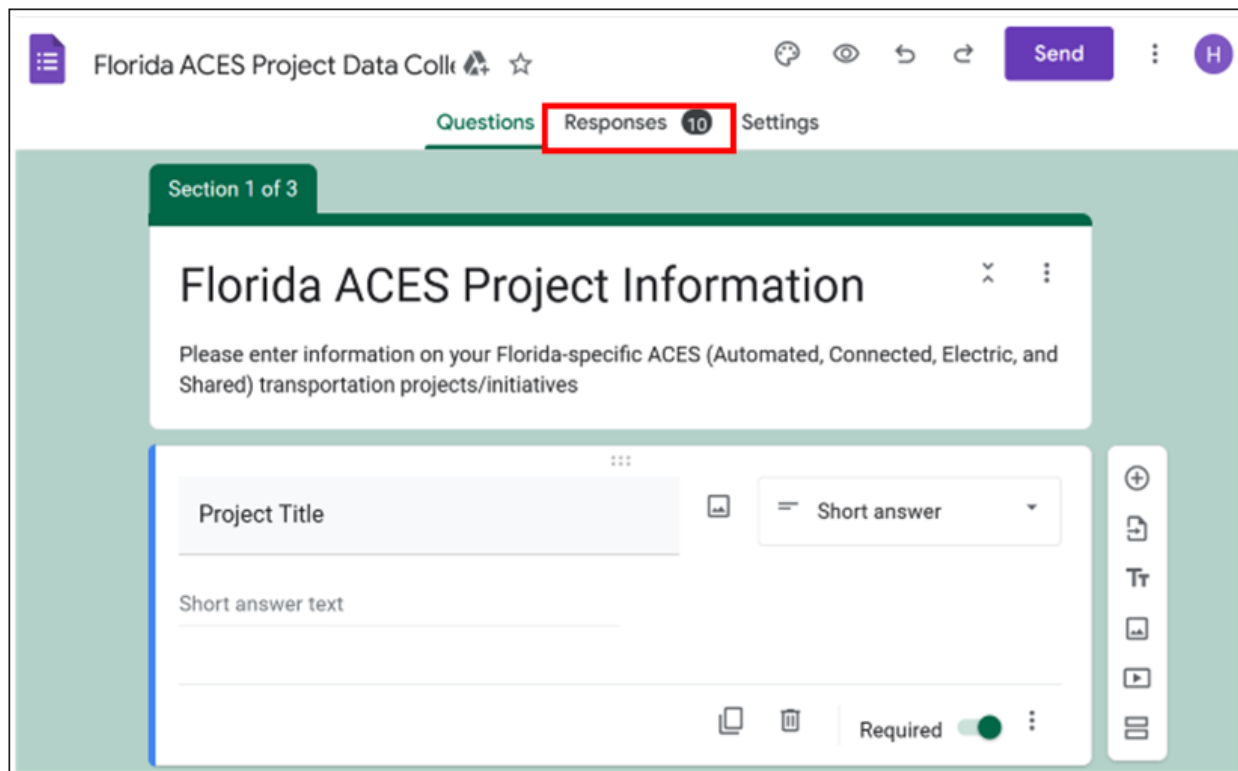


Figure F-7 Click responses of Google Form to check Florida ACES project information

(4) Click the top right icon ellipsis (three dots) to **Download responses (.csv)**. (Figure F-8)

