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Autonomous Traffic Mobile Attenuator (ATMA) Tabletop Exercise 2021 Summary Report

APPLIED RESEARCH & INNOVATION BRANCH

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COLORADO
Department of Transportation

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16. Abstract

The Autonomous Maintenance Technology Pooled Fund, TPF 5(380) contracted with All Clear Emergency Management Group to develop, facilitate, and evaluate a Pooled Fund wide tabletop exercise involving the Autonomous Traffic Mobile Attenuator (ATMA)/Autonomous Impact Protection Vehicle (AIPV) crash. The scope of this summary report includes the design of the exercise, exercise facilitation and evaluation, and the development of an After-Action Report.

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Autonomous Maintenance Technology Pooled Fund, TPF 5(380) Tabletop Exercise 2021 Summary Report

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Autonomous Maintenance Technology Pooled Fund, TPF 5(380) Tabletop Exercise 2021 Summary Report

Project Summary

The Autonomous Maintenance Technology Pooled Fund, TPF 5(380) contracted with All Clear Emergency Management Group to develop, facilitate, and evaluate a Pooled Fund wide tabletop exercise. The scope of this summary report includes the design of the exercise, exercise facilitation and evaluation, and the development of an After-Action Report.

PROJECT STAFF

Will Moorhead
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Project Deliverables

The All Clear team worked closely with the Pooled Fund planning team to complete the following tasks. Each task had corresponding deliverables to move the exercise project forward.

1. Task 1: Project Management and Initiation
    - All Clear held a project kickoff call with the Pooled Fund Exercise Planning Team to develop a project plan to ensure all deliverables and timelines were met.
2. Task 2: Tabletop Exercise Design
    - All Clear held multiple planning meetings with the Pooled Fund planning team on February 22, 2021, April 14, 2021, and May 12, 2021. In these meetings exercise scope, objectives, tasks, and scenario information was discussed and finalized.
    - Throughout the planning process All Clear utilized the Homeland Security Exercise Evaluation Program (HSEEP).
    - All Clear also utilized HSEEP to develop the following documents for the exercise:
        - Exercise Situation Manual
        - Exercise Evaluation Guides
        - After-Action Report
    - All Clear developed a marketing flyer with registration and exercise information for the Pooled Fund members. All Clear managed exercise registration for the planning team.
3. Task 3: Conduct, Facilitation, and Evaluation of the Tabletop Exercise
    - On July 8, 2021, All Clear facilitated and evaluated a two and a half-hour virtual tabletop exercise leveraging Zoom technology. This included an exercise briefing and technology orientation, facilitation of four exercise modules, and an exercise hotwash.

- Using the evaluation information All Clear developed an After-Action Report for the Pooled Fund highlighting their strengths, areas for improvement and corrective actions.

4. Project Closeout
    - As part of the project closeout for this project, the Pooled Fund was provided with a final version of the AAR, a project summary report, copies of all exercise materials, and the final project invoice.

Recommendations for Future Projects

Based on the work during this project, All Clear would like to offer some suggestions for future planning efforts and projects.

1. Each individual state should consider hosting their own, state-specific tabletop exercise. The exercise facilitated in July of 2021 for all members covered response actions in general terms across multiple states, by hosting state specific exercises each state will have the ability to discuss their unique response actions with their partners.
2. Consider facilitating an exercise with a more 'day-to-day' scenario. This exercise was based off of the worst case scenario including fatalities and hospitalizations. Future exercises and trainings should focus on scenarios in which there is only property damage and no injuries to test a more likely scenario.
3. Another scenario that could be tested in the future is one in which a DOT employee is injured in the exercise to test those specific policies and procedures.

ATMA Tabletop Exercise 2021

Situation Manual

July 8, 2021

This Situation Manual (SitMan) provides exercise participants with all the necessary tools for their roles in the exercise. Some exercise material is intended for the exclusive use of exercise planners, facilitators, and evaluators, but players may view other materials that are necessary to their performance. All exercise participants may view the SitMan.

EXERCISE OVERVIEW

Exercise Name	ATMA Tabletop Exercise 2021
Exercise Dates	July 8, 2021
Scope	This exercise is a virtual tabletop exercise, planned for two and half hours at each participant's facility. Exercise play is limited to virtual participation through Zoom.
Mission Area(s)	Response Recovery
Core Capabilities	• Public Information and Warning • Operational Coordination
Objectives	1. Evaluate the immediate response actions taken when a motorist strikes an ATMA vehicle prior to DOT officials arriving on scene. 2. Evaluate the initial response actions taken by DOT staff and response partners after arriving on the scene of a crash. 3. Evaluate the response of an ATMA crash after DOT staff and response partners have arrived on scene and have begun their investigation. 4. Evaluate the extended response as DOT staff continue their investigation of an ATMA vehicle crash.
Threat or Hazard	Manmade – Motorist striking an ATMA Vehicle
Scenario	A motorist strikes an ATMA vehicle during line painting operations. The collision results in the driver of the vehicle that struck the ATMA vehicle needing hospitalization and the passenger to die on scene.
Sponsor	**Autonomous Maintenance Technology Pooled Fund, TPF 5(380)**
Point of Contact	**Ashley Nylen, PMP** Assistant Director of Mobility Technology ashley.nylen@state.co.us 303-512-5533

GENERAL INFORMATION

Exercise Objectives and Core Capabilities

The following exercise objectives in Table 1 describe the expected outcomes for the exercise. The objectives are linked to core capabilities, which are distinct critical elements necessary to achieve the specific mission area(s). The objectives and aligned core capabilities are guided by elected and appointed officials and selected by the Exercise Planning Team.

