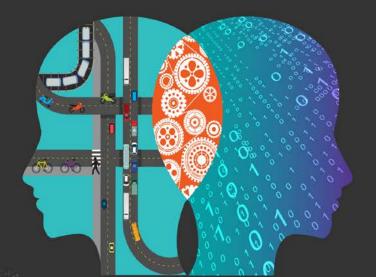
HOW DO YOU SEE SAFETY? Solving for Safety Visualization Challenge



6

Challenge Mechanics Webinar June 19, 2018 | 1 - 2:30 PM EST

Contact: solve4safety@dot.gov Details: www.transportation.gov/solve4safety Engage: #solve4safety



HOUSEKEEPING

AUDIO OPTIONS

Audio Number: 1-866-390-1828 Access Code: 6499380#

TO ASK A QUESTION

- Please use the chat pod to ask questions throughout the webinar.
- We will address questions submitted through the chat pod during the Questions & Answers section at the end of the session.

AGENDA

- Safety Data Initiative
- Challenge Overview
- What We Are Expecting
- Innovation Agents
- Judging Criteria
- The Prizes
- Timeline
- How To Enter
- Questions & Answers



Safety Data Initiative

Data-driven systemic safety approach that strategically prioritizes and addresses transportation safety risks through data-informed decision-making

SDI focuses on:

- Data Visualization
- Data Integration
- Predictive Insights

USDOT is **discovering insights** through internal SDI Projects:

- Fatality Analysis Reporting System Visualization Project
- Neighborhood Pedestrian Fatality Risk Research Project
- Rural Speed Data Project
- Waze Data Project

Read more about the Pilot Projects:

https://www.transportation.gov/policy/transportation-policy/safety/safetydatainitiative



CHALLENGE OVERVIEW Aim, Challenge, Prizes, Timeline





Why We Are Visualizing Safety

MISSION | Unlock the creativity of and empower a broad group of innovators to develop new data visualization tools that can help improve road and rail user safety, to benefit all transportation users

OBJECTIVE | USDOT seeks tools that use innovative analytical visualizations to gain insights into reducing serious crashes

THE PROBLEM | Currently, transportation decision makers have a limited number of analytical visualization tools available that reveal insights, and even fewer focused on safety and prevention of serious crashes

CALL TO VISUALIZE | Technology has already changed how most of us get around. Let's leverage it to change how we view transportation safety



Why We Are Visualizing Safety

Despite rail safety at its all-time best, there were 864 railroad fatalities in 2017, reaching a **10-year high**. Comprehensively, crashes are a societal harm that cost the Nation over **\$800 billion** dollars annually. In 2017, motor vehicle traffic crashes resulted in an estimated **37,150 fatalities**.



The Challenge

- Select an ANALYTICAL VISUALIZATION TOOL to develop:
 - Discover Insights Tool
 - Simulation Tool



Address one or more of the priority **SAFETY FOCUS AREAS**:

- Conflict Points Impacts
- High Risk Factors
- Vulnerable System Users



Design for a USER:

- Policy makers and influencers
- Providers/Operators
- Public



Prizes



Stage I: Ideation

Solvers develop ideations. Four Stage I finalists will be invited to develop their ideations into proofs of concept and compete for a cash prize.



Stage II: Concept

\$100,000

Four finalists develop ideations into proofs of concept and compete for part of a \$100,000 prize purse. Two of the finalists advance to Stage III.





Stage III: Tool

\$250,000

Two semi-finalists develop proofs of concepts into working tools and compete for a \$250,000 prize purse, with each receiving a minimum of \$50,000.



Challenge Mechanics Webinar June 19, 2018

Learn more about the Challenge

Ideation Due July 31, 2018

Challenge Opens

June 14, 2018 Solvers develop ideations

Challenge Connections Webinar

June 26, 2018 Solver-Innovation Agent relationship building and Solver team building

Ideation Prizes Awarded & Proof of Concept Competitors Announced August 2018

Four semi-finalists advance to Stage II, developing ideations into proofs of concept

Proof of Concept Due October 2018

> **Proof of Concept Prizes Awarded & Working Tool Competitors Announced** *Late October 2018*

> Four semi-finalists awarded part of a \$100,000 prize purse. Two semi-finalists advance to Stage III, developing proofs of concepts into working tools.

