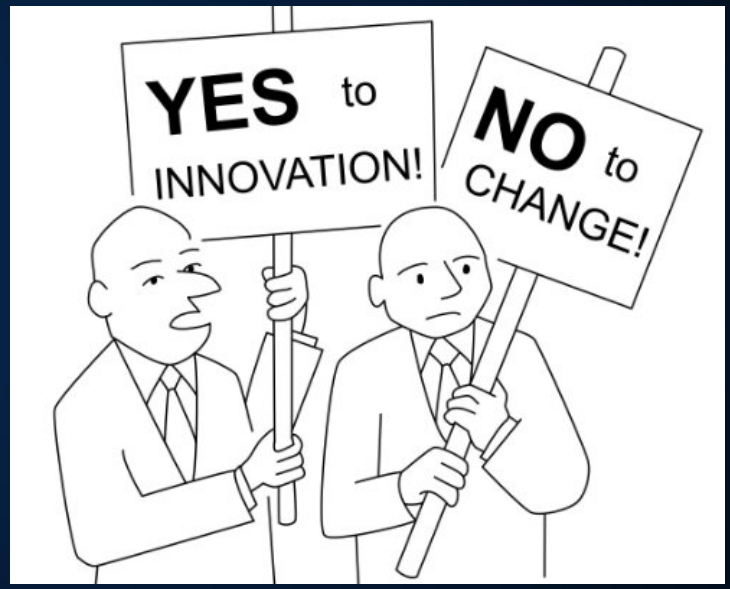
What is e-Ticketing?

September 2020

U.S. Department of Transportation
Federal Highway Administration

Outline

- What is e-Ticketing?
  - Typical ticketing practice
  - Attributes
  - Advantages
  - Examples
  - Related laws and policies
- Deployment activities
  - EDC-3 and EDC-4 accomplishments
  - Current DOT deployment status
  - EDC-6 goals and challenges



Source: FHWA

What is the typical material ticketing practice?

A "Day in the Life" of a Ticket

– Paper Ticket Handlers –

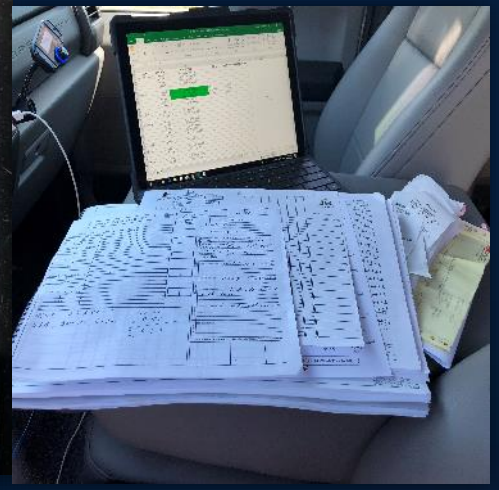
Supplier → Driver / Hauler → Contractor → Field Tester / Inspector

Source: Iowa DOT, Iowa Ready Mix Concrete Association

What is the typical material ticketing practice?