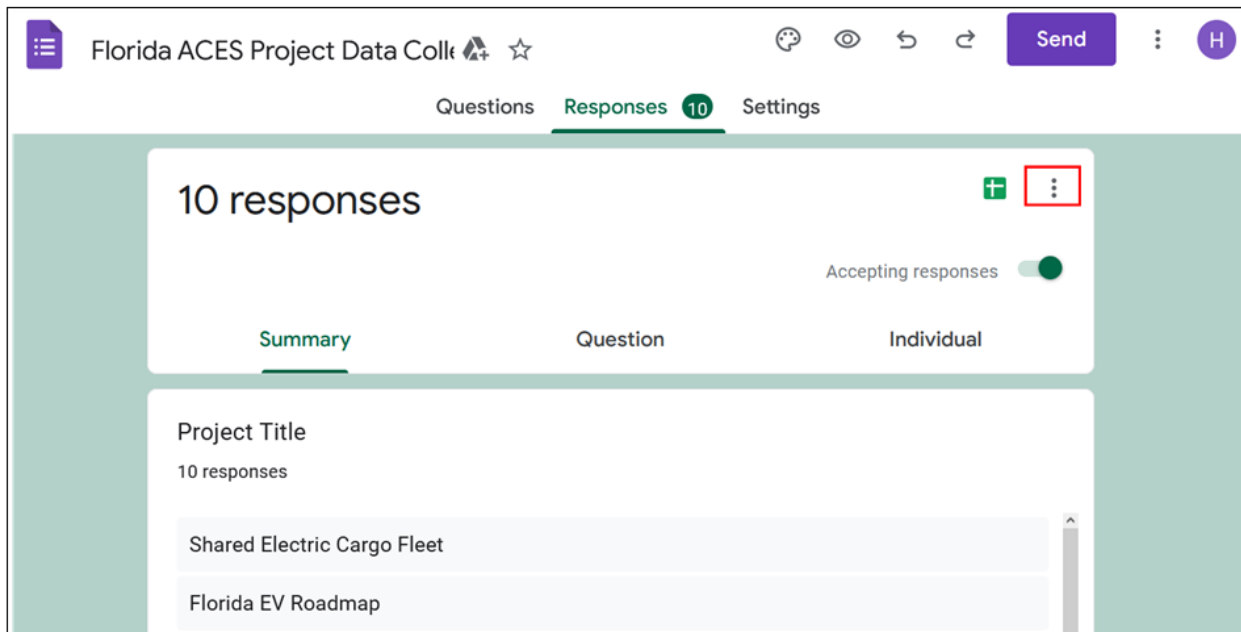


Figure F-8 Download responses of Google Form

(5) Click on **Download responses (.csv)** to download project information via .csv document and check the project information (Figure F-9).