Working Tool Due, Prizes Awarded, & Recognition December 2018 - January 2019 Two finalists awarded part of a \$250,000 prize purse, with each receiving a minimum of \$50,000



WHAT WE ARE EXPECTING Tools, Safety Focus Areas, Users





What We Are Expecting



Select an ANALYTICAL VISUALIZATION TOOL to develop:

Discover Insights Tool

- Analyze data to reveal patterns and trends
- Use compelling visualizations to explain what is happening
- Understand the meaning behind the data and draw conclusions

Scenario Analysis Tool

- Assist in decision-making by visualizing data, allows users to visualize outputs of existing model simulations and scenarios
- Identify issues, determine correlations, and assign probabilities
- Highlight different conditions and results of sensitivity and parametric analysis to visually assist in decision-making



What We Are Expecting

SAFETY FOCUS AREAS*

Vulnerable System Users

- Pedestrians
- Cyclists
- Motorcyclists
- Persons with disabilities
- Persons with declining vision and hearing

High Risk Factors

- Impaired drivers
- Drowsy drivers
- Older drivers
- Speeding drivers

Conflict Points Impacts

- Road intersections
- Rail grade crossings



*Note: Examples given for each focus area are not exhaustive.



VULNERABLE SYSTEM USERS

Federal Motor Carrier Administration Perspective Expert: William Bannister, Chief of the Analysis Division



HIGH RISK FACTORS

National Highway Traffic Safety Administration Perspective Expert: Rajesh Subramanian, Chief Mathematical Statistician



Image: Constraint of the second straints Image: Constraint of the second straints

High-Risk Factors

Leading Causes of Death, by Age (2015)

Top 10 Leading Causes of Death in the United States in 2015, by Age Group¹

.

National Highway Traffic Safety Administration's National Center for Statistics and Analysis

