

I-ACT

Addendum #1

Revision to RFI Due Date, Questions Due Date, List of Attendees
and Project Information Day Presentations.

Addendum #1 is to extend the Illinois Automated and Connected Track (I-ACT) RFI due date from June 25, 2018 to **July 25, 2018**. Questions regarding the RFO will not be accepted after **July 6, 2018**.

This addendum also includes a list of attendees and the Northwestern University Transportation Center and University of Illinois Champaign presentations from the Project Information Day.

Name	Email	Organization
Bill Grunloh	bill.grunloh@illinois.gov	IDOT (Chief Procurement Officer)
Jeff Kern	jkern@openroadpaving.com	Champaign Asphalt
Joe Lamb	jlamb@champaignasphalt.com	Champaign Asphalt
Michael Daley	michael.daley@innovaev.com	Innova EV
John Korn	jkorn@ups.com	UPS
Ozzie Guillen Jr.	osguille@cisco.com	Cisco Systems
Bill Vavrik	wvavrik@ara.com	ARA
Michael Weiser	mickeysimple@comcast.net	Commuter Cars
Yuriy Shvalik	yshvalik@luxoft.com	Luxoft
Walter Beisheim	wbeisheim@CTIA.org	CTIA
Paul Mack	paul.mack@innovaev.com	Innova UV
Garry Huber	gerald.huber@hrglab.com	Heritage
Cedric Langbort	langbort@illinois.edu	UIUC
Scott Lee	slee@transmartinc.com	TranSmart/EJM
Firass Badaruzzaman	Firass.Badaruzzaman@elitetest.com	Elite Electronic Engineering
Paul Sikora	psikor3@illinois.edu	UIUC Student
Bret Johnson	bretj@northwestern.edu	Northwestern
Gerry Derksen	gderksen@illinois.edu	Design Concepts Lab
Don Takehara	dtakehar@illinois.edu	UIUC - COE
George Vukotich	vukotic2@illinois.edu	UIUC graduate
Gerod Carfantan	gerod@sente.link	Seute Foundry
Joe Renz	j.renz@ilavassoc.org	ILAVA
Jerry Quandt	j.quandt@ilavassoc.org	ILAVA
Greg Kristo	greg.kristo@stantec.com	Stantec
Mark Moran	moranmarkD@JohnDeere.com	John Deere
Charlie Glick	charlie.glick@solace.com	Solace
Ellen Partridge	epartridge@elipc.org	Environmental Law & Policy Center
Kevin O'Neill	kevin.oneill@aecom.com	AECOM
Neil Adams	neil.adams@illinois.gov	IDOT
Maddie Burke	mburke@waterstone-llc.com	Waterstone LLC.
Jeff Williams	jwilliams@waterstone-llc.com	Waterstone LLC.
Mike Flavin	mtflavin@uillinois.edu	U of I DPI
Craig Przygoda	cprzygoda@tcfbank.com	TCF Bank

Erin Aleman
Jacek Zwierzchlejski
Charlie McCarthy
Jamil Bousaab
Cory Hotts
Saif Abdulmohsin
Tim Barry
Rafael Salmi
Krystian Gebis
Jerren Chang

erin.aleman@illinois.gov
jzwierzchlejski@autobon.ai
cmccarthy@transmartinc.com
jbousaab@terraagency.com
cory@haasalert.com
tbarry@terraengineering.com
rsalmi@richardsonrfpd.com
krgebis@autobon.ai
jerren.chang@cityofchicago.org

IDOT
Autobon
TranSmart
Terra
Haas Alert
Mobilitie
Terra
Richardson RFPD
Autobon AI
Mayor's Office



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*Research That
Moves You*

June 2018





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Our Strategic Vision

- Pre-eminent think-tank and laboratory in the world for *cutting-edge research that matters* on a global scale.
- Provide the *premier educational program* in transportation systems.
- Essential academic partner for *novel, high-impact collaborative* research.
- Advance state of practice industry applications through a mix of engaged *application-driven research* and *fundamental advances*.



