AASHTO Innovation Initiative

[Proposed] Nomination of Innovation Ready for Implementation

# Sponsor

## Nominations must be submitted by an AASHTO member DOT willing to help promote the innovation

1. Sponsoring DOT (State): Utah Department of Transportation

2. Name and Title: John Leonard, Operations Engineer

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3. Is the sponsoring State DOT willing to promote this innovation to other states by participating on a Lead States Team supported by the AASHTO Innovation Initiative?  Yes  No

# Innovation Description (10 points)

## The term “innovation” may include processes, products, techniques, procedures, and practices.

4. Name of the innovation:

Deployment of ‘Stinger’ tow system on Incident Management Team vehicles

5. Please describe the innovation. Describe how this innovation transforms your existing “state of play.”

Incidents on the highway system cause additional congestion, delay, secondary crashes, and air quality issue due to their impacts. Decreasing the duration of an incident by clearing and opening travel lanes to the motoring public reduces these effects, and contributes to mobility and the economy. The Stinger tow system is a wheel lift system that is installed on an Incident Management Team truck. It will raise the drive tires of the disabled vehicle off the ground, and then the IMT truck will move the vehicle from the travel lane and reposition it to a safe place where a traditional wrecker can complete the removal process later. This process decreases the amount of time that an incident will affect the transportation system.

6. If appropriate, please attach photographs, diagrams, or other images illustrating the appearance or functionality of the innovation (if electronic, please provide a separate file). Please list your attachments here. Attach photographs, diagrams, or other images here.







Images of an IMT Truck loading and transporting a vehicle are attached in a separate file.

7. Briefly describe the history of its development.

In 2014, the Department became aware of a device (the Stinger) that was used in the vehicle repossession industry. It was a hydraulically operated device that could be positioned under a disabled vehicle, lift and secure the vehicle by the tires, and then relocate the vehicle without any damage. This Stinger is attached under the Incident Management Team (IMT) truck, and is operated by remote controls from either side of the IMT truck. IMT personnel do not have to get under the vehicle, or are they exposed to additional traffic. Stingers were placed on several IMT vehicles beginning in January 2014. Training specific to towing practices was provided to the operators of these test vehicles. The tests were very successful. The Stingers provided a way to remove disabled vehicles from travel lanes much earlier in the crash timeline, returning blocked lanes back to the motoring public. The disabled vehicle is then placed in a safer location, including shoulder areas, ramp terminals, or a spot just off the highway. This allows a responding private tow company to pick up the disabled vehicle in a less exposed location, and to not impact the traffic flow as much while performing the recovery. (Note: Oftentimes, the responding tow company is caught in the backing that is created by the incident. The use of the Stinger clears the disabled vehicle out of the travel lane(s), dissipate the queue, and allow the tow truck to reach the scene. The Stinger does not replace the private tow company. They are still required to complete the vehicle removal). The tests were so successful, that Utah Highway Patrol troopers were specifically requesting IMT trucks with the Stingers to respond to crashes to help in clearing them faster. Based upon this success, when new and replacement vehicles were ordered, the Stinger became a standard piece of equipment. The Department will have Stingers on all 25 IMT trucks in October of 2019.

# State of Development (40 points)

## Innovations must be successfully deployed in at least one State DOT. The AII selection process will favor innovations that have advanced beyond the research stage, at least to the pilot deployment stage, and preferably into routine use.

8. How ready is this innovation for implementation in an operational environment? Please check of the following options. Please describe.

Prototype is fully functional and yet to be piloted

Prototype demonstrated successfully in a pilot environment

Technology has been deployed multiple times in an operational environment

Technology is ready for full-scale adoption

The Stinger has been adopted for 100% of the IMT fleet. It is fully operational and part of the daily performance of the Team.

9. What additional development is necessary to enable routine deployment of the innovation? What resources—such as technical specifications, training materials, and user guides—are already available to assist with the deployment effort?

The Stinger is routinely deployed on a daily basis. The Department has developed policy and processes for the use of the Stinger tow systems.

10. Has any other organization used this innovation?  Yes  No

If so, please list organization names and contacts. Please identify the source of this information.

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| **Organization** | **Name** | **Phone** | **Email** |
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# Potential Payoff (30 points)

## Payoff is defined as the combination of broad applicability and significant benefit or advantage over other current practice (baseline).

11. How does the innovation meet customer or stakeholder needs in your State DOT or other organizations that have used it?

The Stinger has decreased the duration of lane blocking during incidents. Every minute that a freeway travel lane is blocked during a peak travel period produces four minutes of travel delay after the incident is cleared. A 15-minute blockage effects traffic for over an hour. According to the FHWA, for every minute that an incident is active, there is a 2.8% increase in the likelihood that a secondary crash may occur. Secondary crashes ate 20% of all crashes, and they have the potential to be more sever, and to increase the overall duration of the original incidents impact on the system. FHWA also indicates that "Struck-bys" are the 2nd leading cause of accidental law enforcement officer death and account for 20% of on-duty firefighter deaths per year. Reducing duration and exposure of these first responders provides them with a safer environment in which to do focus on the incident. Vehicle emissions are correlated closely with vehicle delay. Reduction in vehicle delay and idling in a traffic queue is a benefit to air quality. The deployment of the Stinger tow system throughout the entire IMT fleet is reducing the impacts to the transportation system. It is reducing congestion, improving safety for first responders, improving air quality, reducing the opportunity for secondary crashes, and improving the economy by reducing the impacts of the additional delay created by the incident.

