



Smart Transportation Infrastructure Initiative

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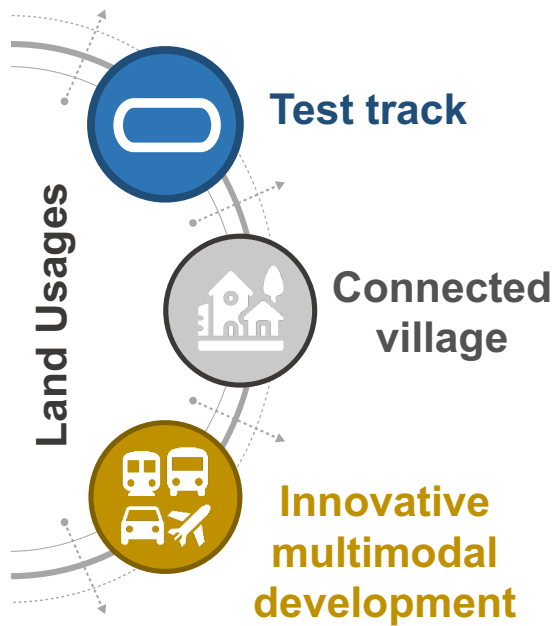
An Arena for the Future of ***Sustainable Mobility***



**Northwestern
University**



I-ACT will pioneer the *development and integration* of connected and autonomous vehicles and trucks (CAV/T) into multimodal transportation infrastructure



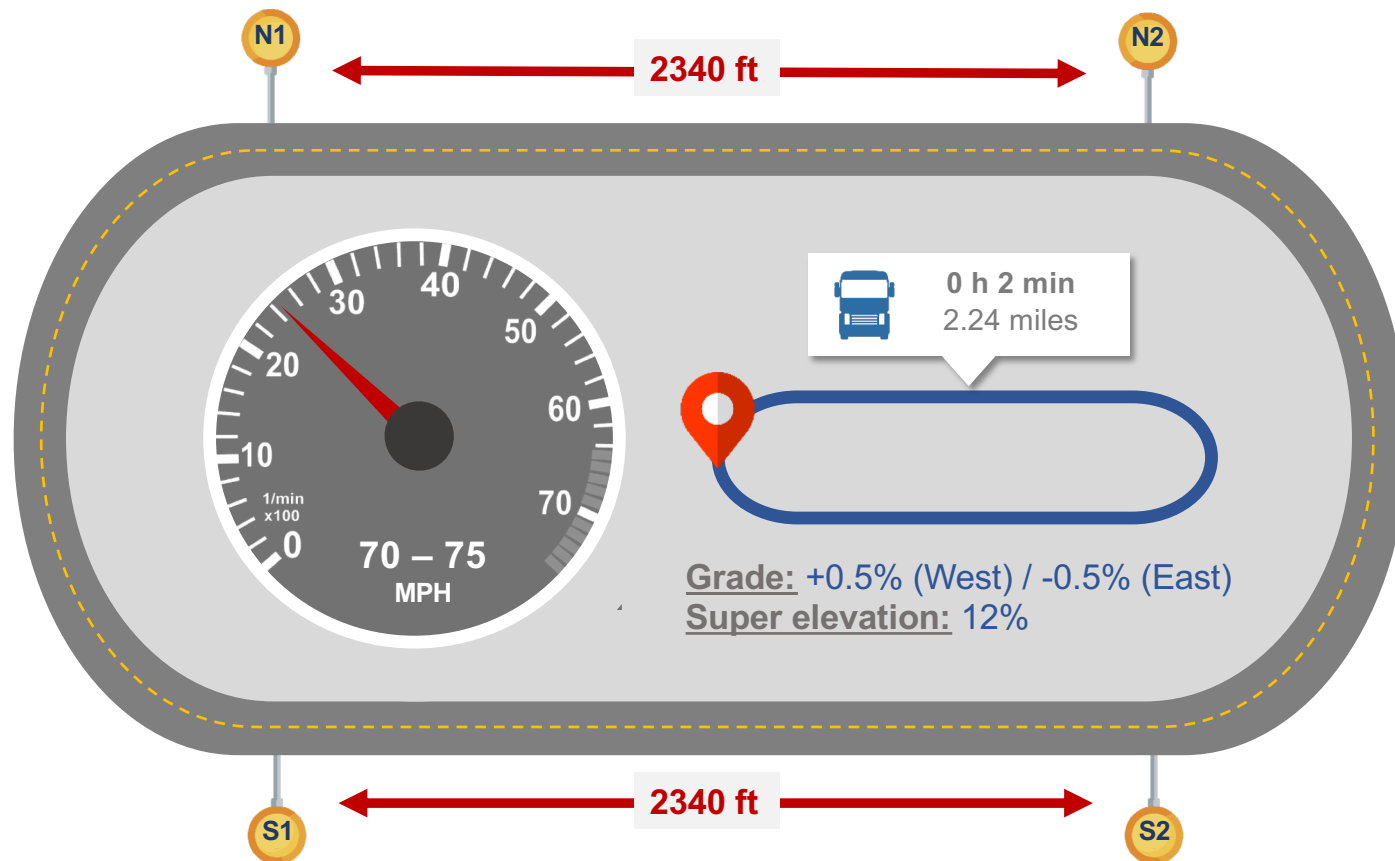
Building on established, successful models: I-ACT mends the gap for high-speed connected and autonomous trucks