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Primary Areas of Activity

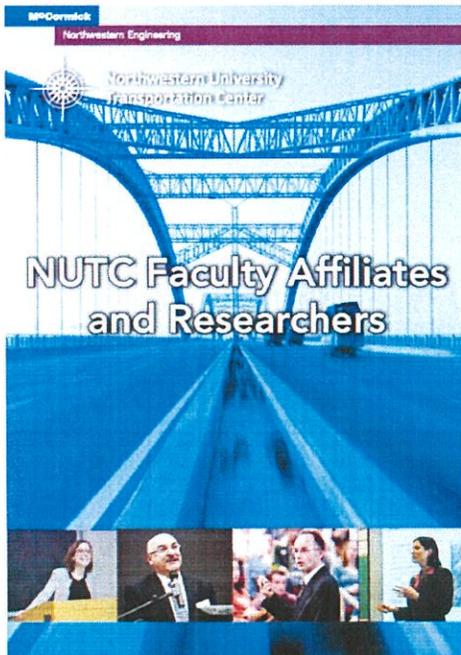
- **Research:** diverse portfolio of cross-disciplinary programs and projects; funding through government agencies, private industry
- **Graduate Education:** primary hub for transportation graduate students, pursuing degrees in different departments/schools (Civil and environmental engineering, Industrial and systems engineering, Kellogg, economics)
- **Undergraduate Education:** minor in Transportation & Logistics; popular among economics and engineering students
- **Industry Cooperation:** through Business Advisory Council and local, state and federal agencies
- **Executive Education programs:** selected and customized offerings, e.g. freight and logistics executive program, and policy development module conducted for elected officials and agency planning staffs in Indonesia.
- **Dissemination and Outreach:** Patterson Lecture, Lipinski Policy Symposium, Technical Seminar Series, Industry Technical Workshops, Sandhouse Rail Seminars, Icarus Aviation Seminars, academic conferences, strong media presence of faculty.



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Faculty Expertise is Wide and Deep



60+ faculty affiliates

- Transport economics
- Demand forecasting and planning
- Strategic planning and freight mobility
- Network modeling and design
- Sustainable transport and green logistics
- Traffic systems operations and safety
- Financing schemes and policy assessment
- Impact assessment and mitigation
- Integrated logistics operations
- Civil and infrastructure systems, health monitoring
- Asset management
- Marketing and risk communication



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Strategic Research Focus Areas

1. Re-inventing the **User Experience** in transportation
 - Freight and passenger
 - Business Intelligence in support marketing / operations
 - New focus on design: urban design, facility design
2. Smart Cities, **Driverless Vehicles, Connected Systems**
3. **Freight**, Logistics and Economic Competitiveness
4. **Data Driven** Operations and **Analytics** for Transportation
5. Transportation **Energy** and **Sustainability**
6. **Mixed** Traffic Flow



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Research: Autonomous and Connected Vehicle Systems



1. Two ongoing FHWA projects

Twinned with European Community project with similar scope

2. New international collaboration on CAV impacts

1. Led by Technical University of Munich (Global Fund Initiatives)
2. In partnership with NUTC and UC-Santa Barbara.

3. ILLINOIS AUTOMATED AND CONNECTED TRACK (I-ACT)



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Experienced Leadership



Hani Mahmassani, Director, NUTC

- William A. Patterson Distinguished Chair in Transportation
- 30+ years of professional, academic and research experience in the areas of multimodal transportation planning and network modeling, freight and logistics systems analysis, homeland security and emergency systems operations, intelligent transportation systems, econometric modeling and applications to travel and freight demand forecasting.
- Principal investigator on over 150 funded research projects sponsored by international, national, state, and metropolitan agencies and private industry.
- PhD, Massachusetts Institute of Technology in transportation systems;
- MS, Purdue University in transportation engineering



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Corporate Engagement– Part of Our DNA

- NUTC approved by Board of Trustees in **1954**
- **Opened in Fall 1956** as an operational organization with programs of education, research and service
- Joint undertaking of School of Commerce, Tech Institute, and the Traffic Institute
- At founding, few or no universities focused on transportation education and research
- **Industry Engagement from the Outset**
 - **Atchison, Topeka & Santa Fe Railroad, United Airlines, Standard Oil, Lockheed Aircraft Corporation**



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Business Advisory Council

- 90+ Senior Transportation Executives
- Representing all modes of transportation
- Lead Business Advisory Council Members are Prominent Names in Industry





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BAC Members Span Modes and Disciplines