R	Cause and Number of Deaths								Years			
AN	Infants	Toddlers	Young Children	Children	Youth	Young Adults	Other Adults			Elderly		of Life
ĸ	Under 1	1-3	4–7	8–15	16-20	21-24	25-34	35-44	45-64	65+	All Ages	Lost ²
1	Perinatal Period 11,613	Congenital Anomalies 389	Malignant Neoplasms 360	MV Traffic Crashes 744	MV Traffic Crashes 3,114	MV Traffic Crashes 3,415	Accidental Poisoning 11,231	Malignant Neoplasms 10,909	Malignant Neoplasms 159,176	Heart Disease 507,138	Heart Disease 633,842	Malignant Neoplasms 23% (9,426,319)
2	Congenital Anomalies 4,825	Homicide 329	MV Traffic Crashes 279	Malignant Neoplasms 694	Suicide 2,441	Accidental Poisoning 2,820	Suicide 6,947	Accidental Poisoning 10,580	Heart Disease 111,120	Malignant Neoplasms 419,389	Malignant Neoplasms 595,930	Heart Disease 19% (7,767,386)
3	Heart Disease 292	Accidental Drowning 316	Congenital Anomalies 168	Suicide 663	Homicide 2,027	Suicide 2,798	MV Traffic Crashes 6,281	Heart Disease 10,387	Chronic Liver Disease 22,152	CLRD ⁵ 131,804	CLRD ⁵ 155,041	CLRD ⁵ 5% (1,880,774)
4	Homicide 263	Malignant Neoplasms 273	Accidental Drowning 163	Homicide 307	Accidental Poisoning 1,075	Homicide 2,601	Homicide 4,863	Suicide 6,936	CLRD ^s 131,804	Stroke 120,156	Stroke 140,323	Accidental Poisoning 4% (1,832,709)
5	Septicemia 180	MV Traffic Crashes 249	Homicide 136	Congenital Anomalies 261	Malignant Neoplasms 614	Malignant Neoplasms 747	Malignant Neoplasms 3,704	MV Traffic Crashes 4,652	Diabetes 20,378	Alzheimer's 109,495	Alzheimer's 110,561	Suicide 4% (1,553,110)
6	Influenza/ Pneumonia 174	Heart Disease 132	Exposure to Smoke/Fire 70	Heart Disease 202	Heart Disease 352	Heart Disease 607	Heart Disease 3,522	Homicide 2,895	Accidental Poisoning 19,452	Diabetes 56,142	Diabetes 79,535	Stroke 4% (1,528,047)
7	Stroke 89	MV Nontraffic Crashes ⁴ 88	Heart Disease 61	Accidental Drowning 160	Accidental Drowning 261	Accidental Drowning 210	Chronic Liver Disease 844	Chronic Liver Disease 2,861	Stroke 17,423	Influenza/ Pneumonia 48,774	Influenza/ Pneumonia 57,062	MV Traffic Crashes 3% (1,349,898)
8	Nephritis/ Nephrosis 85	Influenza/ Pneumonia 76	CLRD⁵ 55	CLRD ⁵ 135	Congenital Anomalies 181	Congenital Anomalies 159	Diabetes 798	Diabetes 1,986	Suicide 16,490	Nephritis/ Nephrosis 41,258	Nephritis/ Nephrosis 49,959	Diabetes 3% (1,237,459)
9	MV Traffic Crashes 57	Exposure to Smoke/Fire 73	MV Other/ Nontraffic Crashes ⁴ 43	MV Other/ Nontraffic Crashes ⁴ 91	MV Other/ Nontraffic Crashes ⁴ 101	MV Other/ Nontraffic Crashes ⁴ 129	Stroke 567	Stroke 1,788	MV Traffic Crashes 10,043	Septicemia 30,817	Accidental Poisoning 47,478	Chronic Liver Disease 2% (940,717)
10	Malignant Neoplasms 53	Perinatal Period ⁶ 45	Influenza/ Pneumonia 41	Exposure to Smoke/Fire 69	Accidental Falls 83	Accidental Falls 128	HIV 529	HIV 1,055	Septicemia 8,316	Accidental Falls 28,486	Suicide 44,193	Perinatal Period 2% (922,063)
ALL ³	23,455	3,376	2,096	4,995	12,461	16,942	51,517	73,088	532,279	1,992,283	2,712,630	All Causes 100% (41,462,779)

¹Overall, motor vehicle crashes are the 13th leading cause of death. When ranked by specific ages they are the leading cause of death for ages 10 and 16 to 23.

*Number of years calculated based on remaining. If expectancy (2012 data from CDC) at time of death; percentages calculated as a proportion of total years of life lost due to all causes of death.

³Not a total of top 10 causes of death.

⁴Includes MV traffic deaths not in FARS (e.g., deaths that occurred more than 30 days after a MV traffic crash). A motor vehicle non-traffic crash is any vehicle crash that occurs entirely in any place other than a public traffic way.

^eTied with septicemia.

Data Source: National Center for Health Statistics, Mortality Data 2015, FARS 2015 Annual Report File

FARS Data

Fatality Analysis Reporting System

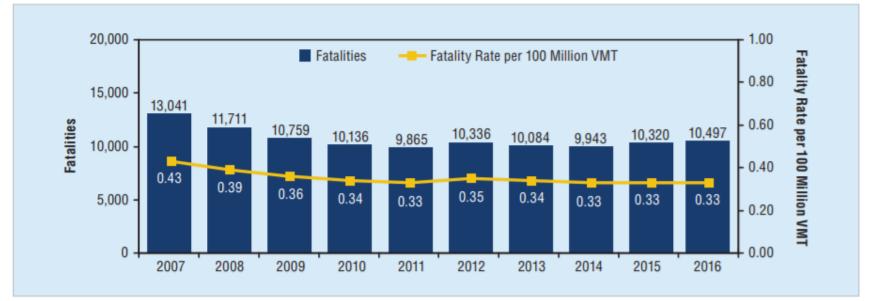
- Census of all Police-reported traffic crashes in the U.S. that resulted in fatality
- Available from 1975 to 2016