Smart Freight

Track Length:

2.24 miles

Speed: **70-75 MPH**



I-ACT aims to optimize use of drone technology and infrastructure integration



Instrumented
Physical
Infrastructure



Cyber-Physical
Infrastructure and
Databases



Platform for System
Control, Operation
and Planning

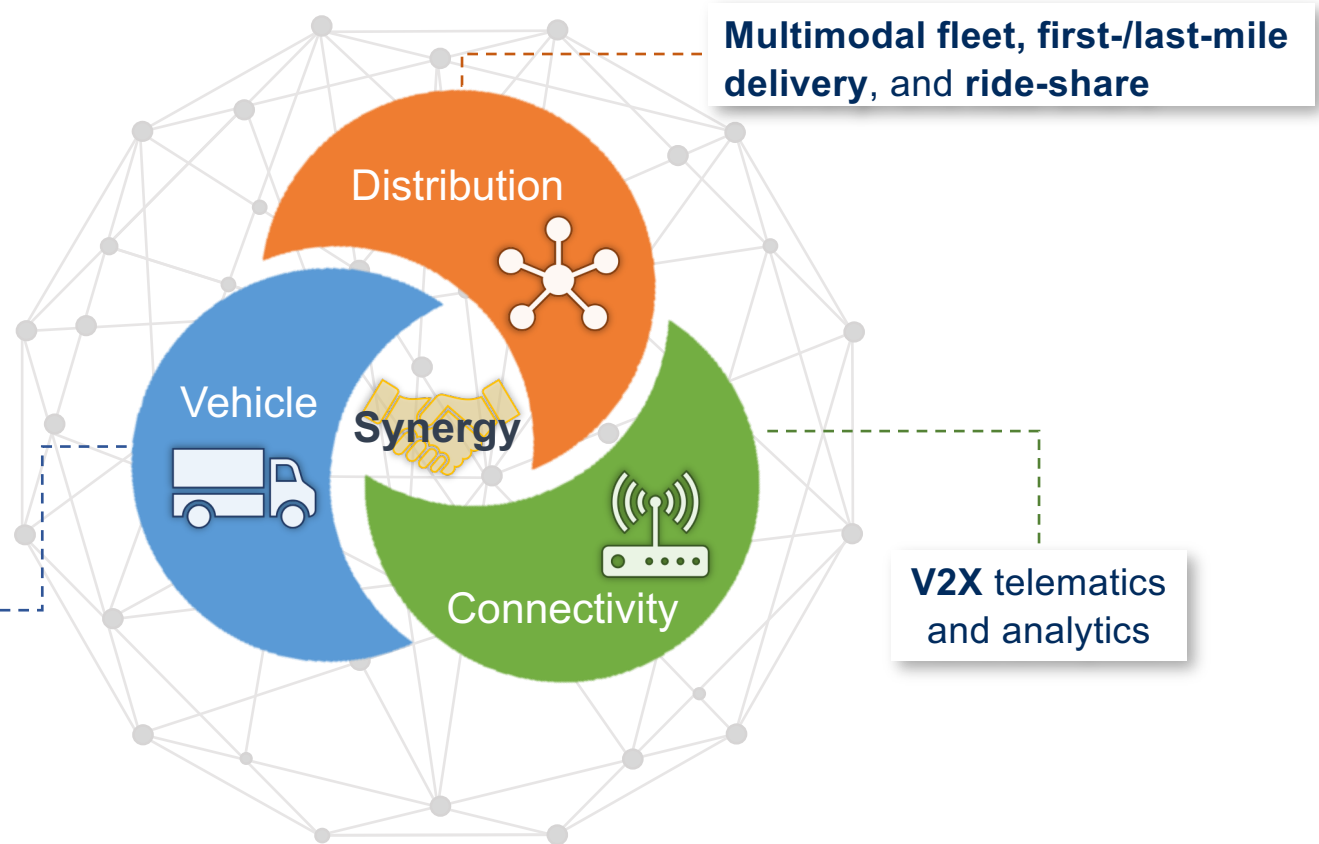


S T I I

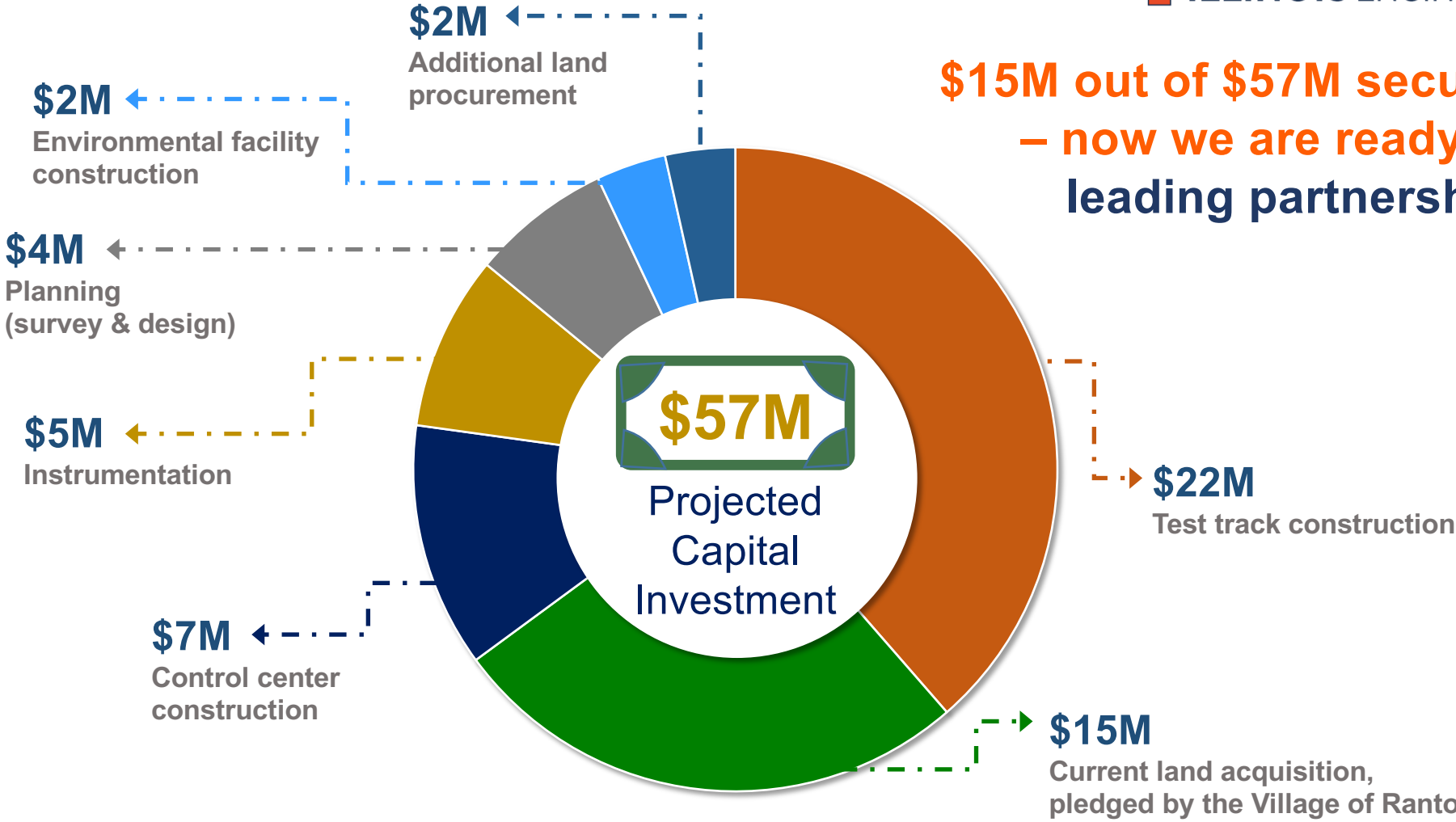
Attracting additional industry to Illinois: new branches, new companies, and new technologies

