Intermodal Transportation Institute (ITI)

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The University of Toledo

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Genesis of the ITI

- ITI a Community Driven Initiative
  - **1990s:** Public and private sector organizations encouraged the University of Toledo (UT) to develop a center focusing on transportation, logistics, and supply chain issues
  - **Spring-Summer 2001:** Government, industry & university leaders identify regional strengths & opportunities in transportation
  - **July 2001:** President Johnson arrives on campus and quickly sees the strategic location and infrastructure
  - **Oct. 2001:** President Johnson announces the creation of the Intermodal Transportation Institute (ITI)
  - **Jan. 2002:** ITI begins operation

Working Together for a Common Purpose

- **Governments:** *City of Toledo, Lucas County, Wood County, Congressional Representatives, FHWA, ODOT*
- **Public Agencies:** *Port Authority, TMACOG, Regional Growth Partnership, TARTA, Toledo Express Airport, Port of Toledo, Regional Technology Alliance, EISC – Technology Center, Ohio Department of Development*
- **Industries:** *Roadway Express, Grand Aire, D&L Trucking, Bax Global, Dana Corporation, Hub Group, Transportation Advocacy Group for Northwest Ohio, Nagle Lines, N-Viro International Corp., Owens Corning, SSOE, Benchmark Engineering, Toledo Trucking Association, Ohio Trucking Association*

Vision Statement

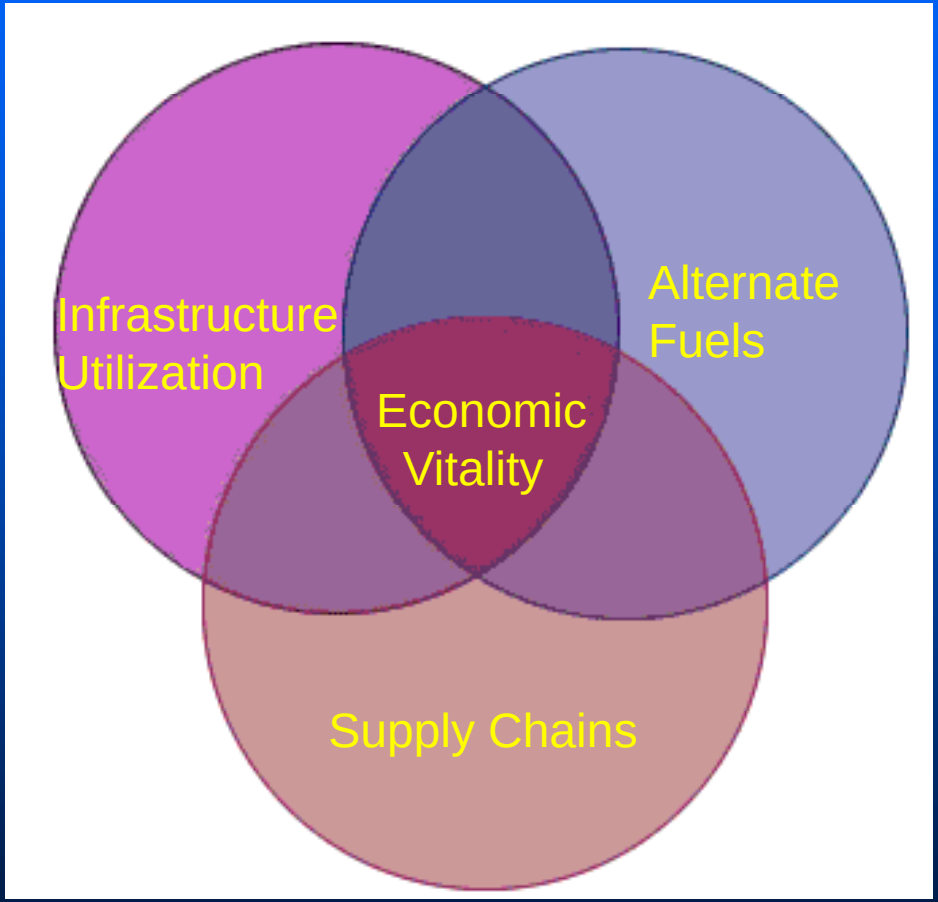
- To develop technology-enabled intermodal transportation systems and supply chains that promote economic development and quality of life.

