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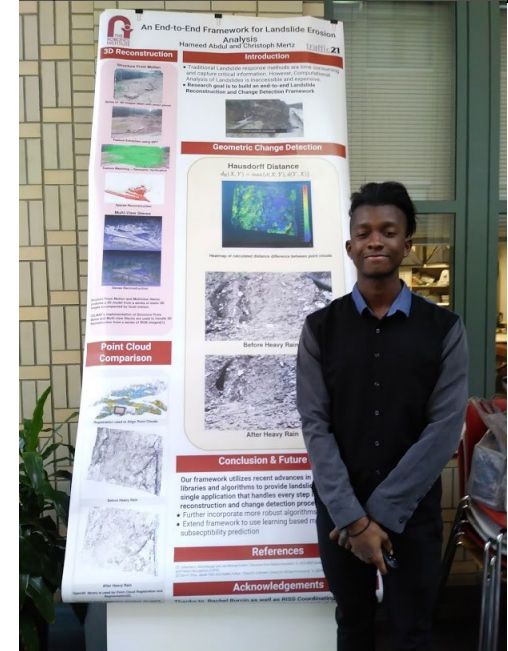
Traffic21

A transportation research institute of Carnegie Mellon University

Mobility21

A USDOT NATIONAL
UNIVERSITY TRANSPORTATION CENTER

Carnegie Mellon University



Transportation Technology Trends from the Smart Transportation Dispatch

ITS Pennsylvania
August 9, 2022

Research Funded by the US DOT University Transportation Centers Program

Mobility21 National UTC Project #358

Synthesis of Research Results and Technology Trends to Inform Federal, State, Regional and Local Policies for Smart Mobility of People and Goods: Phase 4

CMU Professor Chris Hendrickson, CO-PI

Disruptive Transportation Technology Trends

- Automation
- Connectivity
- Shared Mobility
- Electrification
- Advanced Air Mobility
- Digital Twinning

What Technology is Actually Moving to Commercialization?

Beyond Research...

Beyond Concepts...

Beyond Prototypes...

What is moving people and goods commercially... albiet maybe not yet profitably or even safely?

Partial Automation

Mercedes rolls out Level 3 autonomous driving tech in Germany

May 18, 2022 The Robot Report



SAE J3016™ LEVELS OF DRIVING AUTOMATION™

Learn more here: [sae.org/standards/content/j3016_202104](https://www.sae.org/standards/content/j3016_202104)

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	SAE LEVEL 0™	SAE LEVEL 1™	SAE LEVEL 2™	SAE LEVEL 3™	SAE LEVEL 4™	SAE LEVEL 5™
What does the human in the driver's seat have to do?	You <u>are</u> driving whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering			You are <u>not</u> driving when these automated driving features are engaged – even if you are seated in “the driver’s seat”		
	You <u>must constantly supervise</u> these support features; you must steer, brake or accelerate as needed to maintain safety			When the feature requests, you must drive	These automated driving features will not require you to take over driving	

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	These are driver support features			These are automated driving features		
What do these features do?	These features are limited to providing warnings and momentary assistance	These features provide steering OR brake/acceleration support to the driver	These features provide steering AND brake/acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met	This feature can drive the vehicle under all conditions	
Example Features	<ul style="list-style-type: none"> • automatic emergency braking • blind spot warning • lane departure warning 	<ul style="list-style-type: none"> • lane centering OR • adaptive cruise control 	<ul style="list-style-type: none"> • lane centering AND • adaptive cruise control at the same time 	<ul style="list-style-type: none"> • traffic jam chauffeur 	<ul style="list-style-type: none"> • local driverless taxi • pedals/steering wheel may or may not be installed 	<ul style="list-style-type: none"> • same as level 4, but feature can drive everywhere in all conditions

Commercial. Driverless. Taxis

Cruise Driverless Taxi Now Fully Operational In San Francisco

June 12, 2022 Hot Cars

Driverless cars now legal in Shenzhen July 26, 2022 The Robot Report



Commercial. Driverless. Trucks

Walmart Is Already Using Driverless Trucks (with Gatik)

November 9, 2021 Autoweek



Driverless (under)Ground Delivery Devices

Switzerland will build an autonomous, underground freight transport system July 12, 2022 Interesting Engineering

However, the project that will commence on August 1st only includes a short phase of 43 miles (70 km) between the cities of Härkingen-Niederbipp and Zurich, which will include 10 connection hubs and is expected to be completed by 2031.