Infrastructure and energy harvesting

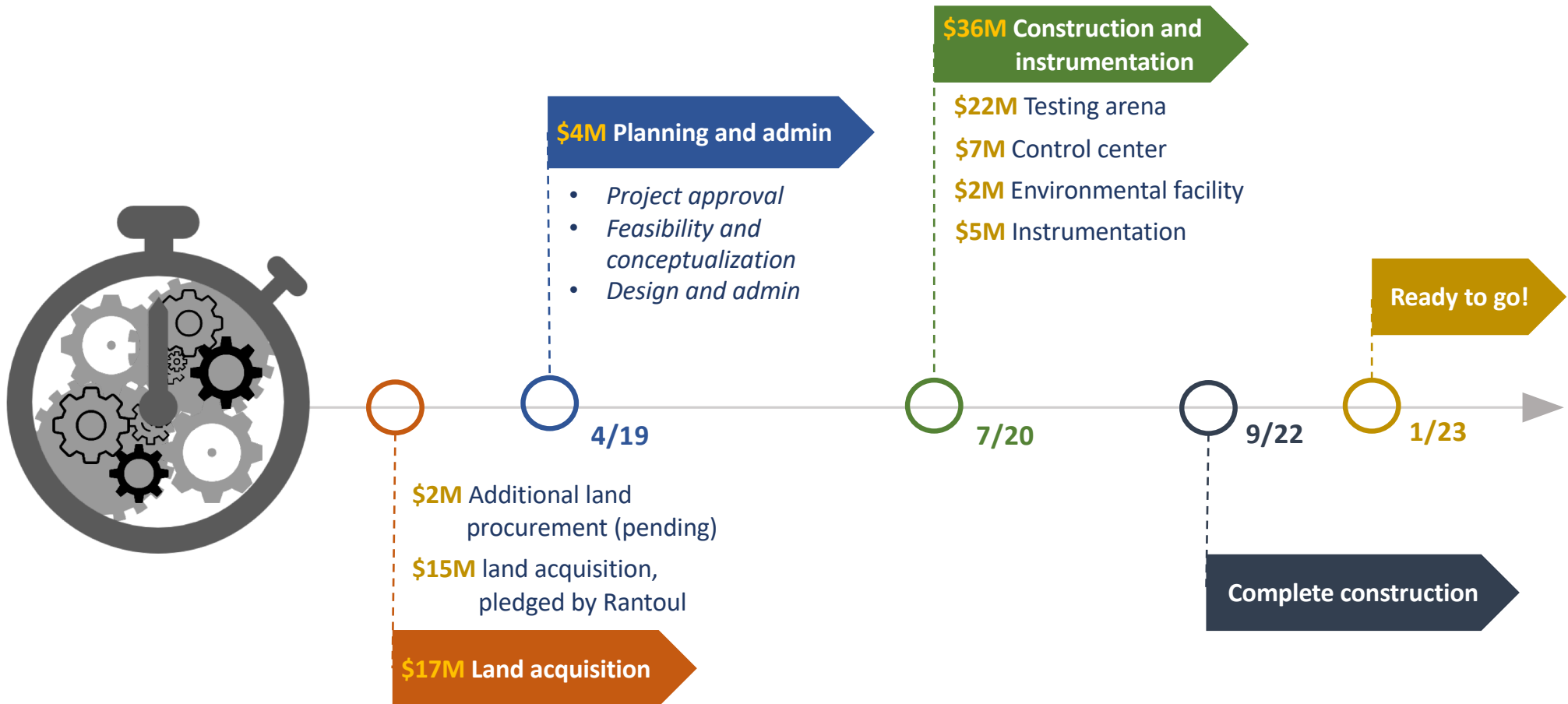
New CAV technology and retrofitting existing vehicles



\$15M out of \$57M secured
– now we are ready for
leading partnerships



I-ACT timeline: ready by 2023



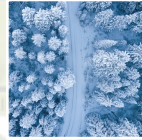
I-ACT testing arena will be the hub of numerous industries for high-speed freight and multimodal transport

Test Setting



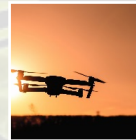
- Freight
- Highway (continuous loop, 75 mph)
- Highway interchange
- Agricultural land
- Airport
- Rural
- Suburban
- Commercial, micro-urban
- Residential
- Signalized intersections

