

# **U.S. DOT Intersection Safety Challenge: System Assessment and Virtual Testing Prize Competition**

## **PRA Supporting Statement**

### Introduction:

This new information collection clearance request is titled “U.S. DOT Intersection Safety Challenge: System Assessment and Virtual Testing Challenge Prize Competition.”

The System Assessment and Virtual Testing (SAVT) Challenge (the subject of this document) is an element of the overall Intersection Safety Challenge, focused on the utilization of Government-provided sensor data and supporting meta-data to characterize intersection situational awareness and predict conflicts among vehicles and vulnerable road users. SAVT Challenge participants are drawn from the Intelligent Transportation Systems (ITS) community, academia, and the public sector.

### Part A. Justification.

#### 1. Circumstances that make collection of information necessary:

Improving the safety of pedestrians, bicyclists, and other vulnerable road users is of critical importance to achieving the objectives of the U.S. Department of Transportation (U.S. DOT) National Roadway Safety Strategy (NRSS) and U.S. DOT's vision of zero fatalities and serious injuries across our transportation system. According to data from the National Highway Traffic Safety Administration (NHTSA), in 2020 there were 10,626 traffic fatalities in the United States at roadway intersections, including 1,674 pedestrian and 355 bicyclist fatalities. These fatalities at intersections represent 27% of the total of 38,824 road traffic deaths recorded in 2020.

The U.S. DOT Intersection Safety Challenge (hereafter, “the Challenge”) supports the U.S. DOT's strategic goals related to safety, mobility, and economic growth. Safety and mobility are being supported by incentivizing innovation that can anticipate and prevent (or mitigate) unsafe conditions in intersections wherein vehicles, pedestrians, and other vulnerable road users utilize shared space. The anticipated outcomes of the challenge are to provide safer and efficiently managed intersections. Safer intersections will improve the confidence of the vulnerable road users who traverse them, helping underserved communities in both improving individual safety and encouraging utilization of non-motorized modes of travel that expand mobility options. Improved confidence in safe travel and enhanced mobility supports other related goals of economic growth and equity.

#### 2. How, by whom, and for what purpose is the information used:

The Challenge aims to transform intersection safety through the innovative application of machine vision, sensor fusion, and real-time decision-making to identify and mitigate unsafe conditions involving vehicles and vulnerable road users. The Challenge aims to encourage broad innovation in real-time roadway intersection safety with anticipatory warning systems and other safety-countermeasures for both drivers and vulnerable road users. Additionally, to set the stage for nationwide deployment, cost-effective solutions leveraging typical roadside control systems are sought to expedite the deployment at scale to the highest risk intersections throughout the nation without degrading the intrinsic safety of the existing intersections.

The SAVT Challenge consists of two tracks. The Primary SAVT Challenge will engage up to 10 teams that will receive prizes under a preceding Concept Development Challenge prize competition. Note that OMB advised previously that the preceding Concept Development Challenge was not subject to PRA and is not part of this package.

The 10 teams, selected for innovation and other criteria, are anticipated to be announced in January-February 2024, prior to the launch of this SAVT Challenge. These teams are eligible to participate in all aspects of the SAVT Challenge, intended to test elements of their proposed solution and the potential impact on intersection safety.

Required materials submitted for the Primary SAVT Challenge include:

- Contact Information Form. Collects contact information via form, including submitter's name, contact e-mail, organization, organization location (State).
- Data File Upload. Derived from an analysis of Government-provided data from an experiment in a closed course environment, submitters will upload a structured data file with the position, classification, and motion path of vulnerable road users and vehicles present in the challenge test cases. For example, the data file may be structured to identify a detected vulnerable road user at a specific time entering the intersection area, with a specific timestamp and x-y coordinate. The detected vulnerable road user position and direction of travel will be indicated by an updated row to the file each second until the road user exits the intersection. Further, the file will include meta-data around the classification of the vulnerable road user (e.g., pedestrian pushing a stroller), and a prediction of future path (time stamp and x-y coordinate) if the vulnerable road user does not exit the intersection within the timeframe of the Government-provided data.
- Code File Upload. Submitters upload relevant software code related to the methods used to create the data file (above) derived from the Government-provided experimental data. The code is used to validate the technical approach used by the submitter.
- Supporting Document Upload. Submitters must include an explanatory Word file providing other supporting technical materials related to the application of their technical approach.

The second track is the Open SAVT Challenge, which will be open to the general public, with particular interest in student participation. In the Open SAVT Challenge, individuals or teams compete on specific research questions that are a subset or supplementary to the Primary SAVT Challenge. Open SAVT Challenge participation requires significantly reduced effort but may utilize the same format as the Primary SAVT Challenge: contact information form, data file upload, code file upload, and meta-data/supporting document upload. The only difference is that in the Open SAVT Challenge the meta-data/supporting document upload is optional.

### 3. Extent of automated information collection:

No paper forms will be utilized. SAVT Challenge participants submit software code and associated documentation to designated online repositories.

### 4. Efforts to identify duplication:

U.S. DOT published a related request for information in the *Federal Register* ([Enhancing the Safety of Vulnerable Road Users](#), 87 FR 57019) to validate the salience and urgency of intersection safety as well as the potential promise of the general technological approach (sensor fusion together with artificial intelligence/machine learning to anticipate and prevent or mitigate

unsafe conditions) to address the issue. Responses confirmed that no current capability exists, and that no information related to the cost-effectiveness of this proposed approach is currently available.

