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**OFFICE OF RESEARCH,
DEVELOPMENT,
AND TECHNOLOGY**

TRUCK PLATOONING EARLY DEPLOYMENT ASSESSMENT

Talking Freight Meeting

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and Development

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OUTLINE

- Project background:
 - Introduction.
 - Phased approach.
- Phase 1:
 - Organization and awardees.
 - Phase 1 key deliverables.
- Phase 2:
 - Project team.
 - Truck platooning system.
 - Experimental design.
 - Next steps.

PROJECT BACKGROUND

WHAT IS LEVEL 1 TRUCK PLATOONING?

- Employs longitudinal control only (throttle and brakes), driver steers the truck.
- Builds on production adaptive cruise control (ACC).
- Uses vehicle-to-vehicle (V2V) communication to deploy cooperative adaptive cruise control (CACC).



Source: FHWA

INTRODUCTION

- Truck Platooning Early Deployment Assessment builds on prior FHWA research in truck platooning.
- Goals and Objectives:
 - Understand truck platooning in real-world operations (i.e., real fleet operators carrying real loads).
 - Assess benefits and impacts across key areas of interest.
 - Inform future State/local departments of transportation (DOT) planning and decisions.



Source: FHWA

INTRODUCTION

- Phased approach manages risks and uncertainties in dynamic environments.
- Phase 1 (March 2019 – December 2019) – completed:
 - Awardees developed concept, partnerships, and evaluation plan.
 - Awardees completed proposal for Phase 2.
 - Independent evaluation team supported performance measures and evaluation planning.
- Phase 2 (July 2020 – January 2023) – in progress:
 - Awardee will finalize the plans and make sure the truck platooning systems are ready for deployment testing.
 - Awardee will conduct field operational test (FOT).
 - Independent evaluation will be conducted.

PHASE 1

PHASE 1 OVERVIEW

- Three teams were selected.
- Phase 1 was conducted from March 2019 to December 2019.
- Phase 1 deliverables:
 - Concept and evaluation related deliverables.
 - Independent evaluator support and feedback.
 - Other deliverables.
 - Proposal.
- Awardee teams engaged with the independent evaluator.

PHASE 1 KEY DELIVERABLES

- Deployment Operational Concept:
 - Platooning system/trucks.
 - Geographic extent and routes.
 - Operational design domain and operating rules.
 - Initial performance measures.
- Test and Performance Evaluation Plan:
 - Documents performance measures.
 - Proposes data collection and management plan.
 - Presents analysis methodology.

PHASE 1 KEY DELIVERABLES (CONT'D)

- Partnership Plan:
 - Identifies partners for Phase 2.
 - Identifies partner roles for Phase 2.
 - Identifies responsibilities and commitments for Phase 2.
- Phase 2 Readiness Assessment:
 - Assesses Phase 2 execution feasibility.
 - Identifies risks and mitigation strategies.
- Phase 2 Proposal.

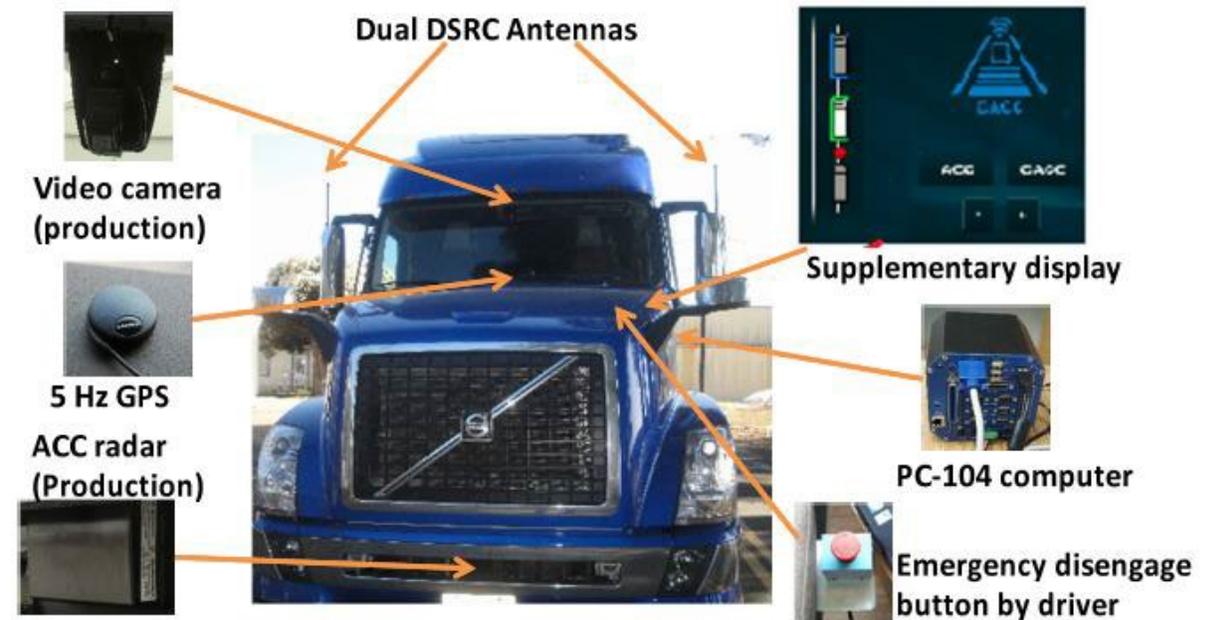
PHASE 2

PROJECT TEAM

- Project team:
 - California PATH (team lead and technology supplier).
 - Roly's Trucking (fleet operator).
 - Westat (human factors).
 - Cambridge Systematics (partnership).
- Other partners.
- Noblis (independent evaluator).