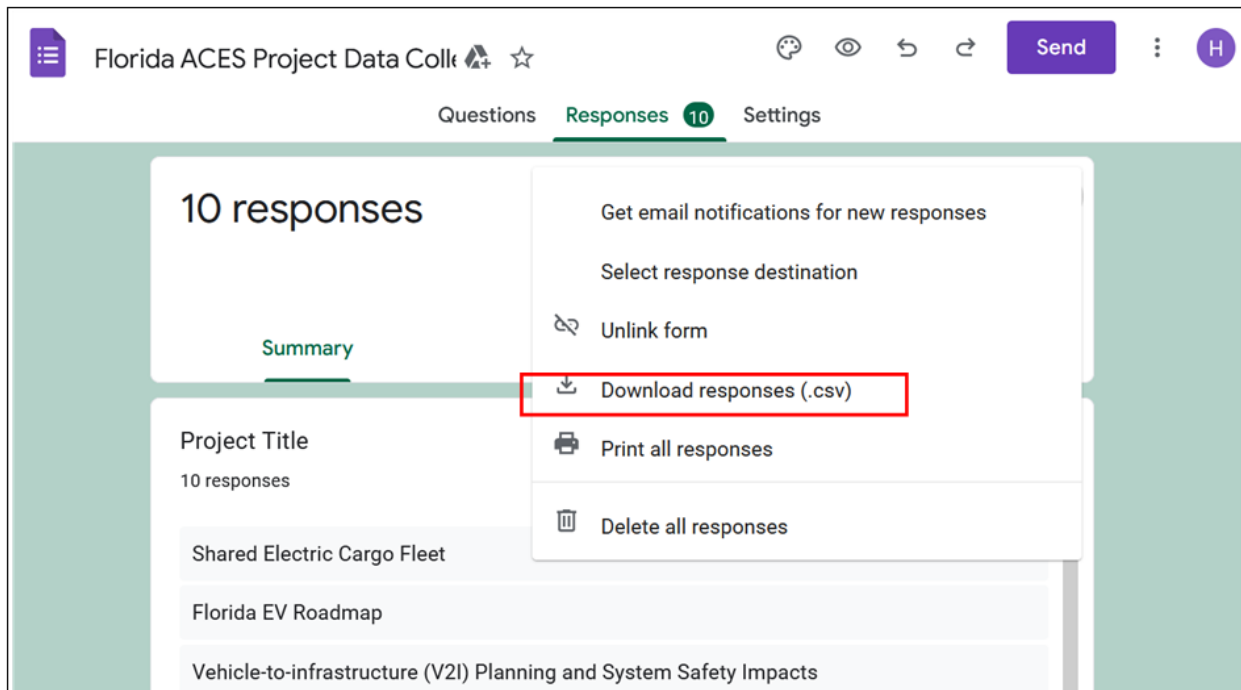


Figure F-9 Download responses of Google Form via .csv document

F.3 Collect and Update ACES Projects from FDOT CAV Initiative Website

The operators on the ACES Administration Page can update the projects on the Florida ACES Database and the ACES Activity Viewer with information obtained from the Florida CAV Initiative website (FDOT, 2022), <https://www.fdot.gov/traffic/teo-divisions.shtm/cav-ml-stamp/connected-vehicles>. Information is provided on this website because CV and AV applications provide opportunities to improve safety and mobility for all modes of travel. CV and AV are described as follows on the website (FDOT, 2022):

- CVs use vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and infrastructure-to-vehicle (I2V) communication to exchange information between vehicles, drivers, the roadside, bicyclists, and pedestrians.
- AVs are vehicles equipped with advanced sensors (radar, LiDAR, cameras, etc.) and computing abilities to perceive surroundings and activate steering, braking, and acceleration actions without operator input.

The Florida CAV Initiative uses innovative technologies to rapidly detect roadway hazards and alert drivers, including:

- Wireless communications
- Signal Phase and Timing (SPaT)
- Roadside Units (RSUs)
- On-Board Units (OBUs)
- Freight Signal Priority
- Transit Signal Priority
- Emergency Vehicle Preemption
- Vehicle Sensors
- Global Positioning System Navigation

CV, AV, and CAV projects are listed and included in three categories on the website—**Planning**, **Design/Implementation**, and **Operational** (Figure F-10). The figure shows the Florida CAV project map and project names.

The operators on the ACES Administration Page can collect and update Florida ACES Database and the ACES Activity Viewer in two ways. First, projects available on the Florida CAV initiative website but missing on the ACES Activity Viewer were identified; information and images from those projects were then added to the Florida ACES Database and the ACES Activity Viewer. Second, the operator could check and update existing projects on the ACES Activity Viewer with any new information from Florida CAV Initiative website; projects were updated only if new data or images were added on the project page on Florida CAV Initiative website.