Exercise Objectives	Core Capability
1. Evaluate the immediate response actions taken when a motorist strikes an ATMA Vehicle prior to DOT officials arriving on scene.	• Public Information and Warning • Operational Coordination
2. Evaluate the initial response actions taken by DOT staff and response partners after arriving on the scene of a crash.	• Public Information and Warning • Operational Coordination
3. Evaluate the response of an ATMA crash after DOT staff and response partners have arrived on scene and have begun their investigation.	• Public Information and Warning • Operational Coordination
4. Evaluate the extended response as DOT staff continue their investigation of an ATMA vehicle crash.	• Public Information and Warning • Operational Coordination

Table 1. Exercise Objectives and Associated Core Capabilities

Participant Roles and Responsibilities

The term *participant* encompasses many groups of people, not just those playing in the exercise. Groups of participants involved in the exercise, and their respective roles and responsibilities, are as follows:

- **Players:** Players are personnel who have an active role in discussing or performing their regular roles and responsibilities during the exercise. Players discuss or initiate actions in response to the simulated emergency.
- **Observers:** Observers do not directly participate in the exercise. However, they may support the development of player responses to the situation during the discussion by asking relevant questions or providing subject matter expertise.
- **Facilitators:** Facilitators provide situation updates and moderate discussions. They also provide additional information or resolve questions as required. Key Exercise Planning Team members also may assist with facilitation as subject matter experts (SMEs) during the exercise.
- **Evaluators:** Evaluators are assigned to observe and document certain objectives during the exercise. Their primary role is to document player discussions, including how and if those discussions conform to plans, polices, and procedures.

Exercise Structure

This exercise will be a multimedia, facilitated exercise. Players will participate in the following four modules:

- Module 1: Initial Actions on Scene
- Module 2: Response Partners Arrive on Scene
- Module 3: Collision Investigation Begins
- Module 4: Ongoing Investigation / Recovery

Each module begins with a multimedia update that summarizes key events occurring within that time period. After the updates, participants review the situation and engage in discussions of appropriate response and recovery issues.

Exercise Guidelines

- This exercise will be held in an open, low-stress, no-fault environment. Varying viewpoints, even disagreements, are expected.
- Respond to the scenario using your knowledge of current plans and capabilities (i.e., you may use only existing assets) and insights derived from your training.
- Decisions are not precedent setting and may not reflect your organization's final position on a given issue. This exercise is an opportunity to discuss and present multiple options and possible solutions.
- Issue identification is not as valuable as suggestions and recommended actions that could improve response, recovery efforts. Problem-solving efforts should be the focus.

Exercise Assumptions and Artificialities

In any exercise, assumptions and artificialities may be necessary to complete play in the time allotted and/or account for logistical limitations. Exercise participants should accept that assumptions and artificialities are inherent in any exercise and should not allow these considerations to negatively impact their participation. During this exercise, the following apply:

- The exercise is conducted in a no-fault learning environment wherein capabilities, plans, systems, and processes will be evaluated.
- The exercise scenario is plausible, and events occur as they are presented.
- All players receive information at the same time.

Exercise Evaluation

Evaluation of the exercise is based on the exercise objectives and aligned capabilities, capability targets, and critical tasks, which are documented in Exercise Evaluation Guides (EEGs). Evaluators have EEGs for each of their assigned areas. Additionally, players will be asked to complete participant feedback forms. These documents, coupled with facilitator observations and notes, will be used to evaluate the exercise and compile the After-Action Report (AAR).

MODULE 1: INITIAL ACTIONS ON SCENE

Scenario

July 8, 2021

A line painting crew is performing their operations on a two-lane highway. A motorist not paying attention to the road strikes the rear of the ATMA Vehicle. Immediately the line painting operations are stopped. The road crew determines that at this point that there were two people in the vehicle and neither appear to be conscious or responsive to verbal cues.

Questions

Based on the information provided, participate in the discussion concerning the issues raised in Module 1. Identify any critical issues, decisions, requirements, or questions that should be addressed at this time.

The following questions are provided as suggested subjects that you may wish to address as the discussion progresses. These questions are not meant to constitute a definitive list of concerns to be addressed, nor is there a requirement to address every question.

1. What are the initial actions that the line painting crew should take immediately after the motorist strikes the ATMA Vehicle?

2. Should the crew attempt to render any aid to the driver or passenger of the vehicle?

3. Who needs to be contacted by the crew?

    a. Are there designated people on the crew to make these notifications?

    b. What information is the crew expected to communicate?

    c. If there are policies or procedures related to notification how proficient are the crews in implementing those? Are checklists or reference guides provided?

4. After initial notifications are made, what actions should the crew take?

5. Upon learning of the incident, what immediate actions should DOT program staff take?

6. Is there anything specific that needs to be done to the ATMA Vehicle prior to response partners arriving on scene?

7. How are these initial response actions different than an incident involving a non-automated vehicle?

MODULE 2: RESPONSE PARTNERS ARRIVE ON SCENE

Scenario

July 8, 2021

At this point law enforcement and EMS have arrived on scene and the highway has been shut down in both directions. EMS has determined that the passenger of the vehicle has died, and the driver needs to be transported to the hospital for non-life-threatening injuries. DOT officials have been notified and are currently en route the accident scene.

Questions

Based on the information provided, participate in the discussion concerning the issues raised in Module 2. Identify any critical issues, decisions, requirements, or questions that should be addressed at this time.

The following questions are provided as suggested subjects that you may wish to address as the discussion progresses. These questions are not meant to constitute a definitive list of concerns to be addressed, nor is there a requirement to address every question.

1. Who at the DOT receives the initial notification from the scene?
2. What does the internal notification process look like within the DOT?
3. What partners / agencies would your DOT notify of the incident upon learning of it?
4. Who is responsible for making these notifications?
5. Who from your DOT is responsible for responding to the scene?
6. Is there any type of incident command set up?
    a. On scene vs. at the DOT headquarters?
7. What is being communicated to the crew from the DOT before arriving on scene?
    a. Is there a single point of contact from DOT to the crew on scene?