A "Day in the Life" of a Ticket

– Paper Ticket Processing –



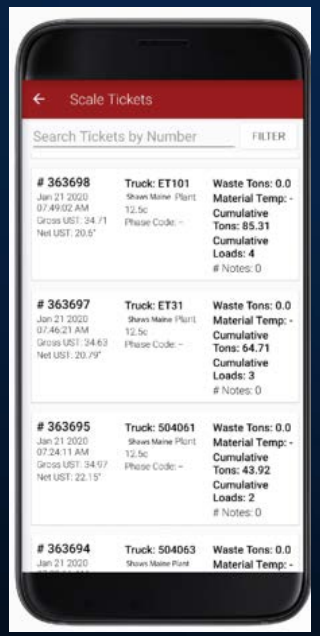
	A	B	D	E	F	K	L	M
1	Date Created	Ticket	Product	Qty	UoM	WBS Element	Accepted	Product In
2	8/11/12	1078515	Flowfil	9	CY	4501.94	YES	458795
3	8/11/12	1078513	Flowfil	9	CY	4501.94	YES	458795
4	8/11/12	1078508	Flowfil	9	CY		YES	458795
5	8/11/12	1078503	Flowfil	9	CY		YES	458795
6	8/11/12	1078499	Flowfil	9	CY	4501.94	YES	458795
7	8/10/12	1078352	Class F - 4000 PSI	2	CY	4503.82	YES	458795
8	8/10/12	1078111	Class SS - 3600 PS	5	CY		NO	
9	8/10/12	1078100	Class SS - 3600 PS	7.5	CY	5005.81	YES	458245
10	8/10/12	1078039	Class C - 3600 PS	10	CY	5005.81	YES	458245
11	8/10/12	1077767	Class F - 4000 PSI	7.5	CY	5005.81	YES	458245
12	8/10/12	1077758	Class F - 4000 PSI	5.5	CY	5006.81	YES	458245
13	8/10/12	1077748	Class F - 4000 PSI	5.5	CY	5006.81	YES	458245
14	8/10/12	1077743	Class F - 4000 PSI	10	CY	5006.81	YES	
15	8/10/12	1077648	Class F - 4000 PSI	2	CY	4503.82	YES	
16	8/9/12	1077418	Class F - 4000 PSI	2	CY		NO	

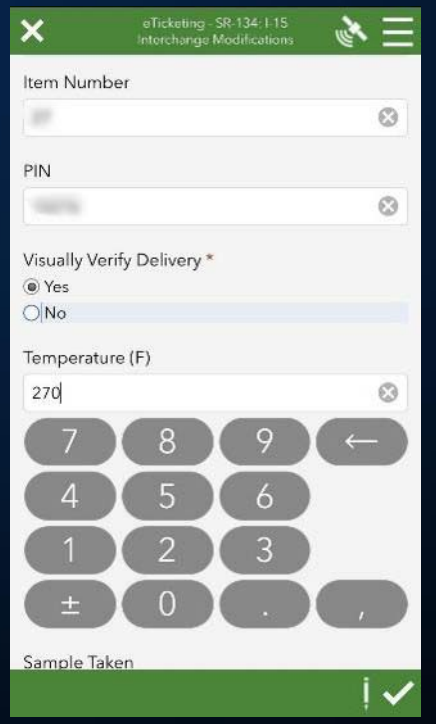
Tickets Collected → Data Captured → Data Re-Keyed → Tickets Reconciled

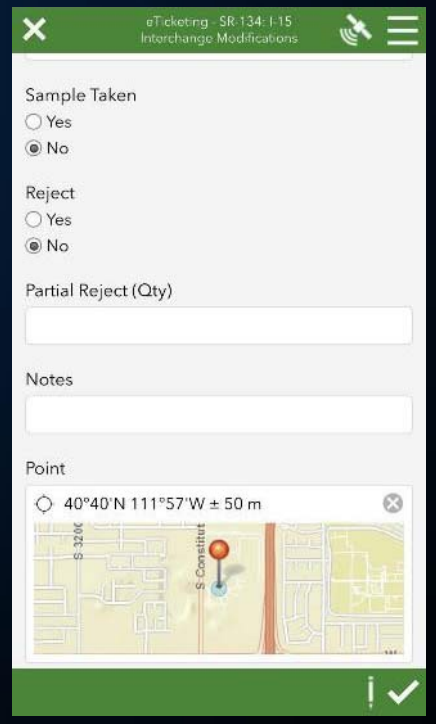
Source: Iowa DOT, Iowa Ready Mix Concrete Association

What is e-Ticketing?

- A paperless process for tracking, documenting, and archiving materials tickets, accessible in real-time via mobile devices.