Electric Vehicles

Hyundai gets \$1.8B in aid to build electric cars in Georgia

AP July 22, 2022

GM is slashing prices for the Chevy Bolt amid high demand for electric vehicles June 1, 2022 The Verge

Biden-Harris Administration Announces All 50 States, DC and Puerto Rico Have Submitted Plans for National Electric Vehicle Charging Network August 2, 2022 FHWA

Electric Delivery Bikes

This California city (SF) is giving out free electric bikes to delivery drivers June 8, 2022 Electrek

UPS tests tiny battery-powered cycles in congested cities June 14, 2022 Inquirer

USPS already testing mail delivery by electric bike with these neat little US-built mail bikes June 3, 2022 Electrek



Advanced Air Mobility

The UK wants to host a "drone superhighway"

July 18, 2022 Tech Radar

The 164-mile superhighway, dubbed "Skyway", will aim to connect towns such as Reading, Oxford, Milton Keynes, Cambridge, Coventry and Rugby, and is set to be completed within the next two years

Drone Home Delivery

Alphabet's Wing Develops Fleet of New Drones for More Efficient Package Delivery July 14, 2022 Bloomberg

The prototypes are all based on the Hummingbird, which the company says can carry about 2 pounds (0.9 kilograms) and has made hundreds of thousands of deliveries in Dallas suburbs, Virginia, Australia and Finland.



Drone Commercial Retail Applications

Walmart and DroneUp expanding drone delivery to 6 states, 4 million people: Major rollout of services comes after successful trials at locations in Arkansas May 24, 2022 Modern Shipper



Connected Vehicle Technology

Tesla has a new self-diagnostic feature in its app July 18, 2022 Electrek

It's not Apple or Tesla, but Inrix has data from 500 million vehicles taking transportation into the future June 9, 2022 CNBC

The biggest changes since its early years are moving beyond the core data to a software-as-a-service model, and that model is being adopted by its biggest-growing customer segment: cities like New York and London and additional geographies around the world including Dubai.

AR/VR/PR / Digital Twins

Bird launches augmented reality-powered parking technology pilot

May 13, 2022 Intelligent Transport

‘Parallel Reality’ at the airport: High-tech screen displays personal flight info to multiple travelers June 30, 2022 Geek Wire

The city of Seoul, South Korea, is planting the seeds for a metaverse ecosystem called “Metaverse Seoul” for all areas of its municipal administration. The effort combines digital twins, virtual reality (VR) and collaboration to improve city services as well as planning, administration and support for virtual tourism. May 5, 2022

Venturebeat

What to Watch for Next?

Industry Consolidation

Ford CEO expects to see industry consolidation as the costs of transition to electric vehicles rise June 1, 2022 CNBC

Business Models of Technology Applications

Though Uber's business continues to lose money, it said it was drawing closer to profitability. Excluding certain expenses like stock compensation and the Didi losses, Uber had another profitable quarter, and its free cash flow approached a break-even point. May 4, 2022 New York Times

What to Watch for Next?

Public Acceptance?

A swarm of Cruise robotaxis blocked San Francisco traffic for hours
June 30, 2022 Engadget

Regulatory Action

FMCSA Looks into TuSimple Accident August 3, 2022 Truckinginfo

Plus new emerging technologies on the horizon...

Where to Watch for Technology Trends for Free?
traffic21.heinz.cmu.edu

The Smart Transportation Dispatch

Carnegie Mellon University



Questions

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