



NDACE Conference

Driverless Technology Increasing Work Zone Safety

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Kratos Defense

A national security focused company that develops and fields affordable, transformative systems and products with force multiplier affect.

Applies leading-edge technologies for:

- Reduced risk and faster deployment
- Real systems working today
- Affordability where scale matters: dollars, units, users, and attrition
- Technology advances providing a force multiplier effect across domains
- Forward-looking, fast-acting, and responsive business practices

Kratos brings a fielded dual-use autonomy baseline, deep multi-domain C2 expertise, and operational LLM/agenting tooling, making us uniquely positioned to deliver world class driverless solutions to market.

- » Kratos 3500+ employees
- » AS9100/ISO9001/NIST800-171
- » Fast Acting & Responsive
- » National Security Focused
- » Force Multiplier Solutions
- » Leading Edge vs. Bleeding Edge



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KRATOS®



 **AUTONOMOUS PLATFORMS**

 **MISSION SOFTWARE**

 **OPERATOR-CENTRIC CONTROL**

TRUSTED NATIONAL SECURITY PARTNER

Applying field-proven autonomy and operator workflows to

 **REDUCE BURDEN & INCREASE TEMPO**

 **DELIVER VEHICLE-AGNOSTIC ORCHESTRATION**

Kratos Overview Video



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Originally developed for defense, our auto-platooning solution is adaptable across industries



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What is a TMA

Roadway work zones are complex environments with potential conflict points existing between traveling vehicles, vulnerable workers, and slow-moving heavy equipment.

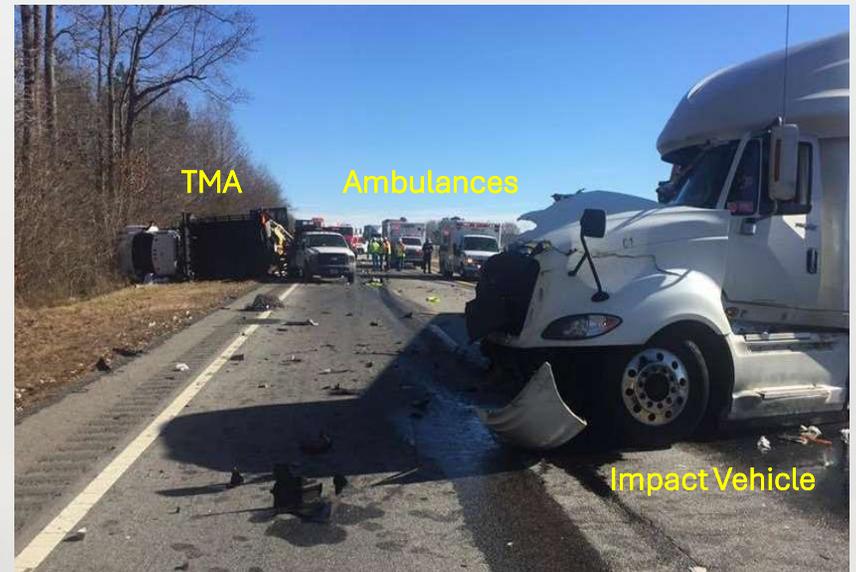
A Truck Mounted Attenuator (TMA) is a human-driven mobile crash barrier that is used to follow behind a highway maintenance operations, shielding workers and equipment ahead from errant drivers entering the work zone.



Why Automate

Driving a TMA is recognized as one of the most dangerous assignments in the work zone.

- Across the US there are over 90 crash-related injuries and 11 fatalities every week in the work zone (ref: Federal Highway Administration)
- TMA drivers are at significant risk of lifelong injury, painful rehabilitation, and even death
- Impact vehicles can be 80,000 lb. tractor-trailers traveling at 65+ mph



ATMA removes the driver from the “high risk” situation



Work Zone Crash Statistics

Kratos Defense has made a push for the ATMA innovation because of the brutal national statistics.

