

Safety VEHicles using adaptive Interface Technology (SAVE-IT): A Program Overview



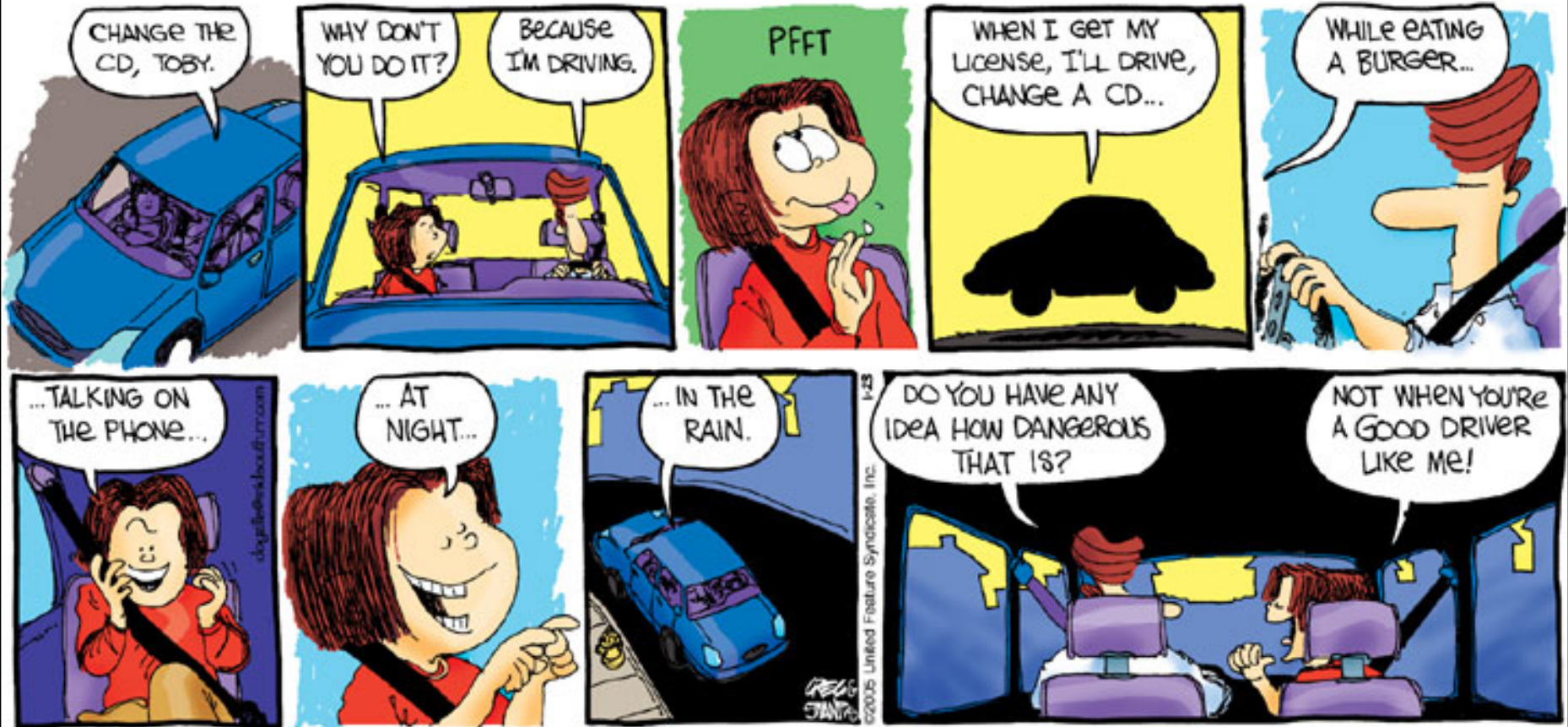
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Background

THE BUCKETS

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Goal

- **Prevent fatalities and injuries by reducing distraction-related motor vehicle crashes.**



Objectives

- Advance the deployment of adaptive interface technology as a potential countermeasure for distraction-related crashes
- Enhance collision warning system effectiveness by tailoring system to the driver's level of workload and distraction.
- Conduct research to help derive distraction and workload measures for use in algorithms for adaptive interface.
- Develop and apply evaluation procedures for assessment of SAVE-IT safety benefits.
- Develop performance requirements for system operation and standards/guidelines for adaptive interface conventions.
- Disseminate research results.

