An Arena for the Future of

Sustainable Mobility

Smart Transportation Infrastructure Initiative
stii.Illinois.edu
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**

**Grade:** +0.5% (West) / -0.5% (East)

**Super elevation:** 12%

**2340 ft**
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
Attracting additional industry to Illinois: new branches, new companies, and new technologies

- Infrastructure and energy harvesting
- New CAV technology and retrofitting existing vehicles
- Multimodal fleet, first-/last-mile delivery, and ride-share
- V2X telematics and analytics
$15M out of $57M secured – now we are ready for leading partnerships

- **$2M** Additional land procurement
- **$2M** Environmental facility construction
- **$4M** Planning (survey & design)
- **$5M** Instrumentation
- **$7M** Control center construction
- **$15M** Current land acquisition, pledged by the Village of Rantoul
- **$22M** Test track construction

Projected Capital Investment

- **$57M**
I-ACT timeline: ready by 2023

- **$4M Planning and admin**
  - Project approval
  - Feasibility and conceptualization
  - Design and admin

- **$17M Land acquisition**
  - $2M Additional land procurement (pending)
  - $15M Land acquisition, pledged by Rantoul

- **$4M Land acquisition**

- **$36M Construction and instrumentation**
  - $22M Testing arena
  - $7M Control center
  - $2M Environmental facility
  - $5M Instrumentation

- **Ready to go!**

  - Complete construction

  - 4/19
  - 7/20
  - 9/22
  - 1/23
I-ACT testing arena will be the hub of numerous industries for high-speed freight and multimodal transport.
Increased movement of goods within the State of Illinois – leading to increase in workforce and industrial benefits

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

* 100% Automation
After Clements and Kockelman, 2017
Optimizing connected and autonomous technologies lead to safe mobility of people and goods

Road Capacity - Safety

Autonomous Vehicle Percentage

After Maurer et al., 2016

After Papadoulis et al., 2016
Ongoing research efforts with truck platooning

- Slowed Damage Acc.
- Seldom Maintenance

Trade-Off

- Pavement LCC
- Fuel Efficiency
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:

**Phase 1**
- Demonstration projects, including intelligent parking control, drone operations, airborne delivery system, and vehicle testing

**Phase 2**
- High speed, CAF testing and platooning
- Extreme climate impact on platooning
- CAV/F shared mobility data sharing and supply chain
- Incorporate CAV into pavement design and new standards
- Emergency response and resilience in smart urban and rural settings
- Energy harvesting and smart material development
- Cybersecurity roadmap for CAV/F and shared mobility

**Phase 3**
- Integration of conventional and autonomous vehicles
- CAV/F validation in real village and highway corridor
- Pilot drone management and communication in village
- Paratransit services and mobility for disabled people
- Policy framework for regulation and management
- Socioeconomic and environmental impacts of CAV/F
- Training protocols for all user and first responders

Year

1  2  3  4  5  6  7  8  9  10

*Ground-break*
*I-ACT Testing Arena Fully Operational*