Hundreds of data elements coded from multiple data sources



Alcohol-Impaired Driving Fatalities

Fatalities and Fatality Rate per 100 Million VMT in Alcohol-Impaired-Driving Crashes, 2007–2016



Sources: Fatalities – FARS 2007–2015 Final File, 2016 ARF; 2007–2015 VMT – Federal Highway Administration's (FHWA) Annual Highway Statistics; 2016 VMT – FHWA's Traffic Volume Trends (June 2017)

מטאיני איז איז איז איז איז איז איז איז איז אי							
Role	Number	Percent of Total Fatalities					
Driver With BAC=.08+ g/dL	6,479	62%					
Passenger Riding With Driver With BAC=.08+ g/dL	1,550	15%					
Subtotal	8,029	76%					
Occupants of Other Vehicles	1,520	14%					
Nonoccupants (pedestrians/ pedalcyclists/other)	948	9%					
Total Alcohol-Impaired- Driving Fatalities	10,497	100%					

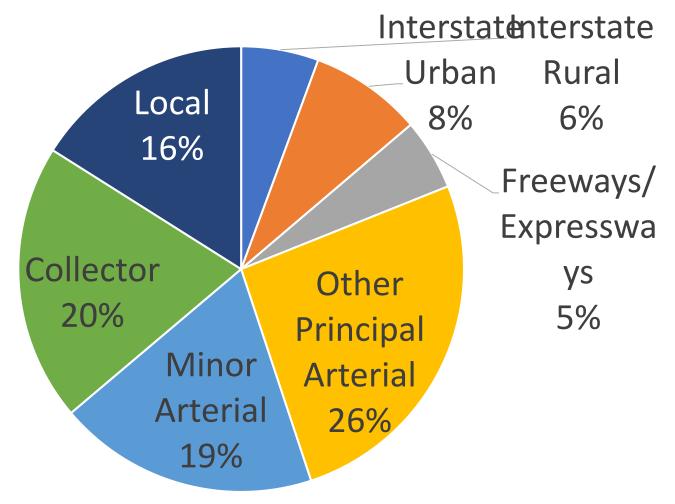
Fatalities, by Role, in Crashes Involving at Least One Driver With a BAC of .08 g/dL or Higher, 2016

Source: FARS 2016 Annual Report File (ARF).

Note: Percentages may not equal sum of components due to independent rounding.

Fatalities in Speeding-Related Crashes

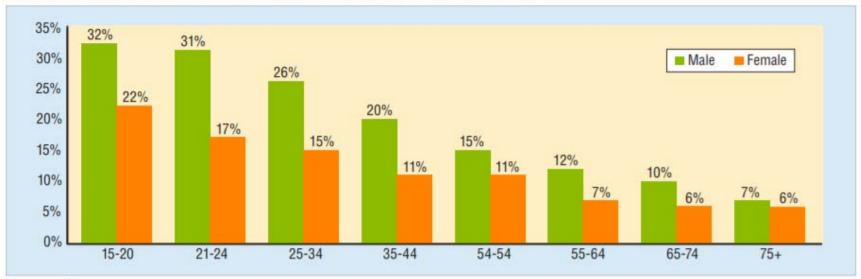
10,111 fatalities (27% of all fatalities)



Source: 2016 FARS

Speeding Drivers by Age

Percentage of Speeding Drivers in Fatal Crashes, by Age and Gender, 2016



Source: FARS 2016 ARF.