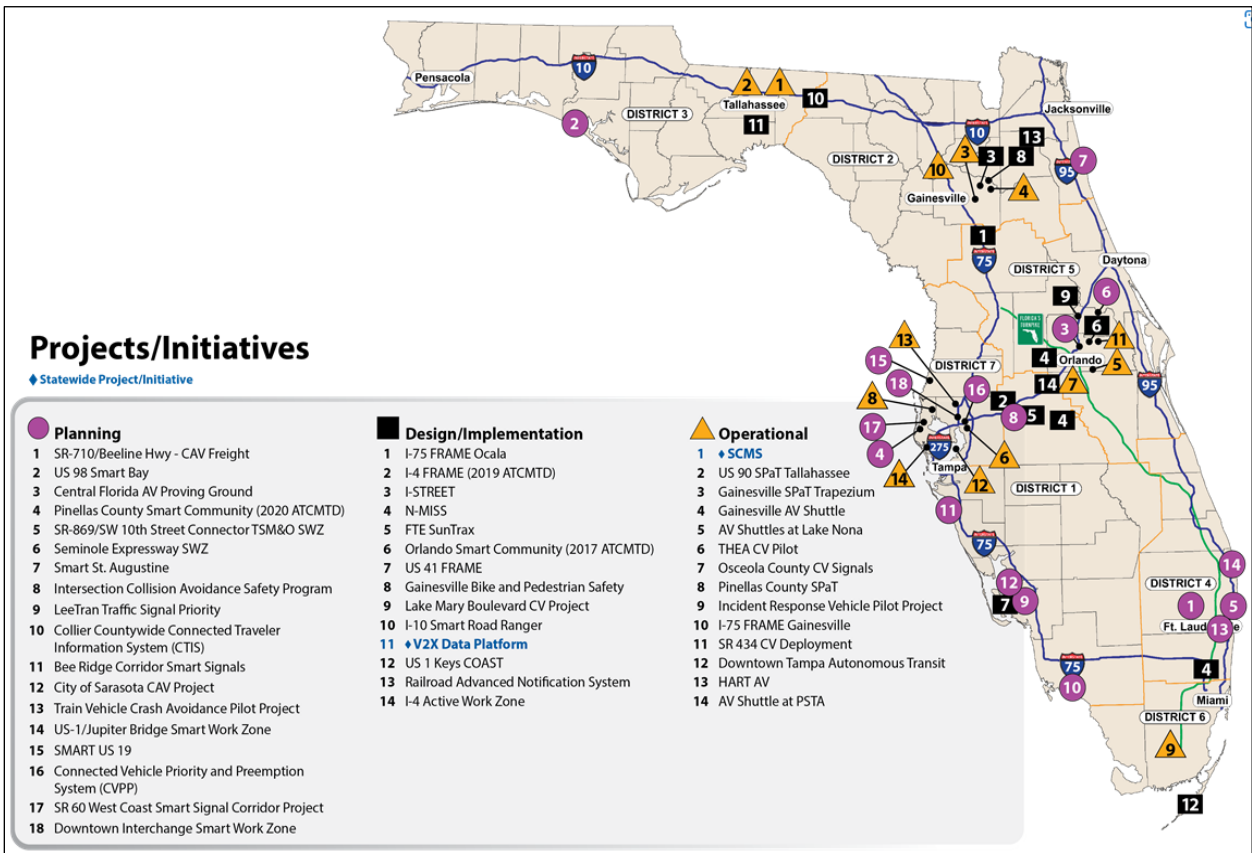


Figure F-10 Florida connected and automated vehicle project map and project names

Appendix G Meeting Minutes for Initial Meeting

Meeting Minutes

Toward a Florida ACES Transportation System Roadmap: Phase II

Initial Meeting on Transition of ACES to FDOT

Project Number
FDOT BDV25 Task Work Order No. 977-80

Prepared For
Florida Department of Transportation



June 23, 2022

Attendees

Name	Agency
Dahiya, Rupender	FDOT
Dockstader, Darryll	FDOT
Dux, Brien	FDOT
Gale, Siobhan	Atkins Global
Green, Ta'rika	FDOT
Larsson, Kristin	CUTR/USF
Li, Qianwen	CUTR/USF
Li, Xiaopeng	CUTR/USF
Lin, Pei-Sung	CUTR/USF
Lyu, Huiqing	CUTR/USF
Ponnaluri, Raj	FDOT
Sipiora, Austin	CUTR/USF
Tuck, Jason	FDOT
Wall, Joseph	FDOT
Wang, Zhenyu	CUTR/USF

Meeting Minutes

Opening Remarks

- Dr. Raj Ponnaluri introduced Siobhan, who will be helping to work with the FDOT Technology Office with the transfer of ACES from USF to FDOT.
- Dr. Pei-Sung Lin introduced the CUTR/USF team and their roles.
- Dr. Ponnaluri and Darryll Dockstader introduced the FDOT team and their roles.

Introduction

- Dr. Lin briefly introduced the Toward a Florida Automated, Connected, Electric, and Shared (ACES) Transportation System Roadmap: Phase II project and associated tasks.
- Introduced the Florida ACES Transportation Roadmap website and Activity Viewer and discussed how this works and how visitors can use and interact with the website.
- Dr. Zhenyu Wang covered the following technical items related to transition of ACES from CUTR to FDOT.

Overview of ACES System

- Reviewed the Core Modules of the System
- Front End
 - Activity Viewer (end user)
 - Webpage
 - Query by Users
 - Display Project Information on GIS Map
 - Administration Page
 - Webpage
 - Database Management
 - Role Management
 - Content Activation
- Backend
 - AWS Service
 - Store Project Information
 - Business Logic
 - Communicate with Frontend
 - Activity Viewer
 - Administration Page
- Survey Forms
 - Information is collected via Google forms.
 - The information collected is not automatically added but is first reviewed by FDOT before posting.