Environment



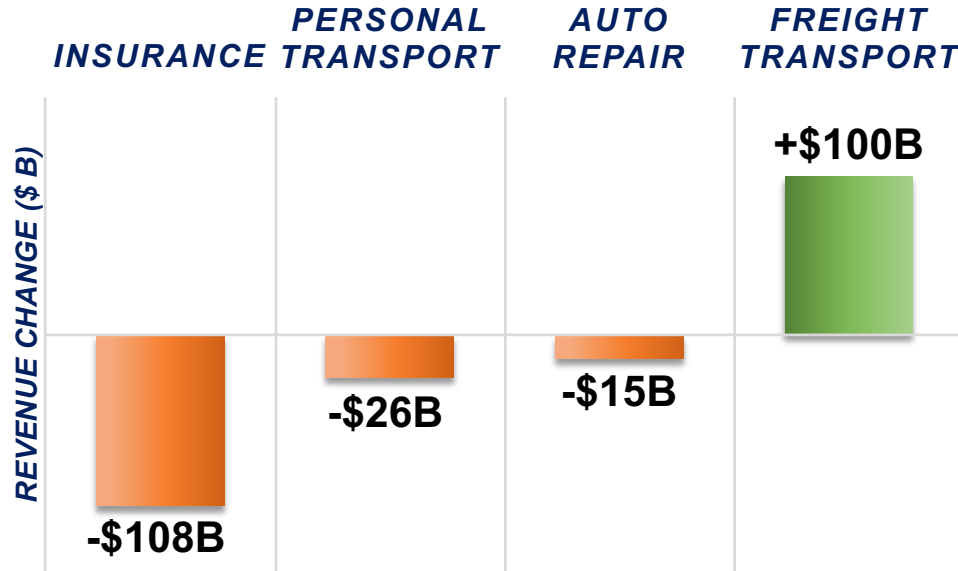
- Controlled indoor
- Rain
- Snow
- Ice
- Wind (speeds up to 40 mph)
- Fog
- Variable lighting
- Outdoor
- All seasons
- Natural conditions

Modes of Transport



- Freight (truck)
- Freight (loading and unloading)
- Smart containers
- Cars and light trucks
- Personal transport (bicycles and pedestrian)
- Mass transit
- Large drone
- Small drone
- Agricultural (land and air)

Increased movement of goods within the State of Illinois – leading to increase in workforce and industrial benefits



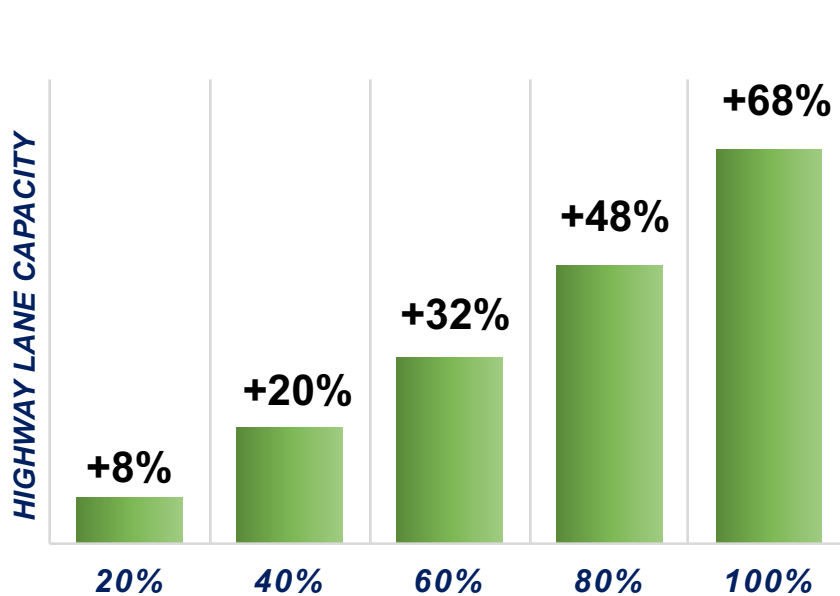
* 100% Automation

After Clements and Kockelman, 2017

- Safer Roads, Less Personal Vehicles
- Less People Owning Vehicles
- Increased Vehicle Reliability
- Increased Capacity of Transportation

