

# The Role of Transportation in the Kansas Economy



**University of Kansas**

**Transportation Research Institute**

**Bob Honea, KU TRI Director**

# Three big drivers of transportation research



- Our daily lives depend upon transportation.
- We face an energy crisis that will change our transportation system.
- Transportation research can be an economic development engine.

# KU TRI history

- A newly created entity started in 2005 after acquiring \$14.5 million in federal appropriations.
- KU TRI seeks to build upon the strengths of KU research efforts in transportation by fostering a cross-disciplinary inquiry into a wide spectrum of emerging transportation issues.

# KU TRI has

## **Six strategic thrusts**

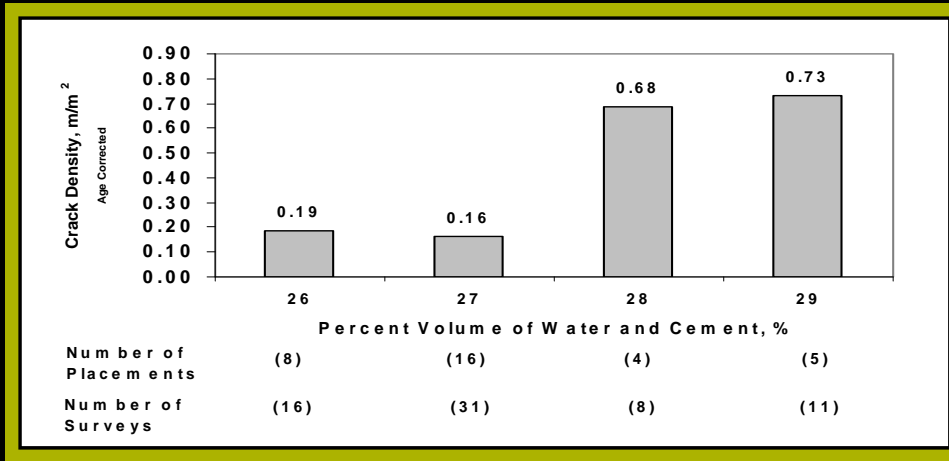
1. Alternative fuels and Propulsion/Vehicle technologies
2. Transportation safety, security, and human factors
3. Information systems, intelligent transportation systems, and logistics
4. Transportation infrastructure life extension
5. Environmental assessment and mitigation
6. Socio-political-economic concerns in transportation systems.

# Currently, 3 emphasis areas

1. Prolong life and safety of transportation infrastructure
2. Develop advanced vehicle and fuel technologies
3. Improve safety for inattentive and aging driver population

All produce marketable technologies.

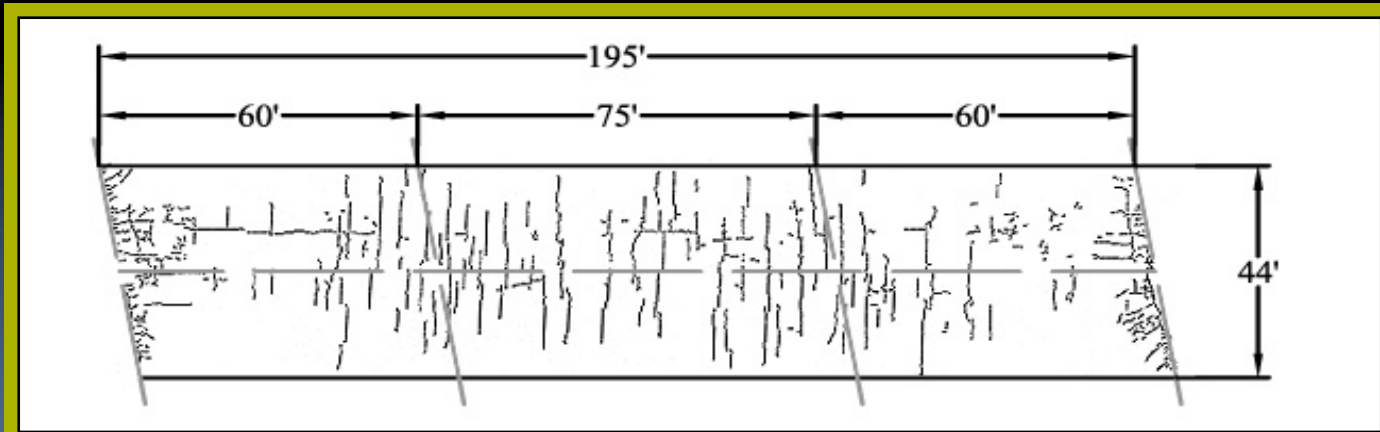
# Reduced cracking of concrete bridge decks extends life of bridges