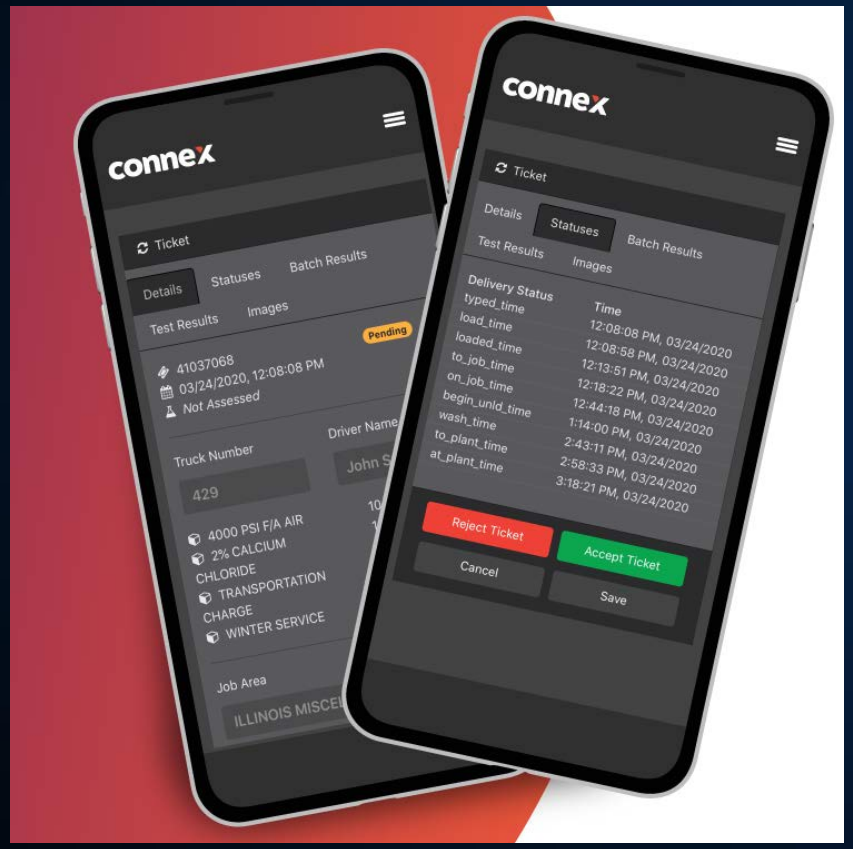






Source: University of Kentucky, Iowa DOT, UDOT

What is e-Ticketing?



- Real-time information
- Potential to automate processes (shifts, payments, estimates, DBE tracking, etc.)
- Quick and easy set-up
- Web-based and interfaces to 3rd parties
- Mobile apps, Excel, and emailed PDFs
- Works with company or brokered trucks
- Captures test data, notes, and photos

Source: University of Kentucky, KYTC, Command Alkon

Q: e-Ticketing - - >> WHY?

#1: Improve worker **safety**

#2: Simplify ticket **handling** using electronic and digital exchanges

#3: Facilitate **integration** of data into AASHTOWare (or other Construction Management System)