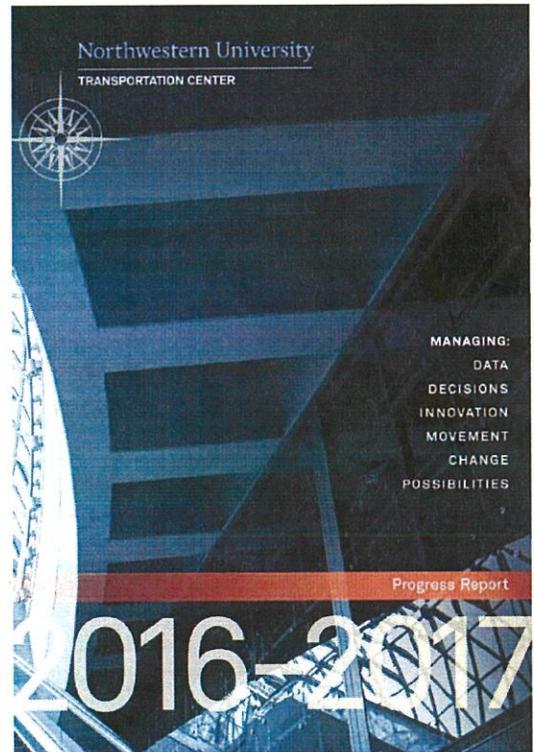




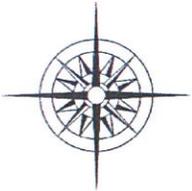
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MORE
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<http://www.transportation.northwestern.edu/documents/about/progress-reports/2016-17.pdf>



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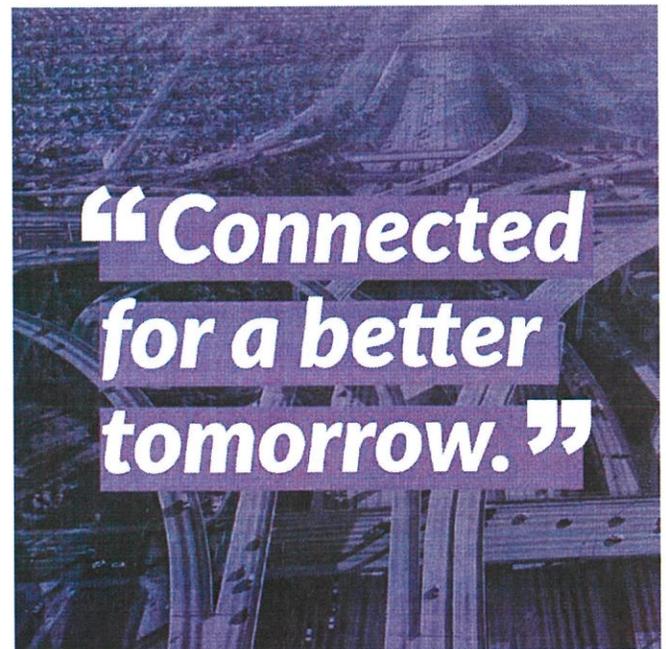
Contact

Bret Johnson
Associate Director

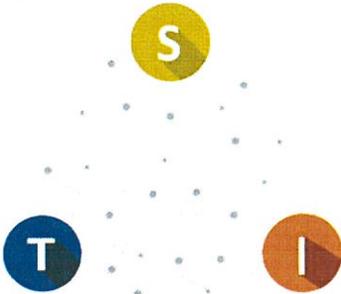
847-491-2194

bretj@northwestern.edu

600 Foster Street
Evanston, IL 60208



I ENGINEERING AT ILLINOIS
Smart Transportation Infrastructure Initiative



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T **I**

Imad L. Al-Qadi
University of Illinois at Urbana Champaign
June 04, 2018

Illinois Department of Transportation **I** ILLINOIS UNIVERSITY OF ILLINOIS AT CHICAGO **UIC** Northwestern University

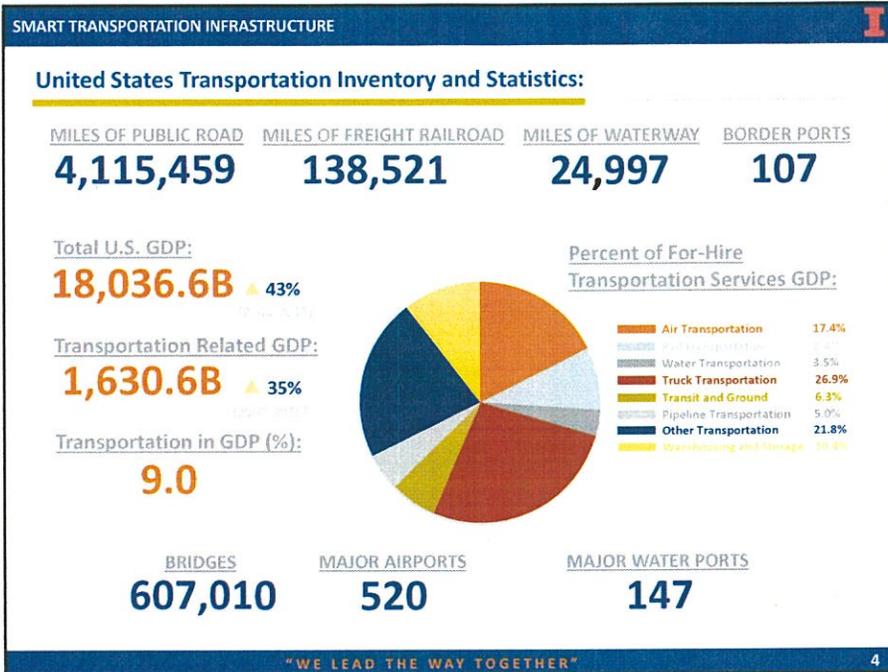
"WE LEAD THE WAY TOGETHER"