Environment of ACES Deployment

- Cloud-based application
- Amazon Web Service (AWS)
 - AWS S3 – File Storage
 - DynamoDB – Database

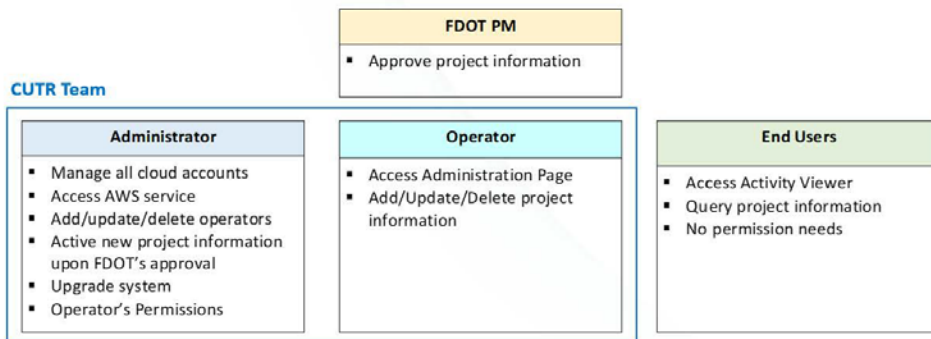
- Lambda – Business Logic
- API Gateway – REST APIs
- Cognito – Authentication
- Webpages
 - Powered by React JS Framework
 - Hosted by Netlify
- Mapbox
 - GIS map service
- GitHub
 - Source code management

Cloud Service Accounts

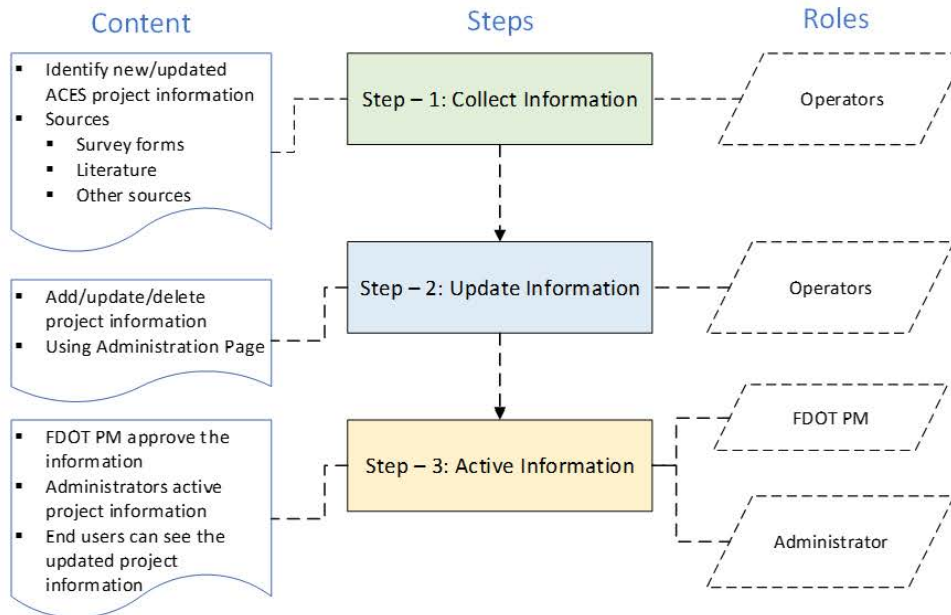
- Source Storage – **GitHub**
- Web Hosting – **Netlify**
- Domain – **Netlify**
- Database/Business Logic/API – **AWS**
- GIS – **Mapbox**
- Survey Form – **Google Form**