MODULE 3: COLLISION INVESTIGATION BEGINS

Scenario

July 8, 2021

All response partners have arrived on scene including DOT, State Highway Patrol, Fire and EMS, and the Coroner's Office. The highway is still shut down and the scene has been stabilized. The DOT and partners are starting to investigate the incident and gathering all necessary information. Reporters from local news outlets have started to arrive on scene as well.

Questions

Based on the information provided, participate in the discussion concerning the issues raised in Module 3. Identify any critical issues, decisions, requirements, or questions that should be addressed at this time.

The following questions are provided as suggested subjects that you may wish to address as the discussion progresses. These questions are not meant to constitute a definitive list of concerns to be addressed, nor is there a requirement to address every question.

1. After arriving on scene, what initial actions would your DOT staff take?
    a. Actions related to initiating the investigation?
    b. Communications with other agencies on scene?
    c. Communications with agencies or individuals not on scene?
2. What agency takes the lead in the investigation?
3. Who authorizes or approves the removal of information or physical assets from the scene?
4. What information needs to be collected from the ATMA Vehicle?
    a. Who is authorized to collect this information?
5. Are there chain of custody protocols /policies in place for handling information gathered from the ATMA Vehicle?
    a. Is physical hardware or equipment handled differently?
6. Is there information stored in any type of cloud system that needs to be downloaded?
7. What is done with physical and virtual information / equipment once recovered from the scene?

8. Who is in charge of handling and speaking with members of the media on scene?

    a. Reporters are asking about any injuries resulting from the crash, how much information is given regarding injuries?

    b. Reporters are questioning the safety of the ATMA vehicle, what response is given in response to these questions?

9. Are there any representatives from the responding agencies tasked with following up with the passenger that was transported to the hospital?

MODULE 4: ONGOING INVESTIGATION / RECOVERY

Scenario

July 8, 2021

At this point the investigation is ongoing for a few hours. Initial information has been collected and data from the ATMA vehicle is starting to be reviewed and analyzed. There is a push to reopen the highway as soon as possible so normal traffic patterns can resume.

Questions

Based on the information provided, participate in the discussion concerning the issues raised in Module 4. Identify any critical issues, decisions, requirements, or questions that should be addressed at this time.

The following questions are provided as suggested subjects that you may wish to address as the discussion progresses. These questions are not meant to constitute a definitive list of concerns to be addressed, nor is there a requirement to address every question.

1. Who makes the ultimate decision that the scene can begin to be cleared and the highway reopened?
2. How is the ATMA vehicle transported from the scene to a DOT facility?
    a. Is the damaged ATMA transported to DOT, or will it be secured by LE as part of a fatal accident investigation?
3. Are there any chain of custody concerns with the transportation of the vehicle itself?
4. If there is scheduled usage of any ATMA Vehicles in the near future are these operations suspended pending the investigation of the crash?
5. Does the removal of this damaged ATMA vehicle from the DOT fleet impact other DOT projects and schedules?
6. Would there be regularly scheduled press releases of press conferences regarding the crash and the pending investigation?
7. Are there administrative restrictions imposed on the crew operating the ATMA while the accident investigation is ongoing?
8. Thinking of long-term response and recovery operations, how are subpoenas / information requests handled from the following parties?
    a. Lawyers
    b. Insurance Investigators

c. Private Investigators

d. Media Outlets

9. Is there any proprietary information that could not be shared?

APPENDIX A: EXERCISE SCHEDULE

Time	Activity
8:30 AM	Opening Remarks and Introduction
8:45 AM	Module 1: Initial Actions on Scene - Breakout Groups (20 Min)
9:05 AM	Large Group Discussion (10 Min)
9:15 AM	Module 2: Response Partners Arrive on Scene - Breakout Groups (30 Min)
9:45 AM	Large Group Discussion (10 min)
9:55 AM	Module 3: Collision Investigation Begins (20 Min)
10:15 AM	Large Group Discussion (10 min)
10:25 AM	Module 4: Ongoing Investigation / Recovery (20 Min)
10:45 AM	Large Group Discussion, Hotwash/Debrief (15 min)
11:00 AM	EndEx

Note: All times are MST.

APPENDIX B: ACRONYMS

Acronym	Term
ATMA	Autonomous Truck Mounted Attenuator
CDOT	Colorado Department of Transportation
DOT	Department of Transportation
EMS	Emergency Medical Services
HSEEP	Homeland Security Exercise and Evaluation Program
SitMan	Situation Manual
SME	Subject-Matter Expert
TTX	Tabletop Exercise

ATMA Tabletop Exercise 2021

After-Action Report/Improvement Plan

September 16, 2021

The After-Action Report/Improvement Plan (AAR/IP) aligns exercise objectives with preparedness doctrine and related frameworks and guidance. Exercise information required for preparedness reporting and trend analysis is included; users are encouraged to add additional sections as needed to support their own organizational needs.

EXERCISE OVERVIEW

Exercise Name	ATMA Tabletop Exercise 2021
Exercise Date	July 8, 2021
Scope	This exercise is a virtual tabletop exercise, planned for two and half hours at each participant's facility. Exercise play is limited to virtual participation through Zoom.
Focus Area(s)	Response & Recovery
Capabilities	• Public Information and Warning • Operational Coordination
Objectives	1. Evaluate the immediate response actions taken when a motorist strikes an ATMA vehicle prior to DOT officials arriving on scene. 2. Evaluate the initial response actions taken by DOT staff and response partners after arriving on the scene of a crash. 3. Evaluate the response of an ATMA crash after DOT staff and response partners have arrived on scene and have begun their investigation. 4. Evaluate the extended response as DOT staff continue their investigation of an ATMA vehicle crash.
Threat or Hazard	Manmade – Motorist striking an ATMA Vehicle
Scenario	A motorist strikes an ATMA vehicle during line painting operations. The collision results in the driver of the vehicle that struck the ATMA vehicle needing hospitalization and the passenger to die on scene.
Sponsor	Autonomous Maintenance Technology Pooled Fund, TPF 5(380)
Participating Organizations	See Appendix B for a Full List of Participants
Point of Contact	Ashley Nylen, PMP Assistant Director of Mobility Technology ashley.nylen@state.co.us 303-512-5533

ANALYSIS OF CAPABILITIES

Aligning exercise objectives and capabilities provides a consistent taxonomy for evaluation that transcends individual exercises to support preparedness reporting and trend analysis. Table 1 includes the exercise objectives, aligned capabilities, and performance ratings for each capability as observed during the exercise and determined by the evaluation team.