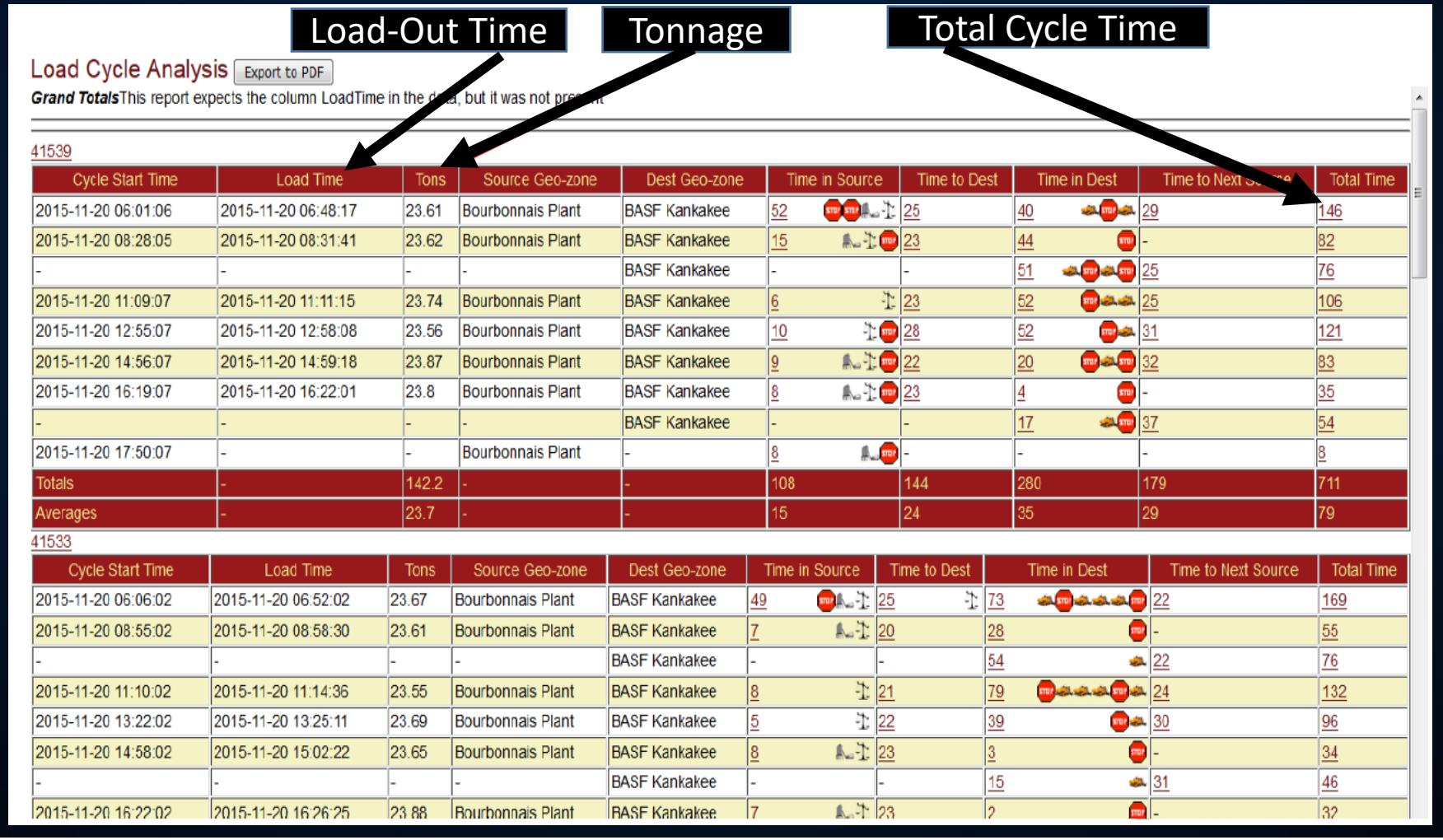
#4: Manage test results with **mobile devices**

#5: **Access** data before (and after) trucks arrive at jobsite

Source: Sysdyne Tech Top 5

Source: FHWA

What is e-Ticketing?
– Real-time information via web or app



Load Cycle Analysis Export to PDF

Grand TotalsThis report expects the column LoadTime in the data, but it was not present