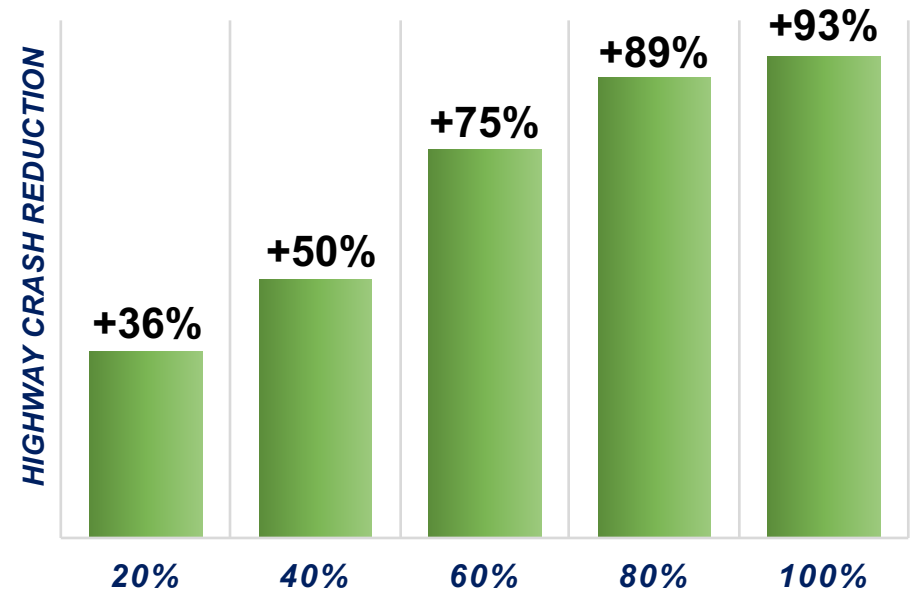
Optimizing connected and autonomous technologies lead to safe mobility of people and goods