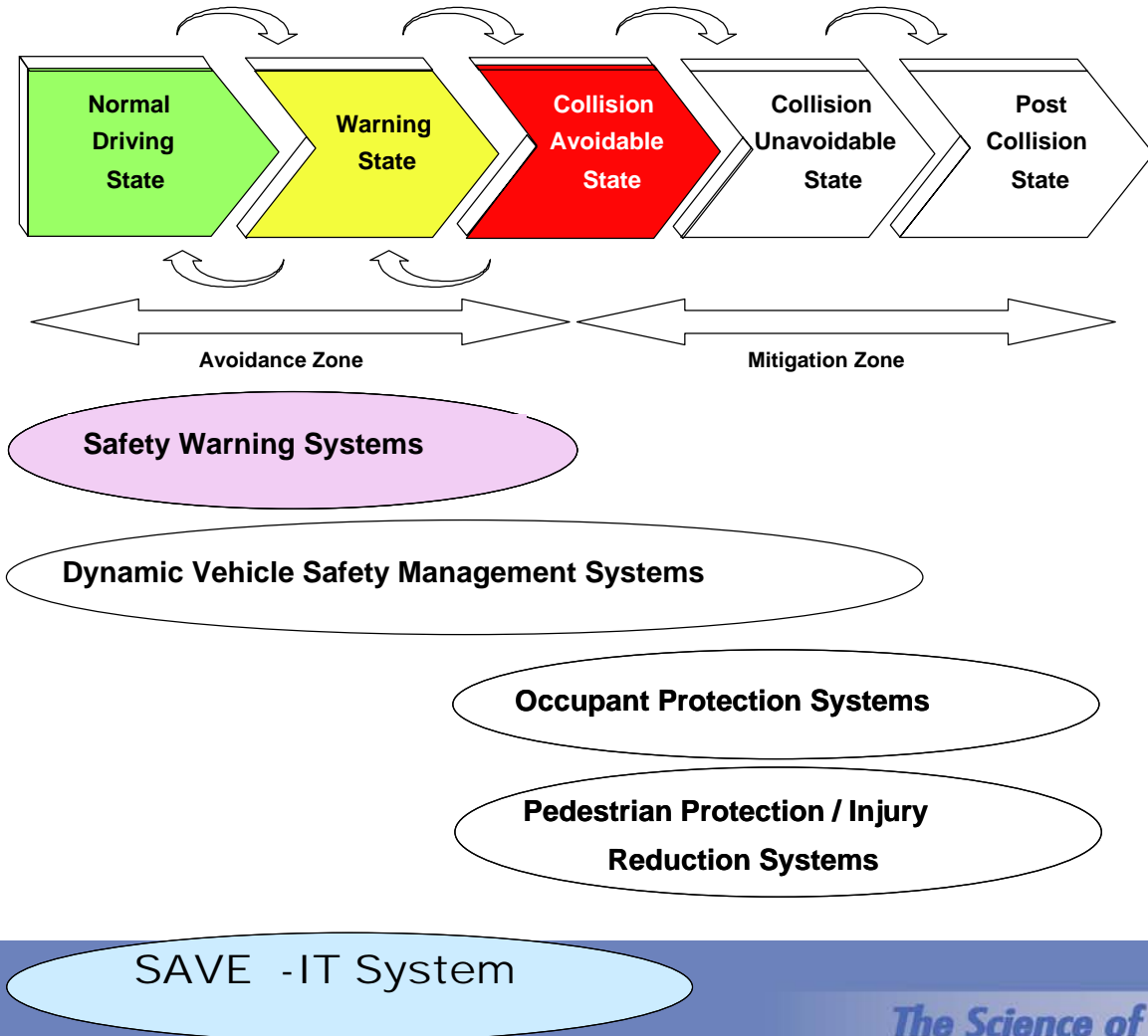
Background

- **Sponsors: John A. Volpe National Transportation Systems Center and the National Highway Traffic Safety Administration**
- **Partners:**
 - **Delphi Delco Electronics (Prime)**
 - **UMTRI**
 - **University of Iowa**
 - **General Motors**
 - **Ford**
 - **Seeing Machines, Inc.**
- **\$3 million plus cost sharing**
- **3 year program, about 1/2 completed.**