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Cycle Start Time	Load Time	Tons	Source Geo-zone	Dest Geo-zone	Time in Source	Time to Dest	Time in Dest	Time to Next Source	Total Time
2015-11-20 06:01:06	2015-11-20 06:48:17	23.61	Bourbonnais Plant	BASF Kankakee	52	25	40	29	146
2015-11-20 08:28:05	2015-11-20 08:31:41	23.62	Bourbonnais Plant	BASF Kankakee	15	23	44	-	82
-	-	-	-	BASF Kankakee	-	-	51	25	76
2015-11-20 11:09:07	2015-11-20 11:11:15	23.74	Bourbonnais Plant	BASF Kankakee	6	23	52	25	106
2015-11-20 12:55:07	2015-11-20 12:58:08	23.56	Bourbonnais Plant	BASF Kankakee	10	28	52	31	121
2015-11-20 14:56:07	2015-11-20 14:59:18	23.87	Bourbonnais Plant	BASF Kankakee	9	22	20	32	83
2015-11-20 16:19:07	2015-11-20 16:22:01	23.8	Bourbonnais Plant	BASF Kankakee	8	23	4	-	35
-	-	-	-	BASF Kankakee	-	-	17	37	54
2015-11-20 17:50:07	-	-	Bourbonnais Plant	-	8	-	-	-	8
Totals	-	142.2	-	-	108	144	280	179	711
Averages	-	23.7	-	-	15	24	35	29	79

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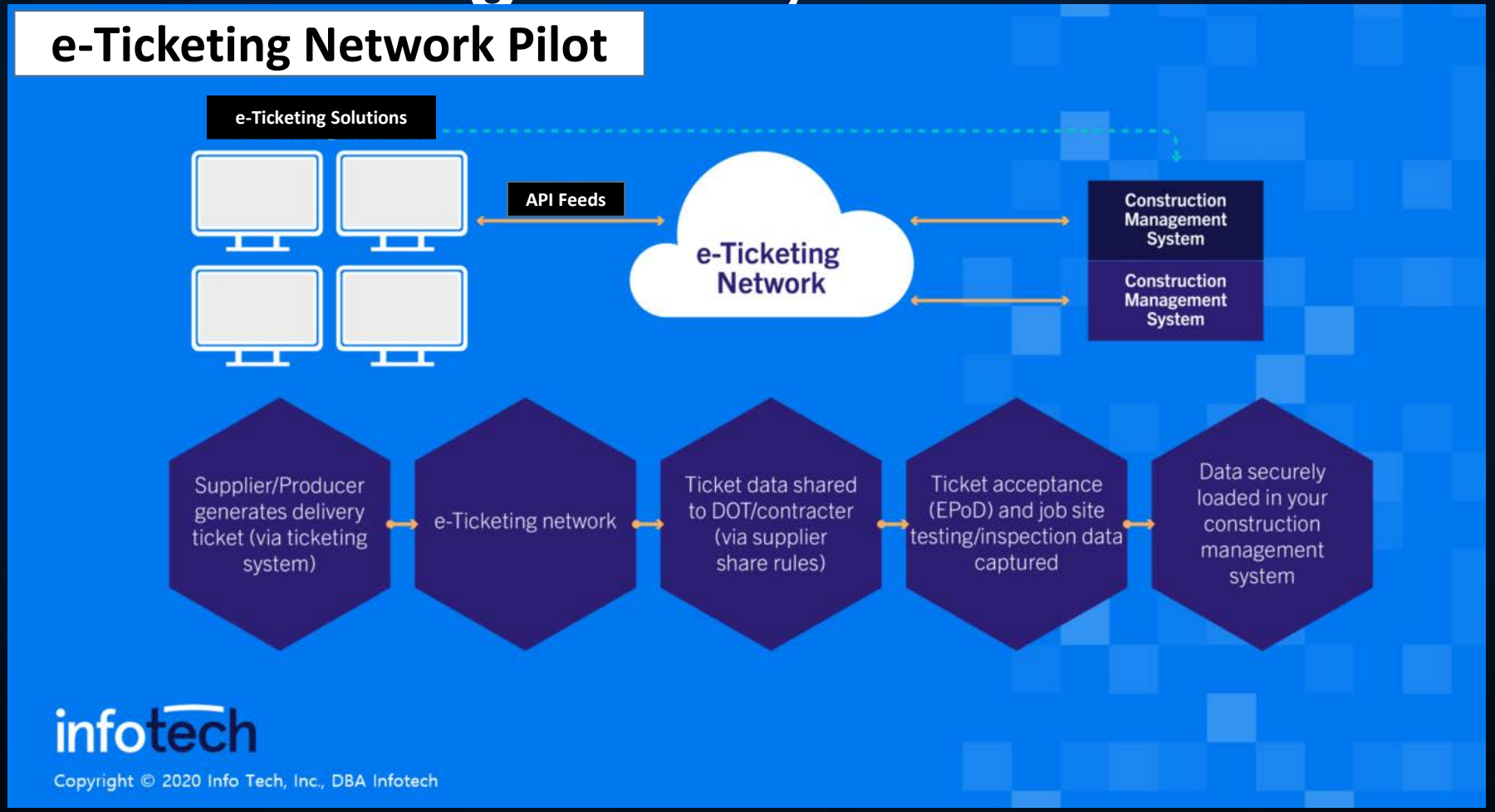
Cycle Start Time	Load Time	Tons	Source Geo-zone	Dest Geo-zone	Time in Source	Time to Dest	Time in Dest	Time to Next Source	Total Time
2015-11-20 06:06:02	2015-11-20 06:52:02	23.67	Bourbonnais Plant	BASF Kankakee	49	25	73	22	169
2015-11-20 08:55:02	2015-11-20 08:58:30	23.61	Bourbonnais Plant	BASF Kankakee	7	20	28	-	55
-	-	-	-	BASF Kankakee	-	-	54	22	76
2015-11-20 11:10:02	2015-11-20 11:14:36	23.55	Bourbonnais Plant	BASF Kankakee	8	21	79	24	132
2015-11-20 13:22:02	2015-11-20 13:25:11	23.69	Bourbonnais Plant	BASF Kankakee	5	22	39	30	96
2015-11-20 14:58:02	2015-11-20 15:02:22	23.65	Bourbonnais Plant	BASF Kankakee	8	23	3	-	34
-	-	-	-	BASF Kankakee	-	-	15	31	46
2015-11-20 16:22:02	2015-11-20 16:26:25	23.88	Bourbonnais Plant	BASF Kankakee	7	23	2	-	32