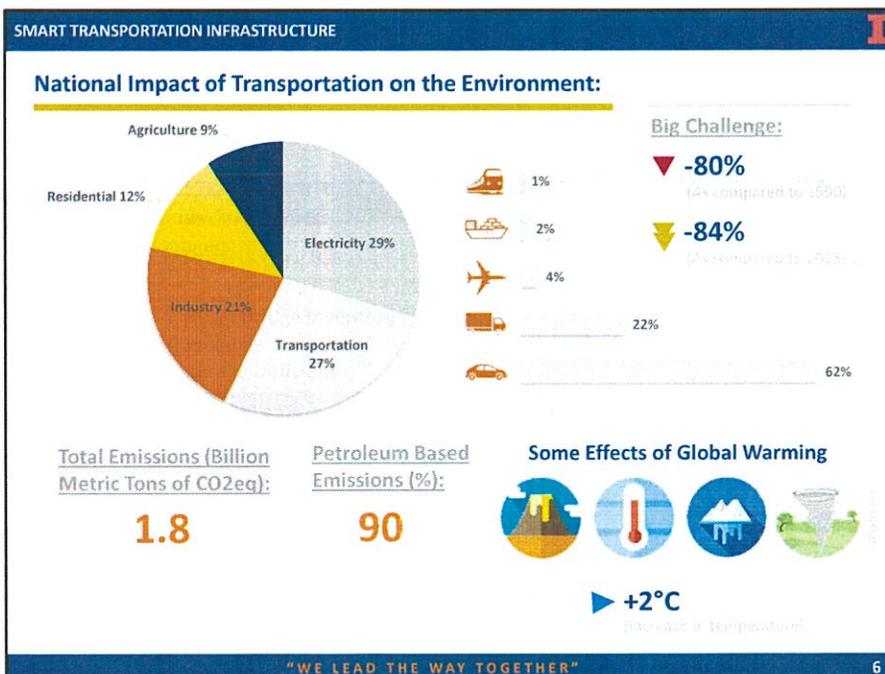
SMART TRANSPORTATION INFRASTRUCTURE **I**