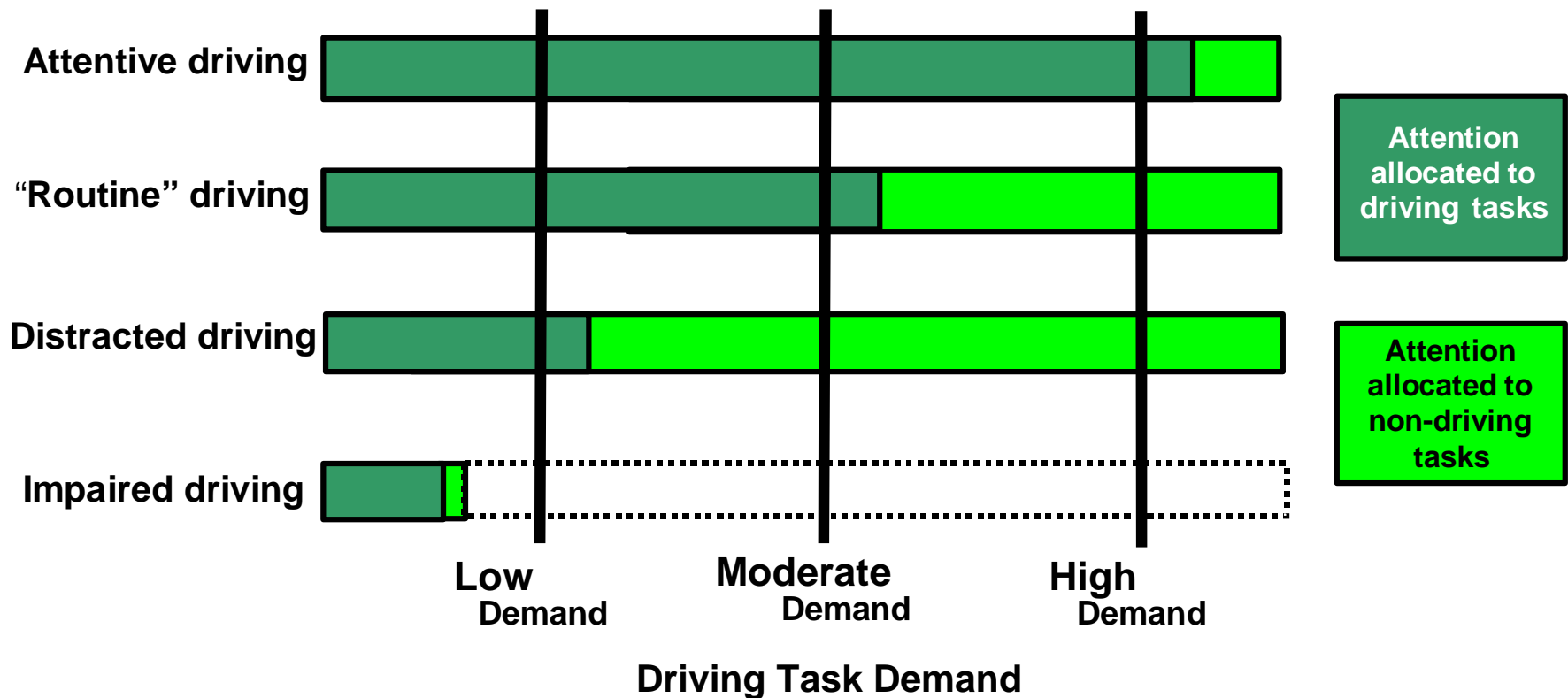
Background

■ Problem Space:



Background

- Relationship between attention variables and safe driving is complex.



Program: 15 Tasks

- **Task 1: Scenario Identification**
 - Identify the driving scenarios in which the SAVE-IT system can provide most benefit in reducing distraction-related crashes;
 - Literature review; CDS data analysis; and expert panel.
- **Task 2: Driving Task Demand**
 - Develop algorithms that measure the level of attention that is required by the driving environment as a function of environmental parameters;
 - Literature review; HSIS data analysis; Self-report from viewing of naturalistic driving video.
- **Task 3: Performance**
 - Develop algorithms that reliably measure degraded driving performance;
 - Literature review; Simulator studies.

