Future of the Interstate - A Systems Operations Perspective from Iowa

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Setting the Stage

• Comments representative of Midwest/Rural states
• Past/Now/Near Future (2030-2040)/Far Future (2040 +)
• Systems Operations Perspective:
  o Safety
  o Mobility
  o Efficiency
  o Economic Development
Groups Contacted

- Internal Iowa DOT divisions and offices
- Iowa Economic Development Authority
- Automated Vehicle project vendor (HERE of North America)
- Retired Iowa DOT staff
- Iowa Motor Truck Association
- Iowa National Guard
- Iowa universities
Discussions

• Imagining what life and the interstates in Iowa will be like over the next 50 years is very difficult for most people to even contemplate

• Looking back 3 years, Automated Vehicles (AV) wouldn’t have been part of the conversations, and every group brought up the impact from AV
Historical and Forecast Iowa Population - Largest 10 Counties vs. Smallest 89 Counties, 1950-2050

Data sources: U.S. Census (1950-2010); Woods & Poole Inc. (2020-2050 projections)
Iowa’s Interstates - Past

• 50 years ago – I went for a ride....... 

• Original purpose of the Interstate:
  o Safety
  o Mobility
  o Efficiency for civilians and military
  o Economic Development
Iowa’s Interstates - Past
Iowa - Past

• Agricultural (Ag) based economy
• Strong rural and “smaller urban” focus
• “Field of Dreams” life
Iowa’s Interstates - Now
Iowa’s Interstates – Now Systems Operations Perspective

– Safety
  • Zero Fatalities Program
  • 27% increase in state traffic fatalities from 2015 to 2016 (from 320 to 404)
    • Iowa’s Automated Vehicle (AV) project, interstate focus
– Mobility – Transportation Systems Management and Operations (TSMO) implementation
– Efficiency focus for freight and cars (not military)
– Economic Development for Ag and manufacturing
Iowa - Now

- “Producer state”
- “Field of Dreams” life in rural/some suburban areas
Iowa Now

Producer state

• $14.6 Billion in manufactured and value-added goods
• Manufactured exports grew 20% from 2008 to 2012
• 95% of Iowa products go to other countries
2014 Annual Value of Iowa Exports to Top 10 Countries

Shaded countries represent top 25.

1. Canada: $4.6 billion
2. Mexico: $2.3 billion
3. Japan: $1.2 billion
4. China: $946 million
5. Brazil: $502 million
6. Germany: $494 million
7. Australia: $399 million
8. United Kingdom: $384 million
9. South Korea: $366 million
10. France: $323 million

IOWA DOT
Iowa’s Interstates - Now

• Current freight commodities
  o Corn, hogs, eggs - #1; Soybeans - #2; 92% of the land is farmland
  o Growing manufacturing – 3X more revenue than ag commodities

• Study of freight transportation network optimization
Interstate Highways in Iowa

• 782 miles of Interstate - out of 114,876 total roadway miles

• Interstates make up ~8% of primary highways

• Carry over 60% of statewide large truck traffic

• Truck percentages approaching 40% in some interstate areas
# Oversize/Overweight Interstate Permits
max 78,451 in 2015
Iowa’s Interstates – Now
% Truck Traffic
Iowa’s Interstates – Now

www.iowadot.gov

• Iowa in Motion - Interstate Corridor Plan (2013)
  Examining safety, efficiency and quality of life (efficient travel) looking toward 2040; includes operations

• Iowa in Motion – State Freight Plan (2016)
  Looking toward 2040, includes operations and AV

• Iowa in Motion 2045– Long-range transportation plan (2017), includes TSMO and AV

• “Shelley Row’s Pause Points lesson” for emerging technology added to our planning processes
Iowa’s Interstates - Now

Iowa I 80 Planning Study

• I 80 (our primary freight corridor) planning study is studying Interstate 80 in an effort to increase mobility across the interstate system

• Tech memos on operations, AV, truck only lanes, resiliency and vulnerability

• www.iowadot.gov/interstatethestudy/home
Iowa’s Interstates I 80 Planning Study
Now and Near Future

Today
- 3 Westbound General Travel Lanes
- 3 Eastbound General Travel Lanes

Tomorrow
- 2 Eastbound AV Lanes
- 2 Westbound AV Lanes

Future
- 2 Eastbound General Travel Lanes
- 2 Westbound General Travel Lanes
Interstate 80 Planning Study-
Automated Vehicle Simulation
Automated Vehicles in Mixed Traffic with Human Drivers

- Dark Blue – AV Car
- Light Blue – AV Car in platoon
- Green – Manual Car
- Purple – AV Truck
- Yellow – Manual Truck
Iowa’s Interstates – Near Future
Still the focus

– Safety
  • Early positive impact from AV for autos and trucks

– Mobility
  • Increased travel info/data for drivers/vehicles

– Efficiency for all
  • Integrated TSMO Program

– Economic Development
  • Continuing truck freight growth
  • Increased global demand for Ag products and machinery; corporate farms with higher yields
Iowa’s Interstates Truck Volume Near Future (2040)
Iowa’s Interstates – Near Future (2030-2040)

- Iowa total Vehicle Miles Traveled (VMT) growth percentage
  - 2014 to 2034 = 47.1%
  - 2014 to 2044 = 79.4%

- Iowa **Truck** VMT growth percentage
  - 2014 to 2034 = 47.9%
  - 2014 to 2044 = 80.7%
Iowa’s Interstates – Far Future (2040+)

From HERE of North America
Iowa’s Interstates – Far Future: Designed for Freight Movement, while accommodating cars

– Safety and Mobility
  • Game changing positive impact from AV for all

– Efficiency improvements for all
  • Reduce the negative effect from weather impacts, especially for freight
  • Urban/rural interstate changes
  • Generational changes in travel by car
  • TSMO embedded
Iowa’s Interstates – Far Future: Designed for Freight Movement, while accommodating cars

– Economic Development

• Increased global demand for Ag products
• “Field of Dreams” quality of life choices
• Freight growth
• Corporate farms/precision farming lead to higher yield
Other Food for Thought

• Look into the Foresight Series, NCHRP Report 750 Series

Exciting Times Ahead for Iowa’s Interstate – Redefining our Priorities

Why? This is our life and our livelihoods.....