Road Capacity - Safety



AUTONOMOUS VEHICLE PERCENTAGE

After Maurer et al., 2016

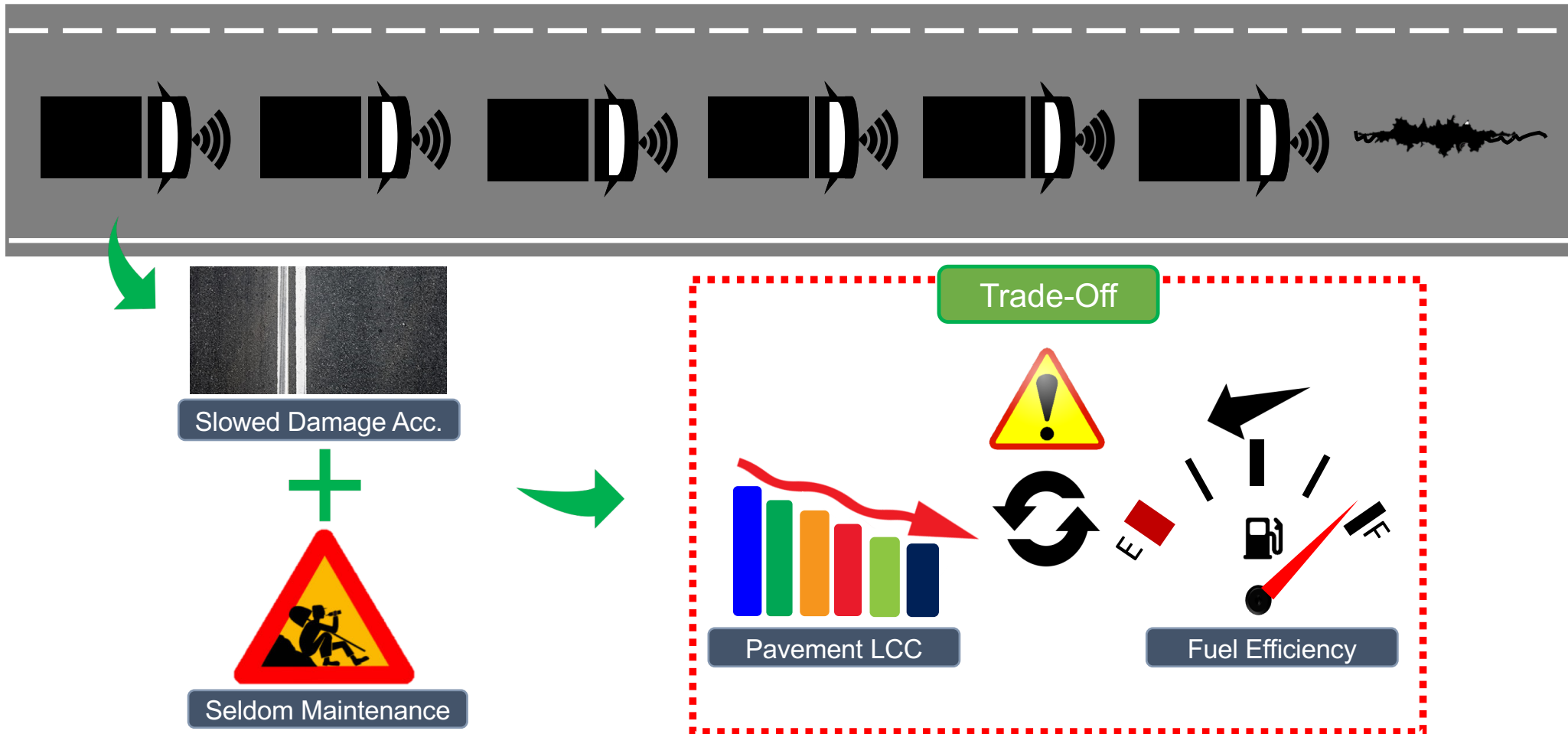


AUTONOMOUS VEHICLE PERCENTAGE

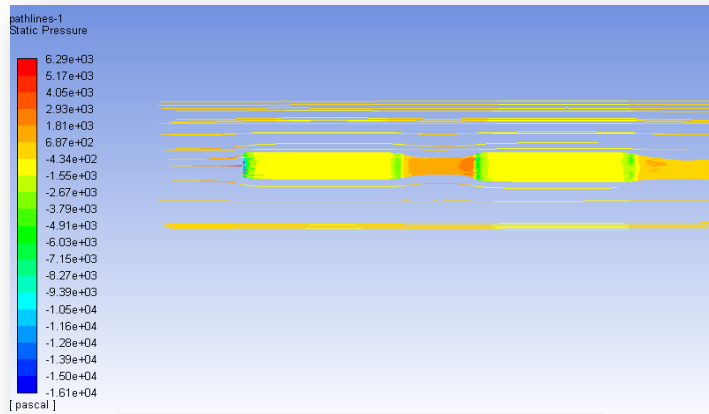
After Papadoulis et al., 2016



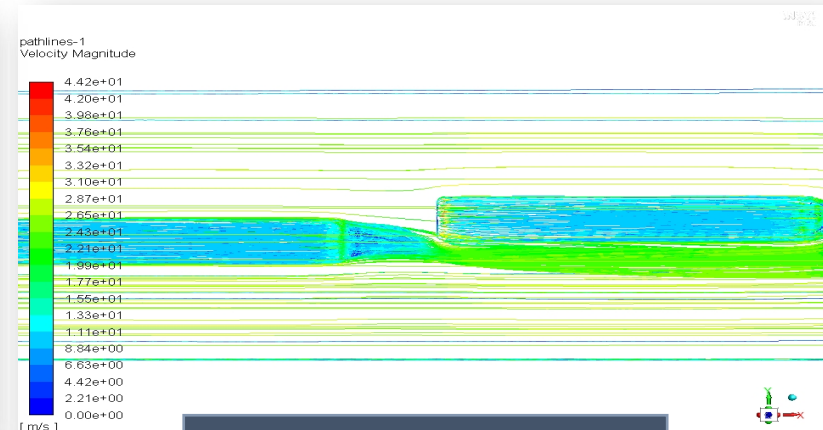
Ongoing research efforts with truck platooning



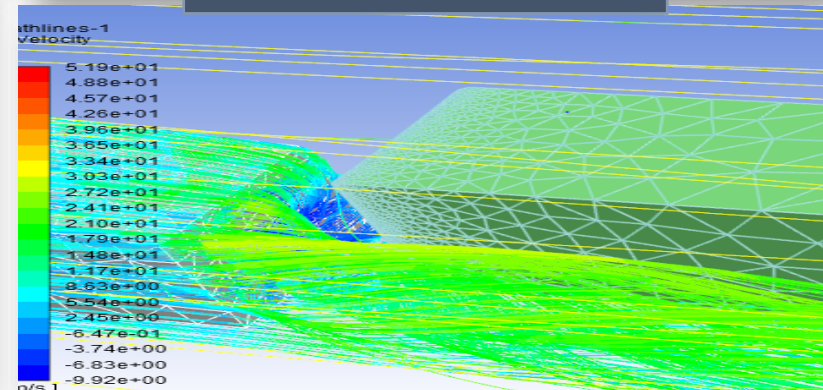
Optimizing freight movement and associated cost: aerodynamics numerical simulations