Objective	Capability	Performed without Challenges (P)	Performed with Some Challenges (S)	Performed with Major Challenges (M)	Unable to be Performed (U)
Evaluate the immediate response actions taken when a motorist strikes an ATMA Vehicle prior to DOT officials arriving on scene.	• Public Information and Warning • Operational Coordination		S		
Evaluate the initial response actions taken by DOT staff and response partners after arriving on the scene of a crash.	• Public Information and Warning • Operational Coordination		S		
Evaluate the response of an ATMA crash after DOT staff and response partners have arrived on scene and have begun their investigation.	• Public Information and Warning • Operational Coordination		S		
Evaluate the extended response as DOT staff continue their investigation of an ATMA vehicle crash.	• Public Information and Warning • Operational Coordination		S		

Table 1. Summary of Core Capability Performance

Ratings Definitions:

Performed without Challenges (P): The targets and critical tasks associated with the capability were completed in a manner that achieved the objective(s) and did not negatively impact the performance of other activities. Performance of this activity did not contribute to additional health and/or safety risks for the public or for emergency workers, and it was conducted in accordance with applicable plans, policies, procedures, regulations, and laws.

Performed with Some Challenges (S): The targets and critical tasks associated with the capability were completed in a manner that achieved the objective(s) and did not negatively impact the performance of other activities. Performance of this activity did not contribute to additional health and/or safety risks for the public or for emergency workers, and it was conducted in accordance with applicable plans, policies, procedures, regulations, and laws. However, opportunities to enhance effectiveness and/or efficiency were identified.

Performed with Major Challenges (M): The targets and critical tasks associated with the capability were completed in a manner that achieved the objective(s), but some or all of the following were observed: demonstrated performance had a negative impact on the performance of other activities; contributed to additional health and/or safety risks for the public or for emergency workers; and/or was not conducted in accordance with applicable plans, policies, procedures, regulations, and laws.

Unable to be Performed (U): The targets and critical tasks associated with the capability were not performed in a manner that achieved the objective(s).

The following sections provide an overview of the performance related to each exercise objective and associated capability, highlighting strengths and areas for improvement.

Objective 1: Evaluate the immediate response actions taken when a motorist strikes an ATMA Vehicle prior to DOT officials arriving on scene.

The strengths and areas for improvement for each capability aligned to this objective are described in this section.

FEMA Core Capability: Public Information and Warning

Strengths

The partial capability level can be attributed to the following strengths:

Strength 1.1: Participating agencies identified and understood the hierarchy of contacts. Once members of a DOT road crew evaluated the scene, they quickly acknowledged that 911, state trooper dispatch, and their supervisors were the first people to call in response. DOT members have received training and are aware of the contact information to communicate detailed information about the incident to the designated personnel.

Strength 1.2: Associated organizations understood their role of monitoring the scene and their ability to give regular updates to their supervisors. They were also quick to acknowledge the importance of sharing information with their managers to update their reporting systems. This ensures seamless communication throughout the agency.

Areas for Improvement

The following areas require improvement to achieve the full capability level:

Area for Improvement 1.1: Creating a Checklist for Who Should Be Notified First.

Analysis: Although most agencies understood their immediate points of contact after evaluating the scene, it is important to organize the hierarchy of contacts on a checklist or within a protocol. Participants stated that having hard copies or electronic versions of this hierarchy can help with organization and ensure that first responders and investigators arrive at the scene first.

Area for Improvement 1.2: Updating Accident Packets with ATMA Specifics.

Reference: Accident Packets in DOT Vehicles/Members

Analysis: Due to the rarity and novelty of an ATMA vehicle collision, it is important specify what information should be included in the report out to the first responders. Documents and packets that are provided for DOT members on scene should be updated and detailed on what information is necessary to document for later investigation.

FEMA Core Capability: Operational Coordination

Strengths

The partial capability level can be attributed to the following strengths:

Strength 1.3: Participating agencies stated that an ATMA vehicle collision response plan would be similar to the response of a non-automated vehicle incident. Members were well trained and understood the basis of an emergency accident plan. Plans and procedures are detailed within the DOT vehicle operations handbook.

Strength 1.4: Participants emphasized the importance of obtaining detailed documentation of the situation. They quickly and easily described the actions to take in order to properly document the collision for further investigation.

Strength 1.5: Members stated that they would render aid if needed or applicable. Agencies made it clear that aid is only necessary based on the situation.

Areas for Improvement

The following areas require improvement to achieve the full capability level:

Area for Improvement 1.3: Limited Information About ATMA Vehicles.

Analysis: There is limited research and information on ATMA vehicles and how specific investigation processes will occur. Participants stated that they are unsure how insurance will factor into the collision. Many were unfamiliar with the liability aspect and need to add the specifics into their pre-existing protocols. There were also questions on how to retrieve the information that is stored within the ATMA vehicle. Trainings and further updates are needed to properly equip personnel on scene.

Area for Improvement 1.4: Documenting ATMA Vehicle Collisions.

Analysis: In addition to being unfamiliar with how ATMA vehicles are covered by insurance and liability, participants stated that they were unsure on how to document / preserve information related to ATMA vehicles. Questions about data storage, sharing and protection circulated amongst the group. It is important to update procedures on how to document ATMA specific vehicles and train employees on the new documentation processes.

Objective 2: Evaluate the initial response actions taken by DOT staff and response partners after arriving on the scene of a crash.

