Image Source: iStock

INTERSECTION
SAFETY CHALLENGE

U.S. Department of Transportation

JUNE 2023

U.S. Department of Transportation

INTERSECTION SAFETY IS A GROWING ISSUE, ESPECIALLY FOR VULNERABLE ROAD USERS

Dangerous Intersections

Each year, roughly one-quarter of traffic fatalities and about one-half of all traffic injuries in the United States are attributed to intersections.[1]

Rising Vulnerable Road User Deaths

Vulnerable road user fatalities are on the rise with pedestrian fatalities up 13% and pedalcyclist fatalities up 2% in 2021 compared to 2020.[2]

[1] https://highways.dot.gov/safety/intersection-safety/about

[2] https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813435

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INTERSECTION SAFETY CHALLENGE PROGRAM

- **PROBLEM:** Intersection safety is a growing issue, especially for vulnerable road users.

- **VISION: Transform intersection safety** through the innovative application of emerging technologies including machine vision, sensor fusion, and real-time decision-making to identify and mitigate unsafe conditions involving vehicles and vulnerable road users.

- **PRIZE COMPETITION:** Encourage teams of innovators and end-users to develop and test their intersection safety systems to compete for prizes.

- **ALIGNMENT WITH DOT PRIORITIES:**

  o The concept aligns with the **National Roadway Safety Strategy (NRSS)** and supplements current and existing U.S. DOT **safety** and **equity** efforts (e.g., FHWA Complete Streets, Proven Safety Countermeasures, etc.).

PROPOSED SOLUTION:
LEVERAGE EMERGING TECHNOLOGIES TO IMPROVE INTERSECTION SAFETY AT SCALE IN A NEW WAY.
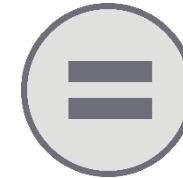
Data Fusion Utilizing Existing and Emerging Sensors

Emerging, low-cost sensors can be deployed at intersections for **improved sensing of vulnerable road users**. Data from these sensors can be fused and used in new ways by AI.

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Artificial Intelligence /Machine Learning

AI/ML can fuse data from multiple machine vision sensing modalities rapidly to **improve situational awareness** and **anticipate safety threats.**

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Low-Cost, High-Value Opportunity for Integration at Scale

These existing technologies have not been deployed together at intersections broadly, offering an opportunity ripe for **innovative collaboration.**

INTERSECTION SAFETY SYSTEM (ISS) CONCEPT

- Emerging, low-cost sensors (e.g., cameras, radar, LiDAR, infrared) deployed at intersections to improve sensing.

- Multi-sensor data fusion/analytics to improve situational awareness and anticipate safety threats.

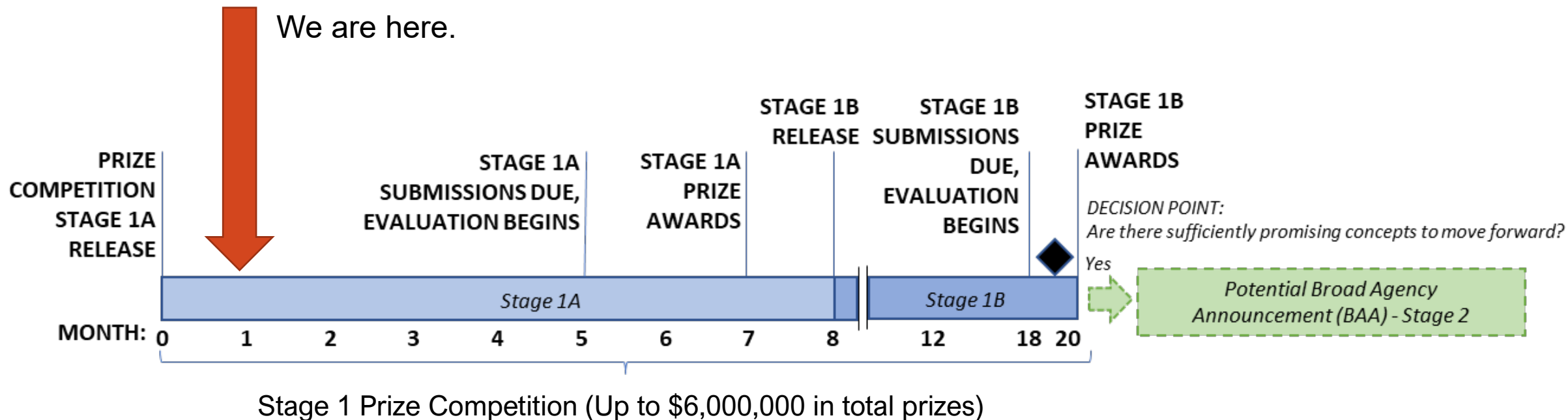- System issues warnings or modifies control settings to improve safety.

Concept Illustration: Intersection Safety System
Safety systems informed by data fused from multiple sensors may anticipate unsafe conditions, e.g., a vehicle turning right in potential conflict with pedestrian pushing a stroller (lower right).

Image Source: U.S. DOT.

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INTERSECTION SAFETY CHALLENGE:
Preliminary Structure & Schedule

We are here.

Stage 1 Prize Competition (Up to $6,000,000 in total prizes)

Note: Dates are subject to change with any changes being posted on the DOT's Challenge website accordingly.

PRIZE COMPETITION OVERVIEW

- **Stage 1A: Concept Assessment**
  - Develop an ISS Concept Paper.
  - Up to ten prizes may be awarded (up to $100,000 each).
  - The total value of all Stage 1A prizes will be a maximum of $1,000,000.
  - Winners may advance to Stage 1B.

- **Stage 1B: System Assessment and Virtual Testing**
  - Develop, train, and improve algorithms for the detection, localization, and classification of vulnerable road users and vehicles using DOT-supplied sensor data collected at a controlled test intersection.
  - The total value of all Stage 1B prizes will be a maximum of $5,000,000.
  - *Additional details to come following Stage 1A awards.*

Concept Assessment

LAUNCH
Late April 2023

CLOSE
September 2023

SELECTION AND AWARDS
November 2023

System Assessment & Virtual Testing

LAUNCH
December 2023

CLOSE
October 2024

SELECTION AND AWARDS
December 2024

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CHECK OUT THESE RESOURCES TO LEARN MORE

- **Intersection Safety Challenge (ISC) Website:** https://its.dot.gov/isc/

- **Apply for the ISC at Challenge.gov:** https://www.challenge.gov/?challenge=us-dot-intersection-safety-challenge

- **Request for Information (RFI): Enhancing the Safety of Vulnerable Road Users at Intersections:**

  - **RFI** (released September 16, 2022): Link on the Federal Register.
  - **RFI Summary Report** (February 2023): FHWA-JPO-23-986.

- **Webinars:**

  - **Enhancing the Safety of Vulnerable Road Users at Intersections** (March 17, 2023): presentation material and recording.
  - **Intersection Safety Challenge Prize Competition** (May 22, 2023): presentation material and recording.

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