[Example of Identified Trend]

**GOAL:** extend life from  
15-20 yrs to 80 yrs

By Dr. David Darwin & Dr. JoAnn Browning



[Typical Crack Map for Bridge Deck]

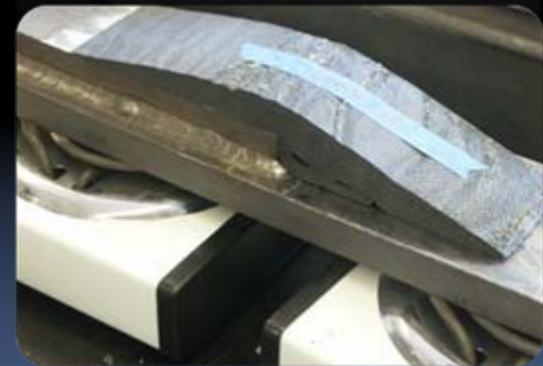
# Also extending life of steel truss bridges

Composite doublers extends  
life and provides a safety fuse.

By Dr. Ron Barrett-Gonzalez, Dr. Adolfo  
Matamoros, Dr. Caroline Bennett & Dr. Stan Rolfe



Test bridge detail



Detail doubler



Minnesota bridge failure



# Geocells for trouble slopes & roadbeds

By Dr. Jie Han & Dr. Bob Parsons



Roadbed test section



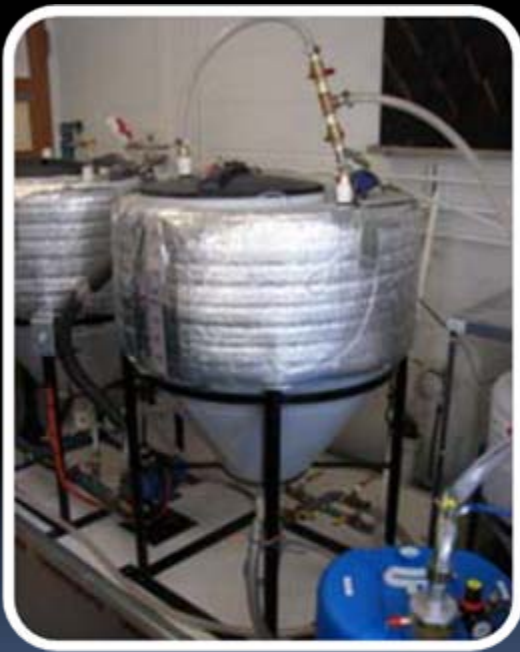
Sample geocell grid



Cheaper way to stabilize slope

# Actively funding **bio-diesel** research

By Dr. Susan Williams & Ilya Tabakh



Bio-diesel Reactors

- Replaced campus buses with new fleet that use bio-diesel (B5 & B20)
- Set up bio-diesel production laboratory with leftover cooking oil
- Developed improved manufacturing process
- Seeking approval as state certification lab
- Assisted first bio-fuels station in Lawrence, KS
- Started the “Feedstock to Tailpipe Initiative”



Ecosystem Level Processes  
*(Ecology and Evolutionary  
Biology/Geography)*



CO<sub>2</sub> emissions  
influencing climate



# BIOFUELS

Feedstock to Tailpipe  
Initiative

Fuel Analysis  
*(Mechanical and Environmental  
Engineering)*



- Driveability
- Emissions
- Performance
- Efficiency
- Cost



Algal bioreactors =  
modified algae strains for  
reactor environments



Feedstock Production  
*(Ecology and Evolutionary Biology/  
Environmental and Chemical  
Engineering)*