Fatalities in Crashes Involving Young Drivers, by Person Type and Year, 2007-2016

Year	Young Driver (15–20)		Passe	nger of Young	Occupants of				
		<15	15-20	21+	Unknown	Total	Other Vehicles	Nonoccupants	Total
2007	3,190	223	1,371	443	7	2,044	1,829	631	7,694
2008	2,742	170	1,067	421	4	1,662	1,527	521	6,452
2009	2,343	145	958	351	2	1,456	1,381	469	5,649
2010	1,965	130	845	356	2	1,333	1,250	493	5,041
2011	1,993	118	777	298	1	1,194	1,122	473	4,782
2012	1,880	88	682	286	4	1,060	1,230	502	4,672
2013	1,696	120	633	313	3	1,069	1,133	469	4,367
2014	1,723	75	671	268	1	1,015	1,093	454	4,285
2015	1,903	101	622	258	1	982	1,326	533	4,744
2016	1,908	94	654	266	4	1,018	1,338	589	4,853

Source: Fatalilty Analysis Reporting System (FARS) 2007–2015 Final File, 2016 Annual Report File (ARF).

High Risk Behaviors

Speeding Drivers

Alcohol/Drug-Impaired Driving

Unrestrained (Safety Belt) Driving

Distracted Driving



NHTSA Publications: https://crashstats.nhtsa.dot.gov/#/

NHTSA Data: ftp://ftp.nhtsa.dot.gov/

NHTSA Data Tools: https://cdan.nhtsa.gov/stsi.htm



CONFLICT POINT IMPACTS

Federal Highway Administration Perspective Expert: Jeffrey Shaw, Highway Engineer



What We Are Expecting



USERS

Policy Makers & Influencers –

- Incentivize/disincentivize transportation system developments
- Address needs using personnel, funding, or laws and regulations

Providers/Operators –

- Design equipment and facilities
- Evaluate safety effectiveness
- Develop operations, countermeasures and techniques

Public

- Use, rely on, and fund the transportation system
- Interest in protecting themselves and others in the community



Judging Criteria

A judging panel of cross-functional technical experts and senior level staff will select finalists and award prizes.

Stage I: Ideation

- Insights/Simulation
- Data
- Benefits
- Technology
- Cost to Implement

Stage II: Concept

- Technical Approach
- Design and Desirability
- Analytical Depth
- Technology Transfer Readiness Level
- Feasibility
- Scalability
- Team

Stage III: Tool

- Quality of Methods
- Sustainability
- Functionality and Technical Effectiveness
- Expected Return on Investment



HOW TO SUPPORT

#solve4safety, Innovation Agents





Innovation Agents

Innovation Agents are companies and organizations interested in providing real world knowledge, guidance, insight, issues, and data to Solvers, especially those new to the transportation safety space.

Technical Assistance Innovation Agents - provide interested Solvers with knowledge, guidance, insight and issues related to transportation safety

Data Innovation Agents - provide interested Solvers with access to data or analytic techniques that can be used in the analytical visualization tools

CHALLENGE CONNECTIONS WEBINAR Solver-Innovation Agent Relationship Building & Solver Team Building June 25, 2018 | 1:00 – 2:30 PM EST



HOW TO ENTER

Solvers, Application, Requirements, Judging, Deadline





Solvers

Individuals and teams with unique set of skills and creativity to step up and **REVOLUTIONIZE TRANSPORTATION SAFETY**.

The Challenge is open to Solvers in the United States or US territory, including:

- Business and Research Communities
- Technology Companies
- Analytics Firms
- Transportation Carriers

- Industry Associations
- Research Institutions
- Universities
- Mapping and Visualization Providers
- Individuals



Solvers develop ideas for an analytical visualization tool. Four Stage I semi-finalists will be invited to develop their ideations into proofs of concept and compete for a cash prize. If a finalist declines to participate in the next stage, an alternate may be selected.

Submission Requirements

- 1. Cover Page
- 2. Solution Idea Summary
- 3. Team Qualifications
- 4. Appendices



1. COVER PAGE

Contact Information

- Team name
- Participant names
- Organization(s)
- Primary point of contact

Challenge Tracks

- Tools Discover Insights Tool, Simulation Tool
- Focus Areas Vulnerable System Users, Conflict Points, High Risk Factors
- Tool End-User Policymakers, Providers/Operators, Public

Submission Title - Proposed name for idea

Submission Description - Headline for idea



2. SOLUTION IDEA SUMMARY

Detailed description of the proposed solution idea.