The strengths and areas for improvement for each capability aligned to this objective are described in this section.

FEMA Core Capability: Public Information and Warning

Strengths

The partial capability level can be attributed to the following strengths:

Strength 2.1: Participating organizations were quick to acknowledge how they communicate information about the initial response and current actions being taken. Specifically, supervisors will filter information to upper management and statewide safety personnel for documentation and reporting purposes.

Strength 2.2: Participants pointed out that most of the coordination happened internally and communication is easily available across DOT offices. Some outside stakeholders such as the Department of Public Safety is notified and works with DOT in the response process. This process was uniform and easily identified by participating organizations.

Areas for Improvement

The following areas require improvement to achieve the full capability level:

Area for Improvement 2.1: Messaging Concerns Around Connected Automated Vehicles.

Analysis: Participating agencies identified the challenges that surround media coverage on connected automated vehicles. Participants stated their concerns with the messaging around an incident involving a collision. Agencies were open to creating a procedure on how to properly create and relay information about ATMA vehicles across outside organizations and the public.

FEMA Core Capability: Operational Coordination

Strengths

The partial capability level can be attributed to the following strengths:

Strength 2.1: Participants understood who will be on scene during the response process. Across most agencies, district supervisors and crew managers oversaw the evaluation process and those helping with response. Therefore, personnel were trained and understood their duties on-scene and what tasks needed to be completed.

Strength 2.2: Although a strict Incident Command Structure (ICS) is not needed for the DOT agencies, participants stated that their Traffic Monitoring Center stood in as that structure. Organizations across multiple states stated that this office helped coordinate information and resources across the offices. Some personnel were trained in basic ICS functions.

Strength 2.3: Participants identified that each DOT vehicle contains accident packets that contain checklists and protocols pertaining to fatal vehicular collisions. Participants stated that DOT employees prepare for this scenario daily by completing their pre-deployment checklist before beginning their workdays.

Areas for Improvement

The following areas require improvement to achieve the full capability level:

Area for Improvement 2.2: Lack of Defined Incident Command Structure.

Analysis: Participants acknowledged the fact that not all states had an Incident Command Structure implemented within the DOT response plan. Members stated that most ICS actions taken were used by first responders. Implementing an Incident Command Structure could be altered within the DOT and specified to ATMA vehicle incidents if needed.

Objective 3: Evaluate the response of an ATMA crash after DOT staff and response partners have arrived on scene and have begun their investigation.

The strengths and areas for improvement for each capability aligned to this objective are described in this section.

FEMA Core Capability: Public Information and Warning

Strengths

The partial capability level can be attributed to the following strengths:

Strength 3.1: Participants acknowledged that checklists and trainings on documentation of fatal accidents already exist and would be used in an ATMA collision scenario. Organization members emphasized the importance of documentation and how procedures are already intact for proper investigation. Non-automated procedures would be applied to automated vehicle scenarios.

Strength 3.2: Participants were very familiar with who the lead agency would be during an ATMA collision scenario. Law enforcement would be the lead agency and help navigate road closures and clear the accident after initial investigation.

Areas for Improvement

The following areas require improvement to achieve the full capability level:

Area for Improvement 3.1: Insurance, Liability & Fault of ATMA Accident.

Analysis: Due to the lack of real world incidents and information surrounding the deployment of ATMA vehicles, many questions were discussed based on citations, insurance, and fault of accident if an automated vehicle is involved. Participants directly stated that the routine drug test that is conducted after a fatal incident will take place with the lead vehicle driver and operator. It is important to specify in detail the different procedures and steps that it will take to fully investigate and document an ATMA accident. Detail such as insurance, liability and fault will need to be outlined within the accident packets and response plans.

FEMA Core Capability: Operational Coordination

Strengths

The partial capability level can be attributed to the following strengths:

Strength 3.3: Participating agencies were able to clearly identify their chain of custody with both ATMA vehicle data and the vehicle itself. Due to the familiarity in custody of these resources with non-automated vehicle situations, similar processes with the chain of custody would apply to the ATMA scenario.

Strength 3.4: Multiple organizations had a protocol on how to download data from the ATMA vehicle and give it to law enforcement or other agencies for further investigation. Specific DOT personnel have been trained on how to do download and also store the data.

Strength 3.5: Organizations were quick to identify who follows up with the passenger of the vehicle who was sent to the hospital. Typically, the safety administration is in charge of this to follow through with the investigation and liability aspect of the accident.

Areas for Improvement

The following areas require improvement to achieve the full capability level:

Area for Improvement 3.2: Policies on Information Gathering for ATMA Accidents.

Analysis: Participants recognized the importance of creating policies and procedures for handling information that is gathered from ATMA vehicles. Participating agencies acknowledged the lack of protocols stating what to do with the data that is extracted from the vehicle and how to manage it for further investigation or storage. As more information becomes available on ATMA vehicles and how the data will look, policies and procedures should be developed pertaining to the situation.

Area for Improvement 3.3: Impounding Virtual ATMA Vehicle Information.

Analysis: In addition to gathering information from the ATMA vehicle, participants were wondering what the process is on impounding virtual information. Once the data has been gathered and used for the collision investigation, the process of impounding that information is going to look different that a non-automated vehicle incident. Therefore, when more research and information become available on ATMA vehicle data, new processes need to be developed within each DOT.

Objective 4: Evaluate the extended response as DOT staff continue their investigation of an ATMA vehicle crash.

The strengths and areas for improvement for each capability aligned to this objective are described in this section.

FEMA Core Capability: Public Information and Warning

Strengths

The partial capability level can be attributed to the following strengths:

Strength 4.1: Participants stated that highway technicians or trained personnel such as public information officers (PIO) on site will provide accident information to media. There are instructions regarding what details can and cannot be released. Road crew personnel are trained on not confirming updates or facts about the incident to media outlets.