System Operations and Management

- Discussed the current management roles



- Discussed the procedure for information updates



Technology Transfer Plan

- Option 1 – Account transfer
 - Keep everything as-is and transfer all cloud accounts to FDOT
 - AWS account
 - Netlify account
 - Mapbox account
 - Domain account
 - Github account (if needed)
 - No need to redeploy
 - Need to check FDOT’s policy for system deployment
 - Cost may be applied to the Cloud services in deployment, depending on the level of services FDOT requires.
- Option 2 – Redeployment using FDOT’s accounts
 - Keep the same system deploy environment
 - Deploy using FDOT’s accounts
 - AWS – suggest to keep the same service
 - Mapbox – suggest to keep the same service
 - Netlify – other webpage hosting services are also good
 - Github – local storage for source codes is also good
- Additional Steps to be done by USF/CUTR

-
- Prepare and organize source code with description
 - Prepare a technical manual for FDOT
 - Prepare and develop training presentation and documents
 - Transfer ACES source code and ACES website, including database and activity viewer related information
 - Provide needed trainings

Questions on Transfer of ACES to FDOT

- Here are some questions that will need to be answered in the coming weeks:
 - What is FDOT's policy for the cloud service deployment?
 - Does FDOT expect to deploy the system on the cloud?
 - If Yes, does FDOT allow use of AWS, Netify, Mapbox, and Github?
 - What are requirements of the transfer?
 - Who will be audiences of the training?

General Discussion and Your Questions, Input, and Guidance

- Dr. Lin concluded the presentation, asked some key questions from the USF/CUTR project team, and sought for FDOT's input and guidance on the ACES transfer from CUTR to FDOT.
- Dr. Ponnaluri and Siobhan discussed their recent experiences with transferring the CAV website over to FDOT.
- Dr. Lin stated that the Task 3 - Transfer Florida ACES Database and Activity Viewer is scheduled to be ended on September 30, 2022.
- Jason Tuck added that this ACES research project ends December 31, 2022.
- Dr. Ponnaluri mentioned that FDOT will setup a meeting in the next few weeks to do a deeper dive into the particulars of the transfer.
- Rupender Dahiya and Brien Dux will coordinate and schedule an upcoming meeting.
- Siobhan Gale will help coordinate with FDOT Office of Information Technology (OIT) on the ACES transfer from CUTR to FDOT.
- USF/CUTR clarified that for Option 1, USF will transfer 100% of everything to FDOT and will not retain any ownership on the accounts that are transferred.
- Dr. Ponnaluri asked if CUTR was able to collection additional information on existing projects from Locals/Universities/etc.
 - Dr. Lin mentioned they started to receive new ACES projects after the completion of interviews of private industries and companies. In Task 2, he will send new projects collected in Task 1 to Dr. Ponnaluri for approval. Once Dr. Ponnaluri approves new ACES projects, the USF/CUTR team will get it added to the ACES Activity Viewer.
 - Dr. Lin discussed the recent interviews that have taken place.
 - Private companies show high interests on the Florida ACES program.
 - Some companies are working on providing their ACES projects. Some indicated that it may take a while to check with their supervisors and upper management for approval.

- Dr. Lin will have USF/CUTR team members send emails to stakeholders including Locals/Universities/etc to collect additional information on existing projects.
- Dr. Ponnaluri asked about the number of views that website has received
 - Dr. Lin mentioned that he would check whether the information is available. After checking, the available information for the ACES website visit for the last 30 days is provided below.

Sessions	Pageviews	Avg. Session Duration
135	188	1m 2s
+54%	+70%	-53%
vs. Previous 30 Days	vs. Previous 30 Days	vs. Previous 30 Days

- Prof. Xiaopeng Li discussed the work he’s been doing on Task 1 with private industries, as well as the breakdown of those private industries. He reported that as of June 2022, there are 54 private industry contacts (from 37 companies), including 19 from the automated and connected industry, 19 from the electric industry, and 16 from the shared industry. The CUTR team reached out to these companies with the goal of scheduling one-on-one meetings. Most private companies were supportive and demonstrated great interest. Some companies do not have specific ACES projects in Florida to share right now but are/will be considering deploying some in Florida (e.g., Cruise, ChargePoint, etc.). They expressed their interest in filling out the Google Form once they have solid content to share.
- Austin Sipiora – Through our private sector outreach we included Utilities. There was an interest expressed in several interviews in the future of the project.
- Dr. Ponnaluri mentioned an I-Street Consortium meeting tentatively scheduled in October.