Goals and Objectives

- Create an internationally recognized center of excellence
- Advance technology and expertise in the many disciplines comprising transportation
- Educate a multi-disciplinary work force
- Attract students, faculty, and staff in undergraduate, graduate, and profession programs
- Enhance diversity in the various fields related to transportation

Focus Areas: Alternate Fuels, Infrastructure Utilization, and Supply Chain Applications

- Decision-making and planning
- Life cycle costs
- Hazardous material
- Administrative impediments
- Safety and Security



- Technology: fuels & hybrid vehicles
- Revenue Impacts
- Fuel Distribution

- Logistics & Distribution
- Information systems
- Intermodal connectivity
- System-wide efficiency

Based on an interdisciplinary approach that links engineering, technology, business, and geography and planning

Active Projects

- Upper Midwest States Freight Study
- Midwest Regional Freight Planning and Research Institute
- Facility Management Information System
- Information Management for the Maumee River Crossing
- Transportation Cluster Leadership
- Transportation Opportunity District
- BIO-Diesel Fuel Study
- Hybrid Vehicle (BGSU bus and plug-in hybrid vehicles)
- Related Research in Alternate Fuel such as Production of Hydrogen from Clean & Renewable Sources for Fuel Cell Vehicles
- Metropolitan Utility Link for Transportation to Industry
- Short Sea Shipping
- KACI Intermodal System
- U.S. DOT University Transportation Center
- Global Network of Universities through ICHCA
- Center for International Business Education and Research

BIO-Diesel Fuel Study

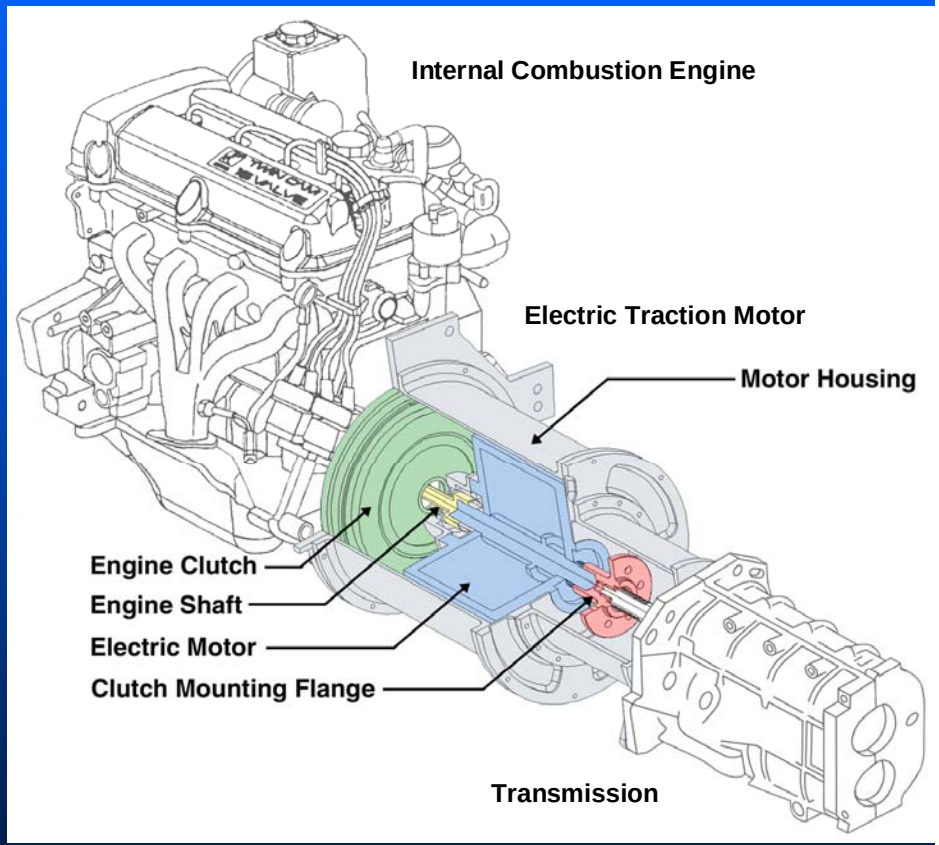
- Objectives: Evaluate the impact of using a mixture of bio-fuel and diesel fuel on operating costs, emissions, engine performance, and engine life (Toledo Public Schools and TARTA)
- U.S. DOT sponsored **(funded for $1.5 million)**
- Unique aspects of project:
  - Large scale study using new vehicles to set an effective benchmark
  - Collect extensive emission (in-bus and tail pipe) and engine wear data
  - Examine the impact of technology and economies of scale on large scale production

