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Institute of
Automated Mobility
Shaping the future of transportation safety, science, and policy

IAM Overview, Marisa Paula Walker

Institute of Automated Mobility

Shaping the future of transportation safety, science, and policy

Participating in the IAM means committing to build an innovative ecosystem that collaborates on state-of-the-art research, development, testing, and evaluation.

Our objective is for Arizona to lead in the commercial deployment of AVs in a safe manner.

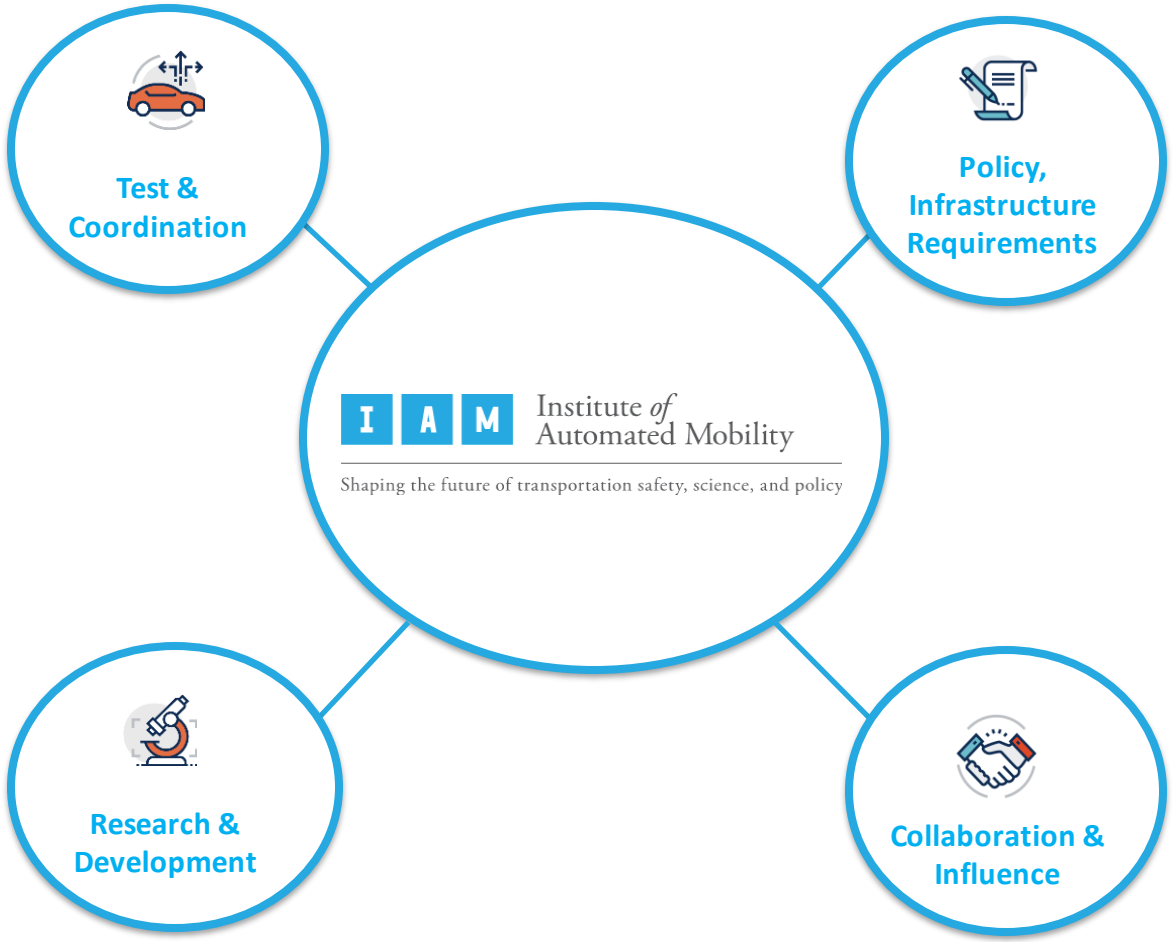
IAM Research, Jeff Wishart Ph.D.

