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

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

By Dr. David Darwin & Dr. JoAnn Browning
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
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

- 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”**
BIOFUELS
Feedstock to Tailpipe Initiative

Fuel Analysis
(Mechanical and Environmental Engineering)

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

Fuel Production
(Chemical and Environmental Engineering)

CO₂ emissions influencing climate

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