Source: University of Kentucky, KYTC

What is e-Ticketing?
– Data management, transfer and usage

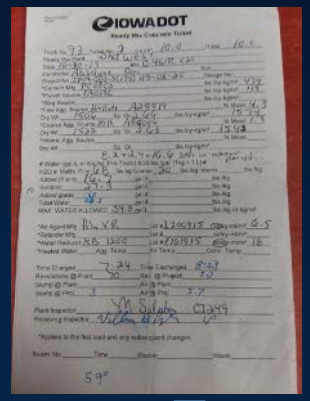


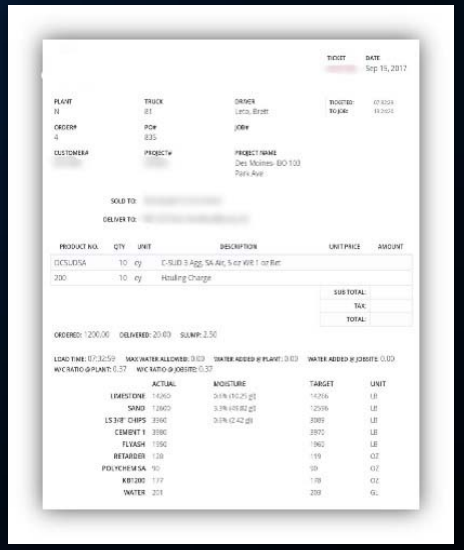
Source: Info Tech

What is e-Ticketing?