Role of IAM

Provide the technical guidance and coordination required to ensure the prudent implementation of safe, efficient automated mobility across Arizona

Members

- State of Arizona
- Automated Mobility Community
- Arizona Public Universities
- State DOTs



Technical Goals

Deploy automation to significantly increase roadway safety and efficiency

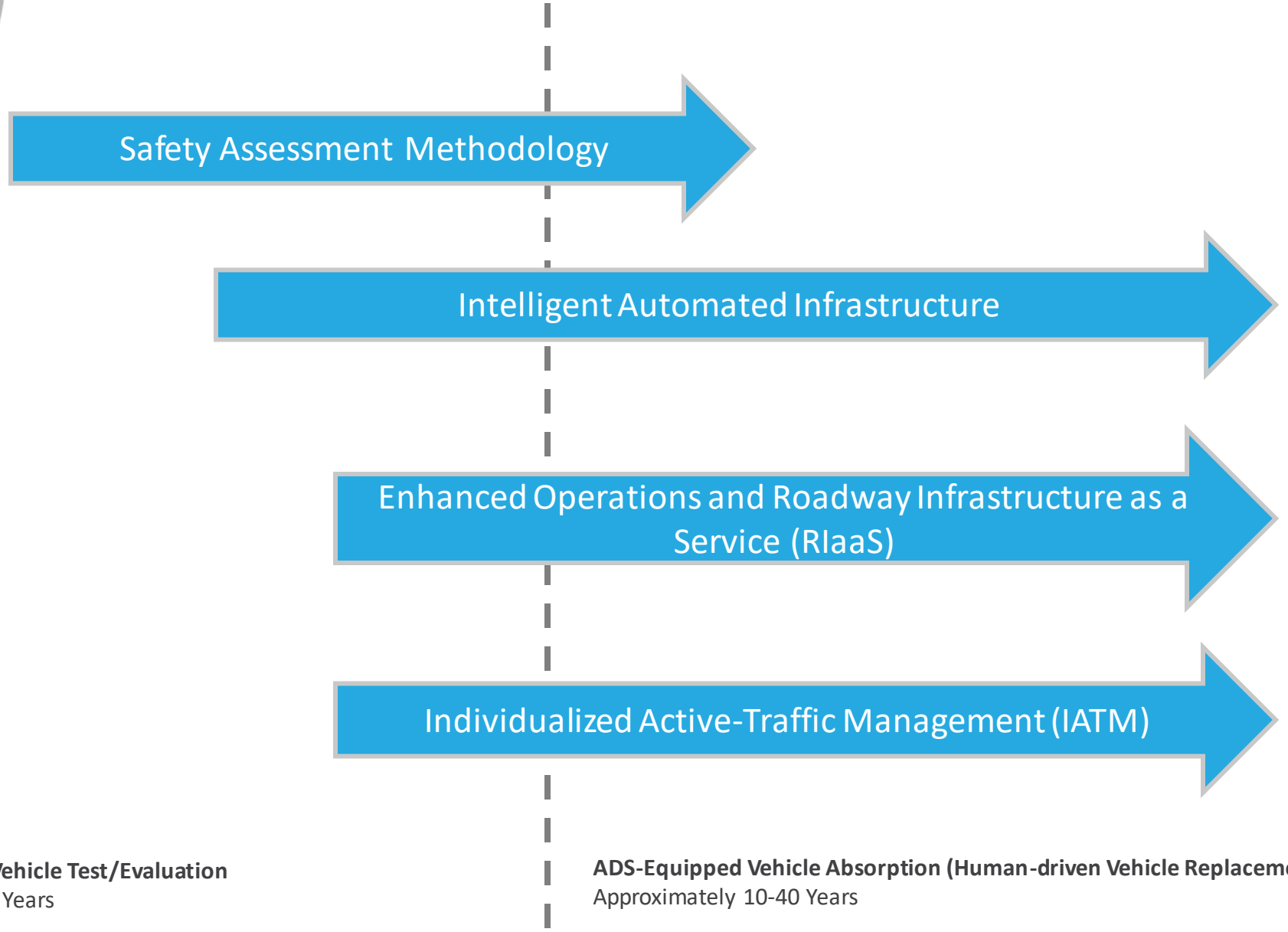
Safety

- **Enable the safe introduction of Automated Vehicles**
  - Safety Assessment Methodology
    - Safety Metrics measurement at intersections and other points of interest within AZ
- **Develop Roadway Infrastructure as a Service (RIaaS) Concept**
  - Demonstrate RIaaS prototypical services
  - Push for RIaaS standards (primarily V2I message formats)
  - Catalyze Commercial Development of RIaaS applications