~101,000
Work zone
crashes in 2023

40,170
People injured in
work zone
crashes in 2023

898
Crash-related
fatalities
in 2023

ATMA is a game changing solution for improving safety by removing the driver from the vehicle that is designed to be struck to protect the work zone.



*crash highlights the value of the ATMA



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TMA Driver Testimony



“This is going to save lives. This is going to prevent any of us from having to come back here and share stories about how we nearly didn’t make it, how we almost never saw our kids again.”

-Michael Kates
Equipment Operator & two time TMA crash survivor



Real Drivers, Real Impact



Jeremiah Rock / Maintenance Operator One

"We were painting safety lines near Somerset and even with multiple message boards and three trucks with arrows, a speeding passenger van cut into our convoy and rear-ended my truck. I was taken to the hospital by ambulance, shaken but thankfully not hurt. **Pay attention to the cones and signs. We just want to go home to our families.**"



Mark Huss / Equipment Operator One

"During an ice removal job, I was driving an attenuator truck when my co-worker radioed that a tractor trailer was headed straight for us. It hit the back of my truck and my head snapped back, breaking my window. I was pushed 1/10 of a mile and the truck lost a load of steel trusses. Being hit definitely makes you more aware of what can really happen when people drive distracted. **Don't drive distracted. Pay attention to signs instead of your phone, passengers or dashboard gadgets.**"



Mike Kates / Maintenance Operator One

"I've had two incidents in three years. First, a tractor trailer going 60 mph hit my partner's dump truck as I ran a shoulder sweeper. My partner could never work again. Second, during a cleaning operation, a driver looking at his radio hit my attenuator truck. With all the warning signs, I keep wondering, 'how can you miss us?' **Stop trying to do so much in your car and make driving your only focus. Literally, you're killing us.**"



Michelle Prestopine / District Manager, Fare Collection

"I was in my office when I heard the loudest crash I've ever heard. I ran out and everything was on fire. An 80,000 lb. tractor trailer had hit my co-worker Mike's booth and its load of floor wax caught fire. Mike survived, but the driver didn't. We do everything we can to have safety processes in place because the worst can, and does, happen. **These are real people, doing a dangerous job. Don't worry about your money or your ticket 'til you're stopped.**"



ATMA Features

The Autonomous Truck Mounted Attenuator (ATMA) is an Autonomous Vehicle (AV) solution that removes the human from the most dangerous assignment in mobile highway operations.

- Driver and Driverless Modes– system easily switches from a manned operation to an unmanned operations
- System Redundancy – reduces possibility of single point failures
- Cybersecurity Precautions – prevents malicious hacking
- Advanced Active Safety System – automated E-Stop capabilities
- Enhanced Obstacle Detection – front and side view protections
- User Controls – user adjustable gap and lateral alignment
- GPS-denied Navigation – status-at-a-glance and operator controls



Navigation data transmitted from a Manned Leader Vehicle enables the ATMA to follow behind completely driverless in a “Leader/Follower” configuration.



Retrofit Kit

The retrofit kit enables any fleet vehicle to be converted into an autonomous system. System components include on-board computer, navigation system, actuators, user interface, and active safety system.

Steering Actuator



Leader Vehicle User Interface



Obstacle Detection & Avoidance



E-Stop Safety



Deployments

England - COLAS



Minnesota DOT



Indiana DOT - Leased



Colorado DOT x 3



Tennessee DOT - Leased



Oklahoma DOT



Missouri DOT x 2



Florida DOT - Leased x 3



Ohio DOT



Caltrans



North Dakota DOT



Wisconsin DOT - Leased



North Dakota

Pilot Deployment

- NDDOT selected crews completed a comprehensive training program
- Operational deployments across multiple maintenance operations
- Deployed in and around the Fargo, ND area
- Initial validation conducted with an onboard Safety Rider for manual take-over capability
- Validated configuration transitioned to controlled driverless operation (Nobody in the ATMA cab).
- Data collected on every deployment for post-deployment analysis and system reporting.