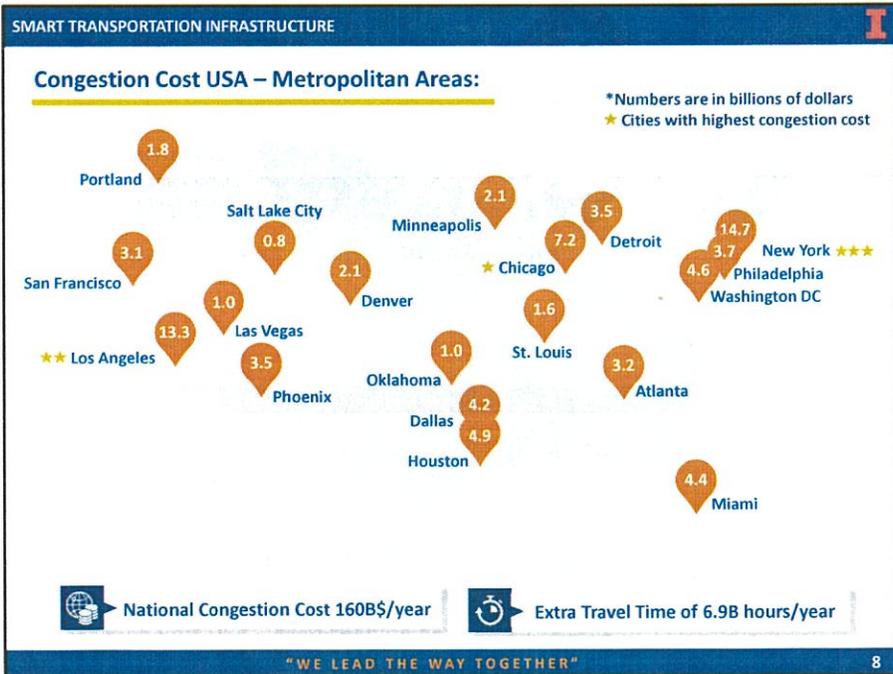
Outline

- I** United States Transportation Data 
- II** Critical Issues for National Transportation Development 
- III** Smart Transportation Infrastructure 
- IV** Illinois Autonomous and Connected Tracks 

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SMART TRANSPORTATION INFRASTRUCTURE



1900s

Ferries, Omnibus and Steam Trains

Traffic Jam on Randolph Street, Chicago in 1909



Water Street Market that ran parallel to the river, Chicago in 1890 (estimated)

Omnibus and Horse Cars

1880s

I



Today

Trucks and Passenger Vehicles

Almost Daily Traffic Congestion, Chicago

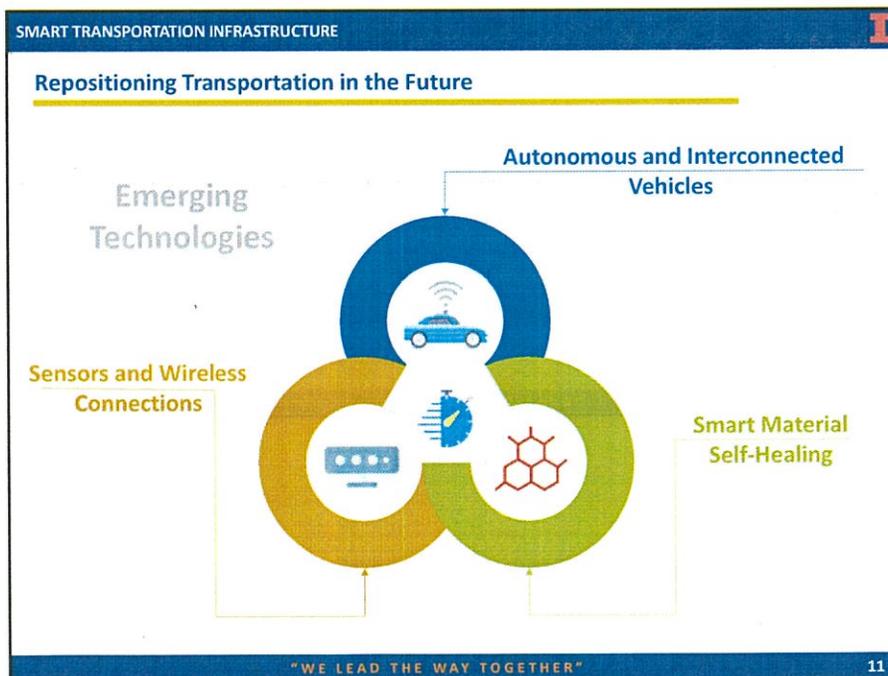
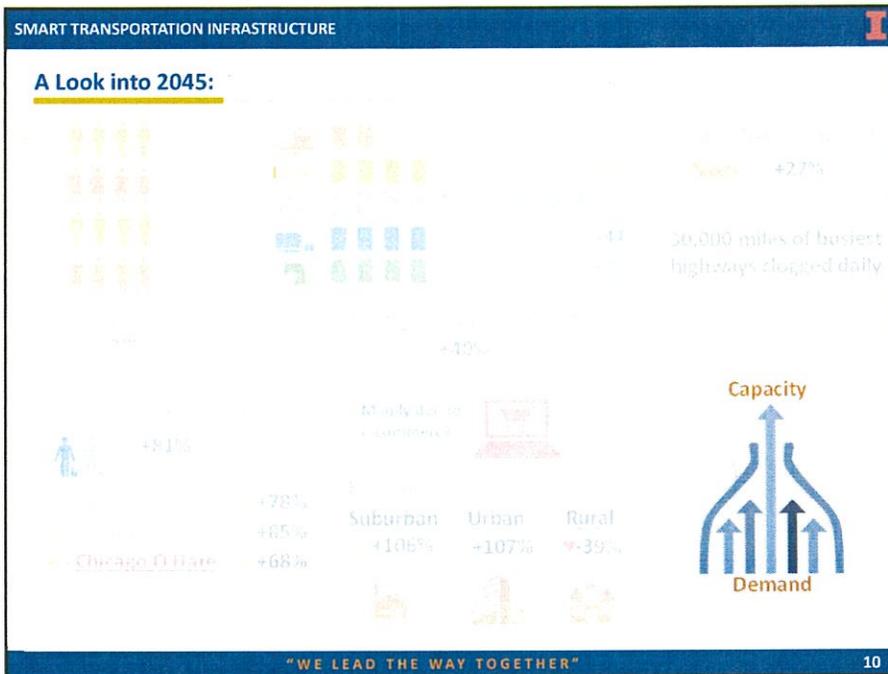