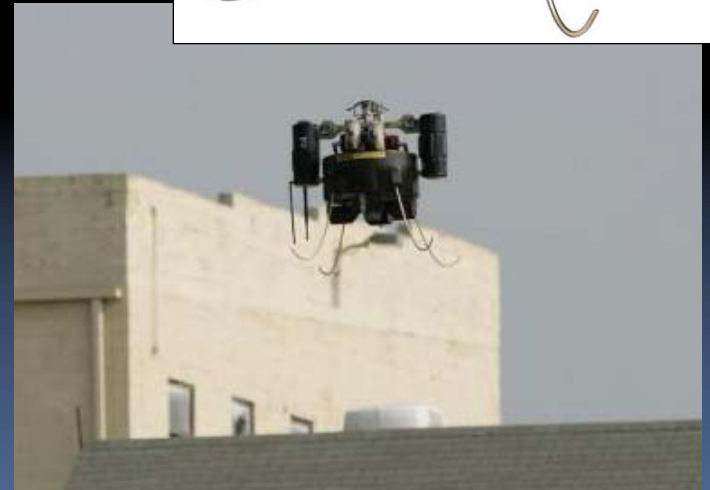


Fuel Production  
*(Chemical and Environmental Engineering)*

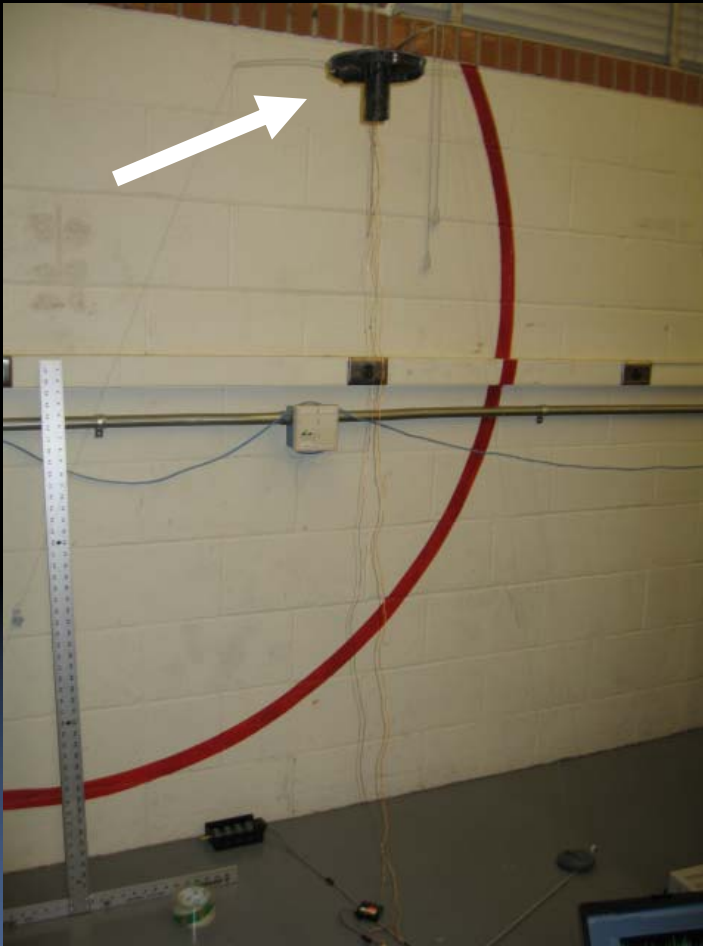


# Honeywell UAV – TOO Expensive

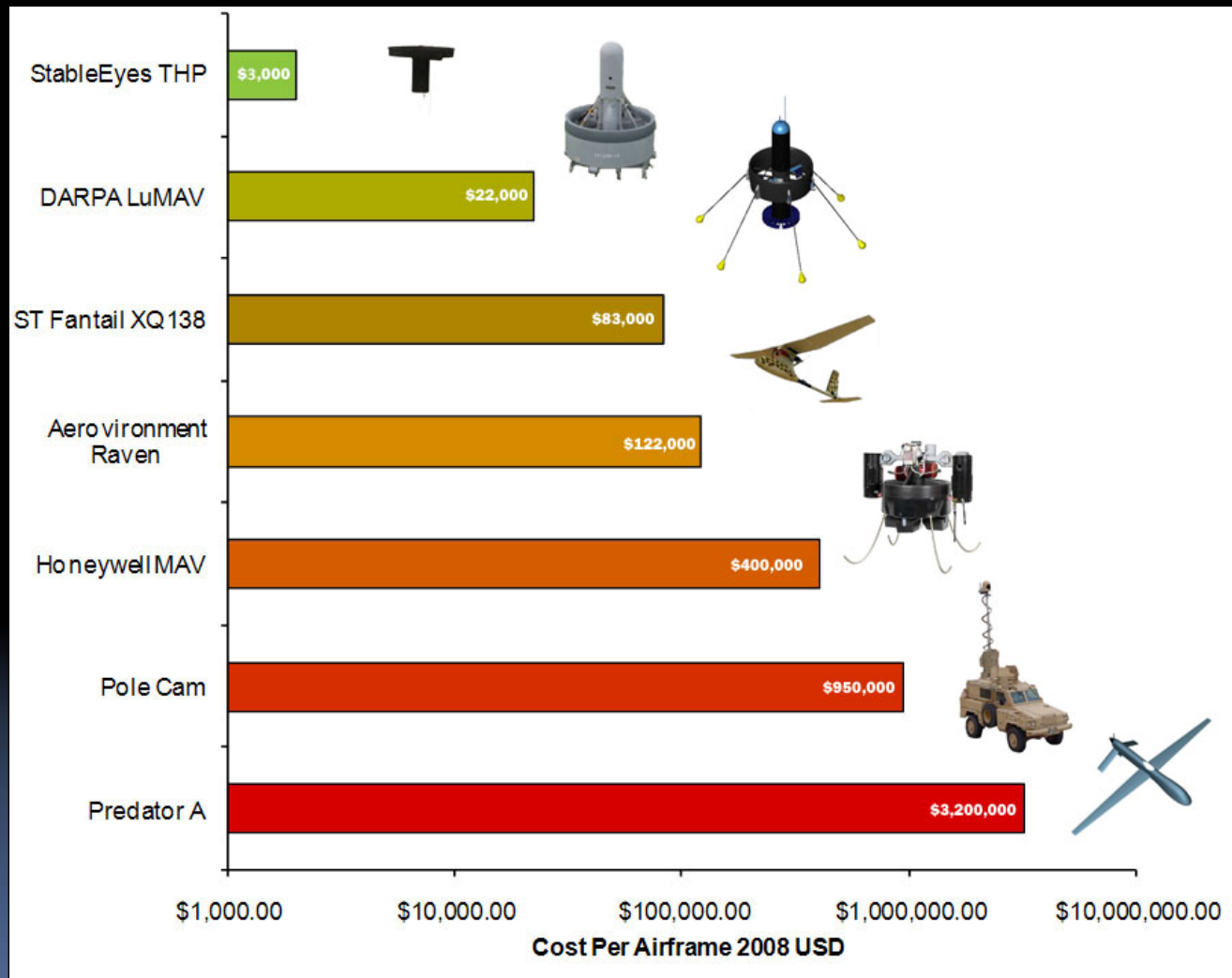
- Max speed 50kts
- Endurance 40 min
- Carried in large backpack to launch site
- Used for “Hover and Stare” mission
- Currently, under procurement by the US Army
- \$328 K each (by program cost /number of platforms)



# New invention ready for the field



# The cost advantage are unmistakable



# Transportation an economic driver

- Most politicians know that new highways stimulate economic growth. But that doesn't solve the problem.
- Major problem for many states is maintenance of current infrastructure. Need to develop more sustainable solutions. **Example: prolonging infrastructure life.**
- Kansas is heavily dependent on aviation industry. Without low-cost fuels the economy will suffer. **Solution: Need to develop alternative fuels like cheap bio jet-fuels.**
- Develop marketing plans that promote a new lifestyle. **Solution: Need to plan “village communities” that offer a mix of uses.**

# THANK YOU