5. Efforts to minimize the burden on small businesses:

Participation in the SAVT Challenge is voluntary. Small businesses may be an element of the up to 10 teams eligible for the Primary SAVT Challenge. Small business may also choose to participate in the Open SAVT Challenge.

6. Impact of less frequent collection of information:

This request is for a one-time information collection. Primary SAVT Challenge teams must submit one complete response over the course of the SAVT Challenge to be eligible for a prize. Primary SAVT Challenge teams may also submit up to two revised submissions. Open SAVT Challenge participants must submit one complete response during the SAVT Challenge to be eligible for a prize.

7. Special circumstances:

Participants in the Primary SAVT Challenge may submit proprietary trade, secret, or other confidential information as a part of the code submitted for validation.

8. Compliance with [5 CFR 1320.8](#):

The prize competition will adhere to the OMB approval process. The initial, 60-day Federal Register notice published on May 17, 2023 (88 FR 31589). One comment was received before the deadline. The agency did not respond to the commenter because no contact information was provided. No changes to the planned information collection have been made by DOT. The second, 30-day Federal Register notice was published on August 11, 2023 (88 FR 54708).

9. Payments or gifts to respondents:

The only payment made to respondents is remuneration in the form of prizes to successful prize competition winners. The total prize pool is \$5 million: \$4 million total for the Primary SAVT Challenge and \$1 million total for the Open SAVT Challenge.

10. Assurance of confidentiality:

Participants in the Primary SAVT Challenge may submit proprietary trade, secret, or other confidential information as a part of the code submitted for validation.

11. Justification for collection of sensitive information:

N/A. The information collection will not request sensitive or private information.

12. Estimate of burden hours for information requested:

Collection Instrument	Track(s)	# of Respondents	Burden Hours per Respondent	Total Burden	
				Hours	Total Cost**
Contact Information Form	Primary + Open	110	0.25	27.50	\$ 1,164
	Primary	10	800.00	8,000.00	\$ 338,640
Data File Upload	Open	100	40.00	4,000.00	\$ 169,320
	Primary	10	1000.00	10,000.00	\$ 423,300
Code File Upload	Open	100	30.00	3,000.00	\$ 126,990
	Primary	10	199.75	1,997.50	\$ 84,554
Supporting Document Upload	Open	100	29.75	2,975.00	\$ 125,932
	<b>TOTAL</b>	<b>440.00</b>	<b>2,099.75</b>	<b>30,000.00</b>	<b>\$ 1,269,900</b>

\*\*Cost estimates assume a mean hourly wage of \$42.33 (from the [Bureau of Labor Statistics' median hourly rates for civil engineers](#)).

13. Estimate of total annual costs to respondents:

U.S. DOT does not expect any additional costs to respondents beyond burden hours described above.

14. Estimate of cost to the Federal government:

The estimated cost to the Federal government for this information collection is \$591,055. This is calculated based on the following:

- 14 federal employees assigned to evaluate submissions, who range from GS-12 to GS-15, with an average federal staff hourly wage of \$74.44\*\*. It is estimated to take 20 hours to evaluate a Primary SAVT Challenge submission and 1.5 hours to evaluate an Open SAVT Challenge submission. The total cost for federal staff evaluation of the Primary SAVT Challenge is \$178,660 and Open SAVT Challenge is \$147,395. Total federal evaluation costs combining both Primary and Open SAVT Challenges is \$326,055.
- \$265,000 for contractor technical support is also estimated for the creation of challenge-related materials, the management of submissions, and the development/application of automated scoring algorithms and routines (used in both Primary and Open SAVT Challenges).
- Together, federal staff and contractor technical support for both Primary and Open SAVT Challenges is \$591,055.

\*\*Federal staff hourly wages average based a mix of GS-12 through GS-15 staff applied to the [2023 federal pay scale](#) for the Washington DC metropolitan area, see below:

GS Grade	Rate	No. of Staff	PRIMARY CHALLENGE				OPEN CHALLENGE				Overall Fed. Review Cost
			No. of Sub.	Hrs. per Sub.	Tot Hrs.	Tot Cost	No. of Sub.	Hrs. per Sub.	Tot Hrs.	Tot Cost	
GS-12	\$ 54.16	2	10	20	400	\$ 21,664	110	1.5	330	\$ 17,873	\$ 39,537
GS-13	\$ 64.41	2	10	20	400	\$ 25,764	110	1.5	330	\$ 21,255	\$ 47,019
GS-14	\$ 76.11	4	10	20	800	\$ 60,888	110	1.5	660	\$ 50,233	\$ 111,121
GS-15	\$ 87.93	4	10	20	800	\$ 70,344	110	1.5	660	\$ 58,034	\$ 128,378
AVG:	\$ 74.44			TOT:	2400	\$ 178,660		TOT:	1980	\$ 147,395	\$ 326,055

15. Explanation of program changes or adjustments:

N/A. This is a new information collection request.

16. Publication of results of data collection:

Prize winners for the Primary SAVT Challenge and the Open SAVT Challenge will be announced publicly. A short abstract describing winning concepts only for the Primary SAVT Challenge will also be published. The public announcement of prize winners is expected approximately 13 months after the SAVT Challenge is announced, currently tentatively scheduled for early 2024.

17. Approval for not displaying the expiration date of OMB approval:

N/A. U.S. DOT does not have any objection to publishing the expiration date of the OMB approval.

18. Exceptions to certification statement:

N/A. None.

Part B. Collections of Information Employing Statistical Methods

N/A. No statistical methods will be used as a part of the information collection portion of the prize competition.