Current Program Status

- Phase 1 pilot deployment complete
- NDDOT operator feedback captured (“likes”, “dislikes”, and recommended updates.
- Aligning scope, schedule, and resources for follow-on deployments.



NDDOT ATMA Deployment Video



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DOT Testimonials



“The ATMA removes drivers from the follower truck during highway maintenance operation. As a result, there is a tremendous decrease in exposure risk to the operator during operations; namely, the risk of potential injury or death to the individuals who would otherwise man the attenuator is greatly diminished. The ATMA is an example of how CDOT is pursuing cutting-edge technology to improve highway management and increase safety of our roadways for the people who manage and maintain them. The ATMA sets the foundation and ground work for automation to be more broadly introduced to DOT work zone and maintenance operations.”

“It is great when military technology can be adapted for civilian use. Especially when it has the potential such as this (ATMA) to save lives. This is important because this truck will save lives and help prevent serious crash injuries to workers in construction zones. NDDOT is committed to using innovation and technology to improve safety and operations throughout North Dakota”



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Awards



2015 American Road and Transportation Builders Association (ARTBA) Work Zone Safety Award for the Autonomous TMA Truck



2018 International Road Federation (IRF) Global Road Achievement Award for the Autonomous TMA



2018 Chartered Institution of Highways and Transportation (CIHT) Ringway Innovation Award Runner Up and Highly Commended for Autonomous Impact Protection Vehicle (AIPV)



2021 American Society of Civil Engineers (ASCE) recognizes the ATMA as an "Infrastructure Gamechanger"



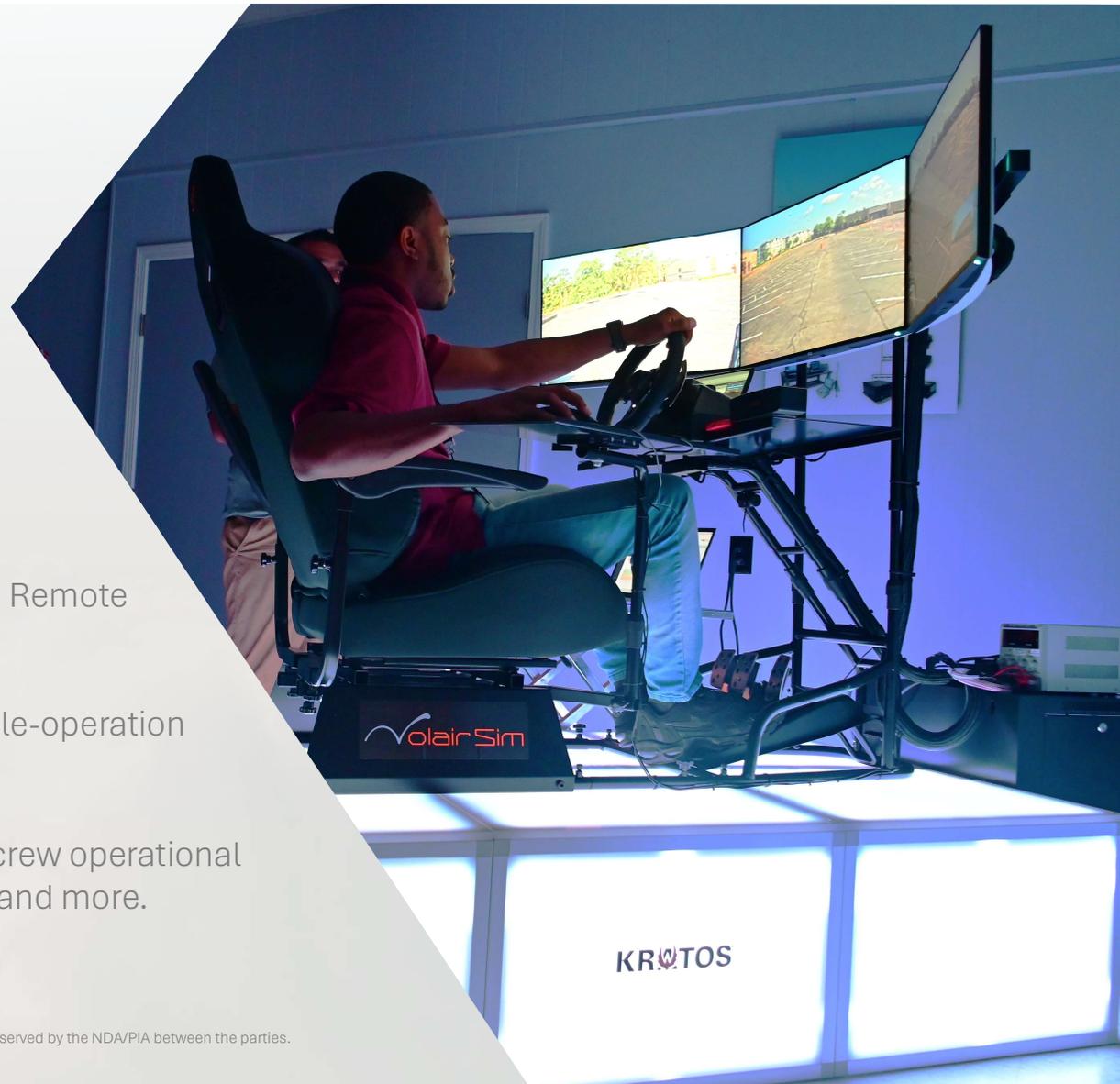
2021 AASHTO Innovation Initiative recognition of the Colorado ATMA program