TRUCK PLATOONING SYSTEM

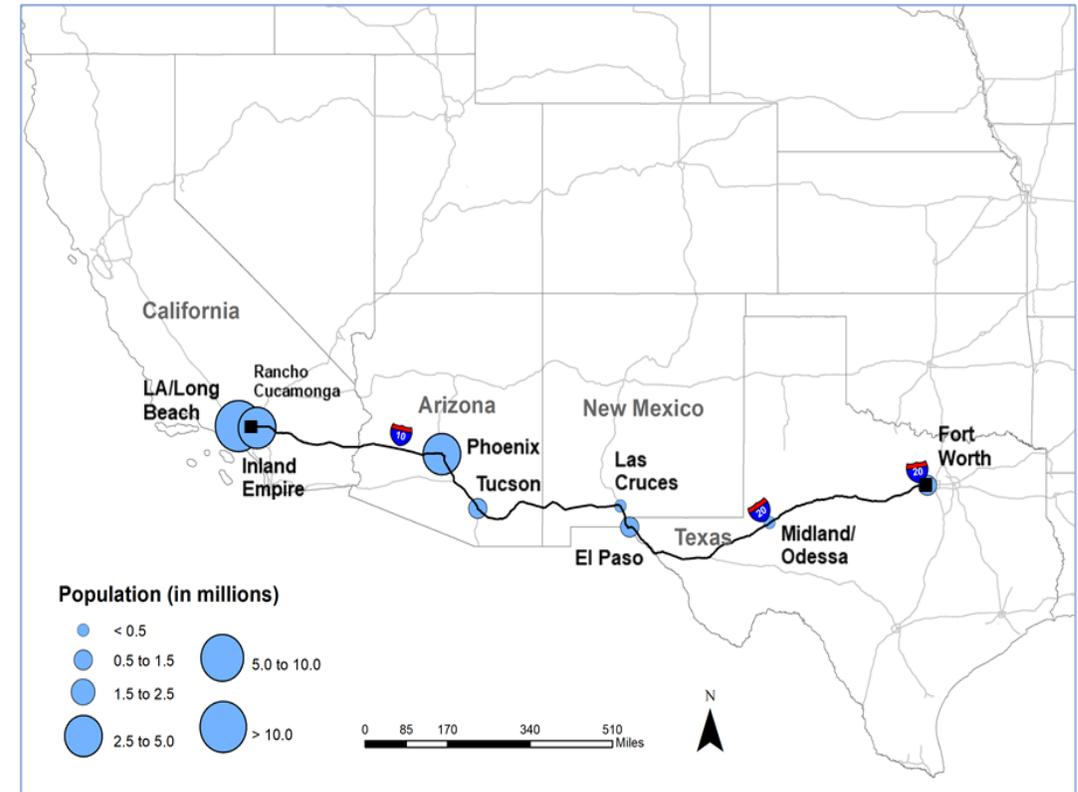
- Implement PATH-CACC capability.
- Four new trucks:
 - 3 trucks for CACC/platooning field test.
 - The 4th truck used as a “control truck” as baseline. :
- Sensors.



Source: California PATH

PROPOSED ROUTE AND EXPERIMENTAL DESIGN

- 1,400 mile-route of Interstate 10 from California to Texas.
- California, Arizona, New Mexico, Texas.
- Four trucks.
- 20 drivers.
- One round trip per week for one year, resulting in the data for 145,000 miles driven.



Source: California PATH

DATA TO BE COLLECTED

- Engineering data: onboard sensors, J-1939 Bus, and DSRC.
- Surrounding traffic data using extra sensors: fixed beam lidars and video cameras.
- Truck driver data using dedicated sensors: SmartCap LifeBand and Jungo VuDrive
- Wireless modem connection with trucks for monitoring: CACC system operation and data logging health.

PERFORMANCE MEASURE REQUIREMENTS

No.	Code	Performance Measure Category	No. of Requirements
1	OP	Platoon Operational Characteristics	4
2	S	Safety	12
3	M	Mobility	3
4	EE	Energy and Emissions	2
5	FLT	Fleet Operator and Driver Impacts	7
6	II	Infrastructure Impacts	3
7	SL	State and Local Government Impacts	2
8	VED	Vehicle Equipment Design Implications	3

Independent evaluation team worked with USDOT to develop “Performance Measure Requirements” in eight key areas to:

- Propose specific requirements to be addressed in Phase 2.
- Determine measures and supporting data.

Asare, S., Chang, J., & Staples, B. *Truck Platooning Early Deployment - Independent Evaluation: Requirements for Performance Measures*. Washington DC: FHWA, 2019.

NEXT STEPS

- Implementation stage (July 2020 – November 2021):
 - Test and evaluation plan.
 - Partnership plan.
 - Human use approval plan.
 - Comprehensive truck platooning deployment plan.
 - System acceptance testing.
 - Operational readiness testing with a go/no-go decision.
- Field operational test stage (November 2021 – January 2023):
 - Field operational test.
 - Data collection and evaluation.
 - Final report.

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