Types of e-Tickets:

- The Big 3
  - Hot Mix Asphalt (HMA)
  - Portland Cement Concrete (PCC)
  - Aggregate
- Other
  - Structural Steel
  - Rebar
  - Precast PCC: pipe, inlets, box culverts
  - Guardrail
  - Signs
  - Millings
  - Soil
  - Liquid asphalt/emulsions





Source: Iowa DOT, University of Kentucky

What is e-Ticketing? – GPS units

Breadcrumb Tracking

- Optional, not required
- Hard-wired, mobile app on smartphones, or cigarette lighter adapter
- Internal battery backup
- Ping every minute on haul vehicles
- Ping every 30 seconds on pavers/mills
- No user fees or special software required
- User-based access to data based on privacy laws and contracts

Source: University of Kentucky, KYTC

e-Ticketing Related Laws and Policies

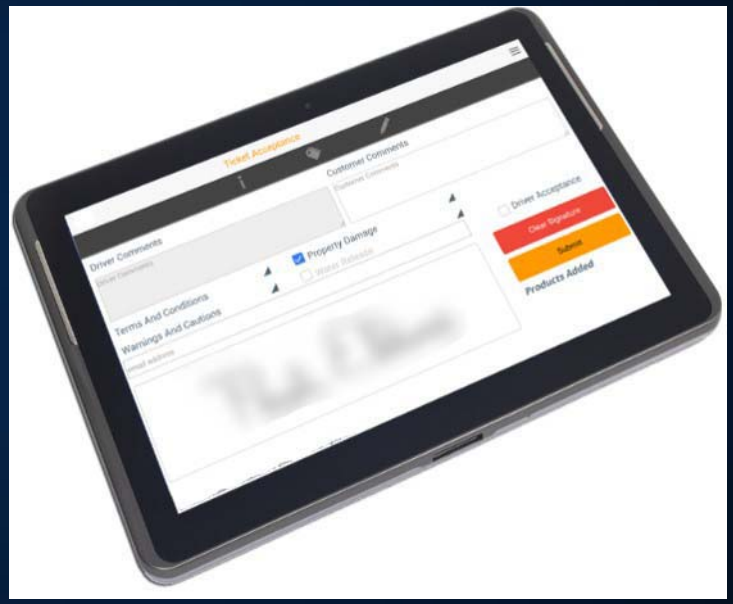
- e-Transaction Laws
  - Government Paperwork Elimination Act (GPEA) 1998
  - Electronic Signatures in Global and National Commerce Act (E-SIGN) 2000
  - Uniform Electronic Transactions Act (UETA) 1999
- 2 CFR 200.335 Methods for Collection, Transmission and Storage of Information
- 23 CFR 635.123 Determination and Documentation of Pay Quantities
- 23 CFR 637 Construction Inspection and Approval
- 2 FHWA Memos
  - Computerization of Construction Records, 09/21/1989
  - Electronic Security, 07/07/1993

Source: FHWA

e-Construction's e-Ticketing Deployment

What have we accomplished under EDC-3 and EDC-4?