Hybrid Vehicle BGSU and UT

- Develop vehicles that combine electric propulsion with other power sources
- Project supported by NASA
- Conducted by Electric Vehicle Institute at Bowling Green State University and the Power Electric Lab at the University of Toledo
  - Advanced diesel electric hybrid vehicle systems
  - Diesel electric hybrid battery development
  - Battery and ultra-capacitor management system

Plug-in Hybrid Electric Vehicle?

- Combine function of EVs and HEVs
  - "Electric range" equivalent to 10-60 miles of driving
    - »60 miles is a long-term outlier
  - Overnight recharge
  - Continuous driving possible without recharge
- Plug-in HEVs use electricity while battery charge is high
  - Switches to hybrid mode when:
    - »Battery charge is low
    - »Higher vehicles speeds
    - »Driver requires full power
- Plug-in HEVs have the potential for further petroleum reduction by substitution of grid electricity



Related Research in Alternate Fuel

- Hydrogen Generation from Photovoltaic Systems: Research awards from State of Ohio and U.S. Department of Energy
- Fuel Cells: Third Frontier project funding from State of Ohio; partnership with Case Western Reserve University

Supply Chain Projects

- Develop alternative to move freight short distances in urban areas with a “campus approach” to manufacturing (MULTI-F)
- Short Sea Shipping Initiative
- KACI Intermodal Systems: linking rails to trucks to achieve efficiency in short haul operations