12. What type and scale of benefits have your DOT realized from using this innovation? Include cost savings, safety improvements, transportation efficiency or effectiveness, environmental benefits, or any other advantages over other existing baseline practice. Please identify the following benefit types:

|  |  |  |
| --- | --- | --- |
| **Check boxes that apply** | **Benefit Types** | **Select a rating from the drop-down menu** |
|  | Cost Savings | 5-High |
|  | Shortened Project/Service Delivery Schedule | Choose an item. |
|  | Improved Customer Service | 7-Exceptional |
|  | Improved Quality | 4-Moderate to High |
|  | Environmental Benefits | 5-High |
|  | Organizational Efficiency | 5-High |
|  | Improved Safety | 5-High |
|  | Improved Operation Performance | 5-High |
|  | Improved Asset Performance | 4-Moderate to High |
|  | Other (please describe) | Choose an item. |

Provide an additional description, if necessary:

The deployment of the Stinger tow system has been very well received by law enforcement, with specific requests to have the IMT vehicles equipped with the system to be the ones dispatched to their incident. The local tow companies, while initially suspect of the use of the technology, now are comfortable with the deployment. They do not lose the call, but now are completed the pick-up in a location that does not place their operator at much risk as securing a disabled vehicle in a live traffic environment.

13. Please describe the potential extent of implementation in terms of geography, organization type (including other branches of government and private industry) and size, or other relevant factors. How broadly might the technology be deployed?

This technology is currently deployed in the urban/suburban areas of Utah. The locations include interstates with AADT in excess of 260,000. It will be deployed to the more rural areas of the state as the IMT program is expanded to cover those areas. We are working with other local agencies to provide information and guidance on how to implement this technology. The use of this technology is expanding each year. In 2014, there were 293 Stinger tows. In 2018, there were 1902 tows. Through July 2019, there have been 1241 tows, which is on track for about 2100 tows this year.

# Market Readiness (20 points)

## The AII selection process will favor innovations that can be adopted with a reasonable amount of effort and cost, commensurate with the payoff potential.

14. What specific actions would another organization need to take along each of the following dimensions to adopt this innovation?

|  |  |  |
| --- | --- | --- |
| **Check boxes that apply** | **Dimensions** | **Please describe:** |
|  | Gaining executive leadership support | This has not historically been a service provided by a transportation agency. Having leadership support helps to form the partnerships with other agencies and partners to implement the technology. |
|  | Measuring performance (e.g. benefits documentation) | Dashboards to measure the results and improvements to the impacts of incidents on the highway system. |
|  | Improving technology understanding | This is a new technology for a transportation department, but is not for the towing industry. |
|  | Overcoming financial constraints | Financial constraints are minor when there is an existing program to add this technology to. |
|  | Addressing legal issues (if applicable) (e.g., liability and intellectual property) | Have Policies or legislation in place to allow for quick clearance when a vehicle is blocking a travel lane. |
|  | Acquiring in-house expertise | Training is required for towing techniques and practices. |
|  | Resolving conflicts with existing regulations and standards | Quick clearance policy for incidents |
|  | Other Challenges | Working with private partners to let them know that this is not in competition with their services, but providing them a safer environment in which to complete their work. |

15. What is the estimated cost, effort, and length of time required to deploy the innovation in another organization?

Please describe:

**Cost**: The approximate cost to install a Stinger tow system on an existing vehicle is approximately $16,000. For UDOT, this includes the Stinger, installation of the system, and modification to the fuel tank under the vehicle where the Stinger is mounted. If an existing vehicle is proposed to have a system installed, the rating of that vehicle must be reviewed to ensure that the operation will not exceed the maximum capacity of the vehicle. If the system can be installed on existing vehicles, the cost to the agency is on the installation costs. Where existing vehicles are not capable of having the system installed, when replacement are ordered, they can be ordered to accommodate the system. This allows integration over time without an initial large expense to modify a fleet.

**Level of Effort**: The level of effort to have the installation of the system and implementation of training is not a long process—it can be done in a matter of weeks and is not a substantial cost or time consuming.

**Time**: If the organization needs to change Policy or procedures, this may take more time to implement. Additionally, partnerships heed to be developed with law enforcement agencies to support the concept of TIM practices for incident clearance, and with private partners for the concept of a transportation agencies doing physical towing of disabled vehicles for a short distance.

16. To what extent should the implementation of this innovation require the involvement of third parties, including vendors, contractors, and consultants? If so, please describe. List the type of expertise required for implementation.

A vendor is required for the Stinger and related parts. Installation can be by an equipment maintenance shop (vendor) or the agency’s forces, whichever is better for them. Training for use and in tow practices can be done in-house. Contractors or consultants are not required.