Remote Control TMA

The Remote Control TMA enables a broader scope of mobile maintenance operations increasing safety using tele-operation to drive from a remotely located Control Console

- Operates Forward and Reverse
- Seamlessly switch between Leader Follower, Remote Control, and Manual driving modes
- Cellular network communications enables tele-operation from a remote Control Console
- Ideal for mobile operations requiring greater crew operational flexibility; mowing, trash pickup, weed spray, and more.



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Benefits

The ATMA aligns with Federal Highways work zone safety objectives and is a great implementation of CAV technologies to improve the day-to-day lives of our workers.

Work Zone Safety

- Reduced Worker Exposure to Danger
- Increased Safety – keep your workers out of harm’s way – now protected by the ATMA
- Improved Worker Quality of Life – reduced work zone anxiety
- Lower Costs – fewer injuries means fewer liability claims
- Work Zone Optimization – increased efficiency means less time on the road

Ideal for CAV Program

- Easy to Use, Easy to Deploy
- Clearly Defined Objective – Safety
- Operates in Specific Environment – mobile highway maintenance operations
- Operates at Slow Speed – typical <15 mph
- Requires 0 Mods to Existing Infrastructure – deployable any time/where
- Positive Public Awareness – a feel-good story that everyone can understand

Better Employee Experience

- Enhanced With Technology
- Safety – TMA vehicles are now operated from a safe location; the lead vehicle
- Strategic Workforce Development – an opportunity to work with CAV technologies
- Availability – able to support other work zone activities – cross training



Other Deployments



DOT and Industry Contractors

- Platoon/RC TMA Trucks
- Increases Work Zone safety
- 1st Driverless TMA Vehicle

Minn-Dak Farmers Co-op

- 4th Largest Sugar Producer
- 99,000lbs caged-flatbed
- 1st ND Platoon Deployment

CHS

- Largest Ag Co-op
- 3000 Trucks / Fortune 100
- 1st MN Platoon Deployment

EASE Logistics

- 3PL Freight Logistics
- ODOT/InDOT Collaboration
- 1st Auto Platoon Deployment

FPInnovations

- Timber Hauling
- Canadian Deployment
- 1st Loaded Timber Trailer Haul



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Thank you!

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