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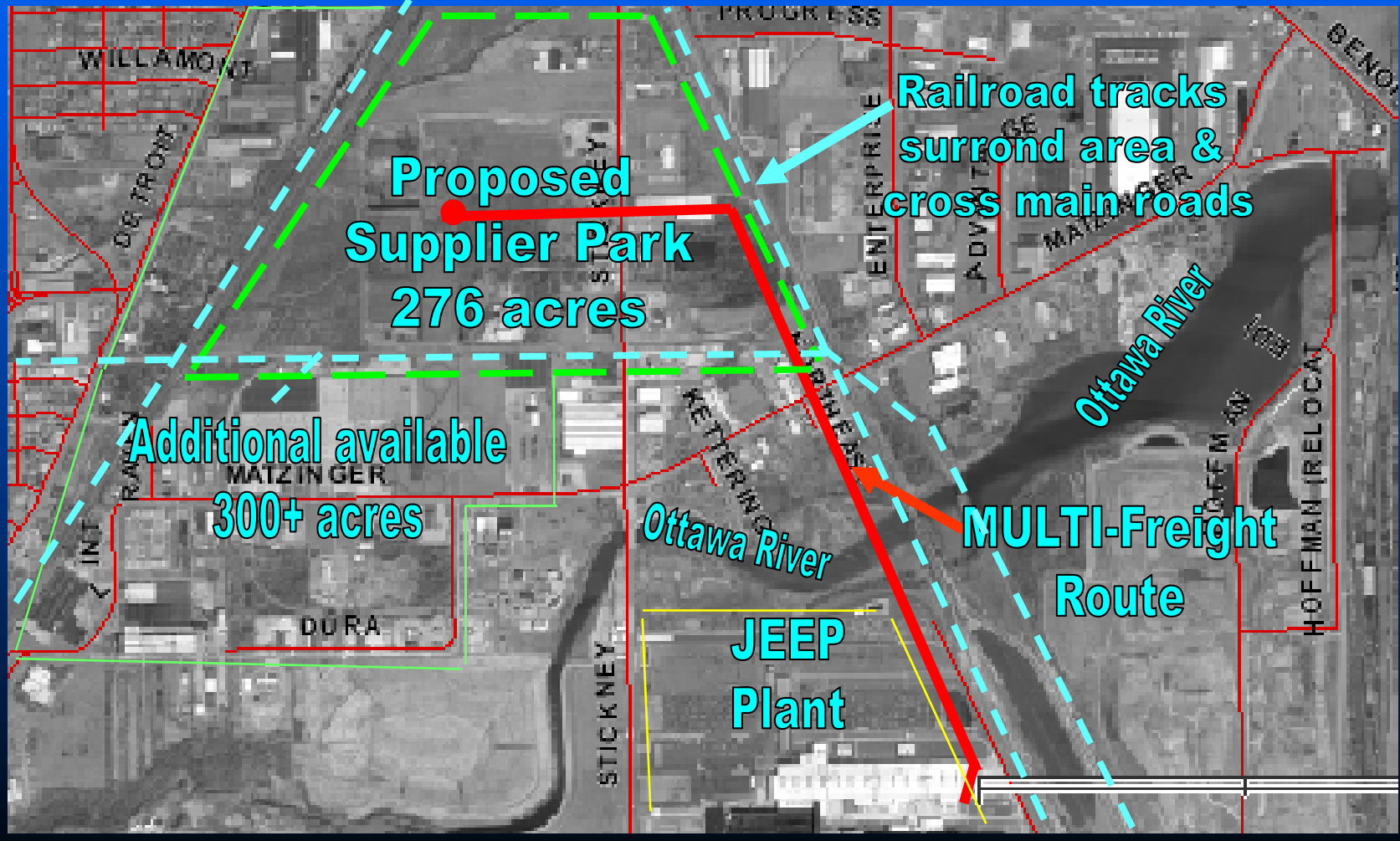
Toledo-Lucas County Port Authority