Areas for Improvement

The following areas require improvement to achieve the full capability level:

Area for Improvement 4.1: Information Sharing on ATMA Vehicle Accidents.

Analysis: Participants wrapped up the discussion by noting that there will be a learning curve when it comes to responding to an ATMA vehicle accident. Sharing information across agencies and with the public will be challenging at times, however, equipping personnel with details regarding what can be shared and what cannot be shared is important moving forward. As stated by one of the DOT members, 'people like to blame machines, not other people'.

FEMA Core Capability: Operational Coordination

Strengths

The partial capability level can be attributed to the following strengths:

Strength 4.2: Participating agencies acknowledged that similar to a fatal non-automated vehicle response plan, there is a protocol for towing and impounding a vehicle. Most cases the vehicle would be towed offsite to limit further damage and be made accessible for further investigation. Participants agreed that this was a universal step across most DOTs.

Strength 4.3: Organizations noted that ATMA vehicles are new to their structure and that there is a necessary learning curve. However, it was stated that because of the uniqueness of the situation, new policies for data storage, sharing and configuring transparency is easily altered at this time.

Areas for Improvement

The following areas require improvement to achieve the full capability level:

Area for Improvement 4.2: Use of Lead Vehicle.

Analysis: Participants were unfamiliar with how to deal with the lead vehicle if it is not damaged. Due to the novelty of the ATMA system, there is no direct protocol written for proper use and storage of the lead vehicle. Participants stated that the lead vehicle could still be utilized if there was no damage, but assessment would be determined case by case.

Area for Improvement 4.3: Red Flag Policies on ATMA Vehicles.

Analysis: Participating organizations discussed the gap on red flag policies if all ATMA vehicles need to be suspended if one were to be in a collision. Participants stated that they would have to assess the root of the issue then determine if further suspension is needed. As ATMA vehicles become more relevant across the nation, red flag policies need to be created and implemented in case of an emergency.

Appendix A: IMPROVEMENT PLAN

This IP is developed specifically for Autonomous Maintenance Technology Pooled Fund, TPF 5(380) as a result of ATMA Tabletop Exercise 2021 conducted on July 8, 2021.

FEMA Core Capability	Issue/Area for Improvement	Corrective Action	Capability Element	Primary Responsible Organization	Organization POC	Start Date	Completion Date
Public Information and Warning	1.1 Creating a Checklist for Who Should Be Notified First.	Ensure each accident packet carried by road crews includes a checklist of who should be contacted in the event of an ATMA involved collision.	Planning				
	1.2 Updating Accident Packets with ATMA Specifics.	When new policies and procedures are developed for ATMA vehicle involved collisions, ensure the accident packets are updated with this new information.	Planning				
	2.1 Messaging Concerns Around Connected Automated Vehicles.	Consider developing talking points and preidentified information to share with the media and public when an ATMA vehicle is involved in an accident.	Planning				
	3.1 Insurance, Liability & Fault	Consider meeting with each DOT's insuring entity to	Training				

FEMA Core Capability	Issue/Area for Improvement	Corrective Action	Capability Element	Primary Responsible Organization	Organization POC	Start Date	Completion Date
	of ATMA Accident.	discuss specifics of what would need to happen and what an accident involving an ATMA vehicle would look like from the insurance side of things.					
	4.1 Information Sharing on ATMA Vehicle Accidents	Along with talking points, consider pulling together a list of resources and safety information regarding the ATMA vehicles and program to share with media and the public. This information would not only be beneficial after an ATMA vehicle involved accident, but also when states begin to roll out the ATMA program for the first time.	Planning				
Operational Coordination	1.3 Limited Information About ATMA Vehicles.	Continue to discuss and exercise ATMA vehicle involved accidents to try and cover all possible scenarios across the board so there are policies and					

FEMA Core Capability	Issue/Area for Improvement	Corrective Action	Capability Element	Primary Responsible Organization	Organization POC	Start Date	Completion Date
		procedures in place if and when this happens in real life.					
	1.4 Documenting ATMA Vehicle Collisions.	Discuss what information needs to be documented at an accident scene and create a checklist for DOT employees responsible for responding to an accident scene involving an ATMA vehicle.	Planning				
		Ensure DOT staff responsible for responding to and documenting an accident involving an ATMA vehicle are trained on any new or updated procedures.	Training				
	2.2 Lack of Defined Incident Command Structure.	Ensure that DOT staff responsible for responding to an accident involving and ATMA vehicle are trained on the basics of the Incident Command Structure (ICS). While there will not always be an ICS set	Training				

FEMA Core Capability	Issue/Area for Improvement	Corrective Action	Capability Element	Primary Responsible Organization	Organization POC	Start Date	Completion Date
		up at the scene of an accident it is still a best practice to be aware of the structure.					
	3.2 Policies on Information Gathering for ATMA Accidents.	Discuss and determine what your state DOTs procedures are for extracting data from the ATMA vehicle after an accident.	Planning				
		Ensure that all DOT staff potentially responsible for data collection and extraction are trained on the procedures.	Training				
	3.3 Impounding Virtual ATMA Vehicle Information.	Discuss with law enforcement or other investigating bodies in your state what the impound process is for virtual information and how their process for incident investigation and information review fits into the DOT response and investigation process.	Planning				