Efficiency

- **Develop Situational Awareness Capability**
- **Develop Individualized Active-Traffic Management (IATM) Concept**
  - Demonstrate V2X capability
  - Demonstrate IATM
  - Push for IATM Standards
  - Catalyze Commercial Development of IATM solutions

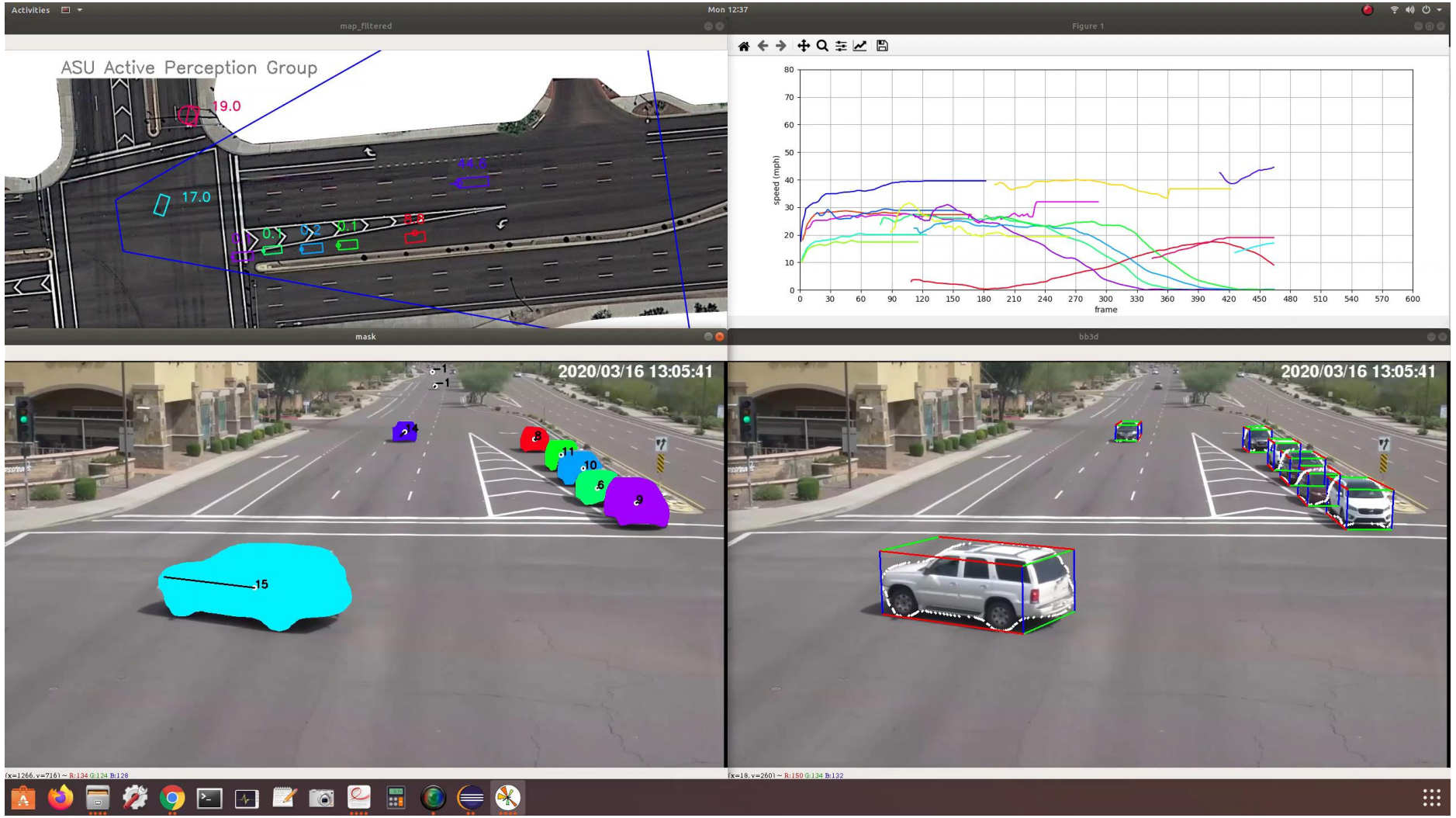
IAM Roadmap


Safety Assessment Methodology
Intelligent Automated Infrastructure
Enhanced Operations and Roadway Infrastructure as a Service (RIaaS)
Individualized Active-Traffic Management (IATM)
ADS-Equipped Vehicle Test/Evaluation
Approximately 5 Years
ADS-Equipped Vehicle Absorption (Human-driven Vehicle Replacement)
Approximately 10-40 Years