MULTI-Freight

Available Land – Jeep Plant - MULTI-Freight Link



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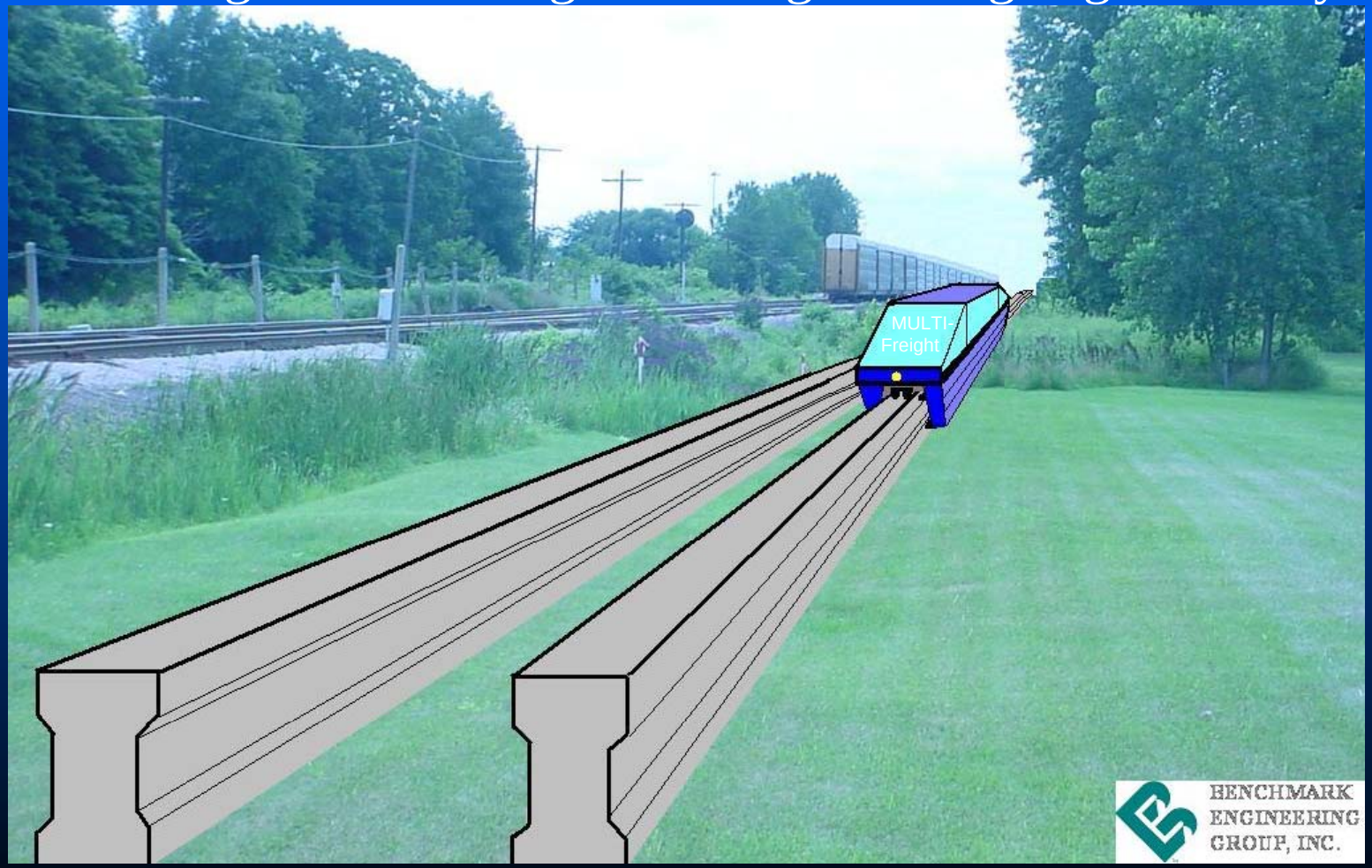
MULTI-Freight

MULTI-Freight Beams on grade along Existing Right-of-Ways



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MULTI-Freight

MULTI-Freight Beams slope up eliminating At-Grade-Crossings

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MULTI-Freight

MULTI-Freight Crosses Over Railroads and Roadways

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MULTI-Freight

Products arrive at Assembly Plant on-time and undisturbed

Short Sea Shipping

- Specific Projects: Integrated Tug Barge – Midwest grain to the Carolinas
- New Ideas for Great Lakes Shipping:
  - Ship design
  - Propulsion
  - Staffing
- Opportunities for containers and trucks (US—80truck versus Europe—45% truck

The KACI System

An operational concept that can provide a very quick, inexpensive, and uniquely simple exchange of highway vehicles onto and off trains.

This breakthrough in time, equipment, and labor savings changes the limit that prevents intermodal trains from being cost-effective in short and medium haul markets.

U.S. Department of Transportation University Transportation Center

- University of Toledo designated as a UTC and **funded** for $500,000 per year for four years **($2 million)**
- University of Toledo is one of five members of a second UTC that is led by the University of Detroit and funded for a similar amount

Global Network of Universities

- University of Toledo & International Cargo Handing and Coordination Association (ICHCA International Limited) will work together to create the network
- ICHCA is a membership organization of more than 900 transportation professionals from 80 countries
- ICHCA promotes new technologies and best practice for efficient movement of goods and people by coordinating all modes of transportation.
- The partnership will access and assemble resources from across the universities and bring them to bear on the needs and priorities of the industry.
- UT-ITI will become ICHCA Secretariat for North America

Center for International Business Education and Research (CIBER)

- U.S. Department of Education grant proposal
- Focus Areas:
  - International business
  - Global supply chain management,
  - Family business,
  - Foreign language and global/area studies
- Purpose: Improve global competitiveness of U.S. firms (focus on family businesses)
- Funding request: $1.6 million

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