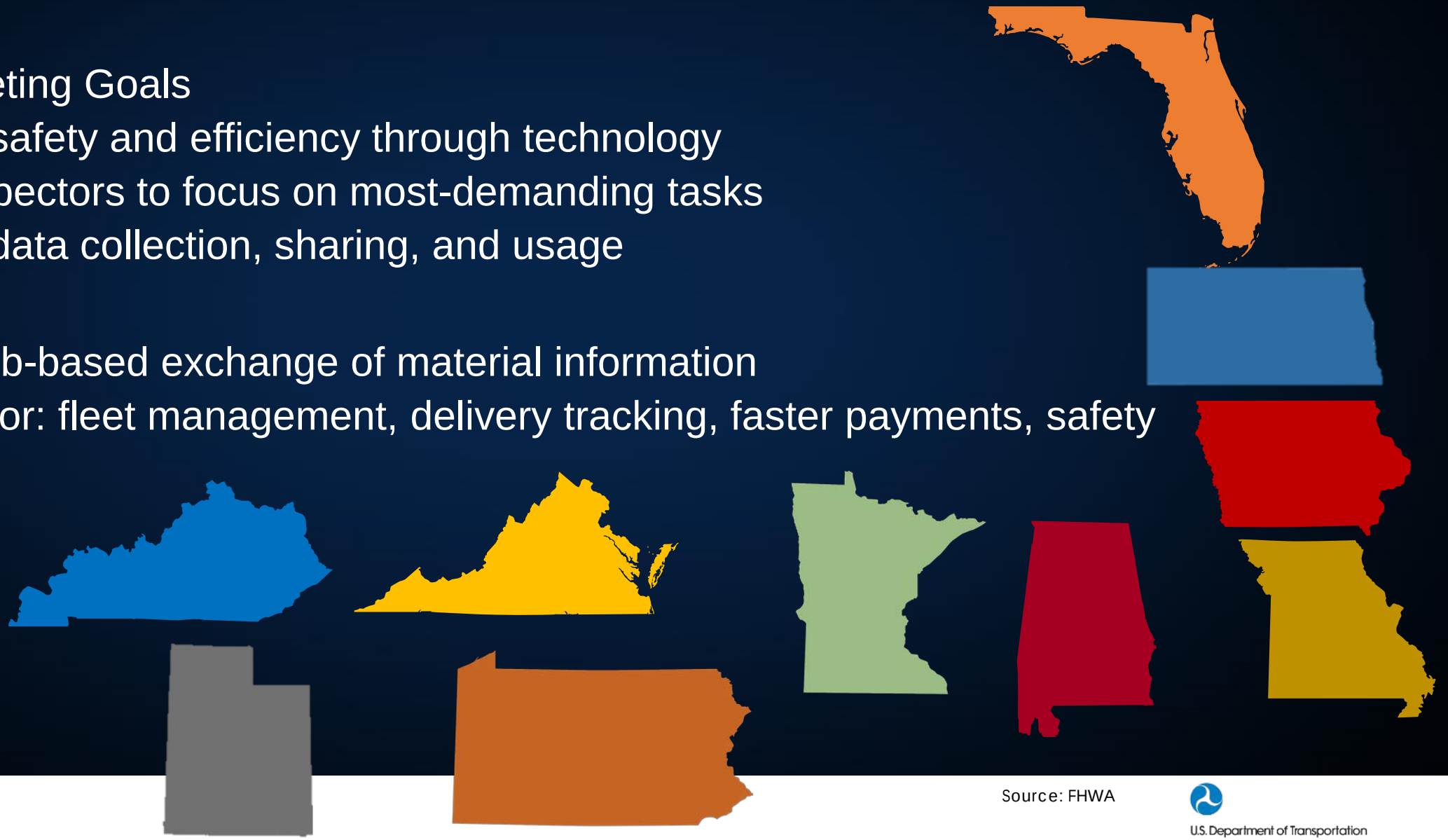
- Proof of concept
  - State DOT pilots
  - Research projects
- Industry awareness and innovation
  - Commercial off-the-shelf (COTS) solutions
    - Batch plant automation systems
    - Supplier systems
    - Private contractor systems
    - State DOT systems
    - 3rd party providers
  - Private industry usage



Source: iStrada

e-Construction's e-Ticketing Deployment

- FHWA e-Ticketing Goals
  - Improve safety and efficiency through technology
  - Allow inspectors to focus on most-demanding tasks
  - Improve data collection, sharing, and usage
- Win-Win
  - DOT: web-based exchange of material information
  - Contractor: fleet management, delivery tracking, faster payments, safety



Source: FHWA

e-Construction's e-Ticketing Deployment

- What would we like to see in EDC-6?
  - Expanded institutionalization of e-Ticketing
  - Promotion of best practices of e-Ticket specifications and standardization of ticket content
  - Expanded use beyond 2020 temporary deployments
  - Use of e-Ticket data for source documentation, acceptance, and payment
- Challenges
  - State DOT, Local Agency, Contractor, and Supplier buy-in
  - Privacy
  - 54+ State DOT versions
  - Delivery and data verification
  - Data management and transfer
  - Data usage beyond the construction project
  - 2020 temporary deployments

CONTACTS

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www.fhwa.dot.gov/construction/econstruction

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