Traffic Jam in The Downtown Area, Chicago in 1927

Street Cars and Railways

1920-40s

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SMART TRANSPORTATION INFRASTRUCTURE **I**

Autonomous and Interconnected Vehicles

The diagram illustrates a bidirectional relationship between two components. On the left, a blue box labeled 'Platooning and Autonomous Vehicles' contains an icon of a car with a Wi-Fi signal. On the right, a blue box labeled 'Infrastructure (Pavements, Bridges etc.)' contains an icon of a road. Two orange arrows, one pointing from the vehicles to the infrastructure and one from the infrastructure to the vehicles, are labeled 'Wireless Communication'.

Main advantages of autonomous and interconnected vehicles:

- A. Higher speed
- B. More control over vehicles
- C. Safer transportation – less crashes
- D. Less congestion

An aerial view of a multi-lane highway with several cars. Blue lines radiate from each car, representing wireless communication signals between the vehicles and the infrastructure.

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SMART TRANSPORTATION INFRASTRUCTURE **I**

Smart Transportation Intermodal Connection:

The illustration shows a city skyline with various transportation modes and communication infrastructure. An airplane is flying in the sky, a train is on a track, and a car is on a road. Several communication towers are shown, with signal waves emanating from them, indicating a networked transportation system.

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SMART TRANSPORTATION INFRASTRUCTURE **I**

Smart Transportation Infrastructure Initiative (STI²):

Vision

The Smart Transportation Infrastructure (STI²) is envisioned to improve **safety**, **mobility**, security, **connectivity** and reduce **energy consumption and emissions** for the next paradigm of transportation systems, including roadway, air, rail, water, and intermodal.

01 Research and Policy

Development of research and policy in support of safe and automated mobility of people/goods

02 Connectivity Needs

Fulfill state, national and global connectivity needs (development/ employment of innovative transportation ideas)

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SMART TRANSPORTATION INFRASTRUCTURE **I**

Partnership of Proven Leaders in Transportation Innovation for over 75 Years:

STI² is a consortium that provides users access to top international talents and leadership and state-of-the-art testing facilities

Academia

Government

Industry

Combined knowledge covers a wide range of expertise:

- Transportation Engineering & Operations
- Computer Science
- Engineering: Electrical, Industrial, Mechanical, Aerospace, Materials, Bio,.....
- Human Factors
- Urban Planning
- Education
- Economy
- Policy, Laws,

The consortium also expands to not-for-profit entities.

Proposed Academic Institutions and Research Centers:

ILLINOIS UNIVERSITY OF ILLINOIS AT CHICAGO UIC

Northwestern University

ILLINOIS CENTER FOR TRANSPORTATION

UIC Artificial Intelligence Lab

Northwestern University Transportation Center

Governmental Agencies:

Illinois Department of Transportation

Industry members:

FedEx

AECOM

SCHNEIDER

IntelinAir

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SMART TRANSPORTATION INFRASTRUCTURE I

Suggested Smart Transportation Infrastructure (STI²) Approach:

2-3 Develop Needed Infrastructure and Facilitate Integration of New Concepts, Technologies, & Deployment

1. Sensing and control systems at various spatial-temporal scales
2. Security and fault tolerance
3. Verification and Validation (V&V)
4. Flow and infrastructure performance implications
5. IoT

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SMART TRANSPORTATION INFRASTRUCTURE I

Illinois Automated and Connected Track (I-ACT) and Connected Village

New era of national automated personal and freight mobility facilitated through a **safe and robust platform**

- I Closed Test Tracks (Big Lab)
- II Urban and Metropolitan Roads
- III Multi-modes of Transportation
- IV Interstate Corridor Testing Facilities

Goals:

- I. Accelerate development and deployment of automated transportation
- II. Ensure **safe and efficient** mobility/operations
- III. Maximize **public benefits** by leveraging connected transportation technologies

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SMART TRANSPORTATION INFRASTRUCTURE **I**

Illinois Autonomous and Connected Tracks (I-ACT) Development Stages

Existing



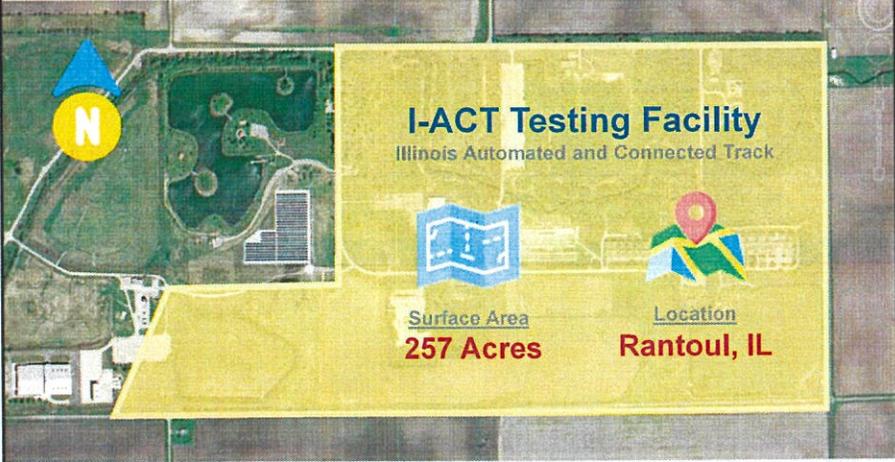
- Immediate opening to testing trucks, vehicles, drones in open space
• Parking lot of 15000 ft²
- Construction of **1.92 miles of smart track** and "authentic smart city" including, intersection, bike paths, and sidewalks
- Use of interstate corridors and Village of Rantoul for validation
- Deployment of developed technology in urban areas (e.g. Chicago)

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SMART TRANSPORTATION INFRASTRUCTURE **I**

Land Acquisition Allocated to I-ACT and STI²

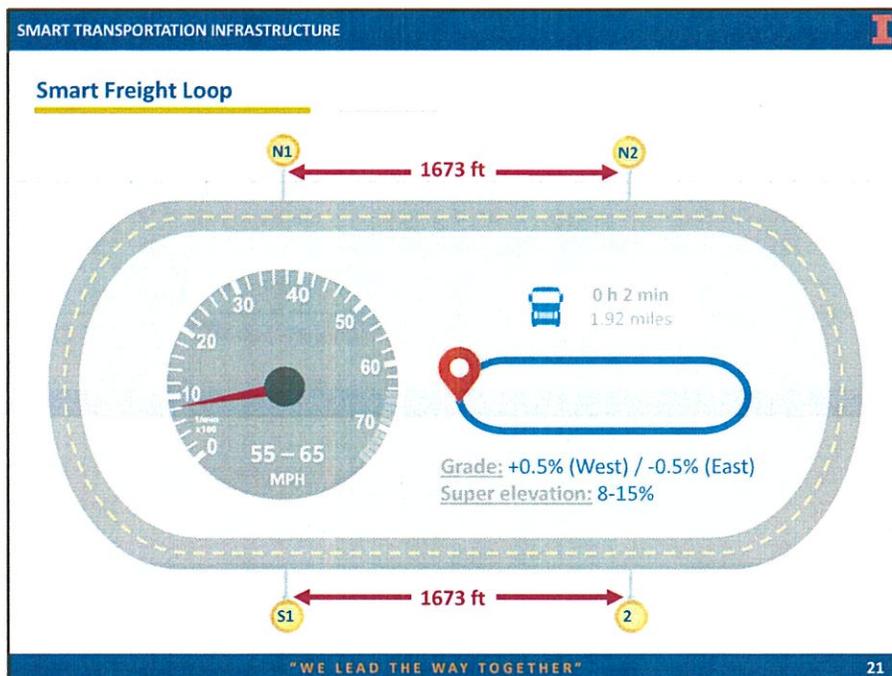
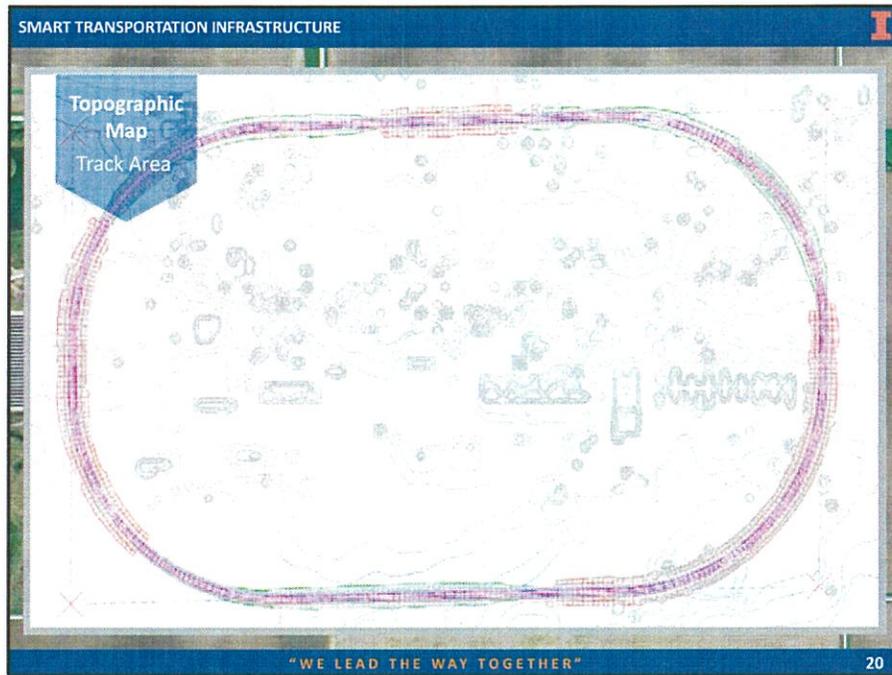