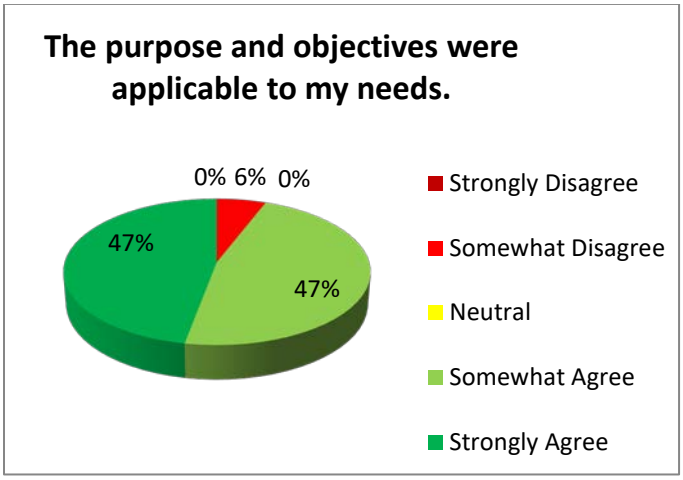
FEMA Core Capability	Issue/Area for Improvement	Corrective Action	Capability Element	Primary Responsible Organization	Organization POC	Start Date	Completion Date
	4.2 Use of Lead Vehicle.	Determine if there is a set of criteria or threshold for taking a lead vehicle out of service when an ATMA vehicle is involved in an accident.	Planning				
	4.3 Red Flag Policies on ATMA Vehicles.	Determine what the process and policies are surrounding removing *all* ATMA vehicles from use while there is an ongoing investigation involving an ATMA vehicle involved accident.	Planning				

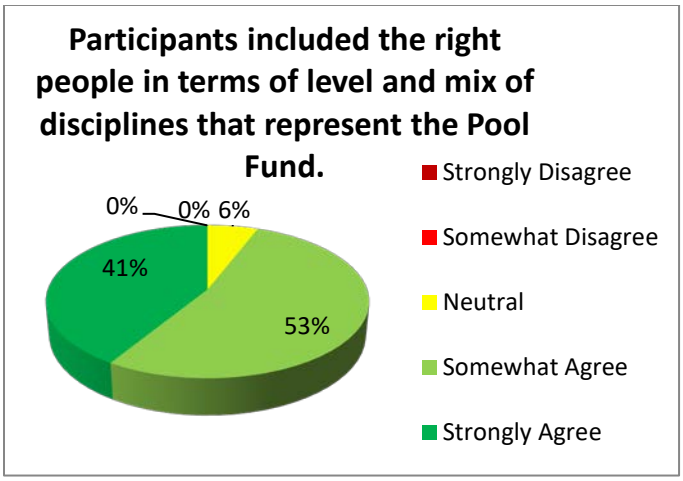
APPENDIX B: EXERCISE PARTICIPANTS

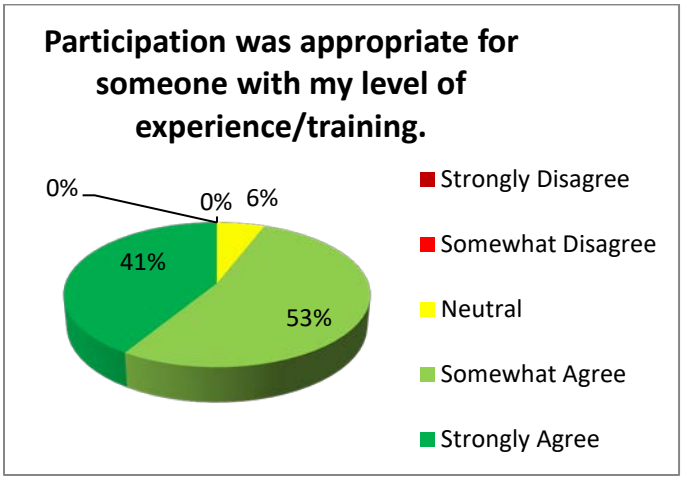
Participating Organizations
Alabama Department of Transportation
California Department of Transportation
Colorado State Patrol
Colorado State University
Colorado Department of Transportation
Florida Department of Transportation
Kansas Department of Transportation
Kratos Defense
Michigan Department of Transportation
Minnesota Department of Transportation
Missouri University of Science and Technology
North Dakota Department of Transportation
Ohio Department of Transportation
Oklahoma Department of Transportation
Pennsylvania Department of Transportation
Virginia Department of Transportation
Washington State Department of Transportation
Weston Forensic Collision Investigations

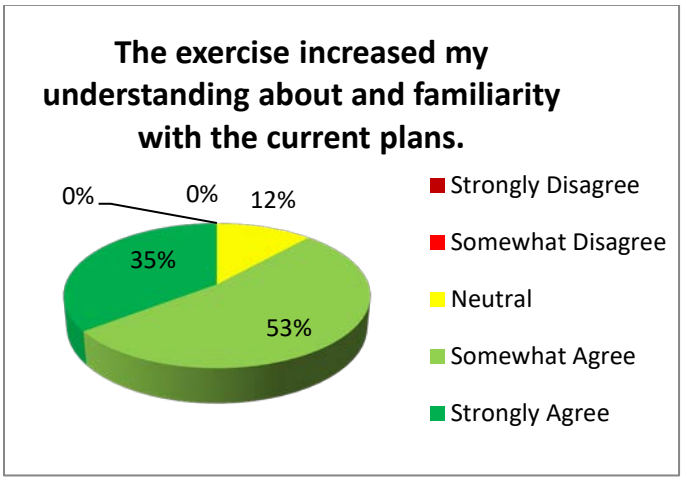
Appendix C: PARTICIPANT FEEDBACK

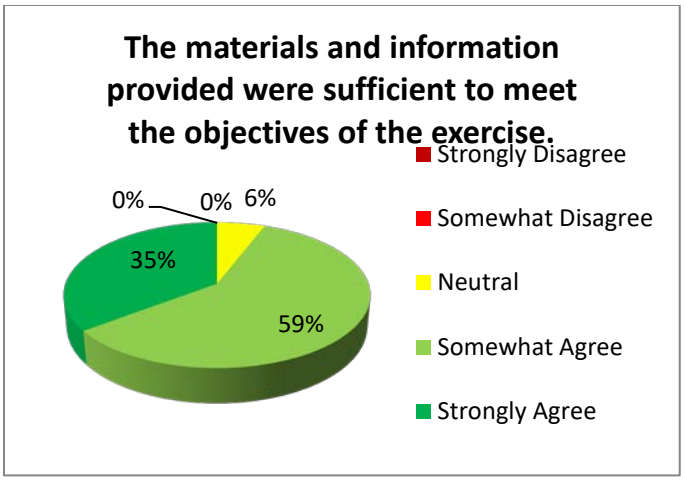
Rating of Satisfaction					
	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
Participant Feedback	1	2	3	4	5
The purpose and objectives were applicable to my needs.	0	1	0	8	8
Participants included the right people in terms of level and mix of disciplines that represent the Pool Fund.	0	0	1	9	7
Participation was appropriate for someone with my level of experience/training.	0	0	1	9	7
The exercise increased my understanding about and familiarity with the current plans.	0	0	2	9	6
The materials and information provided were sufficient to meet the objectives of the exercise.	0	0	1	10	6