Metrics Project

- The Metrics project objective is to develop and validate a comprehensive yet concise set of metrics that allow for driving safety performance assessments for ADS-equipped vehicles to be effectively made
  - ADS development community & transportation engineering community
  - Accommodate differences in cultural/regional norms
  - Cognizant of possibility of lack of access to on-board data, including ADS data
- Research collaboration led by Exponent, Intel, State Farm, ASU, NAU, UArizona, MCDOT, Luminar
  - Metrics Definition Team
  - Data Capture Team
  - Algorithm Team
- The chosen set of metrics is implemented in a real-world intersection in Anthem, AZ equipped with cameras in which the video feed is the input to a bespoke algorithm that detects and tracks entities and determines the metrics for each.

Metrics Project

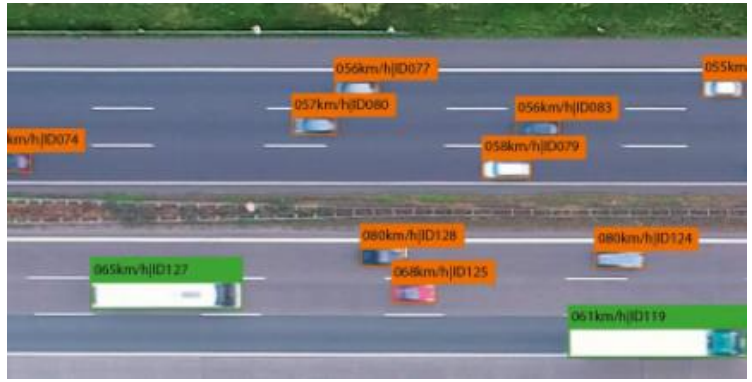


Naturalistic Driving Project

- Some of the driving safety performance metrics derived in the Metrics project (including those from Intel's Responsibility Sensitive Safety system) contained subjective parameters and thresholds that were left open for future research.

- The objective of the Naturalistic Driving Behavior project is to determine appropriate AZ values for these subjective assumptions and thresholds.
  - Naturalistic driving data sets to be primarily used.
  - Simulation to be used where U.S. driving data are not available for a specific metric.

- Results are to be compared against other regions such as Europe and China.



Network Safety Project

- ADOT has a state-wide video surveillance system that covers most of the freeways, interstate highways, and state routes across AZ, with a dense network in the Phoenix metropolitan area, all feeding a traffic operations center.
  - Full capability not realized, and some video feeds are not monitored.
- The objective of the Advanced Video Analytics for Metric-based Network Safety Performance Prediction project is to automate the video feed monitoring for events of interest (e.g., crashes, wrong-way drivers, debris on roadway, etc.) and possibly driving safety performance metrics for analysis.
  - Could eventually lead to AV control.

- Research led by UArizona and Northern Arizona University
  - Partnering with Stanford and MIT on Rekall video processing algorithm for analyzing and managing large quantities of video.

Timeline 2020

2020	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Phase 1 Research												
Phase 2 Exploration												
Phase 2 Research												

Phase 1 Research

Timeframe: 4+ months

- Metrics Project continued (from August 2019)
  - SAE WCX paper "Driving Safety Performance Assessment Metrics for ADS-Equipped Vehicles", voted one of conference's best
- NSF "AI Institute: Planning: Infrastructure-Scale Artificial Intelligence" Proposal

Deliverable: Phase 1 presentations and published papers

Phase 2 Exploration

Timeframe: 5 months

- Brainstorm Phase 2 research projects, statements of work, project resources, and deliverables.
- Review of proposed projects, confirm approval.
- Confirm budgetary funding from IAM members and State of Arizona = $500k.

Deliverable: Phase 2 statements of work

Phase 2 Research

Timeframe: 7 months

- Project 1: Metrics Project, Phase 2
- Project 2: Advanced Video Analytics for Metric-based Network Safety Performance Prediction Project begun
- Project 3: Naturalistic Driving Behavior Project begun

Deliverable: Phase 2 presentations and published papers

Thank you