I-ACT Testing Facility
Illinois Automated and Connected Track

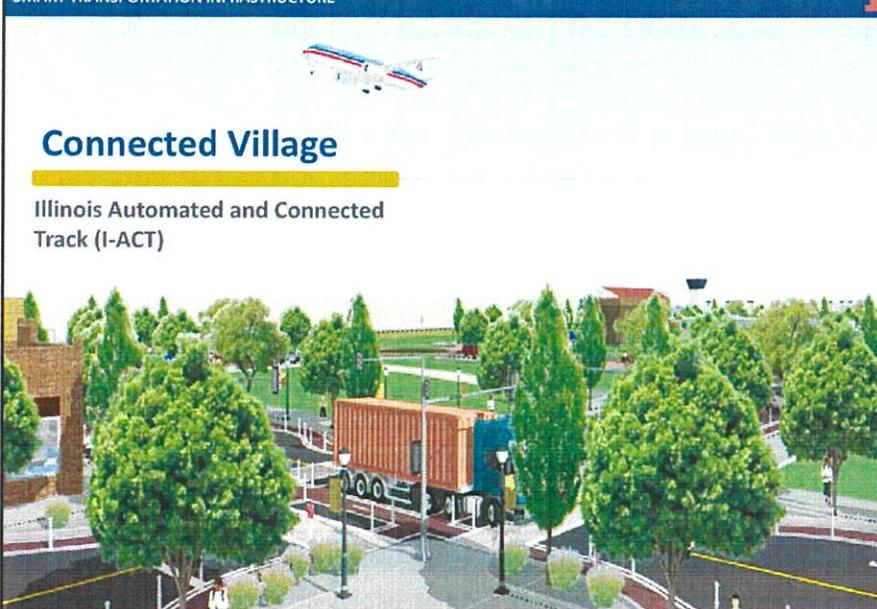
Surface Area
257 Acres

Location
Rantoul, IL

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SMART TRANSPORTATION INFRASTRUCTURE I



Connected Village

Illinois Automated and Connected Track (I-ACT)

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SMART TRANSPORTATION INFRASTRUCTURE I

Illinois Automated and Connected Track (I-ACT)

Instrumented Physical Infrastructure

Cyber-Physical Infrastructure and Databases

Platform for System Control, Operation and Planning

- I. Control, Flow Stabilization, and Vehicle Platooning
- II. Speed, Routing and Network Management
- III. Shared Mobility in Multimodal Context



Operations Center



Underpass



Transit Loop Bus Lane

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SMART TRANSPORTATION INFRASTRUCTURE **I**

Illinois Autonomous and Connected Tracks (I-ACT) and Connected Village



Roundabout

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I ILLINOIS



Thank You

 Illinois Department of Transportation

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