No lateral shift



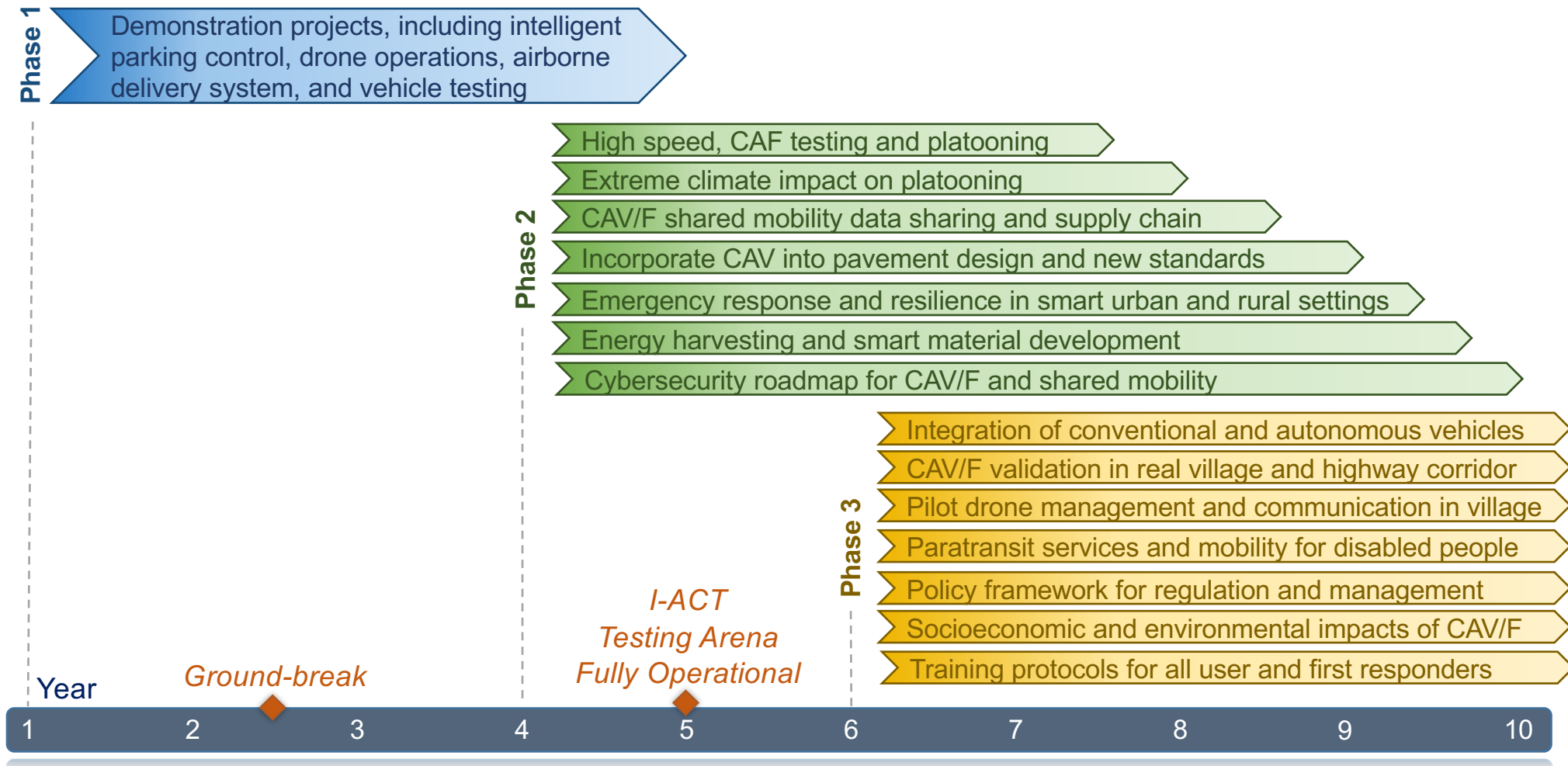
Shifted





Currently expected projects

Our researchers identified the following selected projects based on current relationships only



A large background image featuring a statue of Abraham Lincoln, viewed from the back and slightly to the side. The statue is set against a sky with clouds. The image is split into two main color sections: orange on the left and blue on the right, separated by a diagonal line.

Thank You!

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University of Illinois at Urbana-Champaign



Illinois Center for Transportation



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