- Discuss functionality and capabilities
- Describe how it meets Solution Requirements and Judging Criteria

Must not exceed the character length of the on-line submission form. All written work shall be phrased in layperson English language. Geospatial, visualization, statistical and technical terminology, including program coding language, shall not be used without providing an explanation of terms.



3. TEAM QUALIFICATIONS

- Resume or bio provide details on the key individual(s) who would be responsible for developing the idea in the next stage
- Innovation Agent(s) Information indicate which Innovation Agent(s) you are/will be working with and their role in development (if applicable)

4. APPENDICES

- Video of Submission Idea provide a link to a 30 second video of idea
- Additional Assets upload or link to additional information that may help us better understand your concept :
 - Research abstracts
 - Presentations
 - Data visualizations
 - Other supporting visual information

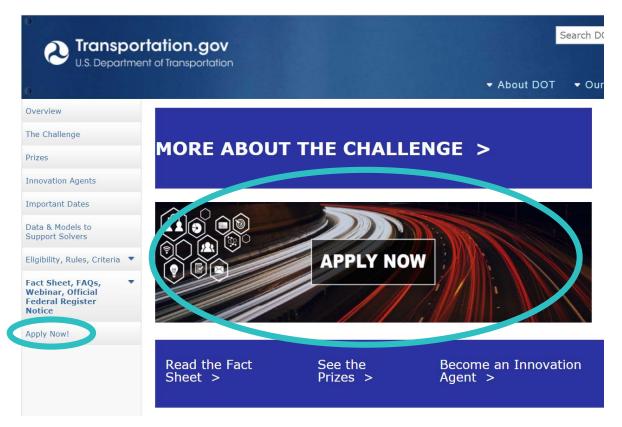


Stage I: Ideation Application

THE CHALLENGE IS OPEN!

Submit your Ideation: www.transportation.gov/solve4safety

Follow the challenge: #solve4safety





Stage I: Ideation Application

Noted States Department of Transportation

Solving for Safety Visualization Challenge



Submit Your Idea

Thank you for your interest in Solving for Safety Visualization Challenge and for stepping up to revolutionize transportation safety. All submissions should follow the instructions stated in the Solicitation which is available in both the Federal Register and on the <u>Solving for Safety</u> <u>website</u>.

Please begin the submittal process by clicking on the "Start your submission" button and completing the information on the pages that follow. Stage I submissions must be submitted by 11:59 P.M. Eastern Time on July 31, 2018.

TIP: Before you start, please have all of the information listed below readily available. The system will time-out after 20 minutes of inactivity, so please submit your information all at once to avoid having to start over.

- Written Description: The written summary of the submission idea must meet the requirements described in the Solicitation. Written summaries should be no smaller than 10-point font size with 1" margins and should not exceed 10 pages.
- Information on Qualifications of Your Team: Provide a resume or bio of the key individual(s) who would be responsible for developing the idea into a proof of concept with a detailed system design and prototype. If you plan to work with a Technical Assistance or Data Innovation Agent, include which Innovation Agent(s) you will be working with and their role in tool development.
- Video Link: Provide a link to a video about your submission idea. Videos should be no more than 30 seconds.
- Additional Assets (optional): Additional information that supports your solution idea can be uploaded in this section. This includes documents or links to additional research abstracts, presentations, data visualization, or other supporting visual information that may help USDOT better understand your concept. All documents uploaded should not exceed 50 MB total.

Start Your Submission

Please contact <u>solve4safety@dot.gov</u> if you experience any technical difficulties while submitting your proposal. Emails received after the 11:59 P.M. deadline may not be responded to until after regular business hours resume.



Stage I: Ideation Application

Proposal Submission

Written Summary of the Solution Idea (.doc, .docx or .pdf) - The written summary of the submission idea must meet the requirements described in the Solicitation. Written summaries should be no smaller than 10-point font size with 1" margins and should not exceed 10 pages.	Choose File No file chosen	Upload
Information on Qualifica tions of Your Team (.doc, .docx or .pdf) - Provide a resume or bio of the key individual(s) who would be responsible for developing the idea into a proof of concept with a detailed system design and prototype. If you plan to work with a Technical Assistance or Data Innovation Agent, include which Innovation Agent(s) you will be working with and their role in tool development.	Choose File No file chosen	Upload
Video URL - Provide a link to a video about your submission idea. Videos should be no more than 30 seconds.		