Program: 15 Tasks

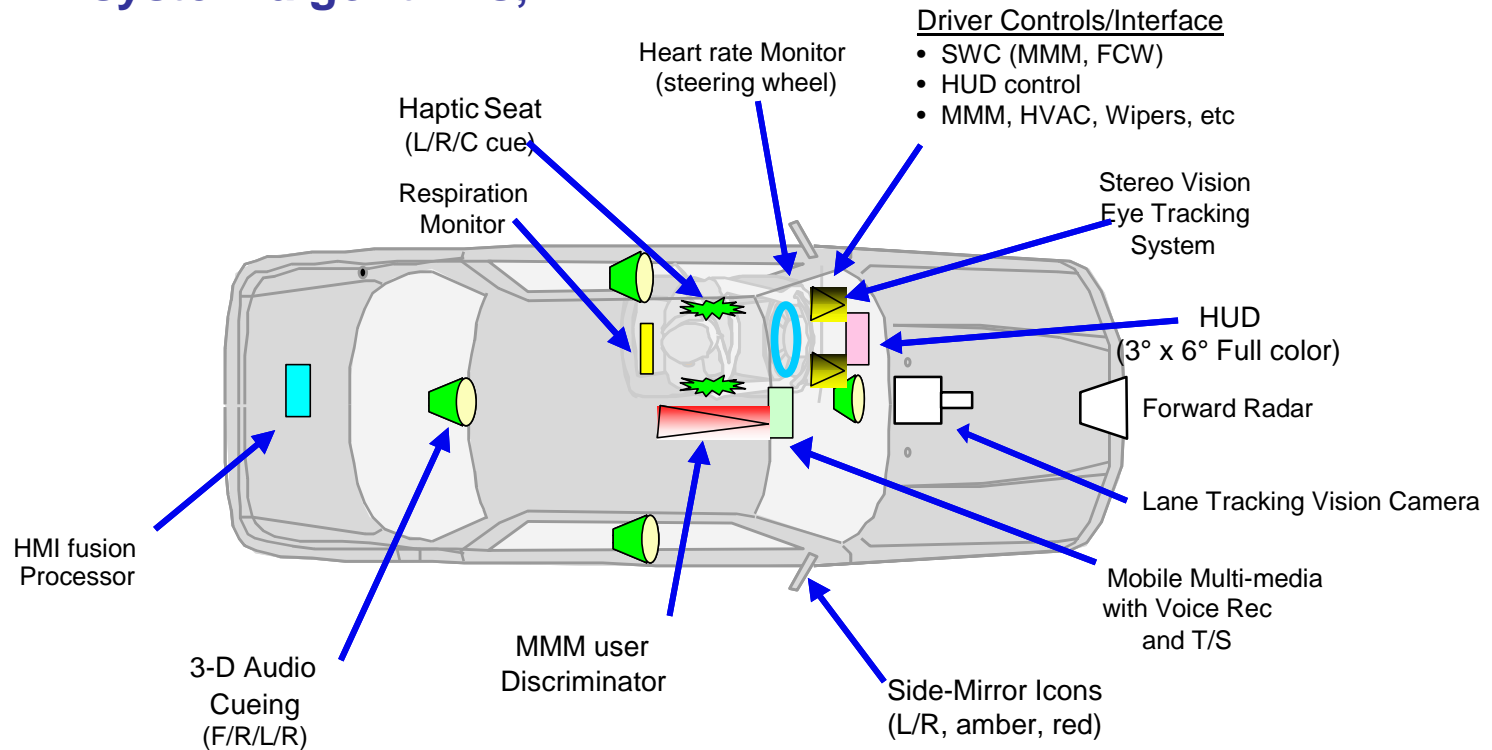
- **Task 4: Distraction Mitigation**
 - Develop countermeasures that mitigate against inappropriate levels of distraction, while maintaining high levels of driver acceptance;
 - Literature review; focus groups; Simulator studies.
- **Task 5: Cognitive Distraction**
 - Develop algorithms that can reliably measure the level of cognitive distraction;
 - Literature review; Simulator studies.
- **Task 6: Telematics demand**
 - Identify the distraction potential of telematics functions;
 - Literature review; Simulator studies.

Program: 15 Tasks

- **Task 7: Visual Distraction**
 - Develop algorithms that can reliably measure the level of visual distraction;
 - Literature review; simulator studies (eye glance)
- **Task 8: Driver Intent**
 - Develop algorithms that can reliably measure the immediate intention of the driver;
 - Literature review; Analysis of naturalistic driving data.
- **Task 9: Safety warning countermeasures**
 - Improve existing safety warning countermeasures so they can adaptively warn the driver about immediate threats in the environment as a function of driver state information;
 - Literature review; Simulator studies.

Program: 15 Tasks

- **Task 10: Technology Development**
 - **Develop a concept vehicle that can serve as a platform for the system algorithms;**



Program: 15 Tasks

- **Task 11: Data Fusion**
 - Develop algorithms that coherently fuse all data from the sub-systems into information that can drive the countermeasure systems.
- **Task 12: Establish Guidelines and Standards**
- **Task 13: System Integration**
 - Demonstration vehicle
- **Task 14: Evaluation**
 - Simulator, on road, test track
- **Task 15: Benefit evaluation**



Program: Two Sub-Systems

- **Safety Warning Countermeasures**
 - Uses driver distraction, driver intent, and driving task demand information to adaptively adjust safety warning systems, such as forward collision warning (FCW);
 - Safety warning systems will require the use of warnings about immediate traffic threats without an annoying rate of false alarms and nuisance alerts;
 - The safety warning system will adapt to the needs of the driver

Program: Two Sub-Systems

- **Distraction Mitigation sub-system**
 - Adaptive interface technologies to minimize driver distraction to reduced risk resulting from inadequate attention allocated to the driving task;
 - Will process driving task demand, the level of driver distraction, the intent of the driver, and the telematics distraction potential to determine which functions should be advised against under a particular circumstance;
 - SAVE-IT program will compare various mitigation methods on effectiveness, driver understandability, and user acceptance.

Program

- Phase 1 (first year) is completed.
- Results can be found at the Volpe web page:
 - <http://www.volpe.dot.gov/opsad/saveit/docs.html>



SAVE-IT

Thank You