Participants included the right people in terms of level and mix of disciplines that represent the Pool Fund.
0%
0%
6%
41%
53%
Strongly Disagree
Somewhat Disagree
Neutral
Somewhat Agree
Strongly Agree


Participation was appropriate for someone with my level of experience/training.
0%
0%
6%
41%
53%
Strongly Disagree
Somewhat Disagree
Neutral
Somewhat Agree
Strongly Agree


The exercise increased my understanding about and familiarity with the current plans.
0%
0%
12%
35%
53%
Strongly Disagree
Somewhat Disagree
Neutral
Somewhat Agree
Strongly Agree



Additional Comments

- The scenario of the incident was not appropriate for my involvement. As a Risk Manager, I am concerned about any potential claim against the State or the DOT. It would have been a better scenario for me if the ATMA would have caused damage to third party property, because then the issue of insurance and liability would have been discussed that is more of my focus on the deployment of the ATMA.
- This was a good exercise, but someone dominated the discussions which may have led us away from the intention of the exercise.
- Extremely useful and engaging exercise! I look forward to the review/plan document and learning more about the data-recording capabilities of these ATMA vehicles.
- I have never dealt with incident response within our organization so had very little to add, however, it was good to hear for an understanding of how the agency functions.
- These tabletop exercises brought to the surface some considerations that our state will need to discuss as we advance to the deployment of our ATMA.
- Great session! For the first of its kind, we had great discussion and sharing of ideas.
- It's good getting others input in an exercise like this.
- I think this exercise was very informative and a great refresher as well as to how to handle that situation.
- The exercise provided some good discussion and highlighted some areas for clarification within our organization when we begin testing equipment.
- I thought there was good discussion and I liked having LE and the manufacture/vendor on to dig deeper into topics that are outside my role.

- The exercise was very applicable to all of us involved in this realm. At least, it gave me much to think about.

Are there additional trainings and/or exercises that you feel are necessary to improve your organization's emergency response?

- Yes, but it would be difficult to arrange as I think it would be State specific depending on how the governmental immunity attaches. I would not encourage any of our personnel to take any investigation role as I do not believe it is in our authority at this time. Our emergency response is limited to traffic control as far as I understand.
- No, I think we have it pretty well situated here.
- I think our agency has a good emergency response system. I think Autonomous vehicles are so new that our agency hasn't given it much thought.
- Data transfer/storage/sharing details
- Maybe just an understanding of what everyone's role will be if there is just an accident, an accident with a fatality. More of a protocol on who needs to be made aware of the situation other than the usual.
- While I'm sure that there will be, nothing comes to mind at the moment.
- We'll work automated maintenance vehicles into our Traffic Incident Management program as these devices are adopted.
- Possibly doing this on an annual basis if nothing else as a refresher
- Actual playout of how response and escalation of information would occur.
- Adding a less severe incident might be helpful. We might want to look at history of TMA crashes and see what the norm is.
- I think follow up exercises may be a good idea. Perhaps, the exercise should focus on policy and procedure.

What do you see as the next steps to address the opportunities for improvements identified during the exercise?

- Insurance and liability. Recent case law regarding autonomous vehicles and where the liability resides.
- Create a Standard Operating Procedure/flow chart to identify steps to take and people to notify when an incident occurs.
- Education, policy enhancements.

- I'd like to see a typical emergency response to the ATMA. The who does what stuff through a potential court hearing/trial. Until we get to litigation we won't know if our first steps were complete enough.
- Communications policy discussion - talking points, identification of stakeholders, etc.
- Meet with my department and put a plan and protocol in place for such events.
- More robust involvement from first responders and area commands when policy is developed for the use of ATMAs in PA.
- The next step is to develop a universal automated maintenance vehicle incident checklist.
- Read and discuss the report.
- Internal Colorado focused simulation of what response would look like from the programmatic standpoint.
- I would like to connect the technology vendor and our LE crash investigators to build a working relationship.
- Follow up conversation with the different agencies.

Please provide any recommendations on how this exercise or future exercises could be improved or enhanced.

- Make the autonomous vehicle and/or the software at fault of an accident and discuss what the understanding is who would be responsible for reporting the damage and what insurance would apply.
- I think Maintenance and Operations should be involved more and separate out academia for a different conversation.
- Perhaps sending out targeted survey questions in advance to each member state. Questions grouped by agency - maintenance, CAV, patrol, EMS, etc.... and asking each state to respond in advance. In my case, I would have reached out to each agency, they would have had to think about dealing with an autonomous vehicle crash and may have decided to attend. Either way it would raise their awareness.
- If we are going to reference SOPs that may not change or only change slightly, it would be nice to see them ahead of time. Not all participants might read them, but it might cut down on questions about current practice.
- Nothing comes to mind at the moment
- Great job, the breakout rooms worked well to encourage participation. Time length was just right.
- I do thing the zoom part does loose some effectiveness. So a person to person would definitely be better when that time comes

- I think for this exercise a video of operations and some background pictures in the beginning would help explain the operations and possible scenarios. I am on the fence with needing more time, but I was able to engage for 2.5 hours no problem.
- Very well coordinated and managed by the professional group.