Additional Assets - Additional information that supports your solution idea can be uploaded in this section. This includes documents or links to additional research abstracts, presentations, data visualization, or other supporting visual information that may help USDOT better understand your concept. All documents uploaded should not exceed 50 MB total.

Links No links entered. Add a link:	Add	Upload files Files allowed to upload are: .doc, .docx, .ppt, .pptx, .jpeg, .jpg, .pdf, .zip (max 50 MB)				
		Upload File Choose File	No file chosen	Upload		
	SUBMIT Y	OUR TOEA]			



JUDGING

- 1. Insights/Simulation
- 2. Data
- 3. Benefits
- 4. Technology
- 5. Cost to Implement



1a. Insights

- Provides an innovative plan and project narrative that describes how the proposed tool will reveal insights to a solution
- Details the tool's unique differentiating factor for reducing serious crashes
- Identifies and addresses one or more of the priority safety focus areas
- Exemplifies potential for raising awareness about transportation safety and for possible solutions to transportation safety challenges

1b. Simulation

- Provides an innovative plan and project narrative that describes how the proposed tool will allow users to simulate different conditions from models
- Describes the capacity to customize the tool based on different scenarios from models
- Details the accuracy and precision the tool will perform at in visualizing a variety of scenarios from models
- Identifies and addresses one or more of the priority safety focus areas
- Exemplifies potential for raising awareness about transportation safety and for possible solutions to transportation safety challenges



2. Benefits

- Defines a target user or demonstrates the potential for users, if developed
- Takes into consideration inputs from potential users
- Details appeal and relevance to target user and describes method to measure benefits
- Describes extent to which the tool expands upon existing safety understanding, generates actionable insights for its proposed target audience, and has the potential for dramatic impacts on transportation safety
- Addresses the challenges facing broad adoption, and how could they be overcome

3. Data

- Identifies data requirements and appropriately handles uncertainty
- Describes a new, original idea that integrates data in an unprecedented and novel way or enhances understanding of the data
- Explains what risks or challenges exist for accessing and/or using the data, and how could they be overcome
- Proposes using cost-effective data
- Details an appropriate use of the data for the analytical visualization tool in supporting insight discovery and for the message of the visualization



4. Technology

- Discusses existing technologies
- Describes how the proposed tool differs from current technologies
- Details the features of the tool and how they can be accessed and understood by the maximum possible number of users
- Describes a wide range of accessibility and uptake for target users by using technology that can easily be deployed and maintained
- Proposes using cost-effective technologies

5. Cost to Implement

- Provides a clear schedule for project implementation, monitoring, and evaluation
- Includes initial estimates of data input and operating costs and includes fiveyear maintenance estimates for implementing and potentially scaling the tool
- Describes how the benefits of the tool outweigh the costs of end-users obtaining the data, technology, skills and resources necessary to implement and sustain the tool



Stage I: Ideation Deadline

Accepting Stage I submissions up to July 31, 2018 11:59 PM EST

Submit your Ideation: www.transportation.gov/solve4safety

Challenge Mechanics Webinar

June 19, 2018 Learn more about the Challenge

> Ideation Due July 31, 2018



Challenge Opens

June 14, 2018 Solvers develop ideations.

Challenge Connections Webinar

June 26, 2018 Solver-Innovation Agent relationship building and Solver team building

Ideation Prizes Awarded & Proof of Concept Competitors Announced August 2018

Four semi-finalists advance to Stage II, developing ideations into proofs of concept



QUESTION & ANSWERS

Solving for Safety Visualization Challenge







CHALLENGE CONNECTIONS WEBINAR Solver-Innovation Agent Relationship Building & Solver Team Building June 26, 2018 | 1:00 – 2:30 PM EST

